

February 9, 2016

Mr. Michael Hinton
New York State Department of Environmental Conservation (NYSDEC)
Region 9
270 Michigan Avenue
Buffalo, New York 14203-2399

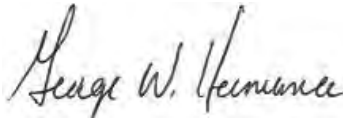
RE: Ekonol Polyester Resins Site (#V00653-9)
Performance Monitoring Report – October 2015

Dear Mr. Hinton:

Attached is the monitoring report for the October 2015 monitoring event at the Ekonol Polyester Resins Site (Site). The monitoring event was completed consistent with the groundwater monitoring program defined in the July 2015 site management plan (SMP). Documentation of well inspection and maintenance, and sub-slab depressurization system operations and maintenance is also provided in the report.

If you have any questions, please feel free to contact me at (716) 407-4990.

Sincerely,



George Hermance
Project Manager

Attachments

cc: M. Teeling, Atlantic Richfield Co.
S. Fiorenza, BP (e-copy)
M. Forcucci, NYSDOH (e-copy)
M. Kolar, Patriot (e-copy)
J. Sabbatis, Saint-Gobain (e-copy)
G. Brown, RT Environmental Services (e-copy)

**PERFORMANCE MONITORING REPORT
OCTOBER 2015
IN SITU TREATMENT USING ENHANCED BIOREMEDIATION**

**EkonoI Polyester Resins, NYSDEC # V00653-9
6600 Walmore Road
Town of Wheatfield, Niagara County, New York**

SUBMITTED TO:



**NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION**

**DIVISION OF HAZARDOUS
WASTE REMEDIATION**

SUBMITTED BY:

ATLANTIC RICHFIELD COMPANY

A BP affiliated company

**201 Helios Way
Houston, TX 77079**

PREPARED BY:

PARSONS

40 La Riviere Drive, Suite 350
Buffalo, New York 14202

FEBRUARY 2016

TABLE OF CONTENTS

1.0 INTRODUCTION.....	2
2.0 BIOREACTOR AND INJECTION/MONITORING WELL INSPECTION	2
3.0 SUB-SLAB DEPRESSURIZATION SYSTEM OPERATIONS AND MAINTENANCE	2
4.0 PERFORMANCE AND QUARTERLY MONITORING.....	3
5.0 BIOREACTOR PERFORMANCE AND MONITORING RESULTS.....	3
6.0 BEDROCK REMEDIATION PERFORMANCE AND QUARTERLY MONITORING RESULTS.....	6
7.0 GENERAL SITE CONCLUSIONS AND ANTICIPATED FUTURE ACTIVITIES.....	8

LIST OF FIGURES

- Figure 1: Overburden Bioreactor Time Series Plots
- Figure 2: Overburden Time Series Plots
- Figure 3 (A and B): Time Series Plots – MW-11S and MW-12S
- Figure 4: Bedrock Well Time Series Plots
- Figure 5: Time Series Plots – Ethene and Ethane
- Figure 6: Time Series Plots – *Dehalococcoides* (DHC) Concentration
- Figure 7: Potentiometric Surface Map – Bedrock – October 12, 2015
- Figure 8: Time Series Plots – Total Organic Carbon and pH
- Figure 9 (A and B): Time Series Plots – Iron, Sulfides, Sulfate, Ethene and Ethane

LIST OF TABLES

- Table 1: Average Difference in Chlorinated Ethene and Chlorinated Ethane Concentrations from Baseline Sampling Event (July 2011)

LIST OF ATTACHMENTS

- ATTACHMENT A: Inspection Records
- ATTACHMENT B: Water Level Measurement, Sampling Matrix and Sampling Records
- ATTACHMENT C: Data Usability Summary Report
- ATTACHMENT D: Site Analytical Data – All Site Wells
- ATTACHMENT E: Laboratory Treatability Study to Evaluate Remediation of Chlorinated Volatile Organic Compounds in Groundwater

1.0 INTRODUCTION

This report summarizes the October 2015 performance and routine monitoring following installation of the bioremediation systems at the Ekonol Polyester Resins Site (Site). The scope of work is defined in the February 2010 NYSDEC-approved “Remedial Action Work Plan (RAWP) for *In Situ* Treatment Using Enhanced Bioremediation,” the NYSDEC-approved (April 10, 2012) changes to the reporting scope and schedule, and the Site Management Plan, submitted to the NYSDEC on July 21, 2015. Additionally, this report includes discussion on site management activities such as well inspection and maintenance, and sub-slab depressurization system operations and maintenance.

2.0 BIOREACTOR AND INJECTION/MONITORING WELL INSPECTION

In September 2015, well repairs were completed, which included installation of new road boxes, well caps, and well bolts. As part of the October 2015 event, the surface conditions above the bioreactor trenches were inspected for settlement, and the protective casings were inspected for integrity. Inspection records are provided in Attachment A. In October 2015, additional repair or maintenance of the protective casings or wells associated with the bioreactor was not necessary.

Well headspace concentrations were monitored for methane and hydrogen sulfide vapor concentrations within source area wells in October 2015. Locations that exhibited elevated levels of methane and/or hydrogen sulfide (within the well casings) were documented (Attachment B). In October 2015, each well that exhibited elevated methane and/or hydrogen sulfide levels had a vented plug already installed.

3.0 SUB-SLAB DEPRESSURIZATION SYSTEM OPERATIONS AND MAINTENANCE

During the October 2015 sampling event, the sub-slab depressurization (SSD) system was inspected in accordance with NYSDEC-approved operations and maintenance plan dated December 5, 2011.

Results of the inspection identified that the system is in proper working order. The inspection included a visual inspection of the system’s interior and exterior components, recording of U-Tube manometer measurements, and smoke stick testing. Additionally, the system was shut down temporarily to confirm that the audible alarm functions as designed. The October 2015 inspection checklist for the SSD system is included in Attachment A. In October 2015, repairs and maintenance to the sub-slab depressurization system were not needed.

Sub-slab vapor samples were collected in accordance with the Ekonol SSD Operations, Maintenance, and Monitoring Plan (December 2011) to help determine if cessation of operation of the SSD system is feasible. A sub-slab vapor sample was collected in

August 2015 with the SSD system running, and in October 2015 with the SSD system shut down for 24 hours prior. Samples were analyzed for volatile organic compounds (VOCs) using EPA Method TO-15. Sampling results for both events were below method detection limits for all constituents of concern. Summary of the SSD sampling activities and recommendations will be provided under separate cover.

4.0 PERFORMANCE AND QUARTERLY MONITORING

In addition to the operations, monitoring and maintenance (OM&M) activities discussed above, the second of two groundwater sampling events scheduled for 2015 was completed from October 12 to 23 in accordance with the submitted Site Management Plan (July 2015), approved work plans and previously reported procedures. In addition to monitoring the overall groundwater conditions, performance monitoring was completed to assist in evaluating the effectiveness of the groundwater remediation from the bioreactor and in the bedrock groundwater treatment area. The following activities were completed as part of the sampling event:

- a complete round of water levels was collected from the monitoring wells, and
- wells were purged by low-flow techniques and sampled for field and laboratory analytes.

The water levels, sampling matrix, and sampling records are provided in Attachment B. The analytical results for these samples were reviewed for usability with respect to NYSDEC quality assurance and quality control requirements. The data are provided in the data usability report included in Attachment C. The data are considered valid for their intended use.

5.0 BIOREACTOR PERFORMANCE AND MONITORING RESULTS

This section presents the most recent concentrations and data trends for the overburden bioreactor and site overburden wells through the October 2015 sampling event. Analytical data tables for all site overburden wells can be found in Attachment D. Data trends for selected wells are discussed herein.

OVERBURDEN OBSERVATIONS INSIDE THE BIOREACTOR TRENCHES

CVOC concentrations within the bioreactor trenches remain significantly decreased (Figure 1) compared to samples taken within the first three to six months after installation of the bioreactors (April 2011). TCE, the primary CVOC, was generally depleted from the shallow groundwater within approximately the first six months of completion of the bioreactor installations. In October 2015, TCE was below detection limits at all locations within the bioreactor. Concentrations of cis-1,2 DCE and VC

declined during the first year of monitoring and have remained below pre-treatment concentrations, with the exception of OR-6SM and OR-10SM.

At OR-6SM, cis-1,2 DCE decreased from 15,000 µg/L in April 2015 to 1,700 µg/L in October 2015, and has shown a cyclical increase and corresponding decrease in DCE concentrations from April 2013 to present. VC has shown a similar trend in this well as it has decreased from 3,700 µg/L in April 2015 to 500 µg/L in October 2015, with the same cyclical increase and decrease since April 2013 (see Attachment D). A similar, but less pronounced pattern can be seen in OR-10SM. Concentrations of both cis-1,2 DCE and VC in OR-10SM decreased from 290 µg/L in April 2015 to below the detection limit in October 2015. An increase and subsequent decrease in DCE and VC concentrations were seen in October 2013 in OR-10SM as well (see Figure 1). This cyclical pattern of CVOC concentrations has been observed at other locations in the overburden.

In April 2015, microbial counts of *Dehalococcoides* (DHC) sp., which degrade chlorinated solvent compounds, ranged from one to four orders of magnitude higher than concentrations measured after bioreactor installation in July 2011. The DHC data results are included in Attachment D. DHC concentrations in select overburden wells were not included in the October 2015 sampling program, and are scheduled to be sampled annually starting in Spring 2016.

The geochemical conditions in the bioreactor wells indicate that the bioreactors remain anaerobic. Average ORP in October 2015 was -173 mV, an increase from an average ORP of -237 mV in April 2015 (Attachment D). TOC concentrations in the bioreactor wells have decreased substantially from initial concentrations in July 2011 (an average of 1,325 mg/L) to October 2015 (an average of 32 mg/L) (see Attachment D). The increasing ORP in conjunction with the low TOC concentrations in the bioreactor wells indicate an environment that is becoming less conducive for the anaerobic biodegradation of chlorinated solvents. Supplemental substrate injection within the bioreactor trenches may be contemplated pending future monitoring results.

OVERBURDEN OBSERVATIONS OUTSIDE THE BIOREACTOR TRENCHES

In all overburden performance monitoring wells (PMW) outside the bioreactors, the total molar concentration of chlorinated ethenes (sum of TCE, DCE, and VC) in overburden groundwater decreased from 1,960 µM in July 2011 to 720 µM in October 2015. At individual PMW wells, CVOC concentrations are variable, with some wells showing increases, some showing decreases and others remaining relatively unchanged (Figure 2).

Although there is an overall decreasing trend in CVOCs, at some locations CVOCs are more persistent. The highest and most persistent CVOC concentrations in the overburden remain at:

- well MW-2S, approximately 8 feet north of the bioreactor trenches and immediately south of the former secondary containment excavation,
- PMW-5S, PMW-9S, and PMW-11S, located between the bioreactor trenches, and
- PMW-3S located downgradient of the southernmost trench.

At these locations (PMW-5S, PMW-9S, and PMW-11S) between the bioreactor trenches, TOC concentrations have never been elevated above background (approximately 12 mg/L). Thus, CVOC concentrations are expected to remain persistent without additional treatment.

At several other well locations between and downgradient of the bioreactors, a decreasing trend in TOC concentrations has been observed. The elevated TOC concentrations in wells PMW-1S, PMW-2S, and PMW-6S following bioreactor installation correlates with reductions in CVOC concentrations and increased ethene in these overburden wells (see Figure 2 and Attachment D).

Due to the low hydraulic conductivity of the fine-grained soils (less than 0.5 feet/day), horizontal transport of TOC and associated lateral expansion of the treatment zone was anticipated to be slow. Empirical data have demonstrated this to be the case; however, due to mounding in the former excavation area (observed throughout the investigation and remediation) the calculated transport rates are variable, and therefore, variations in the horizontal expansion of the treatment zone could also be variable.

Due to the persistent CVOC concentrations in the above specified wells, the lack of TOC outside of the bioreactors in the overburden, and the variable transport rates of the substrate in the bioreactor, additional substrate injections in the overburden may be warranted.

OVERBURDEN OBSERVATIONS - OTHER WELLS

Downgradient wells MW-11S and MW-12S show a decreasing CVOC trend over the long term (Figure 3A and 3B). The ORP of MW-11S and MW-12S decreased after each bedrock injection event (Figures 3A and 3B). Methane increases were noted at MW-11S and MW-12S in the months following the bedrock injection events (Figures 3A and 3B).

At MW-1S, located approximately 150 feet upgradient of the overburden reactors, concentrations of CVOCs, specifically DCE and VC, showed an order of magnitude decrease in the last 4 sampling events (since August 2014) relative to historical concentrations (Attachment D).

6.0 BEDROCK REMEDIATION PERFORMANCE AND QUARTERLY MONITORING RESULTS

This section presents observations of the bedrock remediation system through the October 2015 sampling event. Laboratory analytical results for all site bedrock wells can be found in Attachment D.

BEDROCK BIOREMEDIATION PERFORMANCE SUMMARY

Figure 4 provides time-series plots (from July 2011 to present) of key CVOCs, total ethene and/or ethane, and TOC concentrations for the bedrock injection and monitoring wells.

The data indicate a continuation of CVOC biodegradation attributed to the November 2012 substrate injection (see Figures 4 and 5, Attachment D). The degradation pattern, decreasing TCE accompanied by an increase in DCE, VC, and increasing ethane/ethene (E+E), that was initially observed in December 2012 has continued. These trends in results and biodegradation are demonstrated in INJ-7D, INJ-8D, INJ-13D, PMW-9D, PMW-10D, and PMW-15D. These wells are located within or immediately downgradient of the November 2012 injection locations.

Figure 5 illustrates wells with increases in E+E concentrations (one to three orders of magnitude) from September 2012 (prior to the November 2012 injections) to October 2015. These wells are within and immediately downgradient of the injection area (INJ-07D, INJ-08D, INJ-13D, PMW-9D, PMW-10D, PMW-12D, PMW-15D, PMW-16D, and RMW-2D). One notable exception is PMW-17D, which shows a decrease in E+E and CVOC concentrations, of over an order of magnitude from April 2015 to October 2015 (Figure 5 and Attachment D).

While DHC concentrations were not sampled in October 2015, previous DHC concentrations (sampled from wells INJ-07D, INJ-09D, INJ-10D, PMW-11D, PMW-15D, PMW-17D, and RMW-2D) have increased (one to three orders of magnitude) in the bedrock treatment area after the November 2012 injections (see Figure 6 and Attachment D). DHC concentrations in select bedrock wells will be sampled in Spring 2016.

After the injection events, total molar CVOCs increased to a maximum average difference of 1,387 μM in October 2013, likely due to the release of CVOCs from DNAPL, sorbed contaminants, and increase in solubility, which is common at injection remediation sites. Total molar CVOCs have been steadily declining since the October 2013 maximum, and have decreased to an average of approximately 1,570 μM from October 2013 to October 2015. Within and downgradient of the source area, the average total molar chlorinated CVOC concentrations have decreased by approximately 185 μM since remediation began in July 2011 (see Table 1).

Over the long term, ethene and ethane concentrations are proving an important indicator of bioremediation progress at the site. At multiple locations, E+E concentrations have increased by orders of magnitude over the last 3 years, indicating that although the CVOC concentrations are currently higher than baseline conditions in the source area, biodegradation is continuing in the source area.

Groundwater elevation data (see Figure 7 and Attachment B) indicate the horizontal groundwater flow conditions have remained similar since the initial June 2011 substrate injections. Groundwater flow is southerly across the site with no apparent changes since bioremediation began.

PERFORMANCE ENHANCEMENT TESTING

Previous sampling results indicated that bedrock remediation was dependent on geochemical conditions. Wells with the highest degradation rates had a pH above approximately 6.5 SU and/or hydrogen sulfide less than 30 mg/L approximately. As discussed in previous reports, tests were conducted during the November 2012 substrate injections to mitigate potential limitations to the performance of the bedrock remediation system. The tests included adding vegetable oil substrate and calcium carbonate buffer (instead of sodium bicarbonate) throughout the 2012 injection area to raise the pH, and adding iron at INJ-7D to remove hydrogen sulfide by precipitating the sulfide with iron. The following observations are relevant to these 2012 injections:

- **pH:** The additional calcium carbonate appeared to lack sufficient buffering capacity to prevent the initial pH drop (5.5 – 6.0; Figure 8). The pH of most wells in October 2015 has recovered and is above 6.5 SU, with the exceptions of INJ-07D (6.37 SU), PMW-10D (6.17 SU), and PMW-12D (6.34 SU).
- **TOC:** TOC concentrations above 100 mg/L, which could be indicative of both added substrate and degradation intermediates, have persisted since the November 2012 injection except at PMW-11D located east of the bedrock injection wells (Figure 8).
- **Iron and Sulfide Concentration:** Injection of iron (soluble and mineral sources) in INJ-7D during the November 2012 substrate injection event resulted in an increase in iron and a decrease in sulfide at INJ-7D and the downgradient wells PMW-9D, PMW-12D, and RMW-2D (Figures 9A and 9B). October 2015 data suggest iron concentrations at these locations continue to deplete, relative to post-2012 injection concentrations. A slight increase in iron concentration is also observed in INJ-13D, downgradient from INJ-7D, in October 2015 (Attachment D). Iron migrated downgradient to INJ-02 and INJ-04 based on increases in iron concentrations (see Attachment D). However, recent decreasing concentrations of iron in INJ-04 in December 2014 and April 2015 suggest depletion of iron downgradient. The November 2012 iron injections in INJ-7D may have influenced iron and sulfide concentrations in side-gradient well PMW-1D.

Concentrations of iron increased and concentrations of sulfide decreased from pre-November 2012 levels at PMW-1D (see Attachment D).

In wells further downgradient (PMW-2D, PMW-3D, PMW-4D, PMW-5D, PMW-6D, PMW-7D, PMW-8D, PMW-16D, PMW-17D, RMW-4D, and MW-7D), iron concentrations have remained low, and hydrogen sulfide and DCE concentrations have remained elevated (Attachment D).

- **Ethene and Ethane Concentration:** Ethene and ethane increased in INJ-7D as well as locations downgradient of this well (INJ-9D, INJ-13D, PMW-9D, PMW-10D, PMW-12D, PMW-14D, PMW-15D, PMW-16D, and RMW-2D) (see Figure 5 and Attachment D). The increased ethene and ethane concentration indicates biodegradation of VC, despite the increased VC concentration in some of these wells. Based on the continued results from the iron injections at INJ-7D, it appears that sulfide can be effectively controlled with iron, and that iron improves the rate of CVOC biodegradation.

The iron injection affected the geochemistry and continues to have a positive effect on biodegradation. Use of iron injection will be considered for optimization of the remedy.

A laboratory treatability study conducted under anoxic conditions was conducted to optimize field treatments to enhance CVOC biodegradation in bedrock at the site (Attachment E). Groundwater samples used for the treatability study were collected in December 2013 from wells PMW-14D and PMW-2D. At the time of sampling, hydrogen sulfide concentrations (159 mg/L and 24.5 mg/L) and/or low pH (6.6 and 6.1) at PMW-2D and PMW-14D respectively, were potentially limiting the biodegradation of chloroethenes. The treatments tested in combination with emulsified vegetable oil (EVO) substrate include: 1) ferrous iron to reduce hydrogen sulfide concentration, 2) ferrous iron with sodium bicarbonate to raise pH, and 3) a combination of sodium bicarbonate, ferrous iron, and nutrients (ammonium chloride and sodium tripolyphosphate). Test bottles that received only EVO served as the untreated active control for comparison.

The results of this study indicate that the injection of organic substrate, ferrous iron, and nutrients in combination with appropriately buffering the pH to approximately 6.5 and above has the potential to enhance the biodegradation of chloroethenes, including DCE to ethene at the site.

7.0 GENERAL SITE CONCLUSIONS AND ANTICIPATED FUTURE ACTIVITIES

Overburden Bioreactor: The October 2015 data indicate CVOCs are mostly depleted in the bioreactor. The addition of bioremediation treatments to the bioreactor trenches and/or other selected locations with elevated and persistent CVOC concentrations is

considered while monitoring continues. Methane and hydrogen sulfide will continue to be monitored.

Bedrock Bioremediation Area: The data to date continue to suggest that biodegradation is improving, but can be further optimized. The iron injection test demonstrated that sulfide can be effectively controlled, thus improving CVOC biodegradation. Increasing downgradient concentrations of E+E, combined with decreasing concentrations of CVOCs downgradient, indicate an overall positive performance of the bedrock remediation system. Sulfide concentrations remain elevated in the vicinity of INJ-01 and INJ-04 extending to PMW-7D. DCE concentrations are elevated and stable in these wells. Supplemental injections are contemplated to optimize the treatment by controlling sulfide concentrations and increasing nutrients. Methane and hydrogen sulfide will continue to be monitored.

FIGURES

FIGURE 1: OVERBURDEN BIOREACTOR TIME SERIES PLOTS

FIGURE 2: OVERBURDEN TIME SERIES PLOTS

FIGURE 3 (A AND B): TIME SERIES PLOTS – MW-11S AND MW-12S

FIGURE 4: BEDROCK WELL TIME SERIES PLOTS

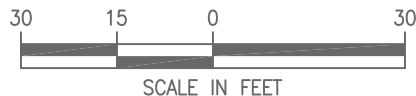
FIGURE 5: TIME SERIES PLOTS – ETHENE AND ETHANE

**FIGURE 6: TIME SERIES PLOTS – *Dehalococcoides* (DHC)
CONCENTRATION**

**FIGURE 7: POTENTIOMETRIC SURFACE MAP – BEDROCK –
OCTOBER 12, 2015**

FIGURE 8: TIME SERIES PLOTS –TOTAL ORGANIC CARBON AND PH

**FIGURE 9 (A AND B): TIME SERIES PLOTS – IRON, SULFIDES,
SULFATE, ETHENE, AND ETHANE**



LEGEND:

+++++ RAILROAD TRACKS



NEW BORING WELL (POST 2010)



REPLACEMENT BEDROCK INVESTIGATION WELL



OLD BORING WELL (PRE 2010)

--- FW --- FIRE WATER LINE

--- G --- GAS LINE

--- SAN --- SANITARY LINE

--- STM --- STORM LINE



CATCH BASIN



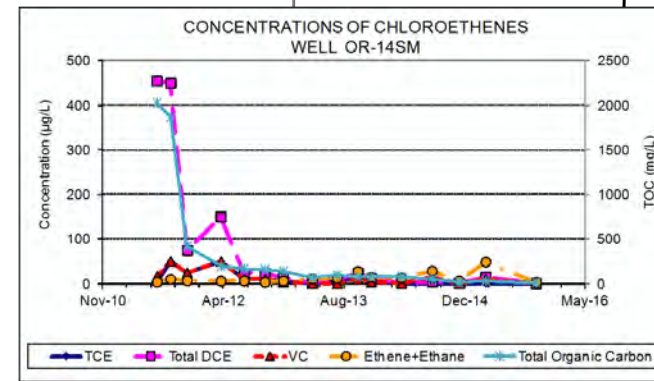
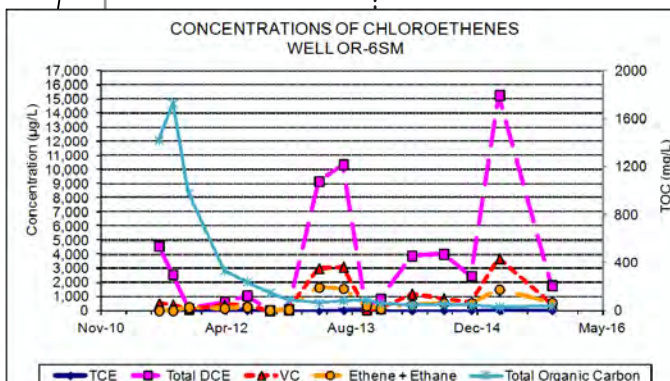
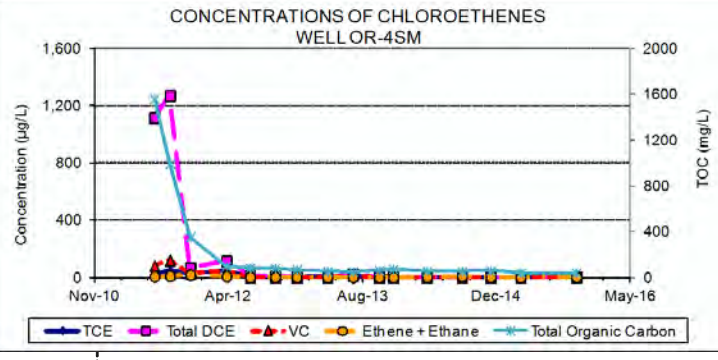
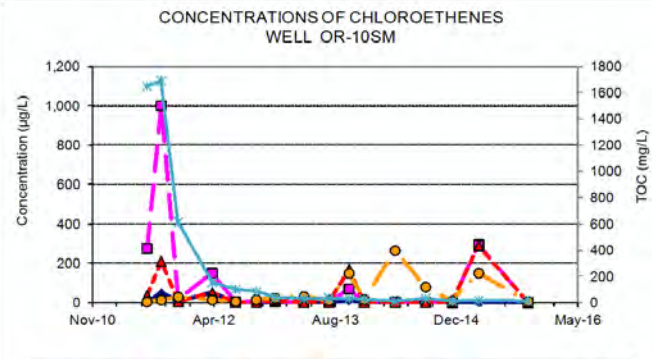
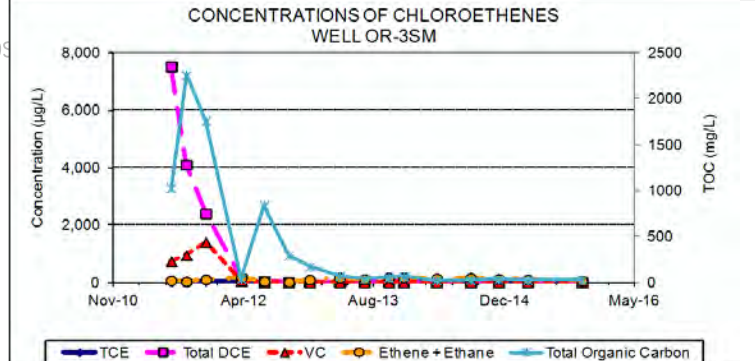
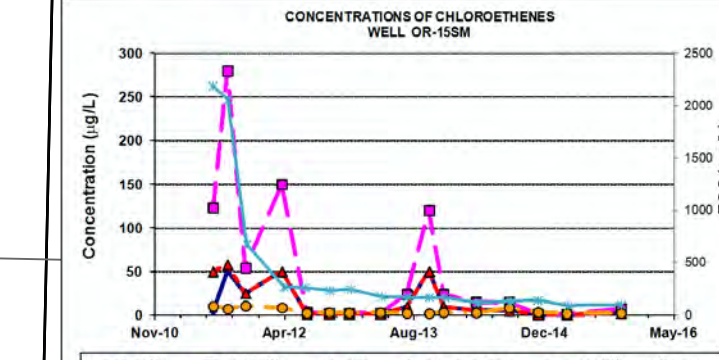
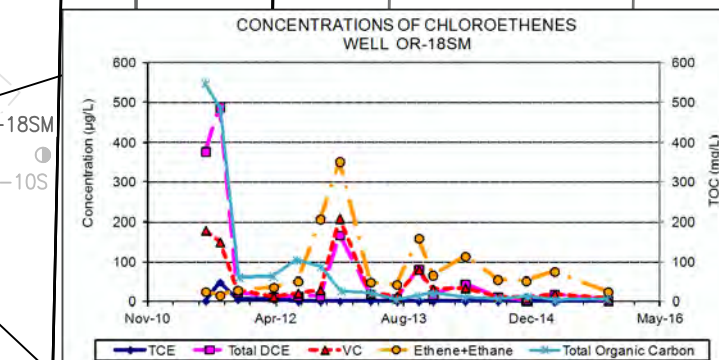
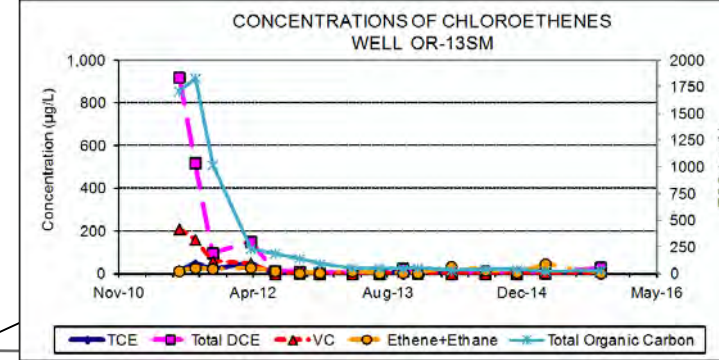
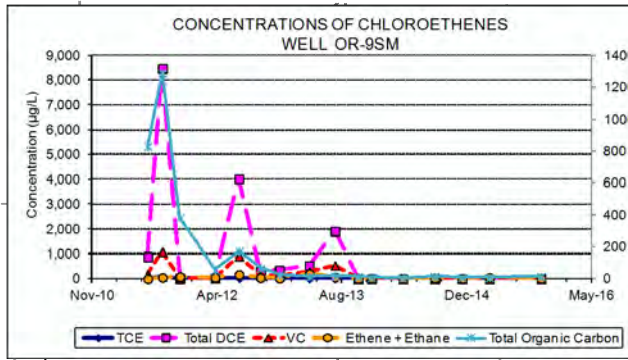
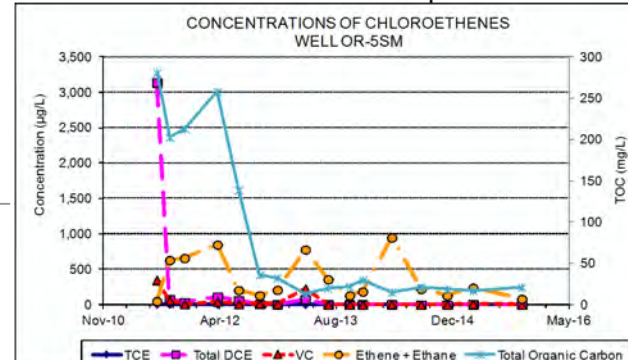
MANHOLE



MULCH AND GRAVEL BIOREACTOR



EDGE OF NEW ASPHALT



LEGEND

- ◆ TCE
- Total DCE
- ▲ VC
- Ethene + Ethane
- ✦ Total Organic Carbon

NOTES:
UTILITY LOCATIONS ARE APPROXIMATE

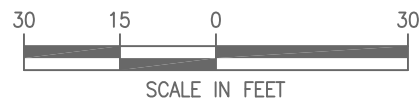
PILOT TEST INJECTIONS PERFORMED IN JUNE 2008,
REMEDATION INJECTIONS IN JULY 2011, BEDROCK INJECTIONS
IN NOV 2012

ATLANTIC RICHFIELD COMPANY

EKONOL POLYESTER
6600 WALMORE ROAD
NIAGARA FALLS, NY

FIGURE 1
OVERBURDEN BIOREACTOR
TIME SERIES PLOTS

PARSONS
40 LA RIVIERE DR, SUITE 350, BUFFALO, NY 14202 PHONE: 716-541-0730



— — — — FW — — — —

----- G -----

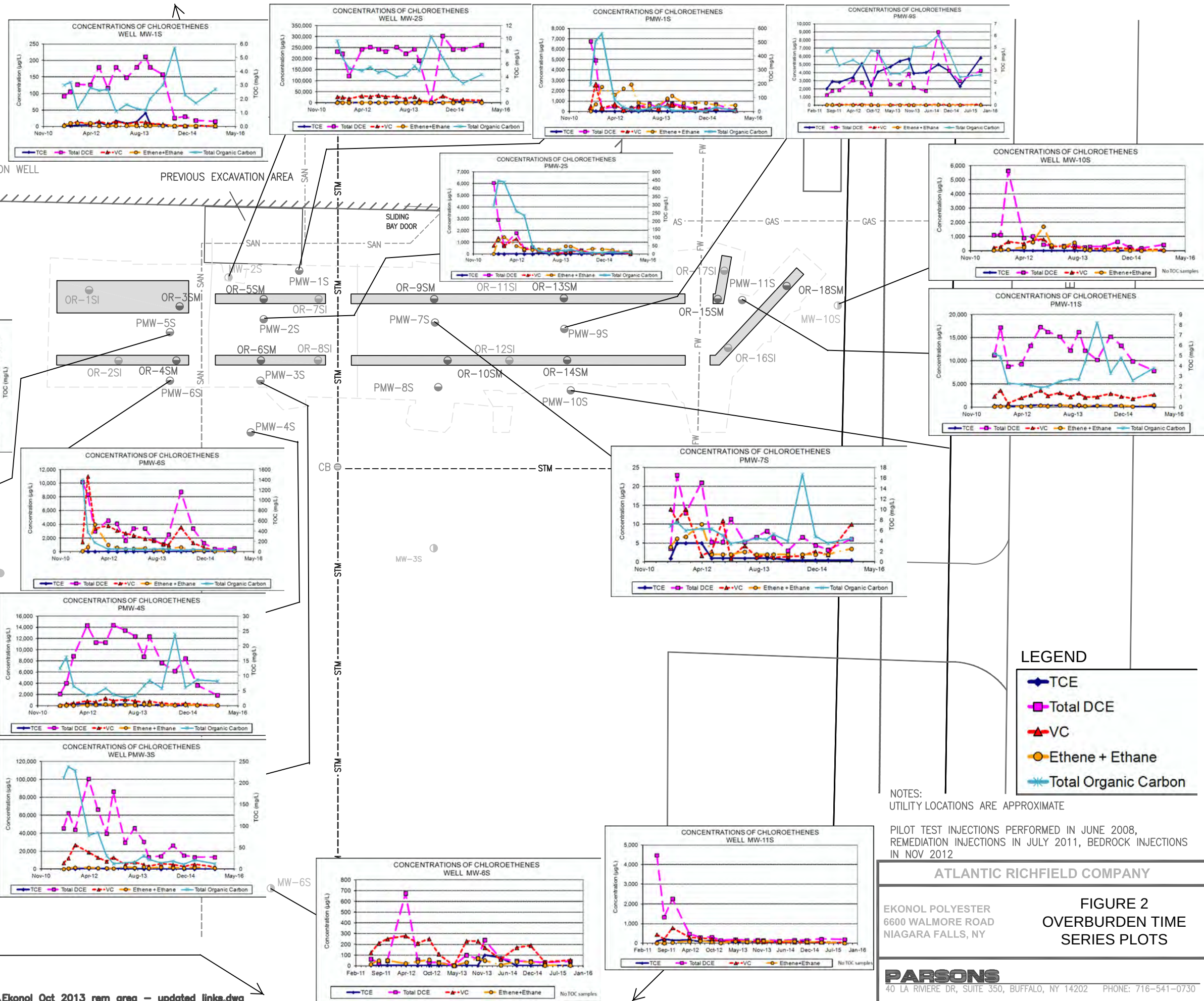
— — — — SAN — — — —

— — — — STM — — — —

 CB

○ MH

RAILROAD TRACKS
NEW BORING WELL (POST 2010)
REPLACEMENT BEDROCK INVESTIGATION WELL
OLD BORING WELL (PRE 2010)
FIRE WATER LINE
GAS LINE
SANITARY LINE
STORM LINE
CATCH BASIN
MANHOLE
MULCH AND GRAVEL BIOREACTOR
EDGE OF NEW ASPHALT



NOTES:
UTILITY LOCATIONS ARE APPROXIMATE

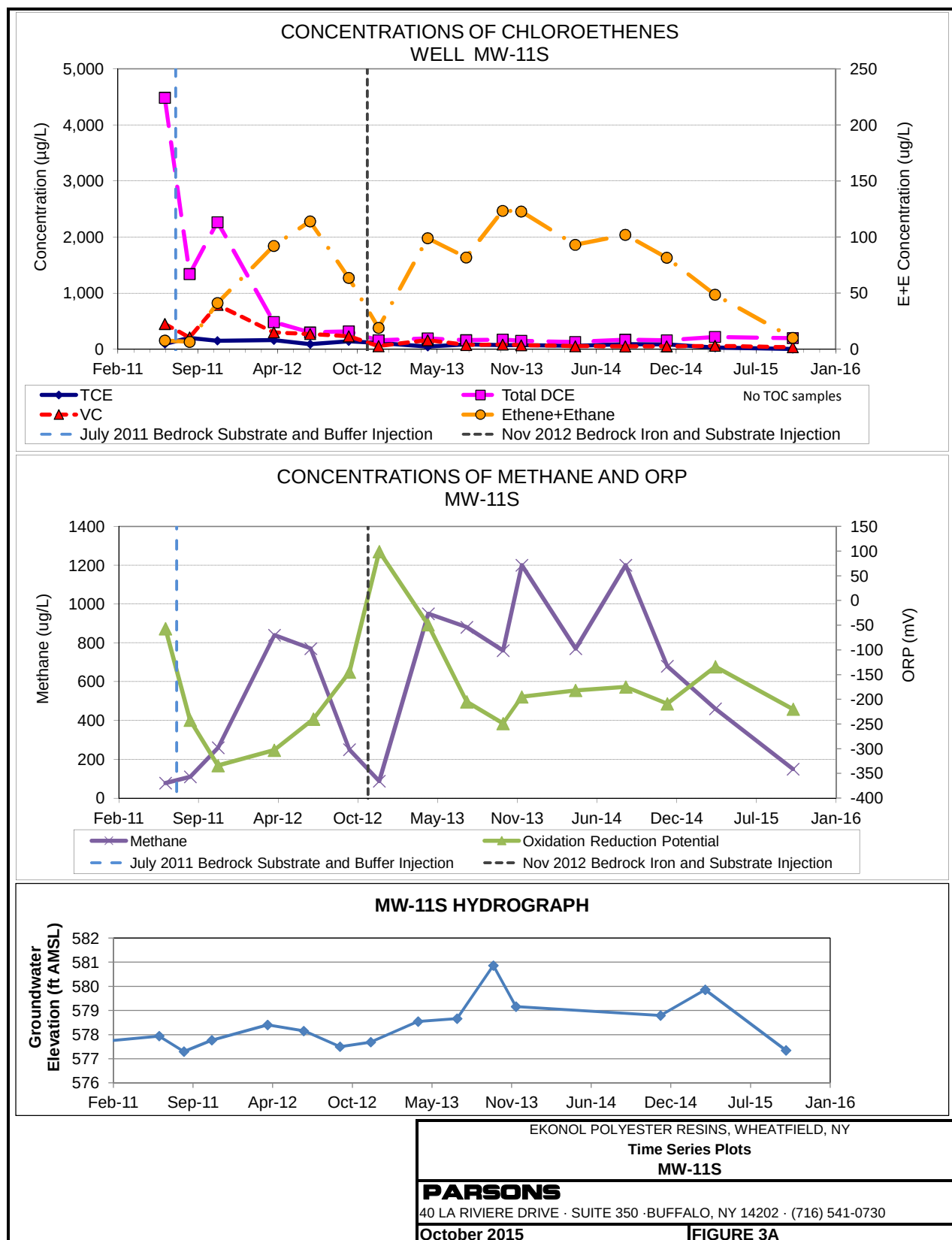
PILOT TEST INJECTIONS PERFORMED IN JUNE 2008,
REMIEDIATION INJECTIONS IN JULY 2011, BEDROCK INJECTIONS
IN NOV 2012

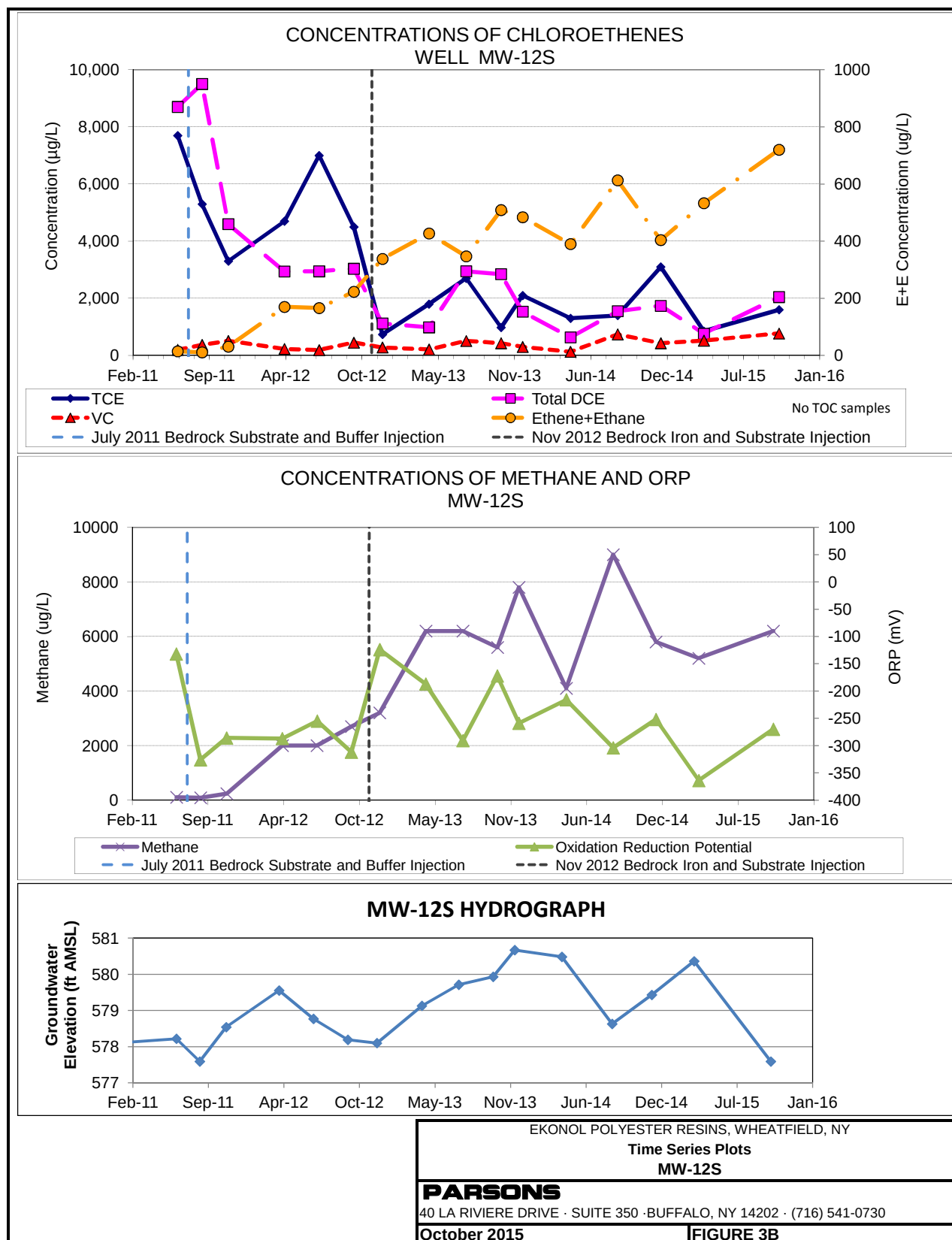
ATLANTIC RICHFIELD COMPANY

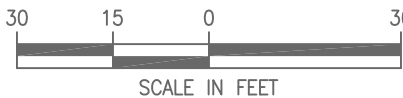
EKONOL POLYESTER
6600 WALMORE ROAD
NIAGARA FALLS, NY

PARSONS

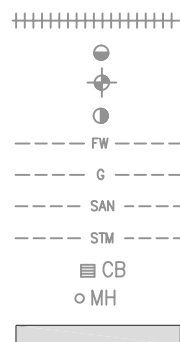
40 LA RIVIERE DR, SUITE 350, BUFFALO, NY 14202 PHONE: 716-541-0730



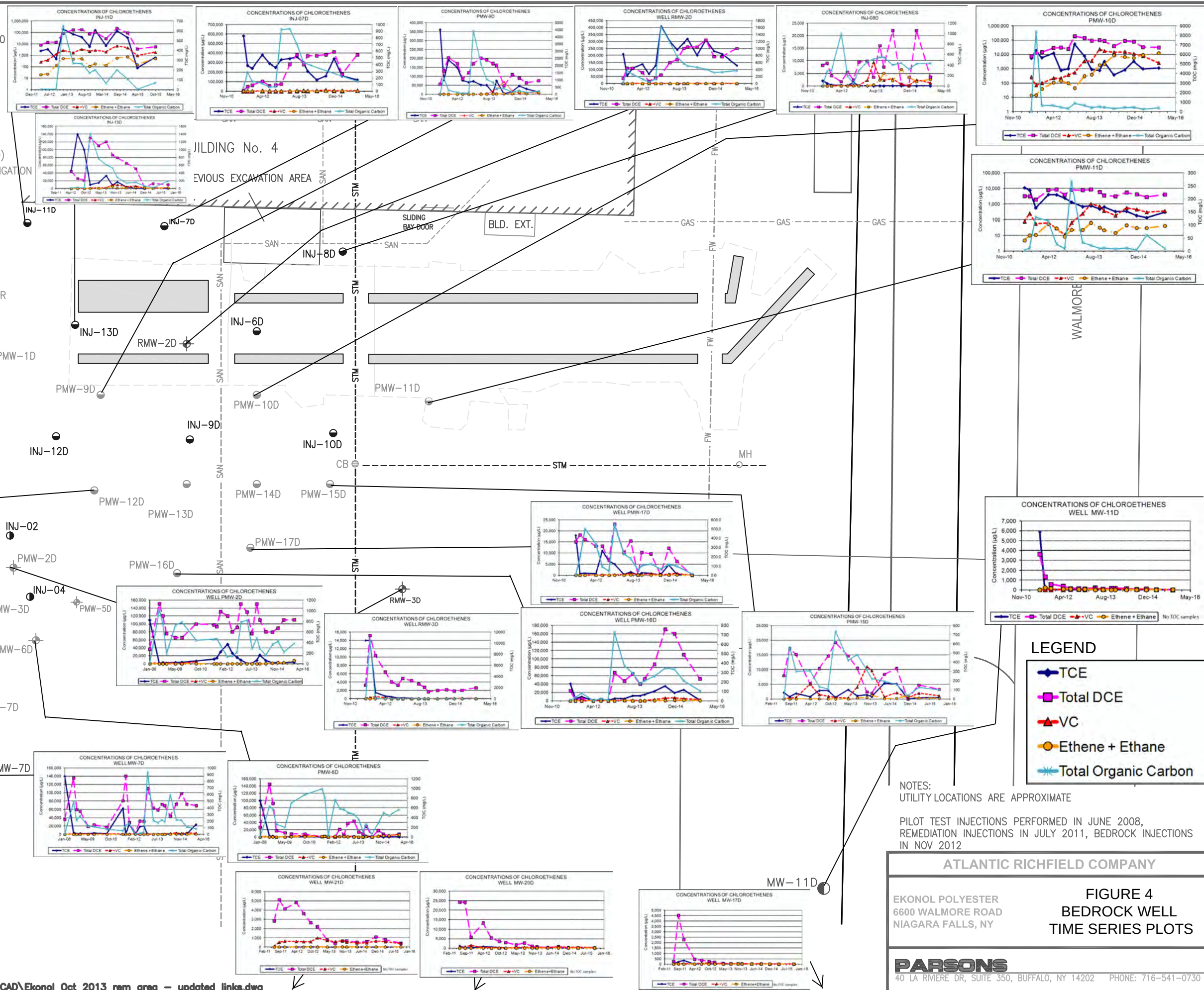




LEGEND:



RAILROAD TRACKS
NEW BORING WELL (POST 2010)
REPLACEMENT BEDROCK INVESTIGATION
OLD BORING WELL (PRE 2010)
FIRE WATER LINE
GAS LINE
SANITARY LINE
STORM LINE
CATCH BASIN
MANHOLE
MULCH AND GRAVEL BIOREACTOR
EDGE OF NEW ASPHALT



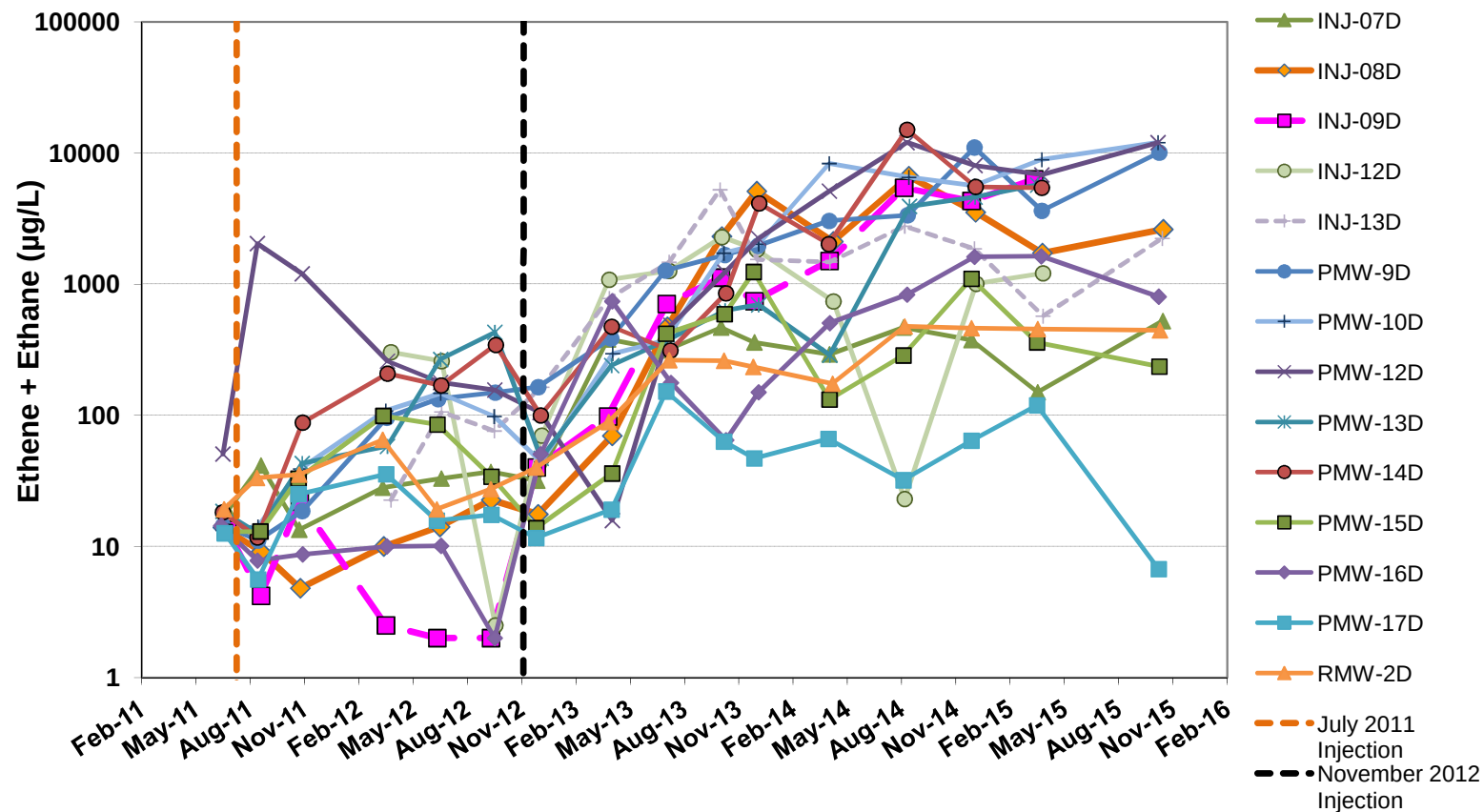
NOTES:
UTILITY LOCATIONS ARE APPROXIMATE
PILOT TEST INJECTIONS PERFORMED IN JUNE 2008,
REMEDIATION INJECTIONS IN JULY 2011, BEDROCK INJECTIONS
IN NOV 2012

ATLANTIC RICHFIELD COMPANY

EKONOL POLYESTER
6600 WALMORE ROAD
NIAGARA FALLS, NY

FIGURE 4
BEDROCK WELL
TIME SERIES PLOTS

PARSONS
40 LA RIVIERE DR, SUITE 350, BUFFALO, NY 14202 PHONE: 716-541-0730



Note: The following wells were not included in the October 2015 sampling plan: INJ-09D, INJ-12D, PMW-13D, and PMW-14D.

EKONOL POLYESTER RESINS, WHEATFIELD, NY

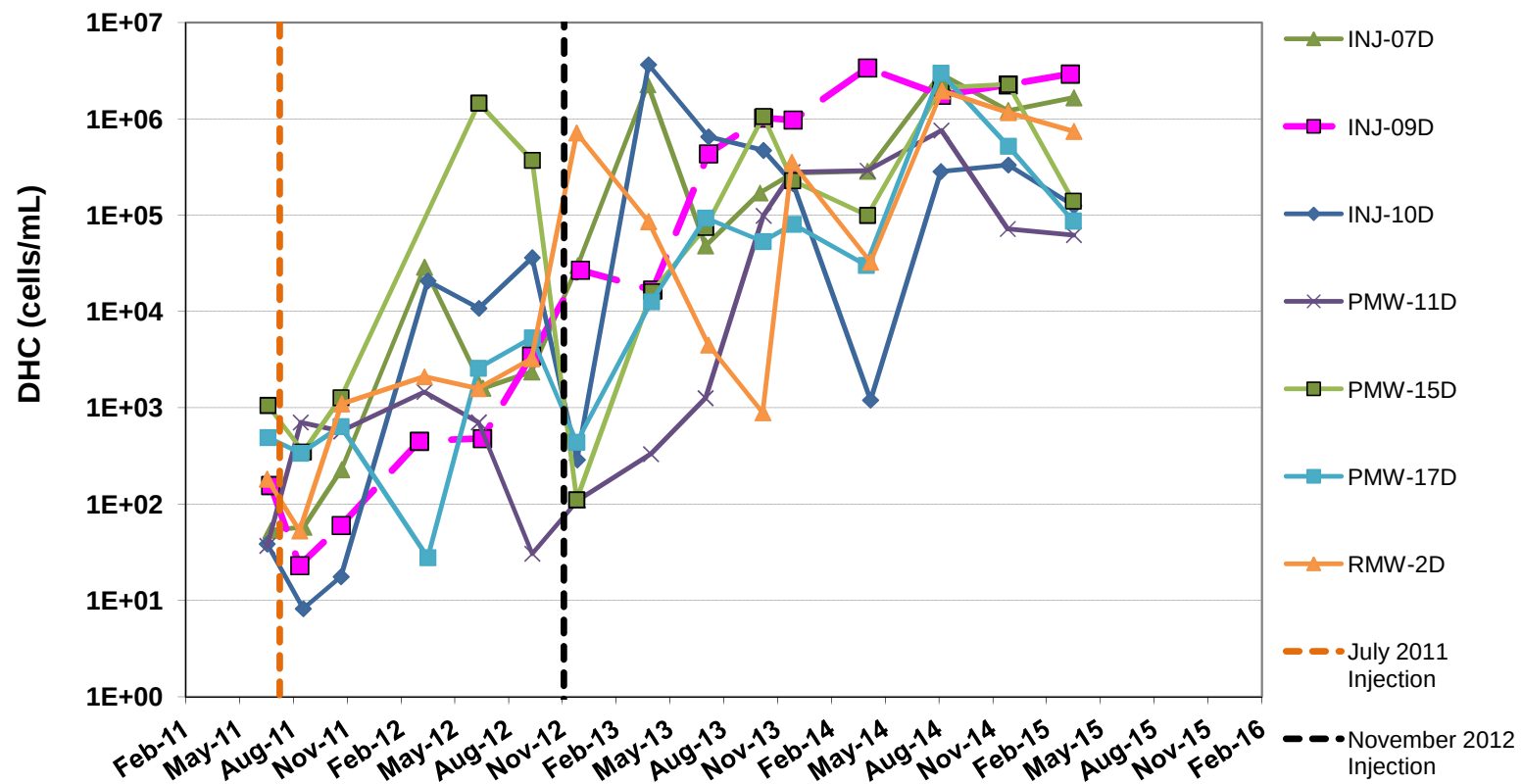
Time Series Plots
Ethene and Ethane

PARSONS

40 LA RIVIERE DRIVE · SUITE 350 · BUFFALO, NY 14202 · (716) 541-0730

October 2015

FIGURE 5



Note: Wells were not sampled for DHC concentrations on October 2015.

EKONOL POLYESTER RESINS, WHEATFIELD, NY

Time Series Plots

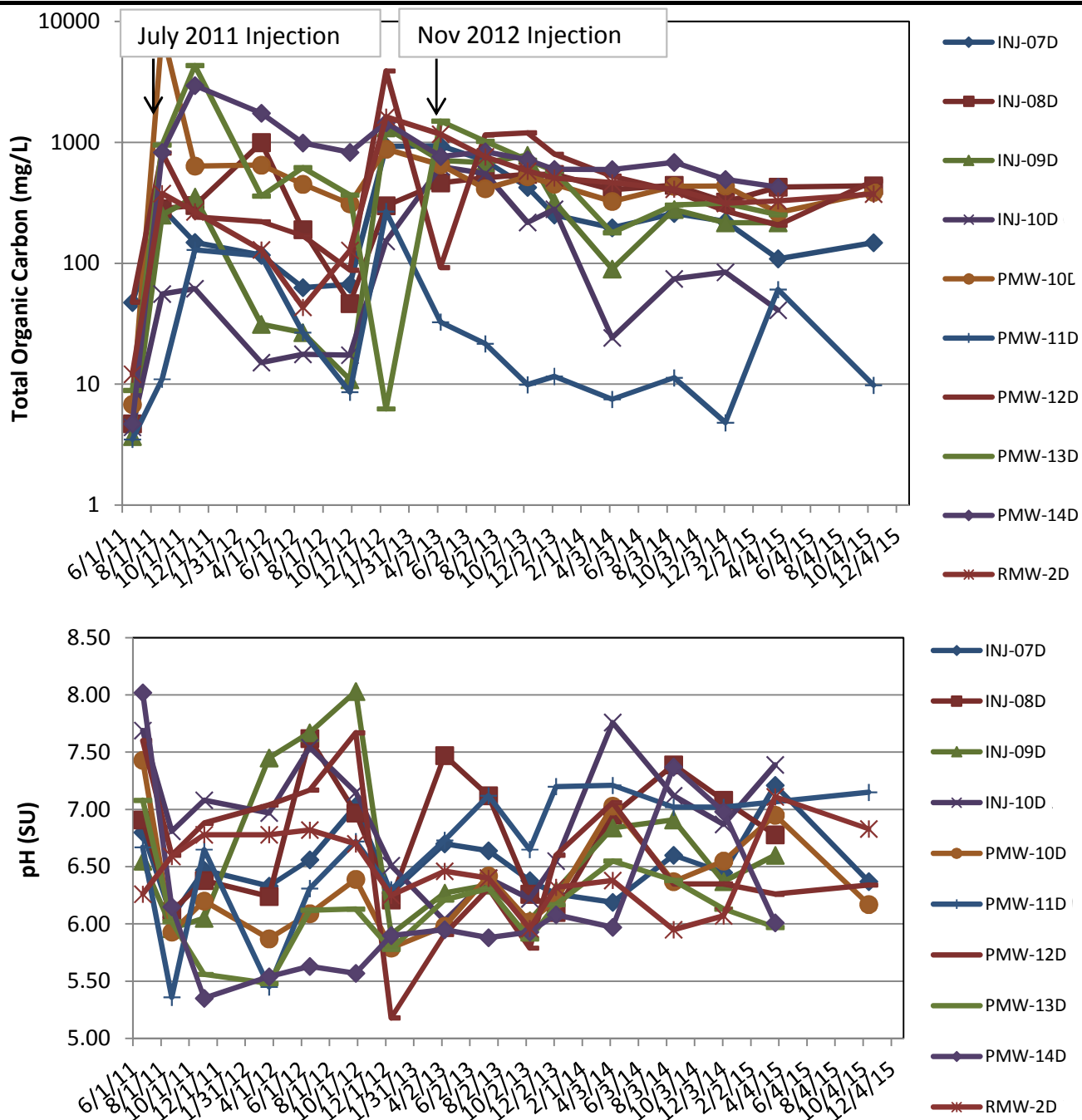
Dehalococcoides (DHC) Concentration

PARSONS

40 LA RIVIERE DRIVE · SUITE 350 · BUFFALO, NY 14202 · (716) 541-0730

October 2015

FIGURE 6



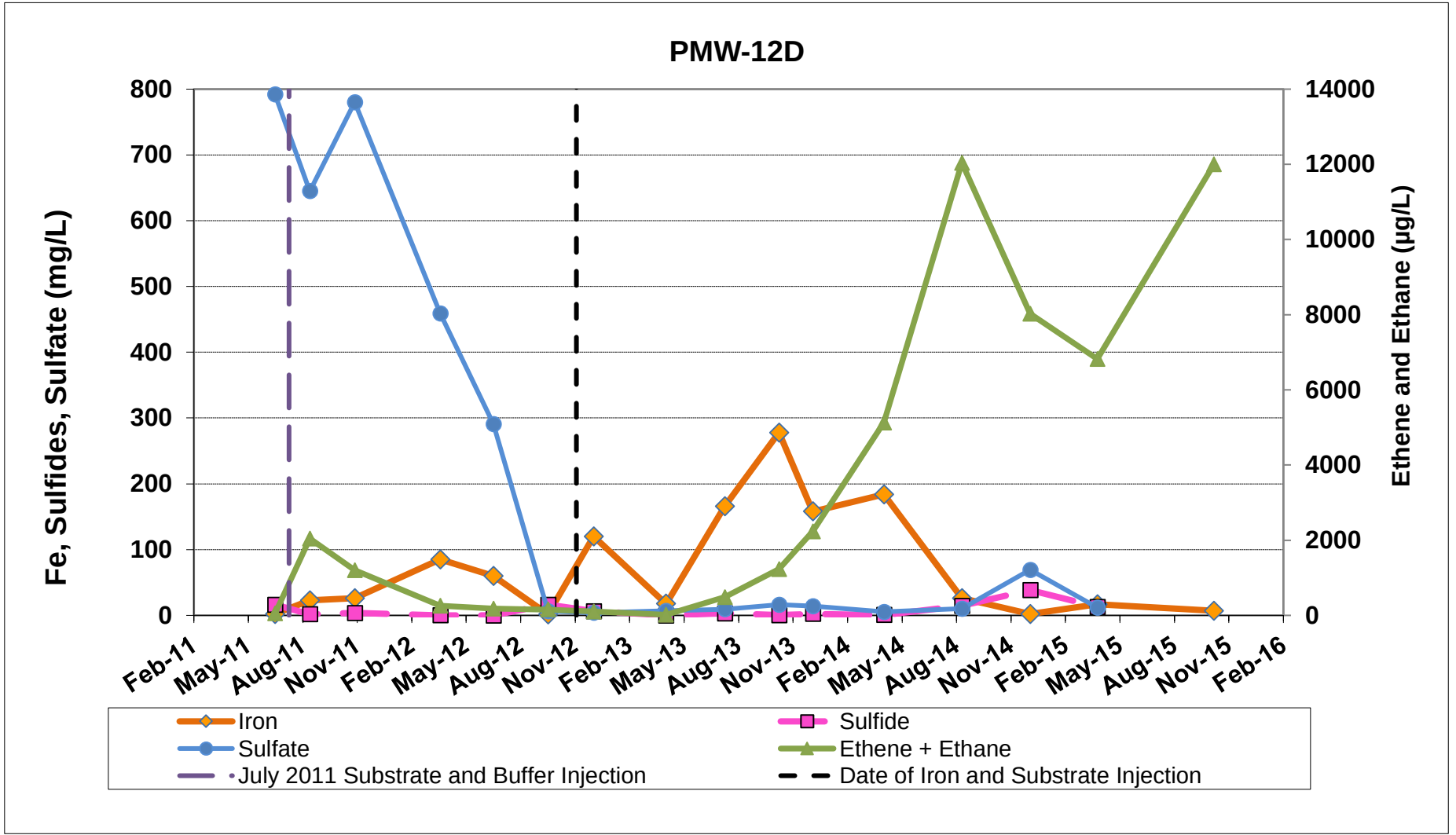
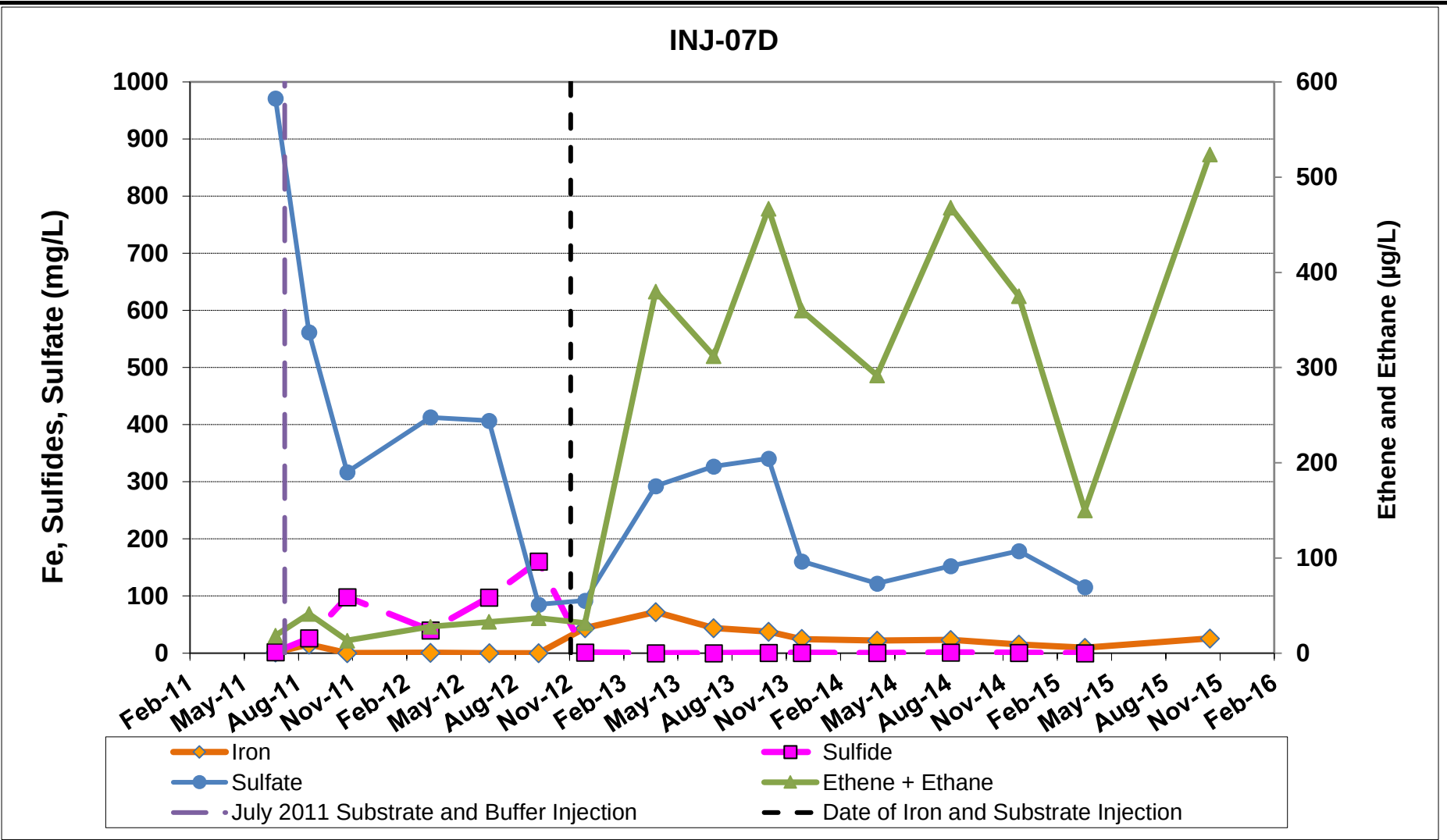
EKONOL POLYESTER, NY
TIME-SERIES PLOTS
Total Organic Carbon and pH

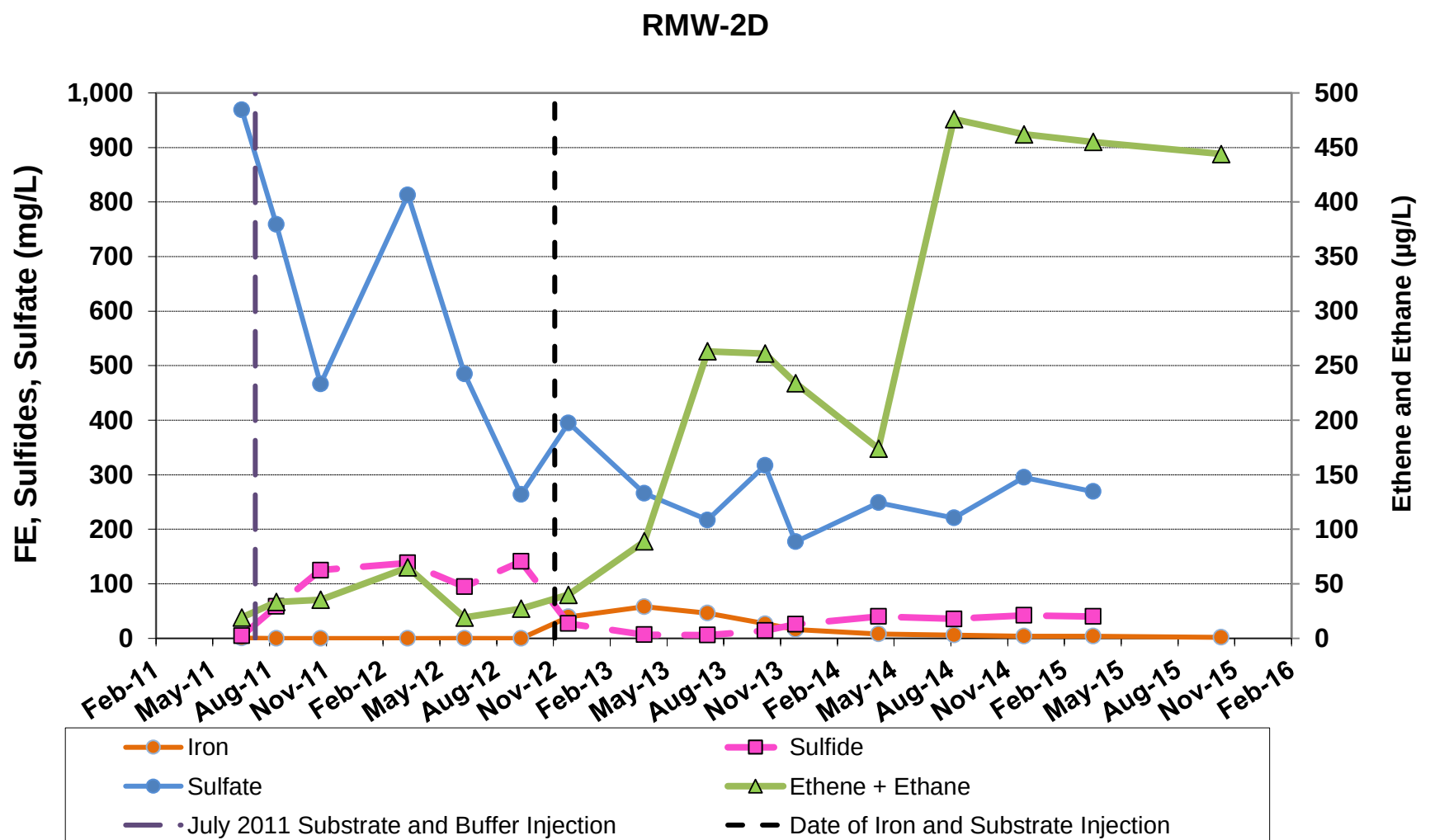
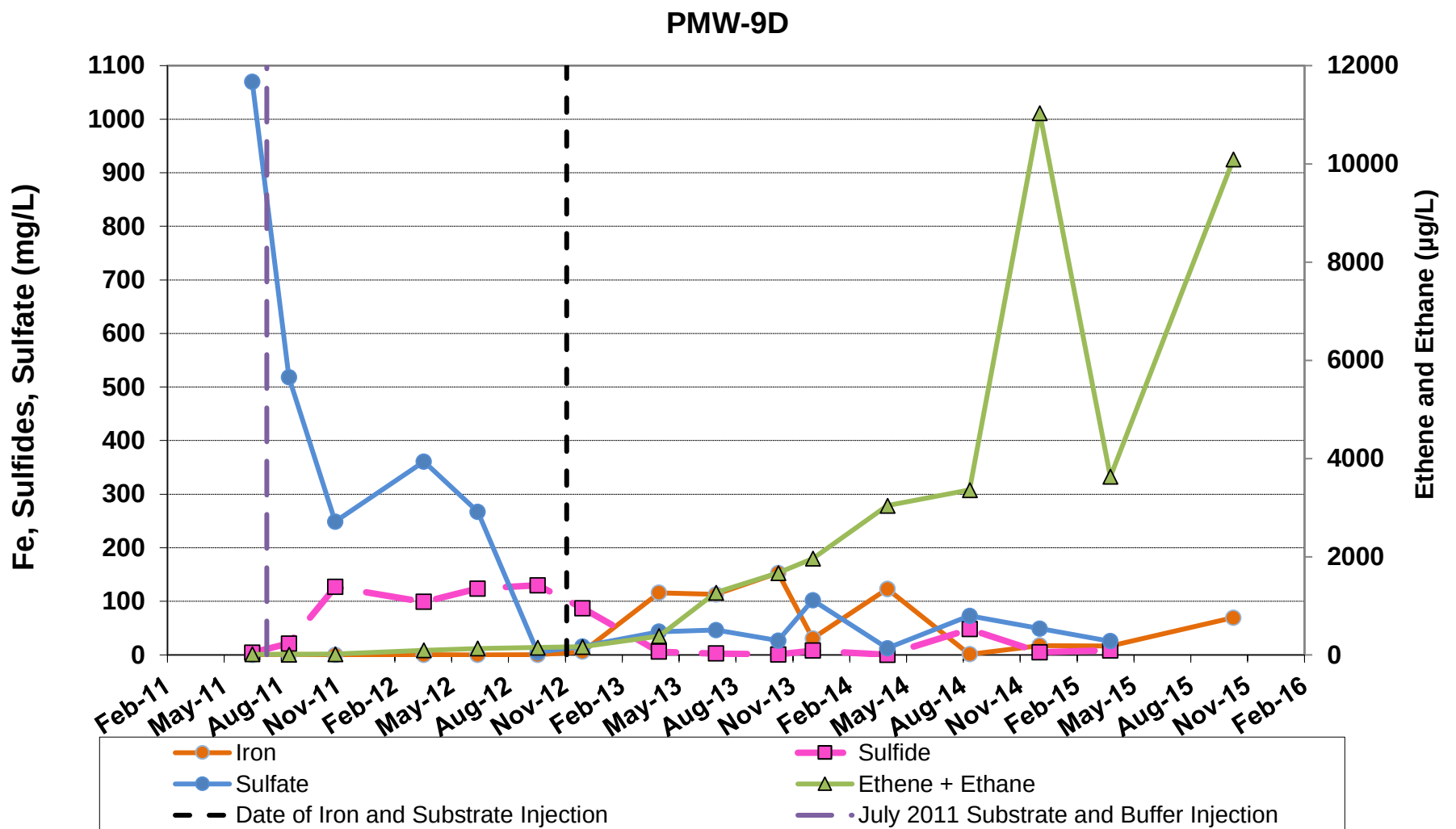
PARSONS

40 LA RIVEIRE DRIVE · SUITE 350 · BUFFALO, NY 14202 · (716) 541-0730

October 2015

FIGURE 8





EKONOL POLYESTER RESINS, WHEATFIELD, NY

Time Series Plots

Iron, Sulfides, Sulfate, Ethene and Ethane

PARSONS

40 LA RIVIERE DRIVE · SUITE 350 · BUFFALO, NY 14202 · (716) 541-0730

October 2015

FIGURE 9B

TABLE

**TABLE 1: AVERAGE DIFFERENCE IN CHLORINATED ETHENE AND
CHLORINATED ETHANE CONCENTRATIONS FROM
BASELINE SAMPLING EVENT (JULY 2011)**

TABLE 1
AVERAGE DIFFERENCE IN CHLORINATED ETHENE AND CHLORINATED ETHANE
CONCENTRATIONS FROM BASELINE SAMPLING EVENT (JULY 2011)

Sampling Date	Average Difference from Baseline Sampling Event*
July 2011	0.0
August 2011	-506.3
November 2011	-32.3
March 2012	178.8
June 2012	-697.7
September 2012	-681.3
December 2012	742.8
April 2013	531.6
July 2013	1337.0
October 2013	1386.7
December 2013	1371.6
April 2014	511.4
August 2014	1071.3
December 2014	1059.7
April 2015	-128.9
October 2015**	-185.1

*Average total molar chlorinated ethene and ethane concentration in μM per liter (μM).

Notes:

The following wells are included in the above calculations:

INJ-7D, INJ-8D, INJ-9D, INJ-10D, PMW-9D, PMW-10D, PMW-11D, PMW-12D, PMW-13D, PMW-14D, PMW-15D, PMW-16D, PMW-17D, MW-20D, MW-21D, RMW-2D, and RMW-3D.

Negative number means a decrease in total CVOC concentrations relative to July 2011.

Positive number means an increase in total CVOC concentrations relative to July 2011.

**The following wells were not sampled and therefore not included in the calculations for October 2015: INJ-9D, INJ-10D, PMW-13D, and PMW-14D.

ATTACHMENT A
INSPECTION RECORDS

EKONOL SITE PAVEMENT INSPECTION FORM WHEATFIELD, NEW YORK

Date of Inspection: 10/21/2015 **Time:** 11:30am

Inspector(s) Name/Title: Rob Piurek/Senior Geologist

Inspection of	Condition Present?		Action Required?		Comments/Location	Correction Date
	Yes	No	Yes	No		
1. Site Pavement						
A. Surface cracks		X		X		
B. Pits/divots		X		X		
C. Sinking		X		X		
2. Well curb boxes						
A. Cracks		X		X		
B. Loose		X		X		
C. Well caps missing		X		X		
D. Settlement		X		X		

OPERATION, MONITORING AND MAINTENANCE CHECKLIST

Date: 10/21/15

Checklist Completed By: RP

Project Number: _____

Property Location: Chong

System Installation Date: _____

The purpose of this form is to document the operation and maintenance of the sub-slab depressurization system to provide assurance that the system is functioning as designed or identify and execute any actions required to achieve the mitigation of subsurface vapor intrusion of volatile organic compounds to indoor air

1. MITIGATION SYSTEM INSPECTION

Occupant Interview

Any concerns identified by the building occupants?

YES NO

Comments / Action Items

Occupant's Initials: _____

External Piping

Vent pipes securely fastened to building

YES NO

Are there any visible openings or breaks in the pipe system

YES NO

Is the rain cap present and intact at discharge point

YES NO N/A

Inspection of the exhaust point verified that no air intakes have been located nearby

YES NO

The sealing/caulking around wall penetrations is intact

YES NO

Comments / Action Items

Mitigation Fan

Fan is mounted securely to building (no excessive vibrations during operation)

YES NO

Fan cover is installed

YES NO

No visible damage to fan or cover

YES NO

Comments / Action Items

OPERATION, MONITORING AND MAINTENANCE CHECKLIST

Internal Piping

Vertical and horizontal pipe runs are secured, including at all penetration points	<u>YES</u>	NO	
The sealing/caulking is intact around the extraction point or points through the basement floor, crawlspace floor, and/or crawlspace/basement wall interface.	<u>YES</u>	NO	
Vibration dampener installed and intact (pertains to fan mount)	YES	NO	<u>N/A</u>
Mitigation system operation placard present and visible/legible	<u>YES</u>	NO	
Contains description of major components, valid contact number and instructions for occupant inquiries and/or system failure	<u>YES</u>	NO	
Mitigation system maintenance tag present and filled out	YES	NO	
Date of last inspection shown on tag: _____			
U-tube manometer present and intact at each extraction point	<u>YES</u>	NO	

Comments / Action Items

Electrical

Electrical connections secured	<u>YES</u>	NO	
Junction boxes are closed	<u>YES</u>	NO	
Conduit is supported	<u>YES</u>	NO	
Circuit breakers controlling the mitigation fan and alarm circuits operate and are labeled "Mitigation System"	<u>YES</u>	NO	
Power switch tagged with intact tamper proof seal	<u>YES</u>	NO	
Audible alarm present	<u>YES</u>	NO	
Audible alarm switch in "on" position (light on alarm is green)	YES	NO	<u>YES</u>

Comments / Action Items

Water Sumps (skip this section if no sump(s) present)

Sump present	YES	NO	
Number of sumps and locations are all shown on as-built drawing	YES	NO	
Sump pit is sealed to minimize influx of conditioned air	YES	NO	N/A
Penetrations to sump covers to accommodate electrical wiring, water injection pipes or vent pipes are sealed	YES	NO	N/A
Sump pits used as suction pits are identified with a label that reads: "This cover must be properly sealed for effective operation of the mitigation system - Contact Geosyntec Consultants (toll free 1-800-695-4436) for instructions on the correct procedure for replacement and sealing if removal or modification for any reason is performed"	YES	NO	N/A

Comments / Action Items

OPERATION, MONITORING AND MAINTENANCE CHECKLIST

2. OPERATIONAL CHECKS

Fan is operating

Noise and Vibration within normal range

Alarm sounds when fan is turned off

☒ YES
☒ YES

NO

NO

U-Tube manometer indicating negative sub slab pressure

YES

NO

U-Tube Manometer Reading: Location: OFFICE Vacuum 0.7 in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

U-Tube Manometer Reading: Location: _____ Vacuum _____ in H₂O

Smoke test performed on internal penetrations and pipe joints

Smoke test indicated no leaks

Smoke test confirms air flow into sump

Back draft test confirms proper air flow at combustion appliances

Smoke test indicated no leaks

☒ YES
☒ YES
☒ YES
☒ YES

NO

NO

NO

NO

N/A
☒ N/A
☒ N/A
☒ N/A

3. MAINTENANCE

Fan last replaced on (date): _____

Fan due to be replaced; _____

Additional Maintenance Action Items Performed

4. ADDITIONAL ACTION ITEMS/ COMMENTS/COMPLETION DATES

5. CERTIFICATION

I certify that the information on this form is true, accurate and complete (all blanks filled in) to the best of my knowledge and ability, and that I have the appropriate training and experience to perform this monitoring/inspection:

Name: Rob Purcell Affiliation: Parsons

Signature: [Signature] Date (dd/mm/yy): 21/10/15 9 am/pm

ATTACHMENT B

**WATER LEVEL MEASUREMENT, SAMPLING MATRIX AND SAMPLING
RECORDS**

**Ekonom Water Levels & 4-Gas readings
10/12/2015**

#	Well ID	DTW (ft btoc)	TD (ft btoc)	PID (ppm)	CO (ppm)	O2 (%)	LEL (%)	H2S (ppm)	Comments
1	INJ-01	8.56	22.22	31	42	20.3	2		
2	INJ-02	8.25	10.9	90.4	106	20.3	3		
3	INJ-03	8.15	NA	26.2	205	16.3	34		
4	INJ-04	8.36	22.3	32.2	52	19.8	3		
5	INJ-05	8.65	22.75	23.8	380	18.2	4	5.5	
6	INJ-06D	8.46	21.9	3.3	12				
7	INJ-07D	8.55	21.45	4.7	9				
8	INJ-08D	8.5	22.08	0.4		18.9			
9	INJ-09D	8.46	19.8	1.3	15	15.5			
10	INJ-10D	7.99	14.57	2	1.4	18.9	15		
11	INJ-11D	8.4	18.96	0.4	8				
12	INJ-12D	8.9	NA	6.1	500	11.3	99	12	
13	INJ-13D	8.82	21.87	2.6	142	11.6	99		
14	MW-1S	8.58	14.56						
15	MW-2S	3.03	12.15	167	11	20		0.9	
16	MW-3S	4.05	11.2						
17	MW-4S	8.84	12.69	20	48	12.6	3		
18	MW-5S	8	14.52						
19	MW-6S	6.96	13.38						
20	MW-7D	8.8	26.28	26.8	57	16.9			
21	MW-7S	6.9	12.42		28				
22	MW-8S	7.15	13.05						
23	MW-9S	8.17	30.3	30.3					
24	MW-10D	8.31	29.95						
25	MW-10S	7.15	11.72						
26	MW-11D	11.34	30.88						
27	MW-11S	8.65	13.45						
28	MW-12D	8.88	32.2						
29	MW-12S	8.52	13.17						
30	MW-13D	12.33	31.54						
31	MW-14D	10.34	32.41						
32	MW-15D	10.25	29.4						
33	MW-16D	13.85	31.55						
34	MW-17D	10.4	33.45						
35	MW-18D	9.8	28.6						
36	MW-19D	8.53	27.13						
37	MW-20D	9.55	29.65						
38	MW-21D	9.17	31.55						

**Ekonom Water Levels & 4-Gas readings
10/12/2015**

#	Well ID	DTW (ft btoc)	TD (ft btoc)	PID (ppm)	CO (ppm)	O2 (%)	LEL (%)	H2S (ppm)	Comments
39	OR-1SI	2.82	12.18						
40	OR-2SI	4.45	11.6	1.4	0	20.9	0	0	
41	OR-3SM	3.03	12.4	4	9	17.5	91		
42	OR-4SM	4.52	12.35	0.5	10		4		
43	OR-5SM	2.75	11.5	0.5	3	18.8	15		
44	OR-6SM	6.3	11.59	6.1	41	15.4	99	99	
45	OR-7SI	2.8	12	0	3	17.7	99	4.2	
46	OR-8SI	6.2	11.88	0.4	8		8		
47	OR-9SM	7.95	12.3	1.7				1.3	
48	OR-10SM	7.95	11.7	1.4		19.5	99	99	
49	OR-11SI	8.05	11.35	1					
50	OR-12SI	7.83	11.5	2.1	4	171	99	3.7	
51	OR-13SM	8	12.85	2.3	4	16.2	99	5.8	
52	OR-14SM	7.96	11.62	1.2	0	18.7	99	57.9	
53	OR-15SM	6.95	12						
54	OR-16SI	7.5	12.05						
55	OR-17SI	6.95	12.2						
56	OR-18SM	7.14	12.2						
57	PMW-1D	8.3	17.4	26.3	261	17.8	99		
58	PMW-1S	2.76	12	14			5		
59	PMW-2D	8.42	33.9	23.6	179	18.5	13		
60	PMW-2S	3.1	11.25	0.4	2	20.4	5		
61	PMW-3D	8.56	29.49	28.1	115	12.9	99	99	
62	PMW-3S	7.07	11.95	7	35	16	99	1	
63	PMW-4D	8.51	24.68	4.4	44	20.8	5	2.3	
64	PMW-4S	6.96	11.65	0.4	5			0.5	
65	PMW-5D	8.46	24.2	38.6	499	17.8	99	26.6	
66	PMW-5S	4.31	10.136	16.3	3		2		
67	PMW-6D	8.52	25.2	52.3	130	19	49	4.7	
68	PMW-6S	7.15	12.05	68.9	11	20.1	4		
69	PMW-7D	8.92	24.55	1.6	42	19.8	4		
70	PMW-7S	7.42	11.42	1.2		17.8	9		
71	PMW-8D	8.37	24.35	94.1	51	18.8	6		
72	PMW-8S	8.2	11.57						
73	PMW-9D	8.52	14	5.1	35	20.9	0	0	
74	PMW-9S	8.48	19						
75	PMW-10S	7.35	11.9	0.1		19.8			
76	PMW-10D	8.35	21.8	5.2	56	19.9	5	0.4	

**EkonoI Water Levels & 4-Gas readings
10/12/2015**

#	Well ID	DTW (ft btoc)	TD (ft btoc)	PID (ppm)	CO (ppm)	O2 (%)	LEL (%)	H2S (ppm)	Comments
77	PMW-11D	8.5	14.48	0.5					
78	PMW-11S	7.05	11.91						
79	PMW-12D	8.52	14.5	8.1	61	20.9	0		
80	PMW-13D	8.46	21.58	23.2	92	19.6			
81	PMW-14D	8.55	21.55	1.2	17				
82	PMW-15D	8.48	22.85	19.1	25	12.8			
83	PMW-16D	8.48	22.02	25.3	192	11.2	11		
84	PMW-17D	8.62	21.32	0.3	6	19.9			
85	RMW-1D	8.3	30.4	1					
86	RMW-2D	NA	NA	3000	500	14.3	5	8	
87	RMW-3D	8.7	26.28						
88	RMW-4D	8.74	28.45	4.9	300	10.1	99	39.5	
89	TP-1	6.22	15.6						
90	TP-2	6.37	10.6						

TABLE 2
SUMMARY OF PROPOSED MONITORING
EKONOL POLYESTER RESINS, WHEATFIELD, NEW YORK

Location	Synoptic Water Level Measurement ^{g/}	VOCs ^{a/} (SW8260B)	Methane, Ethane, Ethene (Lab SOP)	Dissolved Inorganics ^{b/c/} (SW6010B)	Total Organic Carbon (SW9060)	Real time Analyses ^{e/}
		Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual
Overburden Bioreactor Monitoring Wells						
OR-3SM	1	1	1	1	1	1
OR-4SM	1	1	1	1	1	1
OR-5SM	1	1	1	1	1	1
OR-6SM	1	1	1	1	1	1
OR-9SM	1	1	1	1	1	1
OR-10SM	1	1	1	1	1	1
OR-13SM	1	1	1	1	1	1
OR-14SM	1	1	1	1	1	1
OR-15SM	1	1	1	1	1	1
OR-18SM	1	1	1	1	1	1
PMW-1S	1	1	1	1	1	1
PMW-2S	1	1	1	1	1	1
PMW-3S	1	1	1	1	1	1
PMW-4S	1	1	1	1	1	1
PMW-5S	1	1	1	1	1	1
PMW-6S	1	1	1	1	1	1
PMW-7S	1	1	1	1	1	1
PMW-9S	1	1	1	1	1	1
PMW-11S	1	1	1	1	1	1
Bedrock Injection/Withdrawal Wells						
INJ-7D	1	1	1	1	1	1
INJ-8D	1	1	1	1	1	1
INJ-11D	1	1	1	1	1	1
INJ-13D	1	1	1	1	1	1
Bedrock Monitoring Wells						
PMW-9D	1	1	1	1	1	1
PMW-10D	1	1	1	1	1	1
PMW-11D	1	1	1	1	1	1
PMW-12D	1	1	1	1	1	1
PMW-15D	1	1	1	1	1	1
PMW-16D	1	1	1	1	1	1
PMW-17D	1	1	1	1	1	1
Pilot Test Wells						
PMW-1D	1	1	1	1	1	1
PMW-2D	1	1	1	1	1	1
PMW-6D	1	1	1	1	1	1
RMW-4D	1	1	1	1	1	1
PMW-8D	1	1	1	1	1	1
MW-7D	1	1	1	1	1	1
Site Investigation Wells						
MW-1S	1	1	1	1	1	1
MW-2S	1	1	1	1	1	1
MW-4S	1	1	1	1	1	1
MW-6S	1	1	1			1
MW-10S	1	1	1			1
MW-11S	1	1	1			1
MW-12S	1	1	1			1
RMW-2D	1	1	1	1	1	1
RMW-3D	1	1	1	1	1	1
MW-11D	1	1	1			1
MW-17D	1	1	1			1
MW-20D	1	1	1			1
MW-21D	1	1	1			1
Investigative Monitoring Wells						
RMW-1D	1	1	1	1	1	1
MW-15D	1	1	1	1	1	1
MW-16D	1	1	1	1	1	1
MW-18D	1	1	1	1	1	1
MW-19D	1	1	1	1	1	1
MW-13D	1	1	1	1	1	1
MW-9S	1	1	1	1	1	1
MW-7S	1	1	1	1	1	1
Monitoring Subtotal						
	57	57	57	49	49	57
QA/QC						
Duplicates		4	4	4	4	
Matrix Spike		4				
Matrix Spike Duplicate		4				
Trip Blanks		15				
TOTAL PER SAMPLING EVENT:		84	61	53	53	57

^{a/} VOCs = volatile organic compounds, including aromatic and chlorinated aliphatic hydrocarbons. If present, an oil sample will also be collected and analyzed for VOCs.

^{b/} All metal and cation samples must be field-filtered and immediately preserved (Fe, K)

^{c/} Dissolved inorganic compounds will consist of iron (Fe) and potassium (K). Samples will be field filtered.

^{d/} Analysis of microbial population composition will include concentration measurements of dehalococcoides (DHC) and dehalobacter (DHB) species in cells per milliliter as well as DHC functional genes

^{e/} Well head analyses include dissolved oxygen, oxidation-reduction potential, pH, temperature, electrical conductivity, and visual appearance.

^{f/} Mobile lab analyses include carbon dioxide, alkalinity, sulfide, and ferrous iron.

^{g/} For the baseline monitoring round, all Site Water Levels will be recorded

LOW FLOW WELL SAMPLING RECORD													
Site Name: Ekonol Facility Samplers: Bill Simons				Well ID: INJ-7D Manual Entry: 		Well Diameter: 4 inches							
WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot													
Purging Data Method: Low Flow				Initial Depth to Water (ft): 9.83		Depth to Well Bottom (ft): 							
Date: 10/21/2015				Time: 09:40 (hhmm)		1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36	
						4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4	
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mv)	Comments		
0950	10.03	200	.5	8.11	6.74	6	0.429	15.78	0.278	-230			
1000	10.35	200	1	8.14	4.82	0	0.431	15.87	0.281	-235			
1010	10.51	200	1.5	8.09	4.26	0	0.453	15.88	0.298	-235			
1020	10.66	200	2	6.9	2.31	0	1.48	15.92	0.963	-212			
1030	10.73	200	2.5	6.6	2.36	0	1.98	15.99	1.28	-223			
1040	10.75	200	3	6.43	2.39	0	2.5	16.05	1.6	-237			
1050	10.75	200	3.5	6.39	2.37	0	2.61	16.03	1.67	-241			
1100	10.75	200	4	6.38	2.29	0	2.66	16.05	1.7	-245			
1105	10.75	200	4.3	6.37	2.29	0	2.67	16.03	1.71	-249			

Sampling Data			
Method: Dedicated tubing		Date: 10/21/2015	Time: (hhmm) 1105
		Total Volume of Water Purged: 4.3 (gal)	

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.37	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	2.67	Carbon dioxide (mg/L)	
Turbidity (NTU)	0	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp. (°C)	16.03	DTW (ft)	10.75
TDS (g/L)	1.71		
ORP (mv)	-249		

SAMPLE SET			
Parameter	Bottle	Pres.	Method
Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260
MEE	☒ 2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐ 2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒ 2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐		
Acetylene	☐		

Comments:
 DO and ORP values conflict. DO > 0.5 and ORP < 0

Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD																																																																																				
Site Name: Ekonol Facility							Well ID: INJ-11D																																																																													
Samplers: Bill Simons							Manual Entry: 		Well Diameter: 4 inches																																																																											
							WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																													
Purging Data Method: Low Flow							Initial Depth to Water (ft): 8.93		Depth to Well Bottom (ft): 																																																																											
Date: 10/21/2015			Time: 11:50 (hhmm)				1-inch=0.041		1.5-inch=0.092		2-inch=0.16																																																																									
							4-inch=0.64		6-inch=1.4		8-inch=2.5																																																																									
											10-inch=4																																																																									
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments																																																																									
1200	9.4	200	0.5	7.6	3.43	31.5	0.359	17.03	0.233	-131																																																																										
1210	9.52	200	1	7.54	2.58	25.8	0.359	17.26	0.233	-123																																																																										
1220	9.52	200	1.5	7.52	2.25	17.1	0.365	17.29	0.238	-133																																																																										
1230	9.52	200	2	7.48	2.27	5.8	0.384	17.21	0.249	-162																																																																										
1240	9.52	200	2.5	7.38	3.94	0	0.445	17.03	0.289	-233																																																																										
1250	9.52	200	3	7.27	3.79	0	0.496	17.03	0.323	-276																																																																										
1300	9.52	200	3.5	7.18	4.12	0	0.569	17.04	0.368	-307																																																																										
1310	9.52	200	4	7.09	4.34	0	0.711	16.92	0.456	-311																																																																										
1320	9.52	200	4.5	7.02	4.44	0	0.824	17.09	0.530	-311																																																																										
1330	9.52	200	5	6.98	4.78	0	0.915	16.94	0.587	-320																																																																										
1335	9.52	200	5.3	6.95	4.98	0	0.952	16.79	0.614	-324																																																																										
1340	9.52	200	5.6	6.91	5.1	0	1.01	16.79	0.65	-327																																																																										
1345	9.52	200	5.9	6.85	5.21	0	1.05	16.72	0.671	-328																																																																										
1350	9.52	200	6.2	6.79	5.37	0	1.1	16.63	0.706	-329																																																																										
1355	9.52	200	6.5	6.82	5.44	0	1.14	16.69	0.727	-334																																																																										
1400	9.52	200	6.8	6.82	5.48	0	1.14	16.73	0.734	-335																																																																										
Sampling Data Method: Dedicated tubing Date: 10/21/2015 Time: (hhmm) 1400 Total Volume of Water Purged: 6.8 (gal)																																																																																				
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.82</td> <td>Alkalinity (g/g)</td> <td></td> </tr> <tr> <td>Spec. Cond. (mS/cm)</td> <td>1.14</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>0</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>err</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>Temp. (°C)</td> <td>16.73</td> <td>DTW (ft)</td> <td>9.52</td> </tr> <tr> <td>TDS (g/L)</td> <td>0.734</td> <td></td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-335</td> <td></td> <td></td> </tr> </tbody> </table>						STABILIZED PARAMETERS		HACH TEST KITS		pH	6.82	Alkalinity (g/g)		Spec. Cond. (mS/cm)	1.14	Carbon dioxide (mg/L)		Turbidity (NTU)	0	Ferrous Iron (mg/L)		DO (mg/L)	err	Hydrogen sulfide (mg/L)		Temp. (°C)	16.73	DTW (ft)	9.52	TDS (g/L)	0.734			ORP (mv)	-335			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th></th> <th>Bottle</th> <th>Pres. Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒</td> <td>3-40mL glass vial</td> <td>HCl EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒</td> <td>2-250 mL amber glass</td> <td>HCl Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☒</td> <td>1-250 mL plastic (Field Filtered)</td> <td>HNO3 SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>☐</td> <td>2-40 mL glass (Field Filtered)</td> <td>None lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☐</td> <td>1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☒</td> <td>2-40 mL amber glass vial</td> <td>H3PO4 SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> </tr> </tbody> </table>							SAMPLE SET				Parameter		Bottle	Pres. Method	Select VOCs	☒	3-40mL glass vial	HCl EPA 8260	MEE	☒	2-250 mL amber glass	HCl Lab SOP	Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3 SW6010B	Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None lab specified	Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate MS-45000-S2-F	Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4 SW9060	Microbial Census	☐			Acetylene	☐		
STABILIZED PARAMETERS		HACH TEST KITS																																																																																		
pH	6.82	Alkalinity (g/g)																																																																																		
Spec. Cond. (mS/cm)	1.14	Carbon dioxide (mg/L)																																																																																		
Turbidity (NTU)	0	Ferrous Iron (mg/L)																																																																																		
DO (mg/L)	err	Hydrogen sulfide (mg/L)																																																																																		
Temp. (°C)	16.73	DTW (ft)	9.52																																																																																	
TDS (g/L)	0.734																																																																																			
ORP (mv)	-335																																																																																			
SAMPLE SET																																																																																				
Parameter		Bottle	Pres. Method																																																																																	
Select VOCs	☒	3-40mL glass vial	HCl EPA 8260																																																																																	
MEE	☒	2-250 mL amber glass	HCl Lab SOP																																																																																	
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3 SW6010B																																																																																	
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None lab specified																																																																																	
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate MS-45000-S2-F																																																																																	
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4 SW9060																																																																																	
Microbial Census	☐																																																																																			
Acetylene	☐																																																																																			
Comments: DO and ORP values conflict. DO > 0.5 and ORP < 0 Duplicated, inj-110d @ 1201.																																																																																				

LOW FLOW WELL SAMPLING RECORD																																																																																															
Site Name: Ekonol Facility Samplers: Bill Simons							Well ID: INJ-13D Manual Entry: 		Well Diameter: 4 inches																																																																																						
							WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																								
Purging Data Method: Low Flow							Initial Depth to Water (ft): 7.74		Depth to Well Bottom (ft): 																																																																																						
Date: 10/20/2015			Time: 12:55 (hhmm)				1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36																																																																																		
							4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4																																																																																		
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments																																																																																				
1305	7.77	200	0.5	7.75	5.48	267	0.003	20.2	0.002	-195																																																																																					
1325	8.02	200	1.5	6.99	5.5	344	3.95	17.58	2.55	-189																																																																																					
1335	9.07	200	2	6.88	2.68	691	4.1	17	2.62	-192																																																																																					
1345	9.5	200	2.5	6.86	2.67	159	3.8	17.14	2.43	-191																																																																																					
1355	9.82	200	3	6.87	2.04	124	3.58	17.3	2.29	-188																																																																																					
1405	10.16	200	3.5	6.88	1.93	85.8	3.34	17.16	2.13	-191																																																																																					
1415	10.51	200	4	6.92	1.89	68.7	2.94	17.09	1.88	-194																																																																																					
1425	10.81	200	4.5	6.96	1.86	77.1	2.44	17.13	1.56	-197																																																																																					
1435	11.12	200	5	6.94	1.83	71.1	2.14	17.01	1.37	-203																																																																																					
1445	11.31	200	5.5	6.84	1.84	68.1	2.23	16.86	1.43	-215																																																																																					
1455	11.41	200	6	6.79	1.84	69.8	2.33	16.82	1.5	-220																																																																																					
1505	11.4	200	6.5	6.74	1.85	68.6	2.43	16.55	1.55	-216																																																																																					
Sampling Data Method: Dedicated tubing							Date: 10/20/2015		Time: (hhmm) 1505		Total Volume of Water Purged: 6.5 (gal)																																																																																				
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">STABILIZED PARAMETERS</th> <th colspan="2" style="text-align: left;">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.74</td> <td>Alkalinity (g/g)</td> <td></td> </tr> <tr> <td>Spec. Cond. (mS/cm)</td> <td>2.43</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>68.6</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>err</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>Temp. (°C)</td> <td>16.55</td> <td>DTW (ft)</td> <td>11.4</td> </tr> <tr> <td>TDS (g/L)</td> <td>1.55</td> <td></td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-216</td> <td></td> <td></td> </tr> </tbody> </table>							STABILIZED PARAMETERS		HACH TEST KITS		pH	6.74	Alkalinity (g/g)		Spec. Cond. (mS/cm)	2.43	Carbon dioxide (mg/L)		Turbidity (NTU)	68.6	Ferrous Iron (mg/L)		DO (mg/L)	err	Hydrogen sulfide (mg/L)		Temp. (°C)	16.55	DTW (ft)	11.4	TDS (g/L)	1.55			ORP (mv)	-216			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: left;">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th></th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒</td> <td>3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒</td> <td>2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☒</td> <td>1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>☐</td> <td>2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☒</td> <td>1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☒</td> <td>2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>							SAMPLE SET					Parameter		Bottle	Pres.	Method	Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260	MEE	☒	2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☒	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census	☐				Acetylene	☐			
STABILIZED PARAMETERS		HACH TEST KITS																																																																																													
pH	6.74	Alkalinity (g/g)																																																																																													
Spec. Cond. (mS/cm)	2.43	Carbon dioxide (mg/L)																																																																																													
Turbidity (NTU)	68.6	Ferrous Iron (mg/L)																																																																																													
DO (mg/L)	err	Hydrogen sulfide (mg/L)																																																																																													
Temp. (°C)	16.55	DTW (ft)	11.4																																																																																												
TDS (g/L)	1.55																																																																																														
ORP (mv)	-216																																																																																														
SAMPLE SET																																																																																															
Parameter		Bottle	Pres.	Method																																																																																											
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260																																																																																											
MEE	☒	2-250 mL amber glass	HCl	Lab SOP																																																																																											
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																																											
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified																																																																																											
Sulfide	☒	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																																											
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060																																																																																											
Microbial Census	☐																																																																																														
Acetylene	☐																																																																																														
Comments: DO and ORP values conflict. DO > 0.5 and ORP < 0																																																																																															

PARSONS



WELL SAMPLING RECORD																																																																																	
Site Name: Ekonol Facility				Well ID: MW-2S				☒ MW ☐ PMW ☐ INJ ☐ OR																																																																									
Samplers: Dan Chamberland				Manual Entry: 				Well Diameter: 2 inches																																																																									
WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																	
Purging Data Method: Low Flow				Initial Depth to Water (ft): 3.7				Depth to Well Bottom (ft): 																																																																									
Date: 10/15/2015		Time: 13:40 (HH:MM)		1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36																																																																							
				4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4																																																																							
Enter turbidity limit: 50 NTU																																																																																	
SC = Stabilization check																																																																																	
Time HH:MM (24hrs)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)		Comments																																																																					
13:40	3.70	200	0	6.85	1.37	28.5	1.83	18.09	1.71	-179	SC		Final																																																																				
13:45	4.60	200	0.5	6.74	1.43	17.9	2.62	20.62	1.83	-180	SC		Final																																																																				
14:00	7.70	200	1.0	6.76	1.80	4.0	3.15	21.23	2.01	-184	SC		Final																																																																				
14:10	7.89	200	1.5	6.69	1.81	3.0	3.76	21.23	2.41	-183	SC		Final																																																																				
14:20	8.14	200	2.0	6.65	1.41	2.9	4.40	21.21	2.82	-186	SC		Final																																																																				
14:25	8.20	200	2.2	6.64	1.35	2.2	4.53	21.16	2.90	-188	SC		Final																																																																				
14:30	8.36	200	2.5	6.65	1.29	2.6	4.61	21.22	2.95	-191	SC		Final																																																																				
14:35	8.87	200	2.7	6.65	1.27	1.8	4.67	21.02	2.99	-193	SC		Final																																																																				
14:40	9.52	200	2.9	6.64	1.25	2.5	4.74	20.89	3.03	-194	SC		Final																																																																				
14:45	9.75	100	3.2	6.64	1.25	3.0	4.74	20.66	3.03	-195	SC		Final																																																																				
14:50	9.90	100	3.4	6.64	1.26	3.5	4.74	20.48	3.04	-196	SC		Final																																																																				
14:55	10.20	100	3.5	6.64	1.27	4.6	4.74	20.43	3.03	-196	SC		Final																																																																				
15:00	10.52	100	3.7	6.64	1.28	2.9	4.73	20.38	3.02	-197	SC		Final																																																																				
15:05	10.67	100	3.8	6.63	1.28	3.2	4.73	20.23	3.03	-196	SC		Final																																																																				
Sampling Data																																																																																	
Method: Dedicated tubing				Date: 10/15/2015				Time: (HH:MM) 15:10		Total Volume of Water Purged: 4.0 (gal)																																																																							
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.63</td> <td>Alkalinity (mg/L)</td> <td></td> </tr> <tr> <td>Spec. Cond. (mS/cm)</td> <td>4.73</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>3.2</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>1.28</td> <td>Manganese (mg/L)</td> <td></td> </tr> <tr> <td>Temp. (°C)</td> <td>20.23</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-196</td> <td>DTW (ft)</td> <td></td> </tr> </tbody> </table>				STABILIZED PARAMETERS		HACH TEST KITS		pH	6.63	Alkalinity (mg/L)		Spec. Cond. (mS/cm)	4.73	Carbon dioxide (mg/L)		Turbidity (NTU)	3.2	Ferrous Iron (mg/L)		DO (mg/L)	1.28	Manganese (mg/L)		Temp. (°C)	20.23	Hydrogen sulfide (mg/L)		ORP (mv)	-196	DTW (ft)		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th></th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒</td> <td>3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒</td> <td>2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☒</td> <td>1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Sulfate</td> <td>☐</td> <td>2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☐</td> <td>1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☒</td> <td>2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> </tbody> </table>										SAMPLE SET					Parameter		Bottle	Pres.	Method	Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260	MEE	☒	2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
STABILIZED PARAMETERS		HACH TEST KITS																																																																															
pH	6.63	Alkalinity (mg/L)																																																																															
Spec. Cond. (mS/cm)	4.73	Carbon dioxide (mg/L)																																																																															
Turbidity (NTU)	3.2	Ferrous Iron (mg/L)																																																																															
DO (mg/L)	1.28	Manganese (mg/L)																																																																															
Temp. (°C)	20.23	Hydrogen sulfide (mg/L)																																																																															
ORP (mv)	-196	DTW (ft)																																																																															
SAMPLE SET																																																																																	
Parameter		Bottle	Pres.	Method																																																																													
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260																																																																													
MEE	☒	2-250 mL amber glass	HCl	Lab SOP																																																																													
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																													
Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified																																																																													
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																													
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060																																																																													

TDS (g/L)	3.03	* NOTE * HACH test kits are only required for MNA analysis wells.
Microbial Census ☐		
Acetylene ☐		
Comments:		
 Parsons PLUS experience the Parsons advantage		

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

MW-4S

Manual Entry:

Well Diameter: 2 inches

Samplers:

Select...

Select...

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

7.89

Depth to Well Bottom (ft):

Purging Data

Method:

Low Flow

Date:

10/19/2015

Time:

13:34 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
13:44	9.69	150	0.40	6.68	0.77	1.43	5.01	19.21	3.16	-102	
13:54	10.28	150	0.80	6.65	0.56	1.00	5.10	19.53	3.21	-105	
13:59	10.51	150	1.20	6.67	0.48	1.60	5.11	19.67	3.22	-110	
14:04	10.66	150	1.60	6.67	0.47	2.32	5.11	19.51	3.22	-112	
14:09	10.86	150	2.00	6.68	0.43	1.72	5.10	19.16	3.21	-115	
14:14	10.88	150	2.40	6.67	0.42	1.60	5.10	18.98	3.22	-118	
14:19	10.87	150	2.80	6.67	0.40	0.77	5.11	18.81	3.22	-121	

Sampling Data

Method:

Dedicated tubing

Date:

10/19/2015

Time: (hhmm)

14:24

Total Volume of Water Purged:

2.80 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.67	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	5.11	Carbon dioxide (mg/L)	
Turbidity (NTU)	0.77	Ferrous Iron (mg/L)	
DO (mg/L)	0.40	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.81	DTW (ft)	10.87
TDS (g/L)	3.22		
ORP (mv)	-121		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

Acetylene



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

MW-6S

Manual Entry:

Well Diameter: 2 inches

Samplers:

Select...

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Purging Data

Method:

Low Flow

Initial Depth to Water (ft):

7.13

Depth to Well Bottom (ft):

Date:

10/19/2015

Time:

11:18 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
11:28	9.79	125	0.35	9.31	0.89	14.7	2.24	17.42	1.40	-275	
11:38	9.76	125	0.75	8.74	1.09	7.52	2.95	17.83	1.90	-301	
11:43	9.75	125	0.95	8.28	0.75	5.89	3.30	18.33	2.12	-273	
11:48	9.74	150	1.50	7.87	0.57	4.23	3.53	18.60	2.27	-227	
11:53	9.75	150	1.80	7.61	0.49	2.44	3.65	18.62	2.34	-203	
11:58	9.76	150	2.10	7.48	0.51	1.95	3.71	18.64	2.38	-188	
12:03	9.76	150	2.40	7.47	0.50	2.07	3.72	18.73	2.38	-185	
12:08	9.76	150	2.70	7.43	0.47	3.07	3.76	18.92	2.41	-180	

Sampling Data

Method:

Dedicated tubing

Date:

10/19/2015

Time: (hhmm)

12:13

Total Volume of Water Purged:

2.70 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.43	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.76	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.07	Ferrous Iron (mg/L)	
DO (mg/L)	0.47	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.92	DTW (ft)	9.76

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	2.41
ORP (mv)	-180

Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

MS/MSD collected

PARSONS



Parsons PLUS
experience the Parsons advantage

Site Name: <u>Ekono1 Facility</u> Samplers: <u>Bill Simons</u>	Well ID:	
	Manual Entry:	
		Well Diameter: <u>4</u> inches
WATER VOLUME CALCULATION		
= (Total Depth of Well - Depth To Water) x Casing Volume per Foot		

Date: 10/20/2015 Time: 10:55 (hhmm)

WATER VOLUME CALCULATION	
= (Total Depth of Well - Depth To Water) x Casing Volume per Foot	

1-inch=0.041	1.5-inch=0.092	2-inch=0.16	3-inch=0.36
4-inch=0.64	6-inch=1.4	8-inch=2.5	10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1105	9.42	200	.5	6.73	3.73	43.2	4.76	16.2	3.05	-372	
1115	9.42	200	1	6.71	4.24	35.4	4.6	16.16	2.93	-371	
1125	9.42	200	1.5	6.69	4.23	14.8	4.53	16.2	2.9	-370	
1135	9.42	200	2	6.68	4.19	17.6	4.51	16.28	2.88	-370	
1145	9.42	200	2.5	6.68	4.16	5.5	4.49	16.44	2.87	-369	
1150	9.42	200	2.8	6.68	4.13	15.4	4.5	16.4	2.88	-369	

Method:	Date:	Time: (hhmm)	Total Volume of Water Purged:
Dedicated tubing	10/20/2015	1150	2.8 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.68	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.5	Carbon dioxide (mg/L)	
Turbidity (NTU)	15.4	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	16.4	DTW (ft)	9.42
TDS (g/L)	2.88		
ORP (mv)	-369		

Comments:
DO and ORP values conflict. DO > 0.5 and ORP < 0

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			



LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

MW-7S

Manual Entry:

Well Diameter: inches

Samplers:

Select...

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

7.2

Depth to Well Bottom (ft):

12.35

Purging Data

Method:

Low Flow

Date:

10/21/2015

Time:

15:40

(hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
15:50	8.03	100	0.30	6.57	0.57	15.1	6.92	18.70	4.35	3	
16:00	8.54	100	0.60	6.52	0.54	7.44	6.83	18.78	4.30	13	
16:05	8.87	100	0.75	6.51	0.48	2.92	6.91	18.81	4.35	17	
16:10	9.14	100	0.90	6.49	0.44	2.57	6.96	18.80	4.39	21	
16:15	9.24	100	1.10	6.49	0.41	2.14	7.04	18.77	4.44	22	
16:20	9.30	100	1.25	6.48	0.38	1.88	7.05	18.75	4.44	19	
16:25	9.32	100	1.40	6.50	0.37	1.15	7.08	18.71	4.46	15	

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

16:30

Total Volume of Water Purged:

1.40 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.50	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	7.08	Carbon dioxide (mg/L)	
Turbidity (NTU)	1.15	Ferrous Iron (mg/L)	
DO (mg/L)	0.37	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.71	DTW (ft)	9.32
TDS (g/L)	4.46		
ORP (mv)	15		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

Acetylene



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

MW-9S

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.52

Depth to Well Bottom (ft):

13.98

Purging Data

Method:

Low Flow

Date:

10/13/2015

Time:

10:15 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
10:15	8.52	180	0	6.74	6.42	54.3	4.16	18.17	2.67	-90	Black particulates
10:25	9.40	180	0.3	7.04	6.66	27	4.01	18.13	2.56	-134	Clear
10:35	9.40	180	.75	7.08	5.36	17.2	4.17	18.24	2.66	-139	Clear
10:45	9.40	180	1.25	7.12	3.93	9.93	4.22	18.23	2.70	-147	Clear
10:55	9.4	180	1.5	7.12	3.16	6.34	4.19	18.54	2.68	-150	Clear
11:00	9.4	180	1.75	7.12	2.79	4.36	4.13	19.07	2.64	-153	Clear
11:05	9.4	180	2	7.13	2.44	3.77	4.01	19.5	2.57	-154	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/13/2015

Time: (hhmm)

11:05

Total Volume of Water Purged:

2 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.13	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.01	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.77	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.5	DTW (ft)	9.4
TDS (g/L)	2.57		
ORP (mv)	-154		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

MW-10S

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

7.58

Depth to Well Bottom (ft):

11.74

Purging Data

Method:

Low Flow

Date:

10/21/2015

Time:

13:55 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
14:00	7.71	180	.3	6.57	2.14	24.3	3.03	17.94	1.94	-34	Clear
14:10	7.70	180	0.9	6.57	1.46	12.1	2.71	17.24	1.75	-40	Clear
14:25	7.70	180	1.5	6.60	1.15	8.04	2.34	17.08	1.49	-46	Clear
14:35	7.71	180	2.1	6.62	0.99	4.79	2.19	17.08	1.40	-46	Clear
14:50	7.70	180	2.7	6.64	0.80	3.13	1.98	17	1.27	-47	Clear
14:55	7.70	180	2.8	6.62	0.79	2.19	1.96	16.90	1.25	-45	Clear
15:00	7.70	180	3.0	6.62	0.76	2.25	1.91	16.97	1.22	-46	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

15:00

Total Volume of Water Purged:

3.0 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.62	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	1.91	Carbon dioxide (mg/L)	
Turbidity (NTU)	2.25	Ferrous Iron (mg/L)	
DO (mg/L)	0.76	Hydrogen sulfide (mg/L)	
Temp.(°C)	16.97	DTW (ft)	7.7
TDS (g/L)	1.22		
ORP (mv)	-46		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

MW-11D

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

11.65

Depth to Well Bottom (ft):

31.05

Purging Data

Method:

Low Flow

Date:

10/15/2015

Time:

11:05 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
11:05	11.65	250	0	7.86	4.96	2.08	2.55	16.09	1.63	-260	Clear
11:25	11.65	250	1.0	7.53	1.37	0.61	2.37	15.64	1.51	-293	Clear
11:35	11.65	250	1.75	7.44	1.07	0.70	2.37	15.7	1.52	-296	Clear
11:40	11.65	250	2	7.38	1.02	0.57	2.37	15.78	1.52	-295	Clear
11:45	11.65	250	2.25	7.30	0.95	0.45	2.37	15.78	1.52	-291	Clear
11:50	11.65	250	2.5	7.22	0.88	0.52	2.37	15.91	1.51	-288	Clear
11:55	11.65	250	2.75	7.20	0.87	0.44	2.37	15.92	1.52	-287	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/15/2015

Time: (hhmm)

11:55

Total Volume of Water Purged:

2.75 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.20	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	2.37	Carbon dioxide (mg/L)	
Turbidity (NTU)	0.44	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	15.92	DTW (ft)	11.65
TDS (g/L)	1.52		
ORP (mv)	-287		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

WELL SAMPLING RECORD																																																																																															
Site Name: Ekonomol Facility Samplers: Dan Chamberland				Well ID: MW-11S Manual Entry: 		☒ MW ☐ PMW ☐ INJ ☐ OR Well Diameter: 2 inches																																																																																									
WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																															
Purging Data Method: Low Flow				Initial Depth to Water (ft): 9		Depth to Well Bottom (ft): 																																																																																									
Date: 10/15/2015		Time: 15:35 (HH:MM)		1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36 4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4																																																																																											
Enter turbidity limit: 50 NTU SC = Stabilization check																																																																																															
Time HH:MM (24hrs)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	SC	Comments	Final																																																																																		
15:35	9.00	250	0.0	6.97	0.856	OR	5.15	14.56	4.27	-54	SC		Final																																																																																		
15:45	9.10	250	0.6	7.04	2.21	3182	4.82	16.57	3.06	-123	SC		Final																																																																																		
15:55	9.10	250	1.2	6.99	1.51	31.5	3.07	16.21	1.96	-224	SC		Final																																																																																		
16:05	9.10	250	1.8	7.00	1.46	29.5	2.94	16.20	1.88	-222	SC		Final																																																																																		
16:10	9.10	250	2.1	7.00	1.40	31.4	2.97	16.18	1.90	-222	SC		Final																																																																																		
16:15	9.10	250	2.4	6.99	1.34	38.2	2.99	16.13	1.91	-221	SC		Final																																																																																		
16:20	9.11	250	2.6	6.99	1.35	26.7	3.00	16.15	1.91	-220	SC		Final																																																																																		
16:25	9.11	250	2.9	7.00	1.37	20.3	3.01	16.17	1.92	-220	SC		Final																																																																																		
Sampling Data Method: Dedicated tubing Date: 10/15/2015 Time: (HH:MM) 16:25 Total Volume of Water Purged: 2.9 (gal)																																																																																															
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>7.00</td> <td>Alkalinity (mg/L)</td> <td></td> </tr> <tr> <td>Spec. Cond.(mS/cm)</td> <td>3.01</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>20.3</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>1.37</td> <td>Manganese (mg/L)</td> <td></td> </tr> <tr> <td>Temp.(°C)</td> <td>16.17</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-220</td> <td>DTW (ft)</td> <td></td> </tr> <tr> <td>TDS (g/L)</td> <td>1.92</td> <td colspan="2">* NOTE * HACH test kits are only required for MNA analysis wells.</td> </tr> </tbody> </table>				STABILIZED PARAMETERS		HACH TEST KITS		pH	7.00	Alkalinity (mg/L)		Spec. Cond.(mS/cm)	3.01	Carbon dioxide (mg/L)		Turbidity (NTU)	20.3	Ferrous Iron (mg/L)		DO (mg/L)	1.37	Manganese (mg/L)		Temp.(°C)	16.17	Hydrogen sulfide (mg/L)		ORP (mv)	-220	DTW (ft)		TDS (g/L)	1.92	* NOTE * HACH test kits are only required for MNA analysis wells.		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th></th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒</td> <td>3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒</td> <td>2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☐</td> <td>1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Sulfate</td> <td>☐</td> <td>2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☐</td> <td>1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☐</td> <td>2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										SAMPLE SET					Parameter		Bottle	Pres.	Method	Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260	MEE	☒	2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census	☐				Acetylene	☐			
STABILIZED PARAMETERS		HACH TEST KITS																																																																																													
pH	7.00	Alkalinity (mg/L)																																																																																													
Spec. Cond.(mS/cm)	3.01	Carbon dioxide (mg/L)																																																																																													
Turbidity (NTU)	20.3	Ferrous Iron (mg/L)																																																																																													
DO (mg/L)	1.37	Manganese (mg/L)																																																																																													
Temp.(°C)	16.17	Hydrogen sulfide (mg/L)																																																																																													
ORP (mv)	-220	DTW (ft)																																																																																													
TDS (g/L)	1.92	* NOTE * HACH test kits are only required for MNA analysis wells.																																																																																													
SAMPLE SET																																																																																															
Parameter		Bottle	Pres.	Method																																																																																											
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260																																																																																											
MEE	☒	2-250 mL amber glass	HCl	Lab SOP																																																																																											
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																																											
Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified																																																																																											
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																																											
Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060																																																																																											
Microbial Census	☐																																																																																														
Acetylene	☐																																																																																														
Comments: 																																																																																															

LOW FLOW WELL SAMPLING RECORD																																																																																														
Site Name: Ekonol Facility							Well ID: MW-12S																																																																																							
Samplers: Dan Chamberland							Manual Entry: 		Well Diameter: 2 inches																																																																																					
							WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																							
Purging Data Method: Low Flow							Initial Depth to Water (ft): 8.93		Depth to Well Bottom (ft): 																																																																																					
Date: 10/16/2015			Time: 08:50 (hhmm)				1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36																																																																																	
							4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4																																																																																	
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mv)	Comments																																																																																			
08:50	8.93	200	0.0	6.21	16.63	3000	10.7	15.10	6.62	75	Muddy																																																																																			
09:00	9.48	200	0.5	6.78	6.06	436	10.5	16.14	6.51	-10																																																																																				
09:10	9.65	200	1.0	6.78	4.62	65.5	10.4	16.43	6.44	-97	Clearing																																																																																			
09:20	9.80	200	1.5	6.78	4.21	56.0	9.91	16.73	6.24	-171																																																																																				
09:25	9.90	200	1.7	6.82	3.65	57.9	9.40	16.78	5.82	-201																																																																																				
09:30	10.00	200	1.9	6.86	3.19	60.9	8.90	16.83	5.60	-244																																																																																				
09:35	9.98	200	2.2	6.83	3.40	58.8	7.93	16.99	5.25	-249																																																																																				
09:40	9.97	200	2.4	6.80	3.69	52.9	7.56	17.12	4.96	-253																																																																																				
09:45	9.97	200	2.6	6.80	3.85	37.4	7.30	17.19	4.80	-260	Clear no odor																																																																																			
09:50	9.96	200	2.9	6.79	3.96	26.5	7.22	17.25	4.66	-268																																																																																				
09:55	9.95	200	3.1	6.77	4.10	19.1	7.18	17.36	4.48	-270																																																																																				
Sampling Data																																																																																														
Method: Dedicated tubing							Date: 10/16/2015		Time: (hhmm) 09:55		Total Volume of Water Purged: 3.1 (gal)																																																																																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.77</td> <td>Alkalinity (g/g)</td> <td></td> </tr> <tr> <td>Spec. Cond. (mS/cm)</td> <td>7.18</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>19.1</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>err</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>Temp.(°C)</td> <td>17.36</td> <td>DTW (ft)</td> <td>9.95</td> </tr> <tr> <td>TDS (g/L)</td> <td>4.48</td> <td></td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-270</td> <td></td> <td></td> </tr> </tbody> </table>							STABILIZED PARAMETERS		HACH TEST KITS		pH	6.77	Alkalinity (g/g)		Spec. Cond. (mS/cm)	7.18	Carbon dioxide (mg/L)		Turbidity (NTU)	19.1	Ferrous Iron (mg/L)		DO (mg/L)	err	Hydrogen sulfide (mg/L)		Temp.(°C)	17.36	DTW (ft)	9.95	TDS (g/L)	4.48			ORP (mv)	-270			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th></th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒</td> <td>3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒</td> <td>2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☐</td> <td>1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>☐</td> <td>2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☐</td> <td>1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☐</td> <td>2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>							SAMPLE SET				Parameter		Bottle	Pres.	Method	Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260	MEE	☒	2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census	☐				Acetylene	☐			
STABILIZED PARAMETERS		HACH TEST KITS																																																																																												
pH	6.77	Alkalinity (g/g)																																																																																												
Spec. Cond. (mS/cm)	7.18	Carbon dioxide (mg/L)																																																																																												
Turbidity (NTU)	19.1	Ferrous Iron (mg/L)																																																																																												
DO (mg/L)	err	Hydrogen sulfide (mg/L)																																																																																												
Temp.(°C)	17.36	DTW (ft)	9.95																																																																																											
TDS (g/L)	4.48																																																																																													
ORP (mv)	-270																																																																																													
SAMPLE SET																																																																																														
Parameter		Bottle	Pres.	Method																																																																																										
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260																																																																																										
MEE	☒	2-250 mL amber glass	HCl	Lab SOP																																																																																										
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																																										
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified																																																																																										
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																																										
Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060																																																																																										
Microbial Census	☐																																																																																													
Acetylene	☐																																																																																													
Comments: DO and ORP values conflict. DO > 0.5 and ORP < 0																																																																																														

PARSONS



LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Samplers:

Rob Piurek

Well ID:

Manual Entry:

MW-13D

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

12.6

Depth to Well Bottom (ft):

31.7

Purging Data

Method:

Low Flow

Date:

10/14/2015

Time:

11:30 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
11:40	12.95	250	0.25	6.62	5.56	15.2	4.35	14.46	2.78	-263	Clear
11:50	12.92	250	1	6.54	5.69	8.01	4.36	14.46	2.79	-275	Clear
12:00	12.92	250	1.3	6.53	5.33	4.0	4.35	14.5	2.78	-276	Clear
12:15	12.92	250	2.25	6.51	4.32	5.3	3.80	14.67	2.42	-274	Clear
12:20	12.92	250	2.75	6.51	4.04	6	3.53	14.78	2.26	-271	Clear
12:25	12.92	250	3	6.50	3.07	3.04	3.5	14.62	2.24	-271	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/14/2015

Time: (hhmm)

12:25

Total Volume of Water Purged:

3 (gal)

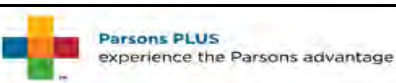
STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.50	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.5	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.04	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp. (°C)	14.62	DTW (ft)	12.92
TDS (g/L)	2.24		
ORP (mv)	-271		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0.

Blind duplicate MW-130D_2015-10-14 sampled for all parameters at 12:01.



LOW FLOW WELL SAMPLING RECORD																																																					
Site Name: Ekonol Facility Samplers: Dan Chamberland								Well ID: MW-15D		Manual Entry: 				Well Diameter: 2 inches																																							
								WATER VOLUME CALCULATION																																													
								= (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																													
Purging Data Method: Low Flow								Initial Depth to Water (ft): 10.13		Depth to Well Bottom (ft): 																																											
Date: 10/13/2015				Time: 13:10 (hhmm)				1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36		4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4																																											
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments																																										
13:10	10.13	200	0	7.21	0.96	26.1	1.98	19.18	1.26	-99	Clear, no odor																																										
13:30	10.63	200	0.5	7.16	0.74	8.7	1.92	18.57	1.23	-115																																											
13:30	10.91	200	1.0	7.10	0.65	6.9	1.87	17.93	1.19	-132																																											
13:40	10.96	200	1.5	7.14	0.53	9.2	1.90	17.92	1.21	-140																																											
13:45	10.97	200	1.7	7.12	0.52	10.9	1.91	17.88	1.22	-140																																											
13:50	10.99	200	1.9	7.10	0.49	12.7	1.92	17.85	1.23	-140																																											
13:55	11.00	200	2.3	7.06	0.45	6.8	1.93	17.82	1.24	-140																																											
14:00	11.00	200	2.5	7.03	0.42	5.8	1.93	17.79	1.23	-141																																											
14:05	11.01	200	2.7	7.02	0.41	8.4	1.93	17.78	1.23	-140																																											
14:10	11.01	200	3.0	7.01	0.40	3.7	1.94	17.76	1.24	-139																																											
14:15	11.01	200	3.2	7.03	0.38	5.7	1.95	17.71	1.25	-141																																											
Sampling Data																																																					
Method: Dedicated tubing								Date: 10/13/2015		Time: (hhmm) 14:15		Total Volume of Water Purged: 3.2 (gal)																																									
STABILIZED PARAMETERS				HACH TEST KITS				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center; padding: 5px;">SAMPLE SET</th> </tr> <tr> <th style="text-align: center; padding: 5px;">Parameter</th> <th style="text-align: center; padding: 5px;">Bottle</th> <th style="text-align: center; padding: 5px;">Pres.</th> <th style="text-align: center; padding: 5px;">Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒ 3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒ 2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☒ 1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>☒ 2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☒ 1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☒ 2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> </tr> </tbody> </table>						SAMPLE SET				Parameter	Bottle	Pres.	Method	Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260	MEE	☒ 2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☒ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Chloride / Nitrate / Sulfate	☒ 2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☒ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☒ 2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census	☐			Acetylene	☐		
SAMPLE SET																																																					
Parameter	Bottle	Pres.	Method																																																		
Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260																																																		
MEE	☒ 2-250 mL amber glass	HCl	Lab SOP																																																		
Dissolved Inorganics	☒ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																		
Chloride / Nitrate / Sulfate	☒ 2-40 mL glass (Field Filtered)	None	lab specified																																																		
Sulfide	☒ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																		
Total Organic Carbon	☒ 2-40 mL amber glass vial	H3PO4	SW9060																																																		
Microbial Census	☐																																																				
Acetylene	☐																																																				
pH	7.03	Alkalinity (g/g)																																																			
Spec. Cond. (mS/cm)	1.95	Carbon dioxide (mg/L)																																																			
Turbidity (NTU)	5.7	Ferrous Iron (mg/L)																																																			
DO (mg/L)	0.38	Hydrogen sulfide (mg/L)																																																			
Temp.(°C)	17.71	DTW (ft)	11.01																																																		
TDS (g/L)	1.25																																																				
ORP (mv)	-141																																																				
Comments: 																																																					

PARSONS



LOW FLOW WELL SAMPLING RECORD																																																																																					
Site Name: Ekonomol Facility						Well ID: MW-16D																																																																															
Samplers: Dan Chamberland						Manual Entry:		Well Diameter: 2 inches																																																																													
Purging Data Method: Low Flow						WATER VOLUME CALCULATION																																																																															
						= (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																															
Date: 10/13/2015						Time: 14:50 (hhmm)		Initial Depth to Water (ft): 13.9		Depth to Well Bottom (ft):																																																																											
								1-inch=0.041		1.5-inch=0.092		2-inch=0.16																																																																									
								4-inch=0.64		6-inch=1.4		8-inch=2.5																																																																									
												10-inch=4																																																																									
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments																																																																										
14:50	13.90	200	0.0	7.48	1.44	18.8	0.648	18.49	0.435	-99	Clear, no odor																																																																										
15:00	14.65	200	0.5	7.22	0.85	12.7	0.745	16.00	0.574	-100																																																																											
15:10	15.00	200	1.0	7.04	0.44	1.5	0.979	14.49	0.629	-102																																																																											
15:20	15.02	200	1.5	7.02	0.44	3.8	1.21	14.43	0.801	-107																																																																											
15:30	15.02	200	1.7	7.01	0.43	5.2	1.46	14.36	0.943	-124																																																																											
15:35	15.02	200	2.0	7.01	0.42	5.4	1.48	14.33	0.948	-115																																																																											
15:40	15.00	200	2.3	7.01	0.85	6.4	1.50	14.40	0.948	-115																																																																											
15:45	15.00	200	2.5	7.00	1.27	3.9	1.53	14.46	0.975	-116																																																																											
15:50	14.99	200	2.7	7.01	1.43	7.6	1.57	14.50	1.01	-117																																																																											
15:55	15.00	200	2.9	7.01	1.39	8.3	1.57	14.45	1.01	-118																																																																											
16:00	15.00	200	3.2	7.02	1.37	9.5	1.56	14.40	1.00	-120																																																																											
Sampling Data Method: Dedicated tubing Date: 10/13/2015 Time: (hhmm) 16:00 Total Volume of Water Purged: 3.2 (gal)																																																																																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>7.02</td> <td>Alkalinity (g/g)</td> <td></td> </tr> <tr> <td>Spec. Cond. (mS/cm)</td> <td>1.56</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>9.5</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>err</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>Temp. (°C)</td> <td>14.40</td> <td>DTW (ft)</td> <td>15</td> </tr> <tr> <td>TDS (g/L)</td> <td>1</td> <td></td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-120</td> <td></td> <td></td> </tr> </tbody> </table>						STABILIZED PARAMETERS		HACH TEST KITS		pH	7.02	Alkalinity (g/g)		Spec. Cond. (mS/cm)	1.56	Carbon dioxide (mg/L)		Turbidity (NTU)	9.5	Ferrous Iron (mg/L)		DO (mg/L)	err	Hydrogen sulfide (mg/L)		Temp. (°C)	14.40	DTW (ft)	15	TDS (g/L)	1			ORP (mv)	-120			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>								SAMPLE SET				Parameter	Bottle	Pres.	Method	Select VOCs	3-40mL glass vial	HCl	EPA 8260	MEE	2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Chloride / Nitrate / Sulfate	2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census				Acetylene			
STABILIZED PARAMETERS		HACH TEST KITS																																																																																			
pH	7.02	Alkalinity (g/g)																																																																																			
Spec. Cond. (mS/cm)	1.56	Carbon dioxide (mg/L)																																																																																			
Turbidity (NTU)	9.5	Ferrous Iron (mg/L)																																																																																			
DO (mg/L)	err	Hydrogen sulfide (mg/L)																																																																																			
Temp. (°C)	14.40	DTW (ft)	15																																																																																		
TDS (g/L)	1																																																																																				
ORP (mv)	-120																																																																																				
SAMPLE SET																																																																																					
Parameter	Bottle	Pres.	Method																																																																																		
Select VOCs	3-40mL glass vial	HCl	EPA 8260																																																																																		
MEE	2-250 mL amber glass	HCl	Lab SOP																																																																																		
Dissolved Inorganics	1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																																		
Chloride / Nitrate / Sulfate	2-40 mL glass (Field Filtered)	None	lab specified																																																																																		
Sulfide	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																																		
Total Organic Carbon	2-40 mL amber glass vial	H3PO4	SW9060																																																																																		
Microbial Census																																																																																					
Acetylene																																																																																					
Comments: DO and ORP values conflict. DO > 0.5 and ORP < 0																																																																																					

PARSONS

Parsons PLUS
experience the Parsons advantage

WELL SAMPLING RECORD													
Site Name: Ekonomol Facility Samplers: Dan Chamberland				Well ID: MW-17D Manual Entry: 		☒ MW ☐ PMW ☐ INJ ☐ OR Well Diameter: 2 inches							
WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot													
Purging Data Method: Low Flow				Initial Depth to Water (ft): 10.7		Depth to Well Bottom (ft): 							
Date: 10/15/2015		Time: 11:50 (HH:MM)		1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36 4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4									
Enter turbidity limit: 50 NTU SC = Stabilization check												Comments	
Time HH:MM (24hrs)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	SC		
11:50	10.70	200	0.0	8.12	6.16	36.1	1.56	14.46	1.00	-224	SC	Clear no odor.	Final
12:00	10.96	200	0.5	7.48	3.08	28.7	2.47	13.57	1.59	-246	SC		Final
12:10	10.97	200	1.0	7.38	2.76	12.7	2.56	13.59	1.64	-257	SC		Final
12:20	10.98	200	1.5	7.38	2.60	9.4	2.57	13.50	1.65	-253	SC		Final
12:30	10.99	200	1.7	7.36	2.65	8.6	2.55	13.47	1.64	-255	SC		Final
12:35	10.99	200	2.0	7.34	2.71	2.9	2.54	13.43	1.63	-258	SC		Final
12:40	10.99	200	2.3	7.32	2.74	6.3	2.53	13.40	1.62	-260	SC		Final
12:45	10.99	200	2.5	7.30	2.75	5.5	2.53	13.42	1.62	-262	SC		Final
12:50	11.00	200	2.7	7.29	2.76	3.7	2.53	13.46	1.62	-264	SC		Final
12:55	11.00	200	3.0	7.27	2.77	4.6	2.53	13.48	1.62	-266	SC		Final
13:00	11.00	200	3.2	7.26	2.78	1.9	2.53	13.48	1.62	-268	SC		Final

Sampling Data			
Method: Dedicated tubing	Date: 10/15/2015	Time: (HH:MM) 13:00	Total Volume of Water Purged: 3.2 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.26	Alkalinity (mg/L)	
Spec. Cond. (mS/cm)	2.53	Carbon dioxide (mg/L)	
Turbidity (NTU)	1.9	Ferrous Iron (mg/L)	
DO (mg/L)	2.78	Manganese (mg/L)	
Temp. (°C)	13.48	Hydrogen sulfide (mg/L)	
ORP (mv)	-268	DTW (ft)	
TDS (g/L)	1.62	* NOTE * HACH test kits are only required for MNA analysis wells.	

SAMPLE SET			
Parameter	Bottle	Pres.	Method
Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260
MEE	☒ 2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☐ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Sulfate	☐ 2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☐ 2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐		
Acetylene	☐		

Comments:

	 PARSONS PLUS experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Samplers:

Rob Piurek

Well ID:

MW-18D

Manual Entry:

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

9.98

Depth to Well Bottom (ft):

28.6

Purging Data

Method:

Low Flow

Date:

10/14/2015

Time:

9:40 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
9:50	9.99	250	0.4	6.63	3.37	59.5	3.12	12.79	2.00	-121	Clear
10:00	10.01	250	1.5	6.93	2.18	25.9	3.40	12.77	2.17	-240	Clear
10:10	10.01	250	2.0	6.85	1.89	20.7	3.42	12.65	2.19	-249	Clear
10:15	10.01	250	2.25	6.83	1.86	13.3	3.42	12.62	2.19	-251	
10:20	10.01	250	2.5	6.80	1.77	12.1	3.42	12.55	2.19	-254	
10:25	10.01	250	2.75	6.79	1.71	10.28	3.42	12.53	2.19	-257	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/14/2015

Time: (hhmm)

10:25

Total Volume of Water Purged:

2.75 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.79	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.42	Carbon dioxide (mg/L)	
Turbidity (NTU)	10.28	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	12.53	DTW (ft)	10.01
TDS (g/L)	2.19		
ORP (mv)	-257		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD																																																																																				
Site Name: Ekonol Facility				Well ID: MW-19D																																																																																
Samplers: Dan Chamberland				Manual Entry:		Well Diameter: 4 inches																																																																														
WATER VOLUME CALCULATION																																																																																				
= (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																				
Purging Data Method: Low Flow				Initial Depth to Water (ft): 7.83				Depth to Well Bottom (ft):																																																																												
Date: 10/13/2015		Time: 10:50 (hhmm)		1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36																																																																										
				4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4																																																																										
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mv)	Comments																																																																									
10:50	7.83	200	0	6.51	4.11	155	3.88	18.13	2.50	19	Clear, no odor.																																																																									
11:00	8.04	200	0.5	6.48	3.94	78.6	3.90	17.35	2.49	-2																																																																										
11:10	8.10	200	1.0	6.46	3.10	38.2	3.97	17.48	2.54	3																																																																										
11:15	8.12	200	1.2	6.47	2.94	36.3	4.00	17.46	2.55	3																																																																										
11:20	8.13	200	1.5	6.47	2.58	32.8	4.03	17.42	2.57	2																																																																										
11:25	8.13	200	1.7	6.48	2.26	29.8	4.05	17.39	2.59	1																																																																										
11:30	8.16	200	1.9	6.55	2.06	24.1	4.06	17.39	2.60	-4																																																																										
11:35	8.18	200	2.2	6.53	1.84	22.3	4.08	17.40	2.62	-4																																																																										
11:40	8.20	200	2.4	6.50	1.37	21.6	4.11	17.40	2.63	-4																																																																										
11:45	8.20	200	2.6	6.49	1.18	22.1	4.12	17.45	2.62	-3																																																																										
11:50	8.20	200	2.8	6.50	1.08	21.3	4.14	17.51	2.64	-2																																																																										
11:55	8.22	200	3.1	6.50	1.03	21.0	4.14	17.59	2.65	-2																																																																										
12:00	8.22	200	3.2	6.51	0.99	20.8	4.15	17.64	2.66	-3																																																																										
Sampling Data																																																																																				
Method: Dedicated tubing				Date: 10/13/2015		Time: (hhmm) 12:00		Total Volume of Water Purged: 3.2 (gal)																																																																												
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.51</td> <td>Alkalinity (g/g)</td> <td></td> </tr> <tr> <td>Spec. Cond. (mS/cm)</td> <td>4.15</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>20.8</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>err</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>Temp. (°C)</td> <td>17.64</td> <td>DTW (ft)</td> <td>8.22</td> </tr> <tr> <td>TDS (g/L)</td> <td>2.66</td> <td></td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-3</td> <td></td> <td></td> </tr> </tbody> </table>				STABILIZED PARAMETERS		HACH TEST KITS		pH	6.51	Alkalinity (g/g)		Spec. Cond. (mS/cm)	4.15	Carbon dioxide (mg/L)		Turbidity (NTU)	20.8	Ferrous Iron (mg/L)		DO (mg/L)	err	Hydrogen sulfide (mg/L)		Temp. (°C)	17.64	DTW (ft)	8.22	TDS (g/L)	2.66			ORP (mv)	-3			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒ 3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒ 2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☒ 1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>☐ 2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☐ 1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☒ 2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> </tr> </tbody> </table>									SAMPLE SET				Parameter	Bottle	Pres.	Method	Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260	MEE	☒ 2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☒ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Chloride / Nitrate / Sulfate	☐ 2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☐ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☒ 2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census	☐			Acetylene	☐		
STABILIZED PARAMETERS		HACH TEST KITS																																																																																		
pH	6.51	Alkalinity (g/g)																																																																																		
Spec. Cond. (mS/cm)	4.15	Carbon dioxide (mg/L)																																																																																		
Turbidity (NTU)	20.8	Ferrous Iron (mg/L)																																																																																		
DO (mg/L)	err	Hydrogen sulfide (mg/L)																																																																																		
Temp. (°C)	17.64	DTW (ft)	8.22																																																																																	
TDS (g/L)	2.66																																																																																			
ORP (mv)	-3																																																																																			
SAMPLE SET																																																																																				
Parameter	Bottle	Pres.	Method																																																																																	
Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260																																																																																	
MEE	☒ 2-250 mL amber glass	HCl	Lab SOP																																																																																	
Dissolved Inorganics	☒ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																																	
Chloride / Nitrate / Sulfate	☐ 2-40 mL glass (Field Filtered)	None	lab specified																																																																																	
Sulfide	☐ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																																	
Total Organic Carbon	☒ 2-40 mL amber glass vial	H3PO4	SW9060																																																																																	
Microbial Census	☐																																																																																			
Acetylene	☐																																																																																			
Comments: DO and ORP values conflict. DO > 0.5 and ORP < 0																																																																																				

PARSONS



LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Samplers:

Rob Piurek

Well ID:

MW-20D

Manual Entry:

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

9.7

Depth to Well Bottom (ft):

29.7

Purging Data

Method:

Low Flow

Date:

10/14/2015

Time:

13:40 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
13:40	9.70	250	0	6.95	2.56	5.76	2.04	17.98	1.31	-240	Clear
13:50	10.05	250	0.6	6.90	2.19	3.10	2.04	17.85	1.31	-247	Clear
14:00	10.06	250	1.6	6.79	1.58	1.13	2.05	17.71	1.31	-255	Clear
14:10	10.08	250	2.5	6.72	1.37	0.65	2.12	17.7	1.36	-259	Clear
14:15	10.08	250	2.75	6.68	1.28	0.60	2.16	17.66	1.38	-260	Clear
14:20	10.08	250	3	6.67	1.25	0.32	2.19	17.63	1.4	-260	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/14/2015

Time: (hhmm)

14:20

Total Volume of Water Purged:

3 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.67	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	2.19	Carbon dioxide (mg/L)	
Turbidity (NTU)	0.32	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.63	DTW (ft)	10.08
TDS (g/L)	1.4		
ORP (mv)	-260		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0.

MS/MSD collected for VOCs only.



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

MW-21D

Manual Entry:

Well Diameter: 4 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

9.4

Depth to Well Bottom (ft):

31.65

Purging Data

Method:

Low Flow

Date:

10/14/2015

Time:

15:20 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
15:20	9.40	250	0	8.50	1.63	8.21	1.32	17.73	.843	-202	
15:40	9.4	325	2.2	8.19	0.74	6.74	1.40	17.25	.897	-284	
15:50	9.4	325	2.5	7.68	0.69	5.92	1.52	17.16	.974	-252	
15:55	9.4	250	3.1	7.26	.66	4.34	1.65	17.08	1.06	-189	
16:00	9.4	250	3.25	7.09	.65	4.06	1.70	17.11	1.08	-187	
16:05	9.4	250	3.5	7.06	.65	3.93	1.73	17.22	1.12	-178	
16:10	9.4	250	3.75	6.99	.65	3.07	1.81	17.20	1.16	-168	

Sampling Data

Method:

Dedicated tubing

Date:

10/14/2015

Time: (hhmm)

16:10

Total Volume of Water Purged:

3.75 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.99	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	1.81	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.07	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.20	DTW (ft)	9.4
TDS (g/L)	1.16		
ORP (mv)	-168		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Samplers:

Rob Piurek

Well ID:

OR-3SM

Manual Entry:

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

3.05

Depth to Well Bottom (ft):

12.45

Purging Data

Method:

Low Flow

Date:

10/21/2015

Time:

11:35 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
11:35	3.05	190	0	6.20	3.47	59.9	10.2	20.88	6.37	-51	Cloudy
11:55	3.92	190	0.9	6.07	1.24	20.6	10.5	19.45	6.51	-81	
12:05	3.92	190	1.5	6.08	0.89	11.6	10.5	19.45	6.48	-89	Clear
12:10	3.92	190	1.75	6.08	0.85	9.82	10.4	19.51	6.47	-90	Clear
12:15	3.92	190	2	6.08	0.79	7.09	10.4	19.57	6.46	-92	Clear
12:20	3.92	190	2.25	6.08	0.79	7.89	10.4	19.57	6.45	-92	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

12:30

Total Volume of Water Purged:

2.25 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.08	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	10.4	Carbon dioxide (mg/L)	
Turbidity (NTU)	7.89	Ferrous Iron (mg/L)	
DO (mg/L)	0.79	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.57	DTW (ft)	3.92
TDS (g/L)	6.45		
ORP (mv)	-92		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

MS/MSD collected for VOCs only.



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

OR-4SM

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

5.05

Depth to Well Bottom (ft):

12.3

Purging Data

Method:

Low Flow

Date:

10/21/2015

Time:

9:25

(hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
9:35	5.15	190	0.2	6.24	2.74	3.65	4.06	18.41	2.59	-81	Clear
9:50	5.18	190	1.0	6.27	1.51	3.28	4.08	18.62	2.61	-132	Clear
10:00	5.19	190	1.5	6.26	1.28	2.96	4.07	18.69	2.61	-149	Clear
10:10	5.21	190	1.75	6.26	1.06	2.81	4.06	18.87	2.60	-174	Clear
10:15	5.21	190	2.0	6.24	1.03	2.57	4.05	18.92	2.59	-177	Clear
10:20	5.21	190	2.25	6.26	0.99	2.63	4.05	19.03	2.59	-184	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

10:25

Total Volume of Water Purged:

2.25 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.26	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.05	Carbon dioxide (mg/L)	
Turbidity (NTU)	2.63	Ferrous Iron (mg/L)	
DO (mg/L)	0.99	Hydrogen sulfide (mg/L)	
Temp. (°C)	19.03	DTW (ft)	5.21
TDS (g/L)	2.59		
ORP (mv)	-184		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

OR-5SM

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

2.8

Depth to Well Bottom (ft):

11.48

Purging Data

Method:

Low Flow

Date:

10/20/2015

Time:

14:50 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
15:00	2.75	190	0.2	5.89	2.05	8.29	5.16	19.18	3.25	-79	Clear
15:20	2.75	190	1.0	5.88	1.16	4.03	5.25	19.29	3.31	-91	Clear
15:35	2.75	190	1.7	5.87	0.80	4.17	5.27	19.37	3.32	-100	Clear
15:40	2.75	190	1.85	5.87	0.78	4.36	5.27	19.38	3.32	-101	Clear
15:45	2.75	190	2.2	5.87	0.67	3.27	5.26	19.38	3.31	-101	Clear
15:50	2.75	190	2.4	5.87	0.65	4.91	5.26	19.38	3.32	-101	Clear
15:55	2.75	190	2.6	5.87	0.65	3.95	5.26	19.40	3.31	-102	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/20/2015

Time: (hhmm)

16:00

Total Volume of Water Purged:

2.6 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	5.87	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	5.26	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.95	Ferrous Iron (mg/L)	
DO (mg/L)	0.65	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.40	DTW (ft)	2.75
TDS (g/L)	3.31		
ORP (mv)	-102		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Samplers:

Rob Piurek

Well ID:

OR-6SM

Manual Entry:

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

6.88

Depth to Well Bottom (ft):

11.65

Purging Data

Method:

Low Flow

Date:

10/20/2015

Time:

11:40

(hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
11:40	6.88	190	0	6.11	3.03	18.2	4.8	19.09	3.07	-215	
11:55	8.07	190	0.5	6.13	1.24	6.48	4.80	19.47	3.07	-250	Clear
12:15	8.20	190	1.4	6.10	0.71	3.02	4.90	20.05	3.14	-278	Clear
12:35	8.25	190	2.1	6.09	0.52	2.89	4.96	19.71	3.17	-304	Clear
12:40	8.25	190	2.25	6.09	0.51	2.11	4.97	19.66	3.18	-305	Clear
12:45	8.25	190	2.5	6.09	0.50	2.29	4.98	19.6	3.18	-306	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/20/2015

Time: (hhmm)

12:50

Total Volume of Water Purged:

2.5 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.09	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.98	Carbon dioxide (mg/L)	
Turbidity (NTU)	2.29	Ferrous Iron (mg/L)	
DO (mg/L)	0.50	Hydrogen sulfide (mg/L)	
Temp. (°C)	19.6	DTW (ft)	8.25
TDS (g/L)	3.18		
ORP (mv)	-306		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

OR-9SM

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.65

Depth to Well Bottom (ft):

12.3

Purging Data

Method:

Low Flow

Date:

10/20/2015

Time:

9:10

(hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
9:15	9.01	180	0	5.79	3.42	31.3	1.17	16.16	.749	-102	
9:35	9.05	180	0.5	6.13	1.61	15.8	1.92	18.09	1.23	-251	
9:45	9.05	180	0.8	6.10	1.20	7.72	2.18	18.85	1.4	-262	
10:00	9.08	180	1.4	6.09	0.99	4.41	2.36	19.2	1.51	-275	
10:10	9.1	180	1.55	6.08	0.90	4.99	2.39	19.23	1.53	-280	
10:15	9.1	180	1.75	6.06	0.87	3.23	2.44	19.31	1.56	-288	
10:20	9.1	180	1.80	6.05	0.82	3.69	2.46	19.33	1.57	-290	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/20/2015

Time: (hhmm)

10:25

Total Volume of Water Purged:

1.80 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.05	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	2.46	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.69	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.33	DTW (ft)	9.1
TDS (g/L)	1.57		
ORP (mv)	-290		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Blind dup OR-90SM_2015-10-20 collected for all parameters.

Acetylene	☐			



LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

OR-10SM

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Purging Data

Method:

Low Flow

Initial Depth to Water (ft):

8.45

Depth to Well Bottom (ft):

11.7

Date:

10/16/2015

Time:

11:40 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
11:40	8.45	190	0	7.11	5.66	1485	.350	18.45	.236	-6	Cloudy gray
11:55	8.95	190	0.6	6.67	2.90	38.7	.284	17.93	.185	15	Cloudy
12:05	9.0	190	1.1	6.60	1.58	10.78	.334	17.94	.221	14	Clear
12:15	9.02	190	1.5	6.59	1.83	6.46	.378	17.95	.247	11	Clear
12:25	9.02	190	1.75	6.55	1.13	3.62	.442	17.88	.289	4	
12:35	9.15	190	2.25	6.48	1.13	2.61	.565	17.55	.362	-6	
12:40	9.12	190	2.45	6.48	1.23	2.19	.591	17.51	.379	-9	
12:45	9.12	190	2.6	6.47	1.19	1.77	.615	17.48	.396	-12	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/16/2015

Time: (hhmm)

12:45

Total Volume of Water Purged:

2.6 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.47	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	.615	Carbon dioxide (mg/L)	
Turbidity (NTU)	1.77	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.48	DTW (ft)	9.12

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	0.396
ORP (mv)	-12

Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Samplers:

Rob Piurek

Well ID:

OR-13SM

Manual Entry:

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.34

Depth to Well Bottom (ft):

12.83

Purging Data

Method:

Low Flow

Date:

10/16/2015

Time:

9:20

(hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
9:30	8.95	180	0	6.24	3.9	8.27	5.04	15.11	3.16	-33	
9:40	8.92	180	0.2	6.28	2.22	9.99	4.59	16.45	2.93	-111	
9:55	9.15	200	1.2	6.33	1.39	6.08	4.68	17.91	2.99	-130	
10:05	9.15	200	1.5	6.35	1.16	4.88	4.71	18.25	3.02	-126	
10:20	9.20	200	2.25	6.37	1.03	3.74	4.70	18.5	3.01	-129	
10:25	9.20	200	2.5	6.38	0.99	4.15	4.69	18.56	3	-126	
10:30	9.20	200	2.7	6.36	0.93	3.40	4.69	18.68	3	-127	

Sampling Data

Method:

Dedicated tubing

Date:

10/16/2015

Time: (hhmm)

10:30

Total Volume of Water Purged:

2.7 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.36	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.69	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.40	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.68	DTW (ft)	9.2
TDS (g/L)	3		
ORP (mv)	-127		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Samplers:

Rob Piurek

Well ID:

OR-14SM

Manual Entry:

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.53

Depth to Well Bottom (ft):

11.75

Purging Data

Method:

Low Flow

Date:

10/19/2015

Time:

11:15 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
11:25	8.80	180	0.15	5.94	3.25	80	.269	14.16	.174	-29	Cloudy
11:40	8.82	180	0.5	6.33	2	66.2	.335	15.25	.218	-82	Cloudy
11:55	8.9	180	1.0	7.05	1.40	35.2	.392	16.0	.256	-162	Sl. Cloudy
12:10	8.88	180	1.5	6.98	1.17	9.16	.450	16.54	.293	-193	Clear
12:15	8.88	180	1.6	6.95	1.11	8.44	.454	16.69	.295	-199	Clear
12:20	8.88	180	1.7	6.96	1.07	10.38	.448	16.75	.293	-199	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/19/2015

Time: (hhmm)

12:20

Total Volume of Water Purged:

1.7 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.96	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	.448	Carbon dioxide (mg/L)	
Turbidity (NTU)	10.38	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	16.75	DTW (ft)	8.88
TDS (g/L)	0.293		
ORP (mv)	-199		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

OR-15SM

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

7.22

Depth to Well Bottom (ft):

12.2

Purging Data

Method:

Low Flow

Date:

10/19/2015

Time:

14:15 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
14:25	7.40	190	0.15	6.80	4.34	16.7	3.13	20.76	1.96	-126	Clear
14:35	7.48	190	.8	6.82	2.72	15.3	3.26	18.42	2.09	-127	Clear
14:50	7.52	190	1.25	6.81	2.32	14.9	3.25	18.11	2.08	-124	Clear
15:05	7.58	190	1.65	6.79	1.96	11.5	3.24	17.86	2.07	-124	Clear
15:10	7.59	190	1.75	6.79	1.90	8.75	3.23	17.81	2.07	-124	Clear
15:15	7.6	190	1.9	6.79	1.79	9.1	3.23	17.7	2.07	-123	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/19/2015

Time: (hhmm)

15:20

Total Volume of Water Purged:

1.9 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.79	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.23	Carbon dioxide (mg/L)	
Turbidity (NTU)	9.1	Ferrous Iron (mg/L)	
DO (mg/L)	1.79	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.7	DTW (ft)	7.6
TDS (g/L)	2.07		
ORP (mv)	-123		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

OR-18SM

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

7.48

Depth to Well Bottom (ft):

12.3

Purging Data

Method:

Low Flow

Date:

10/15/2015

Time:

13:50

(hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
13:55	7.48	180	0	6.78	8.84	12.2	1.6	19.76	1.02	-231	Clear
14:10	7.60	180	0.75	6.69	5.92	7.39	1.59	19.44	1.02	-266	Clear
14:20	7.60	180	1.3	6.68	5.05	5.27	1.61	19.45	1.03	-283	Clear
14:30	7.6	180	1.6	6.68	4.67	5.47	1.65	19.41	1.06	-288	
14:45	7.6	180	2.25	6.66	4.18	4.81	1.70	19.13	1.09	-292	
14:55	7.6	180	2.5	6.67	4.02	3.66	1.71	19.04	1.09	-295	
15:00	7.6	180	2.75	6.62	3.94	3.68	1.71	19	1.1	-292	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/15/2015

Time: (hhmm)

15:00

Total Volume of Water Purged:

2.75 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.62	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	1.71	Carbon dioxide (mg/L)	
Turbidity (NTU)	3.68	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	19	DTW (ft)	7.6
TDS (g/L)	1.1		
ORP (mv)	-292		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

MS/MSD collected for VOCs only.

Acetylene	☐			
 Parsons PLUS experience the Parsons advantage				



LOW FLOW WELL SAMPLING RECORD

Site Name: Ekono1 Facility ▼				Well ID: PMW-1D ▼		Well Diameter: 4 ▼ inches					
Samplers: Bill Simons ▼				Manual Entry: 							
				WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot							
Purging Data Method: Low Flow				Initial Depth to Water (ft): 8.27			Depth to Well Bottom (ft): 17.6				
Date: 10/15/2015 16		Time: 09:50 (hhmm)		1-inch=0.041 		1.5-inch=0.092 		2-inch=0.16 		3-inch=0.36 	
4-inch=0.64 		6-inch=1.4 		8-inch=2.5 		10-inch=4 					

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1000	9.02	200	.5	6.97	0.58	57.2	3.64	17.49	2.45	-233	
1010	9.46	200	1	7.22	0.48	41.6	3.79	17.41	2.43	-256	
1020	9.93	200	1.5	7.28	0.41	30.3	3.81	17.71	2.44	-264	
1030	10.46	200	2	7.31	0.36	17.8	3.8	17.75	2.43	-267	
1040	11.17	200	2.5	7.27	0.31	13.8	3.75	18.05	2.4	-270	
1100	11.86	200	3.5	7.3	0.27	14.4	3.71	18.55	2.37	-260	
1105	12.06	200	3.8	7.28	0.27	18.1	3.7	18.49	2.37	-252	
1120	12.8	200	5.1	7.17	0.24	17.5	3.67	18.78	2.35	-233	
1135	13.31	200	5.6	7.12	0.22	15.9	3.66	18.95	2.34	-224	
1145	13.91	200	6.1	7.06	0.21	17.1	3.64	19.16	2.33	-214	
1155	14.3	200	6.6	7.04	0.2	16.2	3.63	19.39	2.33	-210	
1200	14.92	500	7.4	7.04	0.21	47.8	3.54	18.8	2.26	-210	
1205	15.24	200	7.7	7.02	0.19	38.6	3.6	18.98	2.3	-207	Purged dry

Sampling Data

Method:

Dedicated tubing

Date:

10/16/2015

Time: (hhmm)

0900

Total Volume of Water Purged:

(gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.99	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.31	Carbon dioxide (mg/L)	
Turbidity (NTU)	148	Ferrous Iron (mg/L)	
DO (mg/L)	5.76	Hydrogen sulfide (mg/L)	
Temp.(°C)	15.41	DTW (ft)	10.8
TDS (g/L)	2.12		
ORP (mv)	-209		

Comments:

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

PARSONS

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

PMW-1S

Manual Entry:

Well Diameter: inches

Samplers:

Select...

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Purging Data

Method:

Low Flow

Initial Depth to Water (ft):

2.78

Depth to Well Bottom (ft):

Date:

10/22/2015

Time:

08:54 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
09:04	3.14	100	0.30	7.14	0.65	3.19	3.17	19.35	2.03	-267	
09:14	3.15	100	0.60	7.22	0.52	4.40	3.32	19.31	2.11	-282	
09:19	3.16	100	0.75	7.23	0.49	1.65	3.29	19.32	2.11	-287	
09:24	3.16	100	1.00	7.26	0.47	7.72	3.39	19.27	2.17	-293	
09:29	3.16	100	1.15	7.25	0.44	3.93	3.37	19.23	2.16	-295	
09:34	3.16	100	1.30	7.25	0.42	2.07	3.28	19.27	2.10	-296	
09:39	3.16	100	1.50	7.26	0.39	1.34	3.32	19.24	2.13	-300	
09:44	3.16	100	1.70	7.27	0.39	1.58	3.32	19.25	2.13	-301	

Sampling Data

Method:

Dedicated tubing

Date:

10/22/2015

Time: (hhmm)

09:49

Total Volume of Water Purged:

1.70 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.27	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.32	Carbon dioxide (mg/L)	
Turbidity (NTU)	1.58	Ferrous Iron (mg/L)	
DO (mg/L)	0.39	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.25	DTW (ft)	3.16

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	2.13
ORP (mv)	-301

Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name: Ekonol Facility Samplers: Bill Simons				Well ID: PMW-2D Manual Entry: 		Well Diameter: inches	
				WATER VOLUME CALCULATION			
				= (Total Depth of Well - Depth To Water) x Casing Volume per Foot			
Purging Data Method: Low Flow				Initial Depth to Water (ft): 8.78		Depth to Well Bottom (ft): 23.9	
Date: 10/15/2015		Time: 12:50 (hhmm)		1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36		4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4	

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1310	12.28	200	1	6.23	0.36	4.5	4.78	20	3.06	-344	
1320	13.27	200	1.5	6.29	0.31	5.2	4.79	20.15	3.07	-347	
1330	14.21	200	2	6.26	0.27	6.5	4.75	20.26	3.04	-347	
1340	15.35	200	2.5	6.23	0.25	11.8	4.73	20.21	3.03	-347	
1350	16.24	200	3	6.26	0.23	12.7	4.7	20.05	3.01	-340	
1400	17.2	200	3.5	6.29	0.21	26.5	4.66	20.08	2.98	-349	
1410	17.75	200	4	6.23	0.2	61.6	4.58	20.08	2.93	-345	
1420	18.2	200	4.5	6.2	0.19	64.7	4.5	19.76	2.88	-343	
1440	19.09	200	5.5	6.19	0.18	64.7	4.41	19.43	2.82	-342	
1500	20	200	6.5	6.17	0.18	64	4.4	19.45	2.82	-340	
1520	21.19	200	7.5	6.15	0.18	49.1	4.32	18.94	2.76	-338	
1530	21.58	200	8	6.15	0.18	37	4.3	18.73	2.76	-337	
1540	21.91	200	8.5	6.15	0.17	29	4.32	18.82	2.76	-339	
1550	21.73	150	8.7	6.16	0.18	37.5	4.34	18.54	2.78	-337	
1555	21.73	150	8.8	6.13	0.18	36.7	4.34	18.71	2.77	-336	

Sampling Data

Method:

Dedicated tubing

Date:

10/15/2015

Time: (hhmm)

1555

Total Volume of Water Purged:

8.8 (gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.13	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.34	Carbon dioxide (mg/L)	
Turbidity (NTU)	36.7	Ferrous Iron (mg/L)	
DO (mg/L)	0.18	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.71	DTW (ft)	21.73
TDS (g/L)	2.77		
ORP (mv)	-336		

Comments:

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

PARSONS**Parsons PLUS**
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

Samplers:

Select...

Manual Entry:

PMW-2S

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Purging Data

Method:

Low Flow

Initial Depth to Water (ft):

3.42

Depth to Well Bottom (ft):

Date:

10/20/2015



Time:

13:25 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
13:35	4.62	100	0.30	6.82	0.28	44.0	3.49	20.07	2.23	-272	
13:45	4.89	100	0.60	6.66	0.29	21.7	3.65	19.86	2.33	-273	
13:50	4.99	100	0.75	6.62	0.30	12.0	3.75	19.68	2.40	-275	
13:55	5.06	100	0.90	6.60	0.28	12.0	3.81	19.60	2.44	-273	
14:00	5.06	100	1.10	6.54	0.28	10.38	3.83	19.57	2.45	-272	Dry
10:40	3.85	100	1.25	6.56	0.71	3235	4.26	19.79	2.72	-193	

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

10:40

Total Volume of Water Purged:

1.25 (gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.56	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.26	Carbon dioxide (mg/L)	
Turbidity (NTU)	3235	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.79	DTW (ft)	3.85
TDS (g/L)	2.72		
ORP (mv)	-193		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name: Ekonol Facility							Well ID: 		Well Diameter: 2 inches		
Samplers: Select... Select...							Manual Entry: PMW-3S		WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot		
Purging Data Method: Low Flow							Initial Depth to Water (ft): 7.56				
Date: 10/20/2015			Time: 09:02 (hhmm)				1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36		4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4		

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
09:12	8.35	125	0.30	6.64	0.96	14.2	4.19	18.42	2.68	-79	
09:22	8.62	125	0.60	6.83	1.09	15.7	4.21	18.59	2.69	-234	
09:27	8.75	125	0.75	6.73	0.95	12.8	4.21	18.65	2.69	-261	
09:32	8.80	125	0.90	6.59	0.93	10.60	4.20	18.74	2.69	-277	
09:37	8.87	125	1.10	6.55	0.88	8.76	4.20	18.75	2.69	-285	
09:42	8.93	125	1.25	6.57	0.83	6.87	4.19	18.84	2.68	-295	
09:47	8.98	125	1.30	6.57	0.83	6.96	4.20	18.87	2.69	-299	
09:52	8.99	125	1.45	6.56	0.80	6.66	4.21	18.81	2.70	-307	
09:57	9.05	125	1.60	6.56	0.80	6.56	4.27	18.83	2.73	-314	
10:02	9.08	125	1.75	6.56	0.78	7.12	4.19	18.89	2.68	-321	
10:07	9.10	125	1.9	6.52	0.75	5.8	4.16	18.87	2.66	-322	

Sampling Data

Method:

Dedicated tubing

Date:

10/20/2015

Time: (hhmm)

10:12

Total Volume of Water Purged:

1.9

(gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.52	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.16	Carbon dioxide (mg/L)	
Turbidity (NTU)	5.8	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.87	DTW (ft)	9.1
TDS (g/L)	2.66		
ORP (mv)	-322		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

PMW-4D

Manual Entry:

Well Diameter: 2 inches

Samplers:

Bill Simons

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Purging Data

Method:

Low Flow

Initial Depth to Water (ft):

9.1

Depth to Well Bottom (ft):

Date:

10/19/2015

Time:

15:00 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1520	10.2	200	1	6.91	5.9	7.4	3.31	15.64	2.12	-362	
1530	10.22	200	1.5	6.88	5.91	10.5	3.33	15.65	2.13	-362	
1540	10.15	200	2	6.74	5.66	5.3	3.66	15.86	2.34	-359	
1550	10.15	200	2.5	6.68	5.36	13.3	3.96	15.95	2.54	-356	
1600	10.15	200	3	6.64	5.07	295	4.03	16.00	2.58	-355	
1610	10.15	200	3.5	6.61	5.05	429	4.14	16.08	2.64	-348	
1615	10.15	200	3.8	6.54	4.88	96.3	4.13	15.98	2.65	-349	
1620	10.15	200	4.1	6.55	4.86	89	4.17	15.98	2.67	-350	
1525	10.15	200	4.4	6.54	4.8	75	4.21	15.91	2.69	-348	

Sampling Data

Method:

Dedicated tubing

Date:

10/19/2015

Time: (hhmm)

1525

Total Volume of Water Purged:

4.4 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.54	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.21	Carbon dioxide (mg/L)	
Turbidity (NTU)	75	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	15.91	DTW (ft)	10.15

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	2.69
ORP (mv)	-348

Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0



LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

Manual Entry:

PMW-4S

Well Diameter: 2 inches

Samplers:

Select...

Select...

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

7.37

Depth to Well Bottom (ft):

11.62

Purging Data

Method:

Low Flow

Date:

10/19/2015

Time:

15:05

(hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
15:15	7.98	150	0.40	6.99	0.72	7.99	0.190	19.21	0.128	-52	
15:25	8.89	150	0.80	6.54	0.55	4.66	0.316	19.32	0.209	-64	
15:30	9.46	150	1.00	6.58	0.49	4.87	0.467	19.29	0.307	-68	
15:35	9.62	150	1.20	6.62	0.45	2.50	0.614	19.21	0.397	-72	
15:40	9.91	150	1.40	6.54	0.43	3.34	0.781	19.12	0.503	-66	
15:45	10.03	150	1.60	6.70	1.52	8.20	0.803	19.01	0.514	-65	Dry
10:52	7.80	150	1.80	7.07	1.58	7.53	0.708	19.48	0.453	-190	10-20-15 Sample

Sampling Data

Method:

Dedicated tubing

Date:

10/20/2015

Time: (hhmm)

10:55

Total Volume of Water Purged:

1.80 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.07	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	0.708	Carbon dioxide (mg/L)	
Turbidity (NTU)	7.53	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.48	DTW (ft)	7.8
TDS (g/L)	0.453		
ORP (mv)	-190		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

Samplers:

Select...

Manual Entry:

PMW-5S

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Purging Data

Method:

Low Flow

Initial Depth to Water (ft):

4.44

Depth to Well Bottom (ft):

10.1

Date:

10/20/2015

Time:

14:56 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
15:06	6.54	100	0.30	6.51	0.47	70.7	3.08	19.91	1.96	-62	
15:16	7.38	100	0.60	6.53	0.46	15.2	2.81	19.95	1.79	-90	
15:21	7.71	100	0.75	6.55	0.49	23.1	2.84	19.97	1.82	-76	
15:26	8.00	100	0.90	6.51	0.45	22.6	2.92	19.92	1.87	-62	
15:31	8.27	100	1.10	6.50	0.43	15	2.98	19.91	1.91	-55	
15:36	8.81	100	1.25	6.51	0.47	91.4	3.05	19.87	1.96	-41	
15:41	9.19	100	1.40	6.52	0.53	98.9	3.09	19.83	1.98	-37	Dry
08:50	5.49	100	1.55	6.22	1.60	27.0	3.27	18.20	2.09	71	

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

08:55

Total Volume of Water Purged:

1.55 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.22	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.27	Carbon dioxide (mg/L)	
Turbidity (NTU)	27.0	Ferrous Iron (mg/L)	
DO (mg/L)	1.60	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.20	DTW (ft)	5.49

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	2.09
ORP (mv)	71

Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD																																																																																														
Site Name: Ekonol Facility							Well ID: 																																																																																							
Samplers: Bill Simons							Manual Entry: PMW 6d		Well Diameter: 2 inches																																																																																					
							WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																							
Purging Data Method: Low Flow							Initial Depth to Water (ft): 9.52		Depth to Well Bottom (ft): 25.8																																																																																					
Date: 10/20/2015			Time: 09:35 (hhmm)				1-inch=0.041		1.5-inch=0.092		2-inch=0.16																																																																																			
							4-inch=0.64		6-inch=1.4		8-inch=2.5																																																																																			
											10-inch=4																																																																																			
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mv)	Comments																																																																																			
0955	13.4	200	1	6.59	4.11	3.8	4.1	16.19	2.62	-339																																																																																				
1005	15.98	200	1.5	6.54	3.87	6.1	3.6	16.17	2.3	-335																																																																																				
1015	18	200	2	6.55	3.72	3.8	3.45	16.1	2.2	-334																																																																																				
1025	19.92	200	2.5	6.55	3.69	3	3.38	16.05	2.16	-334																																																																																				
1035	22.8	200	3	6.55	3.61	2	3.36	16.03	2.15	-334																																																																																				
1045	24.3	300	3.8	6.51	3.69	2.6	3.46	15.76	2.22	-337	Purged dry																																																																																			
Sampling Data																																																																																														
Method: Dedicated tubing							Date: 10/21/2015		Time: (hhmm) 0900		Total Volume of Water Purged: (gal)																																																																																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.41</td> <td>Alkalinity (g/g)</td> <td></td> </tr> <tr> <td>Spec. Cond.(mS/cm)</td> <td>5.59</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>49</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>5.08</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>Temp.(°C)</td> <td>15.88</td> <td>DTW (ft)</td> <td>20.5</td> </tr> <tr> <td>TDS (g/L)</td> <td>3.51</td> <td></td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-268</td> <td></td> <td></td> </tr> </tbody> </table>							STABILIZED PARAMETERS		HACH TEST KITS		pH	6.41	Alkalinity (g/g)		Spec. Cond.(mS/cm)	5.59	Carbon dioxide (mg/L)		Turbidity (NTU)	49	Ferrous Iron (mg/L)		DO (mg/L)	5.08	Hydrogen sulfide (mg/L)		Temp.(°C)	15.88	DTW (ft)	20.5	TDS (g/L)	3.51			ORP (mv)	-268			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th></th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒</td> <td>3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒</td> <td>2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☒</td> <td>1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>☐</td> <td>2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☐</td> <td>1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☒</td> <td>2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						SAMPLE SET					Parameter		Bottle	Pres.	Method	Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260	MEE	☒	2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census	☐				Acetylene	☐			
STABILIZED PARAMETERS		HACH TEST KITS																																																																																												
pH	6.41	Alkalinity (g/g)																																																																																												
Spec. Cond.(mS/cm)	5.59	Carbon dioxide (mg/L)																																																																																												
Turbidity (NTU)	49	Ferrous Iron (mg/L)																																																																																												
DO (mg/L)	5.08	Hydrogen sulfide (mg/L)																																																																																												
Temp.(°C)	15.88	DTW (ft)	20.5																																																																																											
TDS (g/L)	3.51																																																																																													
ORP (mv)	-268																																																																																													
SAMPLE SET																																																																																														
Parameter		Bottle	Pres.	Method																																																																																										
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260																																																																																										
MEE	☒	2-250 mL amber glass	HCl	Lab SOP																																																																																										
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																																										
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified																																																																																										
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																																										
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060																																																																																										
Microbial Census	☐																																																																																													
Acetylene	☐																																																																																													
Comments: 																																																																																														

PARSONS



LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Samplers:

Select...

Well ID:

PMW-6S

Manual Entry:

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

7.61

Depth to Well Bottom (ft):

12.04

Purging Data

Method:

Low Flow

Date:

10/21/2015

Time:

13:48 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
13:58	8.70	100	0.30	6.45	0.93	4.20	3.44	20.63	2.20	-213	
14:08	9.19	100	0.60	6.40	0.55	3.31	3.44	20.36	2.20	-218	
14:13	9.38	100	0.75	6.39	0.50	3.42	3.41	20.27	2.18	-230	
14:18	9.51	100	0.90	6.40	0.47	3.45	3.39	20.13	2.17	-239	
14:23	9.64	100	1.10	6.39	0.40	4.28	3.39	20.04	2.17	-242	
14:28	9.76	100	1.25	6.39	0.37	4.37	3.39	20.01	2.17	-242	
14:33	9.85	100	1.40	6.39	0.36	5.67	3.38	19.91	2.16	-244	
14:38	9.89	100	1.55	6.39	0.34	7.24	3.38	19.88	2.16	-246	
14:43	9.91	100	1.70	6.39	0.33	8.86	3.38	19.82	2.16	-249	

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

14:48

Total Volume of Water Purged:

1.70 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.39	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.38	Carbon dioxide (mg/L)	
Turbidity (NTU)	8.86	Ferrous Iron (mg/L)	
DO (mg/L)	0.33	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.82	DTW (ft)	9.91

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	2.16
ORP (mv)	-249

Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

Manual Entry:

PMW-7S

Well Diameter: 2 inches

Samplers:

Select...

Select...

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.37

Depth to Well Bottom (ft):

Purging Data

Method:

Low Flow

Date:

10/20/2015

Time:

12:22 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
12:32	9.42	100	0.30	6.72	0.86	4.27	5.67	21.23	3.57	-62	
12:42	10.00	100	0.60	6.73	0.73	3.92	5.71	21.20	3.60	-60	
12:47	10.37	100	0.80	6.75	0.68	2.74	5.81	20.97	3.66	-68	
12:52	10.59	100	1.00	6.71	0.92	6.32	6.02	20.95	3.80	-70	
12:57	10.63	100	1.20	6.84	2.84	12.2	6.14	20.89	3.87	-60	Dry
09:40	9.01	100	1.30	NA	NA	NA	NA	NA	NA	NA	No readings

Sampling Data

Method:

Dedicated tubing

Date:

10/21/2015

Time: (hhmm)

09:45

Total Volume of Water Purged:

1.20 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.84	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	6.14	Carbon dioxide (mg/L)	
Turbidity (NTU)	12.2	Ferrous Iron (mg/L)	
DO (mg/L)	2.84	Hydrogen sulfide (mg/L)	
Temp.(°C)	20.89	DTW (ft)	10.63
TDS (g/L)	3.87		
ORP (mv)	-60		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☐	3-40mL glass vial	HCl	EPA 8260
MEE	☐	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☐	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☐	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0
Not enough water for readings when collecting sample. Water in
manhole, bailed prior to sampling.



LOW FLOW WELL SAMPLING RECORD

Site Name: Ekono1 Facility Samplers: Bill Simons				Well ID: PMW-8D Manual Entry: 		Well Diameter: 2 inches																																																																																																																																																					
				WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																																																																																							
Purging Data Method: Low Flow				Initial Depth to Water (ft): 8.77		Depth to Well Bottom (ft): 																																																																																																																																																					
Date: 10/16/2015		Time: 09:55 (hhmm)		1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36		4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4																																																																																																																																																					
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Time (hhmm)</th> <th>DTW (ft)</th> <th>Pump Rate (ml/min)</th> <th>Volume (gal.)</th> <th>pH</th> <th>DO (mg/L)</th> <th>Turbidity (NTU)</th> <th>Spec Cond (mS/cm)</th> <th>Temp (°C)</th> <th>TDS (g/L)</th> <th>ORP (mV)</th> <th>Comments</th> </tr> </thead> <tbody> <tr><td>1005</td><td>9.55</td><td>200</td><td>0.5</td><td>7.01</td><td>0.69</td><td>16.80</td><td>3.43</td><td>16.05</td><td>2.19</td><td>-363</td><td></td></tr> <tr><td>1015</td><td>9.82</td><td>200</td><td>1</td><td>6.82</td><td>0.45</td><td>0</td><td>3.65</td><td>16.67</td><td>2.34</td><td>-375</td><td></td></tr> <tr><td>1025</td><td>10.03</td><td>200</td><td>1.5</td><td>6.74</td><td>0.44</td><td>0</td><td>3.85</td><td>16.73</td><td>2.47</td><td>-376</td><td></td></tr> <tr><td>1035</td><td>10.05</td><td>200</td><td>2</td><td>6.67</td><td>0.38</td><td>0</td><td>4</td><td>16.64</td><td>2.56</td><td>-374</td><td></td></tr> <tr><td>1045</td><td>10.1</td><td>200</td><td>2.5</td><td>6.59</td><td>0.38</td><td>4.6</td><td>4.11</td><td>16.73</td><td>2.63</td><td>-373</td><td></td></tr> <tr><td>1055</td><td>10.12</td><td>200</td><td>3</td><td>6.56</td><td>0.34</td><td>0</td><td>4.2</td><td>16.92</td><td>2.69</td><td>-372</td><td></td></tr> <tr><td>1105</td><td>10.16</td><td>200</td><td>3.5</td><td>6.54</td><td>0.31</td><td>0</td><td>4.23</td><td>17</td><td>2.71</td><td>-369</td><td></td></tr> <tr><td>1115</td><td>10.17</td><td>200</td><td>4</td><td>6.51</td><td>0.28</td><td>0</td><td>4.25</td><td>16.9</td><td>2.72</td><td>-367</td><td></td></tr> <tr><td>1125</td><td>10.18</td><td>200</td><td>4.5</td><td>6.56</td><td>0.25</td><td>0</td><td>4.33</td><td>17.26</td><td>2.77</td><td>-370</td><td></td></tr> <tr><td>1135</td><td>10.18</td><td>200</td><td>5</td><td>6.51</td><td>0.24</td><td>0</td><td>4.35</td><td>17.16</td><td>2.78</td><td>-368</td><td></td></tr> <tr><td>1140</td><td>10.18</td><td>200</td><td>5.3</td><td>6.46</td><td>0.23</td><td>0</td><td>4.35</td><td>17.05</td><td>2.78</td><td>-367</td><td></td></tr> </tbody> </table>												Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments	1005	9.55	200	0.5	7.01	0.69	16.80	3.43	16.05	2.19	-363		1015	9.82	200	1	6.82	0.45	0	3.65	16.67	2.34	-375		1025	10.03	200	1.5	6.74	0.44	0	3.85	16.73	2.47	-376		1035	10.05	200	2	6.67	0.38	0	4	16.64	2.56	-374		1045	10.1	200	2.5	6.59	0.38	4.6	4.11	16.73	2.63	-373		1055	10.12	200	3	6.56	0.34	0	4.2	16.92	2.69	-372		1105	10.16	200	3.5	6.54	0.31	0	4.23	17	2.71	-369		1115	10.17	200	4	6.51	0.28	0	4.25	16.9	2.72	-367		1125	10.18	200	4.5	6.56	0.25	0	4.33	17.26	2.77	-370		1135	10.18	200	5	6.51	0.24	0	4.35	17.16	2.78	-368		1140	10.18	200	5.3	6.46	0.23	0	4.35	17.05	2.78	-367	
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments																																																																																																																																																
1005	9.55	200	0.5	7.01	0.69	16.80	3.43	16.05	2.19	-363																																																																																																																																																	
1015	9.82	200	1	6.82	0.45	0	3.65	16.67	2.34	-375																																																																																																																																																	
1025	10.03	200	1.5	6.74	0.44	0	3.85	16.73	2.47	-376																																																																																																																																																	
1035	10.05	200	2	6.67	0.38	0	4	16.64	2.56	-374																																																																																																																																																	
1045	10.1	200	2.5	6.59	0.38	4.6	4.11	16.73	2.63	-373																																																																																																																																																	
1055	10.12	200	3	6.56	0.34	0	4.2	16.92	2.69	-372																																																																																																																																																	
1105	10.16	200	3.5	6.54	0.31	0	4.23	17	2.71	-369																																																																																																																																																	
1115	10.17	200	4	6.51	0.28	0	4.25	16.9	2.72	-367																																																																																																																																																	
1125	10.18	200	4.5	6.56	0.25	0	4.33	17.26	2.77	-370																																																																																																																																																	
1135	10.18	200	5	6.51	0.24	0	4.35	17.16	2.78	-368																																																																																																																																																	
1140	10.18	200	5.3	6.46	0.23	0	4.35	17.05	2.78	-367																																																																																																																																																	

Sampling Data

Method:

Dedicated tubing

Date:

10/16/2015

Time: (hhmm)

1140

Total Volume of Water Purged:

5.3 (gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.46	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.35	Carbon dioxide (mg/L)	
Turbidity (NTU)	0	Ferrous Iron (mg/L)	
DO (mg/L)	0.23	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.05	DTW (ft)	10.18
TDS (g/L)	2.78		
ORP (mv)	-367		

Comments:

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

PARSONS**Parsons PLUS**
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Well ID:

PMW-9D

Manual Entry:

Well Diameter: 4 inches

Samplers:

Bill Simons

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.7

Depth to Well Bottom (ft):

14

Purging Data

Method:

Low Flow

Date:

10/14/2015

Time:

08:55 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
0905	9.55	200	0.5	7.52	0.67	96.4	3.94	17.1	2.52	-202	
0915	10.24	200	1	7.77	0.57	84.4	3.77	17.26	2.41	-244	
0925	11.03	200	1.5	7.58	0.51	121	3.6	17.42	2.31	-236	
0935	11.58	200	2	7.5	0.48	108	3.63	17.35	2.32	-222	
0945	12.13	200	2.5	7.42	0.43	128	3.71	17.44	2.37	-210	
0955	12.72	200	3	7.2	0.4	132	3.86	17.35	2.47	-181	
1005	13.15	200	3.5	7.01	0.38	185	3.97	17.22	2.55	-165	
1015	13.55	200	4	6.8	0.35	250	4.09	16.98	2.62	-158	
1025	13.86	200	4.5	6.68	0.31	284	4.18	16.75	2.67	-161	Purged dry

Sampling Data

Method:

Dedicated tubing

Date:

10/15/2015

Time: (hhmm)

0855

Total Volume of Water Purged:

4.5 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.65	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.42	Carbon dioxide (mg/L)	
Turbidity (NTU)	54. Nv v....	Ferrous Iron (mg/L)	
DO (mg/L)	0.91	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.13	DTW (ft)	8.96

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	2.83
ORP (mv)	-157

Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

Ekono1 Facility

Samplers:

Select...

Well ID:

Manual Entry:

PMW-9S

Well Diameter: 2 inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Purging Data

Method:

Low Flow

Initial Depth to Water (ft):

8.67

Depth to Well Bottom (ft):

12.45

Date:

10/21/2015

Time:

12:16 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
12:26	9.48	100	0.30	6.65	0.54	7.89	5.32	19.91	3.33	34	
12:36	9.86	100	0.60	6.67	0.40	4.21	5.26	19.87	3.32	26	
12:41	10.02	100	0.75	6.67	0.54	2.23	5.36	19.89	3.38	25	
12:46	10.26	100	0.90	6.67	0.57	5.83	5.47	19.79	3.45	22	
12:51	10.52	100	1.10	6.67	0.53	5.61	5.53	19.77	3.50	20	
12:56	10.75	100	1.25	6.67	0.50	6.61	5.63	19.77	3.55	18	
13:01	10.95	100	1.40	6.68	0.48	6.12	5.87	19.78	3.71	20	
13:06	11.13	100	1.55	6.69	0.45	3.90	6.12	19.81	3.96	16	
13:11	11.35	100	1.75	6.69	0.43	3.26	6.58	19.83	4.16	6	
13:16	11.57	100	1.90	6.70	0.42	1.92	7.23	20.08	4.58	-2	Dry
10:16	8.69	100	2.00	6.71	1.87	8.80	6.04	19.70	3.81	-8	10/22/15

Sampling Data

Method:

Dedicated tubing

Date:

10/22/2015

Time: (hhmm)

10:20

Total Volume of Water Purged:

2.00 (gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.71	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	6.04	Carbon dioxide (mg/L)	
Turbidity (NTU)	8.80	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	19.70	DTW (ft)	8.69
TDS (g/L)	3.81		
ORP (mv)	-8		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

PARSONS**Parsons PLUS**
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name: Ekonol Facility				Well ID: PMW-10D							
Samplers: Bill Simons				Manual Entry: 		Well Diameter: inches					
WATER VOLUME CALCULATION											
= (Total Depth of Well - Depth To Water) x Casing Volume per Foot											
Purging Data Method: Low Flow				Initial Depth to Water (ft): 8.35				Depth to Well Bottom (ft): 			
Date: 10/13/2015		Time: 13:55 (hhmm)		1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36	
16		13:55 (hhmm)		4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4	

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1415	10.22	200	1	7.23	2.59	111	1.37	18.39	0.878	-214	
1425	11.06	200	1.5	6.78	1.74	73.6	1.64	18.32	1.05	-209	
1435	11.44	200	2	6.66	1.63	66.5	1.99	18.26	1.27	-217	
1445	11.88	200	2.5	6.5	1.59	33.9	2.1	18.12	1.34	-226	
1455	12.03	200	3	6.3	1.57	36.6	2.05	18.24	1.33	-234	
1505	12.09	200	3.5	6.25	1.62	41.4	2.72	18.05	1.76	-262	
1515	12.09	200	4	6.18	2.57	23.2	3.31	17.74	2.12	-337	
1525	12.1	200	4.5	6.17	2.62	28.6	3.34	17.77	2.14	-378	
1530	12.1	200	4.8	6.16	2.7	25.5	3.32	17.75	2.12	-385	
1535	12.1	200	5.1	6.17	2.84	26.5	3.32	17.74	2.13	-395	
1540	12.1	200	5.4	6.17	2.94	25.9	3.31	17.69	2.12	-402	
1545	12.1	200	5.7	6.17	2.88	25.6	3.36	17.67	2.15	-408	
1550	12.1	200	6	6.17	2.9	26.6	3.32	17.6	2.12	-411	

Sampling Data

Method:

Dedicated tubing

Date:

10/13/2015

Time: (hhmm)

1550

Total Volume of Water Purged:

6

(gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.17	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.32	Carbon dioxide (mg/L)	
Turbidity (NTU)	26.6	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.6	DTW (ft)	12.1
TDS (g/L)	2.12		
ORP (mv)	-411		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

PARSONS



LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

PMW-11D

Manual Entry:

Well Diameter: 4 inches

Samplers:

Bill Simons

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.7

Depth to Well Bottom (ft):

Purging Data

Method:

Low Flow

Date:

10/14/2015

Time:

11:15 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1125	8.75	200	.5	7.43	0.44	51.8	1.93	16.78	1.23	-332	
1135	8.75	200	1	7.27	0.31	19.5	1.84	16.82	1.18	-335	
1145	8.75	200	1.5	7.14	0.27	9.3	1.73	16.74	1.11	-332	
1155	8.75	200	2	7.13	0.25	0	1.66	16.82	1.06	-336	
1205	8.75	200	2.5	7.11	0.24	0	1.63	16.82	1.04	-338	
1210	8.75	200	2.8	7.15	0.23	0	1.65	16.81	1.05	-342	

Sampling Data

Method:

Dedicated tubing

Date:

10/14/2015

Time: (hhmm)

1210

Total Volume of Water Purged:

2.8 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.15	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	1.65	Carbon dioxide (mg/L)	
Turbidity (NTU)	0	Ferrous Iron (mg/L)	
DO (mg/L)	0.23	Hydrogen sulfide (mg/L)	
Temp.(°C)	16.81	DTW (ft)	8.75
TDS (g/L)	1.05		
ORP (mv)	-342		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name: Ekono1 Facility Samplers: Bill Simons				Well ID: PMW-11S Manual Entry: 		Well Diameter: inches					
				WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot							
Purging Data Method: Low Flow				Initial Depth to Water (ft): 7.55		Depth to Well Bottom (ft): 					
Date: 10/22/2015		Time: 09:00 (hhmm)		1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36		4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4					
16											
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
0910	8.5	200	0.5	6.35	2.43	26.6	3.55	17.75	2.27	-25	
0920	8.87	200	1	6.35	2.07	8.57	3.59	17.89	2.3	-14	
0930	9.25	200	1.5	6.36	1.87	2.41	3.65	18	2.34	-10	
0940	9.78	200	2	6.44	1.82	1.23	3.74	18.07	2.39	-12	
0950	10.2	200	2.5	6.42	1.73	1.05	3.76	18.1	2.4	-18	
1000	10.35	200	3	6.35	1.72	0.54	3.75	18.24	2.4	-27	
1010	10.56	200	3.5	6.33	1.55	0.64	3.74	18.24	2.39	-14	
1020	10.76	200	4	6.32	1.47	0.54	3.74	18.11	2.4	-15	
1023	10.8	200	4.2	6.32	1.52	0.6	3.74	18.11	2.39	-17	
1026	10.84	200	4.4	6.32	1.56	0.64	3.74	18.1	2.4	-15	

Sampling Data

Method:

Dedicated tubing

Date:

10/22/2015

Time: (hhmm)

1026

Total Volume of Water Purged:

4.4 (gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.32	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	3.74	Carbon dioxide (mg/L)	
Turbidity (NTU)	0.64	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	18.1	DTW (ft)	10.84
TDS (g/L)	2.4		
ORP (mv)	-15		

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

PARSONS**Parsons PLUS**
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name: Ekonol Facility Samplers: Bill Simons				Well ID: PMW-12D Manual Entry: 		Well Diameter: 4 inches	
Purging Data Method: Low Flow				WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot			
				Initial Depth to Water (ft): 8.66		Depth to Well Bottom (ft): 	
Date: 10/13/2015		Time: 10:50 (hhmm)		1-inch=0.041 1.5-inch=0.092 2-inch=0.16 3-inch=0.36 		4-inch=0.64 6-inch=1.4 8-inch=2.5 10-inch=4 	

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1100	9.2	200	0.5	6.64	1.78	115	3.85	17.17	2.45	-83	
1110	9.84	200	1	6.79	1.81	108	3.46	17.08	2.22	-98	
1120	10.35	200	1.5	6.48	1.82	98.6	3.92	16.78	2.52	-225	
1130	10.58	200	2	6.3	1.66	83	4.04	16.7	2.59	-312	
1140	10.82	200	2.5	6.28	2.51	72.2	4.05	16.61	2.59	-378	
1150	10.91	200	3	6.26	2.89	62.7	4.05	16.6	2.6	-400	
1200	10.98	200	3.5	6.28	3.47	50.3	4.2	16.64	2.69	-410	
1210	11.05	200	4	6.41	3.32	43.4	4.19	16.51	2.68	-414	
1220	11.11	200	4.5	6.4	3.17	58.3	4.11	16.5	2.63	-413	
1225	11.12	200	4.8	6.37	3.53	63.6	4.1	16.51	2.62	-415	
1230	11.14	200	5.1	6.26	3.59	54.8	4.08	16.87	2.61	-428	
1235	12.17	200	5.4	6.35	3.57	51.5	4.08	16.8	2.61	-431	
1240	12.18	200	5.7	6.34	3.42	66	4.09	17.21	2.62	-425	

Sampling Data

Method:

Dedicated tubing

Date:

10/13/2015

Time: (hhmm)

1240

Total Volume of Water Purged:

5.7 (gal)



STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.34	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	4.09	Carbon dioxide (mg/L)	
Turbidity (NTU)	66	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.21	DTW (ft)	12.18
TDS (g/L)	2.62		
ORP (mv)	-425		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0
Turbidity measured with horiba

PARSONS



WELL SAMPLING RECORD																																																					
Site Name: Ekono1 Facility				Well ID: 				☒ MW ☐ PMW ☐ INJ ☐ OR																																													
Samplers: Dan Chamberland				Manual Entry: PMW-15D				Well Diameter: 4 inches																																													
WATER VOLUME CALCULATION = (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																					
Purging Data Method: Low Flow				Initial Depth to Water (ft): 8.77				Depth to Well Bottom (ft): 																																													
Date: 10/15/2015		Time: 08:50 (HH:MM)		1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36																																											
				4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4																																											
Enter turbidity limit: 50 NTU																																																					
SC = Stabilization check																																																					
Time HH:MM (24hrs)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)		Comments																																									
08:50	8.77	200	0.0	6.55	2.95	63.3	1.38	14.3	0.879	13	SC		Final																																								
09:00	9.18	200	0.5	7.54	2.33	17.0	1.38	15.85	0.884	-235	SC	Clear, substrate odor	Final																																								
09:10	9.30	200	1.0	7.59	2.33	15.2	1.36	16.06	0.872	-244	SC		Final																																								
09:20	9.32	200	1.5	7.55	2.39	17.6	1.37	16.10	0.873	-223	SC		Final																																								
09:25	9.35	200	1.7	7.53	2.50	15.0	1.37	16.14	0.875	-215	SC		Final																																								
09:30	9.36	200	1.9	7.53	2.27	12.7	1.37	16.16	0.874	-225	SC		Final																																								
09:35	9.37	200	2.2	7.53	2.24	18.9	1.36	16.18	0.873	-238	SC		Final																																								
09:40	9.38	200	2.5	7.53	2.23	23.7	1.36	16.20	0.872	-247	SC	Water oxidizing	Final																																								
09:45	9.39	200	2.7	7.52	2.38	26.3	1.37	16.19	0.880	-251	SC		Final																																								
09:50	9.41	200	2.9	7.51	2.49	27.1	1.39	16.18	0.887	-268	SC		Final																																								
09:55	9.42	200	3.2	7.25	3.74	22.2	1.52	16.18	1.07	-286	SC		Final																																								
10:00	9.43	200	3.5	7.13	5.87	25.5	1.79	16.18	1.22	-308	SC		Final																																								
10:05	9.43	290	3.7	7.01	6.11	18.5	1.84	16.18	1.22	-338	SC		Final																																								
10:10	9.44	200	3.9	6.89	6.54	16.6	1.89	16.17	1.21	-368	SC		Final																																								
10:15	9.45	200	4.2	6.89	5.95	23.2	1.92	16.17	1.22	-369	SC		Final																																								
10:20	9.45	200	4.4	6.89	5.91	15.4	1.94	16.17	1.24	-370	SC		Final																																								
10:25	9.46	200	4.7	6.90	5.86	15.5	1.92	16.18	1.23	-370	SC		Final																																								
Sampling Data																																																					
Method: Dedicated tubing				Date: 10/15/2015				Time: (HH:MM) 10:25		Total Volume of Water Purged: 4.7 (gal)																																											
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td> 6.90 </td> </tr> <tr> <td>Carbon dioxide (mg/L)</td> <td> 1.92 </td> </tr> </tbody> </table>				STABILIZED PARAMETERS		pH	6.90	Carbon dioxide (mg/L)	1.92	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>Alkalinity (mg/L)</td> <td> </td> </tr> <tr> <td>Carbon dioxide</td> <td> </td> </tr> </tbody> </table>				HACH TEST KITS		Alkalinity (mg/L)		Carbon dioxide		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">SAMPLE SET</th> </tr> </thead> <tbody> <tr> <td>Parameter</td> <td></td> <td>Bottle</td> <td>Pres.</td> </tr> <tr> <td>Select VOCs</td> <td>☒</td> <td>3-40mL glass vial</td> <td>HCl</td> </tr> <tr> <td>MEE</td> <td>☒</td> <td>2-250 mL amber glass</td> <td>HCl</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Method</td> </tr> <tr> <td></td> <td></td> <td></td> <td>EPA 8260</td> </tr> <tr> <td></td> <td></td> <td></td> <td>Lab SOP</td> </tr> </tbody> </table>						SAMPLE SET				Parameter		Bottle	Pres.	Select VOCs	☒	3-40mL glass vial	HCl	MEE	☒	2-250 mL amber glass	HCl				Method				EPA 8260				Lab SOP
STABILIZED PARAMETERS																																																					
pH	6.90																																																				
Carbon dioxide (mg/L)	1.92																																																				
HACH TEST KITS																																																					
Alkalinity (mg/L)																																																					
Carbon dioxide																																																					
SAMPLE SET																																																					
Parameter		Bottle	Pres.																																																		
Select VOCs	☒	3-40mL glass vial	HCl																																																		
MEE	☒	2-250 mL amber glass	HCl																																																		
			Method																																																		
			EPA 8260																																																		
			Lab SOP																																																		

Specific Conductivity (µmhos/cm)	1.54	(mg/L)	
Turbidity (NTU)	15.5	Ferrous Iron (mg/L)	
DO (mg/L)	5.86	Manganese (mg/L)	
Temp. (°C)	16.18	Hydrogen sulfide (mg/L)	
ORP (mv)	-370	DTW (ft)	
TDS (g/L)	1.23	* NOTE * HACH test kits are only required for MNA analysis wells.	

Comments:

Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			



LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Samplers:

Bill Simons

Well ID:

PMW-16D

Manual Entry:

Well Diameter: inches

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.6

Depth to Well Bottom (ft):

Purging Data

Method:

Low Flow

Date:

10/14/2015



Time:

14:40 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1500	8.65	200	1	9.04	0.49	338	0.264	17.12	0.174	-296	
1510	8.65	200	1.5	6.78	0.4	53.2	2.12	17.05	1.38	-319	
1520	8.65	200	2	6.76	0.48	4.9	2.44	16.89	1.57	-343	
1530	8.65	200	2.5	6.77	0.47	0	2.46	16.8	1.58	-349	
1540	8.65	200	3	6.75	0.47	0	2.44	16.75	1.52	-349	

Sampling Data

Method:

Dedicated tubing

Date:

10/14/2015

Time: (hhmm)

1540



Total Volume of Water Purged:

3 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	6.75	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	2.44	Carbon dioxide (mg/L)	
Turbidity (NTU)	0	Ferrous Iron (mg/L)	
DO (mg/L)	0.47	Hydrogen sulfide (mg/L)	
Temp.(°C)	16.75	DTW (ft)	8.65
TDS (g/L)	1.52		
ORP (mv)	-349		

Comments:

SAMPLE SET

Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☐	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☐	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			
Acetylene	☐			

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

PMW-17D

Manual Entry:

Well Diameter: 4 inches

Samplers:

Bill Simons

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

8.53

Depth to Well Bottom (ft):

Purging Data

Method:

Low Flow

Date:

10/14/2015

Time:

13:00 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
1320	9.11	200	1	8.68	0.46	26.1	0.1	17.81	0.065	-260	
1330	9.11	200	1.5	8.65	0.4	27.3	0.107	18.12	0.07	-262	
1340	9.11	200	2	8.53	0.35	25.5	0.114	18.03	0.074	-258	
1350	9.11	200	2.5	8.46	0.33	26.7	0.118	18.04	0.077	-257	
1355	9.11	200	2.8	8.38	0.32	28.1	0.126	18.05	0.082	-255	
1400	9.11	200	3.1	8.3	0.32	29.3	0.130	17.99	0.084	-254	
1405	9.11	200	3.4	8.25	0.31	29.8	0.132	18	0.086	-251	
1410	9.11	200	3.7	8.25	0.3	28.7	0.133	17.98	0.087	-250	

Sampling Data

Method:

Dedicated tubing

Date:

10/14/2015

Time: (hhmm)

1410

Total Volume of Water Purged:

3.7 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	8.25	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	0.133	Carbon dioxide (mg/L)	
Turbidity (NTU)	28.7	Ferrous Iron (mg/L)	
DO (mg/L)	0.3	Hydrogen sulfide (mg/L)	
Temp.(°C)	17.98	DTW (ft)	9.11

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☒	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☒	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F

TDS (g/L)	0.087
ORP (mv)	-250

Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☒			
Acetylene	☒			

Comments:

PARSONS



Parsons PLUS
experience the Parsons advantage

LOW FLOW WELL SAMPLING RECORD																																																																																					
Site Name: Ekonomi Facility				Well ID: RMW-2D																																																																																	
Samplers: Dan Chamberland				Manual Entry:		Well Diameter: 2 inches																																																																															
WATER VOLUME CALCULATION																																																																																					
= (Total Depth of Well - Depth To Water) x Casing Volume per Foot																																																																																					
Purging Data Method: Low Flow				Initial Depth to Water (ft): 8.5				Depth to Well Bottom (ft):																																																																													
Date: 10/16/2015		Time: 10:50 (hhmm)		1-inch=0.041		1.5-inch=0.092		2-inch=0.16		3-inch=0.36																																																																											
				4-inch=0.64		6-inch=1.4		8-inch=2.5		10-inch=4																																																																											
Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments																																																																										
10:50	8.50	200	0.0	7.17	10.67	511	4.45	17.79	2.81	-312	Strong substrate odor																																																																										
11:00	10.80	200	0.5	6.87	5.26	516	3.69	17.66	2.35	-343																																																																											
11:10	12.00	200	1.0	6.92	5.26	527	3.58	17.26	2.29	-357																																																																											
11:20	12.4	200	1.5	6.93	5.60	523	3.60	17.17	2.30	-356																																																																											
11:25	12.8	200	1.7	6.94	5.50	374	3.60	17.20	2.30	-357	Water oxidizing																																																																										
11:30	13.3	200	1.9	6.96	5.40	129	3.59	17.23	2.31	-358																																																																											
11:35	13.35	200	2.1	6.94	5.25	68.8	3.63	17.20	2.33	-357	Clear																																																																										
11:40	13.38	200	2.3	6.92	5.08	22.3	3.68	17.15	2.36	-356																																																																											
11:45	13.42	200	2.6	6.89	4.89	24.0	3.72	17.09	2.39	-354																																																																											
11:50	13.46	200	2.8	6.85	4.70	16.7	3.78	17.05	2.42	-352																																																																											
11:55	13.50	200	3.1	6.83	4.58	13.7	3.83	17.01	2.45	-351																																																																											
12:00	13.51	200	3.3	6.83	4.61	15.5	3.82	16.96	2.44	-353																																																																											
12:05	13.52	200	3.6	6.83	4.64	18.6	3.81	16.88	2.44	-356																																																																											
Sampling Data																																																																																					
Method: Dedicated tubing				Date: 10/16/2015		Time: (hhmm) 12:05		Total Volume of Water Purged: 3.6 (gal)																																																																													
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">STABILIZED PARAMETERS</th> <th colspan="2">HACH TEST KITS</th> </tr> </thead> <tbody> <tr> <td>pH</td> <td>6.83</td> <td>Alkalinity (g/g)</td> <td></td> </tr> <tr> <td>Spec. Cond. (mS/cm)</td> <td>3.81</td> <td>Carbon dioxide (mg/L)</td> <td></td> </tr> <tr> <td>Turbidity (NTU)</td> <td>18.6</td> <td>Ferrous Iron (mg/L)</td> <td></td> </tr> <tr> <td>DO (mg/L)</td> <td>err</td> <td>Hydrogen sulfide (mg/L)</td> <td></td> </tr> <tr> <td>Temp. (°C)</td> <td>16.88</td> <td>DTW (ft)</td> <td>13.52</td> </tr> <tr> <td>TDS (g/L)</td> <td>2.44</td> <td></td> <td></td> </tr> <tr> <td>ORP (mv)</td> <td>-356</td> <td></td> <td></td> </tr> </tbody> </table>				STABILIZED PARAMETERS		HACH TEST KITS		pH	6.83	Alkalinity (g/g)		Spec. Cond. (mS/cm)	3.81	Carbon dioxide (mg/L)		Turbidity (NTU)	18.6	Ferrous Iron (mg/L)		DO (mg/L)	err	Hydrogen sulfide (mg/L)		Temp. (°C)	16.88	DTW (ft)	13.52	TDS (g/L)	2.44			ORP (mv)	-356			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">SAMPLE SET</th> </tr> <tr> <th>Parameter</th> <th>Bottle</th> <th>Pres.</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Select VOCs</td> <td>☒ 3-40mL glass vial</td> <td>HCl</td> <td>EPA 8260</td> </tr> <tr> <td>MEE</td> <td>☒ 2-250 mL amber glass</td> <td>HCl</td> <td>Lab SOP</td> </tr> <tr> <td>Dissolved Inorganics</td> <td>☒ 1-250 mL plastic (Field Filtered)</td> <td>HNO3</td> <td>SW6010B</td> </tr> <tr> <td>Chloride / Nitrate / Sulfate</td> <td>☐ 2-40 mL glass (Field Filtered)</td> <td>None</td> <td>lab specified</td> </tr> <tr> <td>Sulfide</td> <td>☐ 1-250 mL glass (Field filtered)</td> <td>NaOH/Zn Acetate</td> <td>MS-45000-S2-F</td> </tr> <tr> <td>Total Organic Carbon</td> <td>☒ 2-40 mL amber glass vial</td> <td>H3PO4</td> <td>SW9060</td> </tr> <tr> <td>Microbial Census</td> <td>☐</td> <td></td> <td></td> </tr> <tr> <td>Acetylene</td> <td>☐</td> <td></td> <td></td> </tr> </tbody> </table>										SAMPLE SET				Parameter	Bottle	Pres.	Method	Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260	MEE	☒ 2-250 mL amber glass	HCl	Lab SOP	Dissolved Inorganics	☒ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B	Chloride / Nitrate / Sulfate	☐ 2-40 mL glass (Field Filtered)	None	lab specified	Sulfide	☐ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F	Total Organic Carbon	☒ 2-40 mL amber glass vial	H3PO4	SW9060	Microbial Census	☐			Acetylene	☐		
STABILIZED PARAMETERS		HACH TEST KITS																																																																																			
pH	6.83	Alkalinity (g/g)																																																																																			
Spec. Cond. (mS/cm)	3.81	Carbon dioxide (mg/L)																																																																																			
Turbidity (NTU)	18.6	Ferrous Iron (mg/L)																																																																																			
DO (mg/L)	err	Hydrogen sulfide (mg/L)																																																																																			
Temp. (°C)	16.88	DTW (ft)	13.52																																																																																		
TDS (g/L)	2.44																																																																																				
ORP (mv)	-356																																																																																				
SAMPLE SET																																																																																					
Parameter	Bottle	Pres.	Method																																																																																		
Select VOCs	☒ 3-40mL glass vial	HCl	EPA 8260																																																																																		
MEE	☒ 2-250 mL amber glass	HCl	Lab SOP																																																																																		
Dissolved Inorganics	☒ 1-250 mL plastic (Field Filtered)	HNO3	SW6010B																																																																																		
Chloride / Nitrate / Sulfate	☐ 2-40 mL glass (Field Filtered)	None	lab specified																																																																																		
Sulfide	☐ 1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F																																																																																		
Total Organic Carbon	☒ 2-40 mL amber glass vial	H3PO4	SW9060																																																																																		
Microbial Census	☐																																																																																				
Acetylene	☐																																																																																				
Comments: DO and ORP values conflict. DO > 0.5 and ORP < 0. Collected duplicate.																																																																																					

PARSONS



LOW FLOW WELL SAMPLING RECORD

Site Name:

EkonoI Facility

Well ID:

RMW-3D

Manual Entry:

Well Diameter: 2 inches

Samplers:

Rob Piurek

WATER VOLUME CALCULATION

= (Total Depth of Well - Depth To Water) x Casing Volume per Foot

Initial Depth to Water (ft):

9

Depth to Well Bottom (ft):

Purging Data

Method:

Low Flow

Date:

10/15/2015

Time:

9:35 (hhmm)

1-inch=0.041

1.5-inch=0.092

2-inch=0.16

3-inch=0.36

4-inch=0.64

6-inch=1.4

8-inch=2.5

10-inch=4

Time (hhmm)	DTW (ft)	Pump Rate (ml/min)	Volume (gal.)	pH	DO (mg/L)	Turbidity (NTU)	Spec Cond (mS/cm)	Temp (°C)	TDS (g/L)	ORP (mV)	Comments
9:35	9	250	0	6.52	3.96	8.50	.623	16.40	.400	-228	Clear
9:45	9.01	250	0.75	6.94	2.19	3.57	1.18	16.59	.752	-267	Clear
9:55	9.01	250	1.25	6.99	1.88	3.38	1.39	16.81	.886	-272	Clear
10:05	9.01	250	2	7.05	1.53	1.34	1.52	16.28	.973	-280	Clear
10:15	9.01	250	2.5	7.09	1.28	0.64	1.56	16.56	1.0	-286	Clear
10:20	9.01	250	2.9	7.11	1.24	0.42	1.58	16.48	1.01	-288	Clear
10:25	9.01	250	3.2	7.12	1.20	0.69	1.59	16.49	1.02	-289	Clear

Sampling Data

Method:

Dedicated tubing

Date:

10/15/2015

Time: (hhmm)

10:25

Total Volume of Water Purged:

3.2 (gal)

STABILIZED PARAMETERS		HACH TEST KITS	
pH	7.12	Alkalinity (g/g)	
Spec. Cond. (mS/cm)	1.59	Carbon dioxide (mg/L)	
Turbidity (NTU)	0.69	Ferrous Iron (mg/L)	
DO (mg/L)	err	Hydrogen sulfide (mg/L)	
Temp.(°C)	16.49	DTW (ft)	9.01
TDS (g/L)	1.02		
ORP (mv)	-289		

SAMPLE SET				
Parameter		Bottle	Pres.	Method
Select VOCs	☒	3-40mL glass vial	HCl	EPA 8260
MEE	☒	2-250 mL amber glass	HCl	Lab SOP
Dissolved Inorganics	☒	1-250 mL plastic (Field Filtered)	HNO3	SW6010B
Chloride / Nitrate / Sulfate	☒	2-40 mL glass (Field Filtered)	None	lab specified
Sulfide	☒	1-250 mL glass (Field filtered)	NaOH/Zn Acetate	MS-45000-S2-F
Total Organic Carbon	☒	2-40 mL amber glass vial	H3PO4	SW9060
Microbial Census	☐			

Comments:

DO and ORP values conflict. DO > 0.5 and ORP < 0

Acetylene

☐

Parsons PLUS
experience the Parsons advantage

ATTACHMENT C
DATA USABILITY SUMMARY REPORT

DATA USABILITY SUMMARY REPORT

EKONOL FACILITY

Prepared For:

Atlantic Richfield Company

4850 East 49th Street
MBC 3-147
Cuyahoga Heights, Ohio 44125

Prepared By:

PARSONS

40 La Riviere Drive, Suite 350
Buffalo, New York 14202
(716) 541-0730

JANUARY 2016

TABLE OF CONTENTS

	<u>Page</u>
SECTION 1 DATA USABILITY SUMMARY	1-1
1.1 LABORATORY DATA PACKAGES	1-1
1.2 SAMPLING AND CHAIN-OF-CUSTODY	1-1
1.3 LABORATORY ANALYTICAL METHODS	1-1
1.3.1 Volatile Organic Analysis Including Methane, Ethane, and Ethene	1-2
1.3.2 Metals Analysis	1-2
1.3.3 Other Parameters	1-2
SECTION 2 DATA VALIDATION REPORT.....	2-1
2.1 4 th QUARTER MONITORING EVENT.....	2-1
2.1.1 Volatiles Including Methane, Ethane, and Ethene (MEE)	2-1
2.1.2 Dissolved Metals	2-3

LIST OF ATTACHMENTS

ATTACHMENT A VALIDATED LABORATORY DATA

SECTION 1

DATA USABILITY SUMMARY

Groundwater samples were collected for the 2015 4th Quarter Monitoring from the Ekonol Facility site in Wheatfield, New York from October 13, 2015 through October 22, 2015. Analytical results from these samples were reviewed by Parsons for usability with respect to the following requirements:

- Work Plan,
- NYSDEC Analytical Services Protocol (ASP), and
- USEPA Region II Standard Operating Procedures (SOPs).

The analytical laboratories for this project were Eurofins Laboratories, Inc. (Eurofins). Eurofins is approved to conduct project analyses through the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP).

1.1 LABORATORY DATA PACKAGES

The laboratory data package turnaround time, defined as the time from sample receipt by the laboratory to receipt of the analytical data packages by Parsons, was 32-40 days for the Ekonol samples. Comments on specific quality control (QC) and other requirements are discussed in detail in the attached data validation report.

1.2 SAMPLING AND CHAIN-OF-CUSTODY

The samples were collected, shipped under a COC record, and received at the laboratory within one day of sampling. All samples were received intact and in good condition at the laboratories. It was noted that the volatile samples OR-4SM, OR-6SM, OR-15SM, and PMW-6S were received and analyzed at Eurofins with a pH between 5 and 7 which exceeds the pH<2 preservation requirement.

1.3 LABORATORY ANALYTICAL METHODS

The groundwater samples collected from the Ekonol site were analyzed for certain volatile organic compounds (VOCs) including methane, ethane, and ethane, dissolved iron and potassium, and total organic carbon (TOC). Summaries of issues concerning these laboratory analyses are presented in Subsections 1.3.1 through 1.3.3. The data qualifications resulting from the data review and statements on the laboratory analytical precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) are discussed for each analytical method in Section 2. The laboratory data were reviewed and may be qualified with the following validation flags:

"U" - not detected at the value given,

"UJ" - estimated and not detected at the value given,

"J" - estimated at the value given,

- "J+" - estimated biased high at the value given,
- "J-" - estimated biased low at the value given,
- "N" - presumptive evidence at the value given, and
- "R" - unusable value.

The validated laboratory data were tabulated and are presented in Attachment A.

1.3.1 Volatile Organic Analysis Including Methane, Ethane, and Ethene

The groundwater samples collected from the Ekonol site were analyzed for certain VOCs using the USEPA SW-846 8260C analytical method and methane, ethane, and ethene using the modified USEPA approved RSK-175 analytical method. Certain reported results for these samples were considered estimated based upon sample holding times and field duplicate precision. The reported VOC and methane, ethane, and ethene analytical results were 100% complete (i.e., usable) based upon the groundwater data presented by Eurofins. PARCCS requirements were met.

1.3.2 Metals Analysis

Certain groundwater samples collected from the Ekonol site were analyzed for dissolved iron and potassium using the USEPA SW-846 6010C analytical method. The reported results for the metals samples did not require qualification resulting from data validation. The reported metals analytical results were 100% complete (i.e., usable) based upon the groundwater data presented by Eurofins. PARCCS requirements were met.

1.3.3 Other Parameters

The groundwater samples collected from the Ekonol site were analyzed for TOC using the SM20 5310C analytical method. Custody documentation, holding times, laboratory blanks, matrix spike/matrix spike duplicate, laboratory duplicate precision, laboratory control samples, instrument calibrations, quantitation limits, sample result identification, and field duplicate precision were reviewed for compliance. The reported results for these samples did not require qualification resulting from data validation with the exception of the positive TOC result for sample MW-13D. This result was considered estimated, possibly biased high, and qualified "J+" based upon a high matrix spike recovery for TOC (117%R; QC limit 91-113%R).

The reported analytical results for the wet chemistry parameters were 100% complete (i.e., usable) based upon the groundwater data presented by Eurofins. PARCCS requirements were met.

SECTION 2

DATA VALIDATION REPORT

2.1 4TH QUARTER MONITORING EVENT

Data review has been completed for data packages generated by Eurofins containing analytical data results from groundwater samples collected from the Ekonol Facility site during the 4th Quarter Monitoring event. All of these samples were shipped under a COC record and received intact by the analytical laboratory. Analytical results from the project samples were submitted by Eurofins within the following sample delivery groups (SDGs): BPX46, BPX47, BPX48, BPX49, BPX50, BPX51, BPX52, and BPX53. Data validation was performed for all samples in accordance with the most current editions of the USEPA Region II SOPs and the NYSDEC ASP for organic and inorganic data review. This data validation and usability report is presented by analysis type. The validated laboratory data are tabulated and presented in Attachment A.

2.1.1 Volatiles Including Methane, Ethane, and Ethene (MEE)

The following items were reviewed for compliancy in the volatile analysis:

- Custody documentation
- Holding times
- Surrogate recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy
- Laboratory control sample (LCS) recoveries
- Laboratory method blank and trip blank contamination
- Instrument performance
- Initial and continuing calibrations
- Internal standard responses
- Field duplicate precision
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of holding times, MS/MSD precision and accuracy, and field duplicate precision as discussed below.

Holding Times

All analytical holding times were within the 14-day criteria for preserved volatile samples with the exception of the samples OR-4SM, OR-6SM, OR-15SM, and PMW-6S. These samples were received by the laboratory at a pH between 5 and 7 and exceeded the 7-day analytical holding time criteria for unpreserved samples by one to five days. In addition, the methane result for sample OR-9SM exceeded the 14-day holding time criteria by one day. Therefore, results for these samples were considered estimated with positive results qualified “J” and nondetected results qualified “UJ”.

MS/MSD Precision and Accuracy

All MS/MSD precision (relative percent difference; RPD) and accuracy (percent recovery; %R) measurements were considered acceptable and within QC limits for designated spiked project samples with the exception of the MS/MSD accuracy results for ethene (139%R/128%R; QC limit 83-115%R) and the MSD accuracy result for methane (78%R; QC limit 85-115%R) during the spiked analyses of sample MW-18D; the high MS accuracy result for ethene (118%R; QC limit 83-115%R) during the spiked analyses of sample OR-18SM; the high MS accuracy result for trans-1,2-dichloroethene (123%R; QC limit 80-120%R) during the spiked analyses of sample OR-13SM; the high MS/MSD accuracy results for methane (124%R/133%R; QC limit 85-115%R) and the high MS accuracy results for trans-1,2-dichloroethene (121%R; QC limit 80-120%R) and trichloroethene (121%R; QC limit 80-120%R) during the spiked analyses of sample MW-6S; the high MS/MSD accuracy results for ethane (144%R/138%R; QC limit 85-115%R) during the spiked analyses of sample PMW-3S; the high MS/MSD accuracy results for ethene (239%R/235%R; QC limit 83-115%R) during the spiked analyses of sample OR-3SM; and the high MS accuracy result for ethene (141%R; QC limit 83-115%R) during the spiked analyses of sample PMW-1S. Validation qualification of the parent samples was not required.

Field Duplicate Precision

All field duplicate precision results were considered acceptable with the exception of the precision for methane (59%RPD) associated with sample INJ-11D and its field duplicate sample INJ-110D; and the results for chloroethane (2.1 µg/L and nondetect), cis-1,2-dichloroethene (52%RPD), and vinyl chloride (49%RPD) associated with sample OR-9SM and its field duplicate sample OR-90SM. Therefore, results for these compounds were considered estimated with positive results qualified “J” and nondetected results qualified “UJ” for the affected parent sample and associated field duplicate.

Usability

All volatile groundwater sample results including methane, ethane, and ethene were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The volatile groundwater presented were 100% (i.e., usable). The validated volatile laboratory data are tabulated and presented in Attachment A.

It was noted that many samples were diluted and reanalyzed due to the exceedance in instrument calibration ranges for cis-1,2-dichloroethene, trichloroethene, 1,1,1-trichloroethane, vinyl chloride, methane, and/or ethene. Therefore, the diluted result for these compounds was reported for these samples in the validated laboratory data table in Attachment A.

2.1.2 Dissolved Metals

The following items were reviewed for compliancy in the metals analysis:

- Custody documentation
- Holding times
- Initial and continuing calibration, and preparation blank contamination
- Initial and continuing calibration verifications
- Interference check sample (ICS) recoveries
- Matrix spike recoveries
- Laboratory duplicate precision
- Field duplicate precision
- Laboratory control sample recoveries
- Serial dilutions
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols.

Usability

All metals sample results were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, comparability, and sensitivity. The metals data presented by Eurofins were 100% complete (i.e., usable). The validated groundwater laboratory data are tabulated and presented in Attachment A.

ATTACHMENT A

VALIDATED LABORATORY DATA

		Dup of INJ-11D_2015-10-21					
EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	INJ- 7D INJ-7D_2015-10-21 8100261 LANCASTERLABS BPX52 WATER 10/21/2015 11:05 12/14/2015	INJ- 8D INJ-8D_2015-10-21 8100263 LANCASTERLABS BPX52 WATER 10/21/2015 16:00 12/14/2015	INJ-11D INJ-11D_2015-10-21 8100262 LANCASTERLABS BPX52 WATER 10/21/2015 14:00 12/14/2015	INJ-11D INJ-110D_2015-10-21 8100259 LANCASTERLABS BPX52 WATER 10/21/2015 12:01 12/14/2015	INJ-13D INJ-13D_2015-10-20 8097872 LANCASTERLABS BPX51 WATER 10/20/2015 15:05 12/14/2015
CAS NO.	COMPOUND	UNITS:					
	VOLATILES						
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	100 U	130	5 U	5 U	5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	100 U	490	6.7 J	7.5 J	8.1 J
75-35-4	1,1-DICHLOROETHENE	ug/l	590	5.7	13	15	12
75-00-3	CHLOROETHANE	ug/l	100 U	2.5 U	5 U	5 U	5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	380000	3600	5700	6600	10000
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	330	2.5 U	5 U	5 U	5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	420	18	17	18	54
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	120000	7.4	660	720	90
75-01-4	VINYL CHLORIDE	ug/l	6600	1200	1900	2000	2500
74-85-1	ETHENE	ug/l	480	2600	460	440	2100
74-84-0	ETHANE	ug/l	44	21	73	82	140
74-82-8	METHANE	ug/l	1800	15000	13000 J	24000 J	7200
	METALS						
7439-89-6	IRON	mg/l	25.9	3.05	0.2 J	0.177 J	17.6
9/7/7440	POTASSIUM	mg/l	8.4	62.1	13.7	13.9	13.7
	WET CHEMISTRY						
TOC	TOTAL ORGANIC CARBON	mg/l	148	437	70.6	67.8	191

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	MW- 1S MW-1S_2015-10-13 8087645 LANCASTERLABS BPX46 WATER 10/13/2015 14:20 12/14/2015	MW- 2S MW-2S_2015-10-15 8094345 LANCASTERLABS BPX48 WATER 10/15/2015 15:10 12/14/2015	MW- 4S MW-4S_2015-10-19 8095828 LANCASTERLABS BPX50 WATER 10/19/2015 14:24 12/14/2015	MW- 6S MW-6S_2015-10-19 8095824 LANCASTERLABS BPX50 WATER 10/19/2015 12:13 12/14/2015	MW- 7D MW-7D_2015-10-20 8097869 LANCASTERLABS BPX51 WATER 10/20/2015 11:50 12/14/2015	MW- 7S MW-7S_2015-10-21 8100264 LANCASTERLABS BPX52 WATER 10/21/2015 16:30 12/14/2015
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 U	250 U	0.5 U	0.5 U	150	0.5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	0.5 U	250 U	1.3	0.55 J	310	0.5 U
75-35-4	1,1-DICHLOROETHENE	ug/l	0.5 U	360 J	5.2	0.5 U	53 J	0.5 U
75-00-3	CHLOROETHANE	ug/l	0.5 U	250 U	0.5 U	0.5 U	50 U	0.5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	14	260000	2300	42	69000	0.5 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	250 U	0.5 U	0.5 U	290	0.5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.82 J	1200	5.7	0.5 U	140	0.5 U
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.5 U	250 U	3.2	0.7 J	24000	0.5 U
75-01-4	VINYL CHLORIDE	ug/l	1.4	9300	420	53	2300	0.5 U
74-85-1	ETHENE	ug/l	1 U	170	79	1.7 J	420	1 U
74-84-0	ETHANE	ug/l	1 U	14	15	2.9 J	26	1 U
74-82-8	METHANE	ug/l	260	210	2000	100	7900	22
	METALS							
7439-89-6	IRON	mg/l	0.238 J	3.4	0.533		0.0333 U	2.15
9/7/7440	POTASSIUM	mg/l	3.72	3.94	7.02		8.29	7.73
	WET CHEMISTRY							
TOC	TOTAL ORGANIC CARBON	mg/l	2.7	4.4	4.7		85.4	1.8

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	MW- 9S MW-9S_2015-10-13 8087644 LANCASTERLABS BPX46 WATER 10/13/2015 11:10 12/14/2015	MW-10S MW-10S_2015-10-21 8100257 LANCASTERLABS BPX52 WATER 10/21/2015 15:00 12/14/2015	MW-11D MW-11D_2015-10-15 8094340 LANCASTERLABS BPX48 WATER 10/15/2015 11:55 12/14/2015	MW-11S MW-11S_2015-10-15 8094348 LANCASTERLABS BPX48 WATER 10/15/2015 16:25 12/14/2015	MW-12S MW-12S_2015-10-16 8094355 LANCASTERLABS BPX49 WATER 10/16/2015 9:55 12/14/2015	MW-13D MW-13D_2015-10-14 8089413 LANCASTERLABS BPX47 WATER 10/14/2015 12:25 12/14/2015
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 U	0.5 U	35	1.7 J	12	0.5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	0.5 U	0.5 U	16	5	24	4.9
75-35-4	1,1-DICHLOROETHENE	ug/l	0.5 U	0.89 J	1.3	1 U	3.8 J	0.66 J
75-00-3	CHLOROETHANE	ug/l	0.5 U	0.5 U	0.69 J	1 U	2.5 U	0.5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	1	410	15	190	2000	180
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	0.5 U	0.5 U	1 U	2.5 U	0.5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.5 U	2.7	0.5 U	6.2	42	1
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.5 U	5.5	1.5	2.8	1600	0.55 J
75-01-4	VINYL CHLORIDE	ug/l	0.5 U	79	21	34	770	160
74-85-1	ETHENE	ug/l	1 U	14	8.6	9	690	61
74-84-0	ETHANE	ug/l	1 U	3.3 J	41	1.1 J	30	3.4 J
74-82-8	METHANE	ug/l	19	91	220	150	6200	1400
	METALS							
7439-89-6	IRON	mg/l	2.02					0.232 J
9/7/7440	POTASSIUM	mg/l	4.03					4.55
	WET CHEMISTRY							
TOC	TOTAL ORGANIC CARBON	mg/l	8.9					3.2 J+

			Dup of MW-13D_2015-10-14				
EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID:	MW-13D	MW-15D	MW-16D	MW-17D	MW-18D
		Sample ID:	MW-130D_2015-10-14	MW-15D_2015-10-13	MW-16D_2015-10-13	MW-17D_2015-10-15	MW-18D_2015-10-14
		Lab Sample Id:	8089414	8087649	8087650	8094347	8089411
		Source:	LANCASTERLABS	LANCASTERLABS	LANCASTERLABS	LANCASTERLABS	LANCASTERLABS
		SDG:	BPX47	BPX46	BPX46	BPX48	BPX47
		Matrix:	WATER	WATER	WATER	WATER	WATER
		Sampled:	10/14/2015 12:01	10/13/2015 14:15	10/13/2015 16:00	10/15/2015 13:00	10/14/2015 10:25
		Validated:	12/14/2015	12/14/2015	12/14/2015	12/14/2015	12/14/2015
CAS NO.	COMPOUND	UNITS:					
	VOLATILES						
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 U	160	0.5 U	11	0.5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	4.7	51	3.4	11	0.5 U
75-35-4	1,1-DICHLOROETHENE	ug/l	0.58 J	6.1	1.2	0.5 U	0.5 U
75-00-3	CHLOROETHANE	ug/l	0.5 U	0.5 U	0.5 U	2.5	0.5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	180	370	200	7.2	0.5 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.98 J	5.3	0.95 J	0.5 U	0.5 U
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.5 J	4.5	0.72 J	0.67 J	0.5 U
75-01-4	VINYL CHLORIDE	ug/l	160	370	120	12	0.5 U
74-85-1	ETHENE	ug/l	74	6.8	12	6.5	1 U
74-84-0	ETHANE	ug/l	4 J	1 U	2.2 J	2.9 J	1.7 J
74-82-8	METHANE	ug/l	1500	46	130	75	57
	METALS						
7439-89-6	IRON	mg/l	0.222 J	0.125 J	0.157 J		0.0333 U
9/7/7440	POTASSIUM	mg/l	4.59	5.17	3.24		2.94
	WET CHEMISTRY						
TOC	TOTAL ORGANIC CARBON	mg/l	3.7	1.8	2.1		4

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	MW-19D MW-19D_2015-10-13 8087648 LANCASTERLABS BPX46 WATER 10/13/2015 12:00 12/14/2015	MW-20D MW-20D_2015-10-14 8089416 LANCASTERLABS BPX47 WATER 10/14/2015 14:20 12/14/2015	MW-21D MW-21D_2015-10-14 8089420 LANCASTERLABS BPX47 WATER 10/14/2015 16:10 12/14/2015	OR- 3SM OR-3SM_2015-10-21 8100254 LANCASTERLABS BPX52 WATER 10/21/2015 12:30 12/14/2015	OR- 4SM OR-4SM_2015-10-21 8100252 LANCASTERLABS BPX52 WATER 10/21/2015 10:25 12/14/2015	OR- 5SM OR-5SM_2015-10-20 8097873 LANCASTERLABS BPX51 WATER 10/20/2015 16:00 12/14/2015
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 U	970	47	0.5 U	0.5 UJ	0.5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	0.5 U	110	24	0.5 U	0.5 UJ	0.5 U
75-35-4	1,1-DICHLOROETHENE	ug/l	0.5 U	20	4.9	0.5 U	0.5 UJ	0.5 U
75-00-3	CHLOROETHANE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	9.9	170	410	1.3	0.5 UJ	0.5 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	1.9	0.5 U	0.5 U	0.5 UJ	0.5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.5 U	3.7	3	0.5 U	0.5 UJ	0.5 U
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.5 U	9.4	1.5	0.5 U	0.5 UJ	0.5 U
75-01-4	VINYL CHLORIDE	ug/l	0.5 U	390	380	0.83 J	0.5 UJ	0.5 U
74-85-1	ETHENE	ug/l	1.9 J	49	16	1 U	1 U	1.1 J
74-84-0	ETHANE	ug/l	1 U	2 J	3.4 J	58	2.3 J	83
74-82-8	METHANE	ug/l	20	230	120	10000	7700	13000
	METALS							
7439-89-6	IRON	mg/l	2.02			26.2	24.3	9.74
9/7/7440	POTASSIUM	mg/l	5.48			32.5	26.3	16.2
	WET CHEMISTRY							
TOC	TOTAL ORGANIC CARBON	mg/l	8.8			32.1	40.3	21.2

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	OR- 6SM OR-6SM_2015-10-20 8097871 LANCASTERLABS BPX51 WATER 10/20/2015 12:50 12/14/2015	OR-9SM OR-9SM_2015-10-20 8097867 LANCASTERLABS BPX51 WATER 10/20/2015 10:25 12/14/2015	Dup of OR-9SM_2015-10-20 OR- 9SM OR-90SM_2015-10-20 8097870 LANCASTERLABS BPX51 WATER 10/20/2015 12:01 12/14/2015	OR-10SM OR-10SM_2015-10-16 8094353 LANCASTERLABS BPX49 WATER 10/16/2015 12:45 12/14/2015	OR-13SM OR-13SM_2015-10-16 8094352 LANCASTERLABS BPX49 WATER 10/16/2015 10:30 12/14/2015
CAS NO.	COMPOUND	UNITS:					
	VOLATILES						
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	2.5 UJ	0.5 U	0.5 U	0.5 U	10 U
75-34-3	1,1-DICHLOROETHANE	ug/l	2.7 J	1.2	1	0.5 U	10 U
75-35-4	1,1-DICHLOROETHENE	ug/l	2.5 UJ	0.5 U	0.5 U	0.5 U	10 U
75-00-3	CHLOROETHANE	ug/l	2.5 UJ	2.1 J	0.5 UJ	0.5 U	10 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	1700 J	7.3 J	4.3 J	0.5 U	10 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	2.5 UJ	0.5 U	0.5 U	0.5 U	10 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	57 J	0.82 J	0.73 J	0.5 U	10 U
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	2.5 UJ	0.5 U	0.5 U	0.5 U	10 U
75-01-4	VINYL CHLORIDE	ug/l	500 J	6.1 J	4.3 J	0.5 U	10 U
74-85-1	ETHENE	ug/l	280	18	25	2.5 J	1.7 J
74-84-0	ETHANE	ug/l	300	6.1	7.8	4.8 J	2 J
74-82-8	METHANE	ug/l	8700	11000 J	11000	6600	10000
	METALS						
7439-89-6	IRON	mg/l	1.48	0.143 J	0.125 J	2.63	13.4
9/7/7440	POTASSIUM	mg/l	25.5	9.8	9.52	2.55	25.9
	WET CHEMISTRY						
TOC	TOTAL ORGANIC CARBON	mg/l	40.7	14.7	14.6	16.1	34.1

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	OR-14SM OR-14SM_2015-10-19 8095827 LANCASTERLABS BPX50 WATER 10/19/2015 12:20 12/14/2015	OR-15SM OR-15SM_2015-10-19 8095829 LANCASTERLABS BPX50 WATER 10/19/2015 15:20 12/14/2015	OR-18SM OR-18SM_2015-10-15 8094341 LANCASTERLABS BPX48 WATER 10/15/2015 15:00 12/14/2015	PMW- 1D PMW-1D_2015-10-16 8094351 LANCASTERLABS BPX49 WATER 10/16/2015 9:00 12/14/2015	PMW-1S PMW-1S_2015-10-22 8102359 LANCASTERLABS BPX53 WATER 10/22/2015 9:49 12/14/2015	PMW- 2D PMW-2D_2015-10-15 8094344 LANCASTERLABS BPX48 WATER 10/15/2015 15:55 12/14/2015
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 U	2.5 UJ	0.5 U	25 U	0.5 U	50 U
75-34-3	1,1-DICHLOROETHANE	ug/l	0.5 U	2.5 UJ	0.5 U	25 U	0.63 J	86 J
75-35-4	1,1-DICHLOROETHENE	ug/l	0.5 U	2.5 UJ	0.5 U	25 U	0.5 U	160
75-00-3	CHLOROETHANE	ug/l	0.5 U	2.5 UJ	0.5 U	25 U	3.3	50 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	0.5 U	2.5 UJ	2.3	21000	100	110000
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	2.5 UJ	0.5 U	25 U	0.5 U	50 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.5 U	2.5 UJ	0.5 U	25 U	9.6	430
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.5 U	2.5 UJ	0.5 U	25 U	0.97 J	4100
75-01-4	VINYL CHLORIDE	ug/l	0.5 U	2.5 UJ	7.7	1700	130	26000
74-85-1	ETHENE	ug/l	1 U	1 U	20	3100	240	8300
74-84-0	ETHANE	ug/l	2.1 J	1.3 J	5.4	330	350	22
74-82-8	METHANE	ug/l	9800	9100	8100	14000	15000	7500
	METALS							
7439-89-6	IRON	mg/l	2.04	60.2	0.0333 U	78.7	0.0424 J	0.412
9/7/7440	POTASSIUM	mg/l	1.76	94.9	13.2	13	11.2	10.2
	WET CHEMISTRY							
TOC	TOTAL ORGANIC CARBON	mg/l	14.3	99	7.3	341	4.5	382

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	PMW- 2S PMW-2S_2015-10-21 8100253 LANCASTERLABS BPX52 WATER 10/21/2015 10:40 12/14/2015	PMW- 3S PMW-3S_2015-10-20 8097866 LANCASTERLABS BPX51 WATER 10/20/2015 10:12 12/14/2015	PMW- 4D PMW-4D_2015-10-19 8095830 LANCASTERLABS BPX50 WATER 10/19/2015 15:25 12/14/2015	PMW- 4S PMW-4S_2015-10-20 8097868 LANCASTERLABS BPX51 WATER 10/20/2015 10:55 12/14/2015	PMW- 5S PMW-5S_2015-10-21 8100250 LANCASTERLABS BPX52 WATER 10/21/2015 8:55 12/14/2015	PMW- 6D PMW-6D_2015-10-21 8100260 LANCASTERLABS BPX52 WATER 10/21/2015 9:00 12/14/2015
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 U	5 U	10 U	1 U	10 U	5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	0.5 U	11	89	2.6	10 U	48
75-35-4	1,1-DICHLOROETHENE	ug/l	0.5 U	24	43	4.6	39	5 U
75-00-3	CHLOROETHANE	ug/l	0.5 U	5 U	10 U	1 U	10 U	5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	1.3	13000	50000	1800	22000	8100
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	5 U	10 U	1 U	10 U	5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.97 J	290	120	45	450	77
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.5 U	63	700	9.2	1300	30
75-01-4	VINYL CHLORIDE	ug/l	2.8	2400	5700	150	3100	6700
74-85-1	ETHENE	ug/l	13	1000	1100	26	340	5600
74-84-0	ETHANE	ug/l	190	170	21	21	100	66
74-82-8	METHANE	ug/l	15000	9500	9200	1600	5900	6200
	METALS							
7439-89-6	IRON	mg/l	1.45	0.39 J	0.0333 U	0.414	0.353 J	0.232 J
9/7/7440	POTASSIUM	mg/l	13.1	9.89	7.75	2.25	4.3	10.7
	WET CHEMISTRY							
TOC	TOTAL ORGANIC CARBON	mg/l	9.5	12.5	269	8.2	6.8	561

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	PMW- 6S PMW-6S_2015-10-21 8100258 LANCASTERLABS BPX52 WATER 10/21/2015 14:48 12/14/2015	PMW- 7S PMW-7S_2015-10-21 8100251 LANCASTERLABS BPX52 WATER 10/21/2015 9:45 12/14/2015	PMW- 8D PMW-8D_2015-10-16 8094350 LANCASTERLABS BPX49 WATER 10/16/2015 11:40 12/14/2015	PMW- 9D PMW-9D_2015-10-15 8094338 LANCASTERLABS BPX48 WATER 10/15/2015 8:55 12/14/2015	PMW- 9S PMW-9S_2015-10-22 8102360 LANCASTERLABS BPX53 WATER 10/22/2015 10:20 12/14/2015	PMW-10D PMW-10D_2015-10-13 8087646 LANCASTERLABS BPX46 WATER 10/13/2015 15:50 12/14/2015
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 UJ	0.5 U	50 U	100 U	5 U	180
75-34-3	1,1-DICHLOROETHANE	ug/l	1.9 J	76	50 U	100 U	5 U	370
75-35-4	1,1-DICHLOROETHENE	ug/l	0.72 J	0.5 U	50 U	160 J	11	44
75-00-3	CHLOROETHANE	ug/l	0.5 UJ	0.5 U	50 U	100 U	5 U	1 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	480 J	5.1	34000	76000	4200	30000
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 UJ	0.5 U	50 U	100 U	5 U	24
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	29 J	0.5 U	91 J	100 U	31	61
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.85 J	0.5 U	7000	12000	5800	1100
75-01-4	VINYL CHLORIDE	ug/l	250 J	10	3400	5400	110	2500
74-85-1	ETHENE	ug/l	87	2.4 J	400	10000	9	12000
74-84-0	ETHANE	ug/l	9	1.1 J	9.4	89	5.9	23
74-82-8	METHANE	ug/l	10000	61	2700	13000	91	8500
	METALS							
7439-89-6	IRON	mg/l	0.423	0.963	0.0333 U	69.7	0.055 J	19.6
9/7/7440	POTASSIUM	mg/l	18.1	6.77	7	12.3	9.34	4.41
	WET CHEMISTRY							
TOC	TOTAL ORGANIC CARBON	mg/l	32.7	4.5	93.8	226	2.6	387

EkonoI Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	PMW-11D PMW-11D_2015-10-14 8089412 LANCASTERLABS BPX47 WATER 10/14/2015 12:10 12/14/2015	PMW-11S PMW-11S_2015-10-22 8102361 LANCASTERLABS BPX53 WATER 10/22/2015 10:26 12/14/2015	PMW-12D PMW-12D_2015-10-13 8087647 LANCASTERLABS BPX46 WATER 10/13/2015 12:40 12/14/2015	PMW-15D PMW-15D_2015-10-15 8094346 LANCASTERLABS BPX48 WATER 10/15/2015 10:25 12/14/2015	PMW-16D PMW-16D_2015-10-14 8089419 LANCASTERLABS BPX47 WATER 10/14/2015 15:40 12/14/2015	PMW-17D PMW-17D_2015-10-14 8089415 LANCASTERLABS BPX47 WATER 10/14/2015 14:10 12/14/2015
CAS NO.	COMPOUND	UNITS:						
	VOLATILES							
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	15000	10 U	17	10000	1800	6.8
75-34-3	1,1-DICHLOROETHANE	ug/l	680	35	75	1600	660	3.9
75-35-4	1,1-DICHLOROETHENE	ug/l	340	16 J	190	230	160	0.5 U
75-00-3	CHLOROETHANE	ug/l	1 U	10 U	1 U	10 U	2.5 U	0.5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	3700	7700	120000	3100	52000	30
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	46	10 U	240	67	84	0.5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	15	130	220	18 J	100	0.5 U
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	300	75	43000	550	1400	5
75-01-4	VINYL CHLORIDE	ug/l	360	2700	18000	1100	2800	9.5
74-85-1	ETHENE	ug/l	33	420	12000	220	790	3.9 J
74-84-0	ETHANE	ug/l	8.2	26	1 U	15	13	2.8 J
74-82-8	METHANE	ug/l	490	4400	8700	6400	4500	890
	METALS							
7439-89-6	IRON	mg/l	0.129 J	3.1	6.83	0.464	0.116 J	0.509
9/7/7440	POTASSIUM	mg/l	3.3	4.48	9.56	3.86	4.65	1.47
	WET CHEMISTRY							
TOC	TOTAL ORGANIC CARBON	mg/l	9.8	3.8	480	101	105	13

EkonoL Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	RMW-1D RMW-1D_2015-10-13 8087643 LANCASTERLABS BPX46 WATER 10/13/2015 13:30 12/14/2015	RMW-2D RMW-2D_2015-10-16 8094356 LANCASTERLABS BPX49 WATER 10/16/2015 12:05 12/14/2015	Dup of RMW-2D_2015-10-16 RMW-2D RMW-20D_2015-10-16 8094354 LANCASTERLABS BPX49 WATER 10/16/2015 12:01 12/14/2015	RMW-3D RMW-3D_2015-10-15 8094339 LANCASTERLABS BPX48 WATER 10/15/2015 10:25 12/14/2015	FIELDQC TripBlank1_2015-10-13 8087651 LANCASTERLABS BPX46 WATER 10/13/2015 0:00 12/14/2015
CAS NO.	COMPOUND	UNITS:					
	VOLATILES						
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	27	250 U	250 U	8700	0.5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	4.1	250 U	250 U	170	0.5 U
75-35-4	1,1-DICHLOROETHENE	ug/l	2.4	350 J	420 J	210	0.5 U
75-00-3	CHLOROETHANE	ug/l	0.5 U	250 U	250 U	5 U	0.5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	290	250000	220000	2400	0.5 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	1300	1400	5 U	0.5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.92 J	250 U	250 U	9.3 J	0.5 U
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	2.3	130000	150000	16	0.5 U
75-01-4	VINYL CHLORIDE	ug/l	8.6	1000	1300	96	0.5 U
74-85-1	ETHENE	ug/l	1 U	380	400	4.6 J	
74-84-0	ETHANE	ug/l	27	64	56	2.5 J	
74-82-8	METHANE	ug/l	120	930	970	150	
	METALS						
7439-89-6	IRON	mg/l	0.265 J	2.2	2.44	0.0712 J	
9/7/7440	POTASSIUM	mg/l	3.32	5.99	6	2.74	
	WET CHEMISTRY						
TOC	TOTAL ORGANIC CARBON	mg/l	1.5	374	302	5.3	

Ekonol Facility Validated Groundwater Analytical Results Wheatfield, New York 4th Quarter 2015 (October)		Location ID: Sample ID: Lab Sample Id: Source: SDG: Matrix: Sampled: Validated:	FIELDQC TripBlank1_2015-10-14 8089410 LANCASTERLABS BPX47 WATER 10/14/2015 0:00 12/14/2015	FIELDQC TripBlank1_2015-10-15 8094337 LANCASTERLABS BPX48 WATER 10/15/2015 0:00 12/14/2015	FIELDQC TripBlank1_2015-10-16 8094349 LANCASTERLABS BPX49 WATER 10/16/2015 0:00 12/14/2015	FIELDQC TripBlank1_2015-10-19 8095823 LANCASTERLABS BPX50 WATER 10/19/2015 0:00 12/14/2015	FIELDQC TripBlank1_2015-10-20 8097865 LANCASTERLABS BPX51 WATER 10/20/2015 0:00 12/14/2015	FIELDQC TripBlank1_2015-10-21 8100249 LANCASTERLABS BPX52 WATER 10/21/2015 0:00 12/14/2015	FIELDQC TripBlank1_2015-10-22 8102358 LANCASTERLABS BPX53 WATER 10/22/2015 0:00 12/14/2015
CAS NO.	COMPOUND	UNITS:							
	VOLATILES								
71-55-6	1,1,1-TRICHLOROETHANE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-34-3	1,1-DICHLOROETHANE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-35-4	1,1-DICHLOROETHENE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-00-3	CHLOROETHANE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
156-59-2	CIS-1,2-DICHLOROETHYLENE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
127-18-4	TETRACHLOROETHYLENE(PCE)	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
79-01-6	TRICHLOROETHYLENE (TCE)	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
75-01-4	VINYL CHLORIDE	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
74-85-1	ETHENE	ug/l							
74-84-0	ETHANE	ug/l							
74-82-8	METHANE	ug/l							
	METALS								
7439-89-6	IRON	mg/l							
9/7/7440	POTASSIUM	mg/l							
	WET CHEMISTRY								
TOC	TOTAL ORGANIC CARBON	mg/l							

ATTACHMENT D
SITE ANALYTICAL DATA – ALL SITE WELLS

EKONOL FACILITY

Well Id: INJ-01

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	840 J	100000	23000	5000 U	5000 U	1600 J	7	17	78	5000 U	5000 U	5000 U	6.46	1480								
07/2008	5000 UJ	2600 J	150000 J	380 J	5000 UJ	1600 J	9.2 J	52 J	100 J	5000 UJ	5000 UJ	5000 UJ	202 J	1150 J								
12/2008	100 J	14000	120000 J	1100 J	220 J	3500	6.4	12	66	1300 U	62 J	1300 U	441	260								
10/2009	110 J	19000	99000	300 J	260 J	3500	11	110	440	1000 U	72 J	1000 U	365	991	0.0394 J	247						
07/2010	80 U	9900	83000	170 J	120 J	3700	40	330	1000	80 U	100 U	100 U	545	130	4.72	169						
06/2011	600 J	90000	99000	180 J	290 J	3000	12	93	170	160 U	200 U	200 U	51	1390	0.0308 J	117						
08/2011	390 J	44000	110000	240 J	220 J	2900	22	260	720	500 U	500 U	500 U	239	270	0.0878 J	272						
11/2011	660	54000	87000	130 J	200 J	3500	21	540	2800	110 J	500 U	500 U	139	464 J	0.127 J	190						
03/2012	470	29000	48000	88 J	110	3000	11	100	1800	87 J	37 J	100 U	32.4	1790 J	0.2 U	203						
06/2012	570	51000	34000	52 J	82 J	1100	13	76	1300	1000	83 J	50 U	25.6	261 J	0.04 J	148						
09/2012	450	32000	49000	80 J	120	5700	89	440	4300	290	58 J	20 U	79.5	54.2	0.0484 J	121						
12/2012	140 J	3600	100000	100 J	90 J	2800	28	310	1800	86 J	100 U	100 UJ	1640	498	0.812	170						
04/2013	84 J	5300	150000	220 J	110 J	3600	13	190	1700	80 U	140 J	100 U	1060	304	1.32	169						
07/2013	87 J	4100	120000	150 J	91 J	3900	18	370	1600	80 UJ	120 J	100 U	780	202	20.5	61.8						
10/2013	400 U	3900	140000	400 U	400 U	4000	33	610	2100	400 U	500 U	500 U	715	66.7	4.47	128						
12/2013	200 U	3200	140000	200 U	200 U	4300	30	620	3000	200 U	250 U	250 U	571	126	1.2	171						
04/2014	54 J	8800	160000	260	230	11000	24	1200	4800	50 U	89 J	50 U	440	25.8	2.92	87.1	6.23					
08/2014	50 U	7700	94000	210	160	19000	37	4600	9100	50 U	70 J	50 U	388	74.9	1.2	94.6	6.48					
12/2014	100 U	3500	89000	200 J	100 J	13000	30	5000	9400	100 U	100 U	100 U	337	86.7	0.357 J	113	6.34					
03/2015	30 J	4800	84000	210	150	14000	26	5200	10000	25 U	45 J	25 U	269	17	1.21	76	6.32					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-02

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2-DCE (ug/L)	Trans-1,2-DCE	1,1-DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1-	1,1-	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
										Trichloro ethane (ug/L)	Dichloro- ethane (ug/L)											
07/2010	40 U	50 U	78000	240 J	170 J	29000	24 U	340	6300	40 U	50 U	50 U	121	3.5 J	0.24	62.7						
08/2011	250 U	93 J	90000	110 J	170 J	19000	31	1300	400	250 U	250 U	250 U	194	2.5 J	11.4	0.68						
03/2012	5.9 J	190	4900	8.4 J	18 J	1500	6.5	140	350	25 U	25 U	25 U	92.5	3.1 J	1.84	93.1						
06/2012	16 U	38 J	14000	26 J	51 J	4200	18 J	360 J	1200	16 UJ	20 U	20 U	97.8	1.7 J	1.32 J	24.1						
09/2012	66	5700	13000	26 J	110	2100	20	220	1400	9.4 J	10 U	10 U	50.1	2.6 J	0.339	5.8						
12/2012	93 J	3600	54000	2700	430 J	8800	17	110	1500	95 J	230 J	100 U	1940	8.4	425	9.5						
04/2013	190 J	26000	200000	220 J	160 U	2500	13	140	1400	160 U	200 U	200 U	1170	270	13.4	135						
07/2013	80 U	6200	140000	230 J	180 J	2400	45	490	1200	80 UJ	100 U	100 U	1040	5 J	241	5.5						
10/2013	160 U	270 J	190000	240 J	340 J	3800	86	690	1500	160 U	200 U	200 U	962	1.5 U	338	0.36						
12/2013	95 J	8600	160000	240 J	310 J	5800	51	440	1000	80 U	100 U	100 U	690	42.2	22.4	58						
04/2014	50 U	930	65000	120	67 J	5100	29	620	2000	50 U	50 U	50 U	611	1.6 J	182	2.3	6.02					
08/2014	55	4400	44000	160	58	12000	63	3700	11000	25 U	37 J	25 U	258	18	2.53	60.2	6.55					
12/2014	200	20000	90000	220	110	11000	35	6200	12000	50 U	50 U	50 U	306	156	1.53	87.6	6.96					
04/2015	92	5100	24000	91	49 J	6600	34	4400	8700	25 U	25 U	25 U	396	4.4 J	118	2.8	6.44					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-04

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
10/2009	240 J	20000	110000	290 J	290 J	3200	10	70	300	1000 U	120 J	1000 U	454	506	0.0381 J	221						
07/2010	150 J	17000	130000	260 J	170 J	6200	19	260	1400	80 U	120 J	100 U	469	73.3	0.442	155						
08/2011	870	74000	84000	130 J	200 J	1300	23	200	660	250 J	500 U	500 U	259	146	1.52	257						
03/2012	720	40000	48000	83 J	77 J	1300	20	250	3300	170 J	96 J	250 U	34.9	2790	0.256	254						
06/2012	780	54000	69000	89 J	160 J	2200	21	370	2600	730 J	130 J	100 U	56.5	166 J	0.0333 U	176						
09/2012	710	30000	57000	85 J	130 J	3400	60	400	3300	390	78 J	50 U	41.2	11.4 J	0.0333 U	149						
12/2012	170 J	3300 J	77000 J	80 UJ	80 UJ	780 J	13	340	3500	120 J	100 J	100 UJ	782	680	0.923	176						
04/2013	160 U	2400	110000	160 U	160 U	2500	26	440	3700	160 U	200 U	200 U	302	833	0.365	133						
07/2013	80 U	950	120000	110 J	86 J	2700	29	760	1900	80 U	150 J	100 U	709	62.3	5.78	140						
10/2013	80 U	100 U	65000	80 U	80 U	5000	74	830	2700	80 U	100 U	100 U	1150	1.5 U	479	0.17						
12/2013	80 U	1100	120000	130 J	84 J	2500	26	520	2300	80 U	120 J	100 U	546	13.4	0.792	117						
04/2014	20	53	15000	22	17	880	14	80	790	5 U	10	5 U	135	1.9 J	11.5	0.68	6.15					
08/2014	7.4	8.5	1700	3.4	2.5	130	9.9	35	3600	0.5 U	1.3	0.5 U	143	1.5 U	46.7	0.094 J	6.85					
12/2014	50 U	730	100000	210	92 J	9000	32	1600	9800	50 U	55 J	50 U	176	413	0.0866 J	167	7.32					
04/2015	50 U	1500	56000	160	100 J	16000	43	2700	9400	50 U	50 U	50 U	152	8.4	0.494	52.4	6.39					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-05

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2010	800 J	270000	87000	190 J	210 J	1100	89	1400	69	160 U	200 U	200 U	258	1250	2.24	146						
08/2011	600	110000	99000	180 J	250 J	2300	80	800	360	500 U	500 U	500 U		460	0.0959 J	217						
09/2011													292									
03/2012	730	61000	48000	92	100	1600	18	140	1900	170	55	10 U	60.7	1250	0.2 U	161						
06/2012	650	45000	27000	42 J	62 J	290	15	120	730	1100 J	76 J	50 U	26.8	214 J	0.0333 U	156						
09/2012	360 J	27000	75000	80 U	230 J	830	150	1000	1500	220 J	100 U	100 U	124	23.7	2.52	61.3						
12/2012	230 J	17000	92000	80 U	80 U	1100	22	180	2500	80 U	100 U	100 U	1250	373	0.539	273						
04/2013	200 J	27000	110000	160 U	160 U	1700	28	290	4400	160 U	200 U	200 U	566	500	0.528	211						
07/2013	230 J	29000	99000	160 U	160 U	1800	20	160	3000	160 U	200 U	200 U	477	205	0.582	210						
10/2013	230 J	29000	130000	160 U	160 U	1400	54	390	2400	160 U	200 U	200 U	465	211	0.728	234						
12/2013	270 J	30000	140000	160 J	130 J	1900	50	350	4000	80 U	110 J	100 U	434	333	0.633	202						
04/2014	170	17000	150000	100 J	97 J	2500	32	470	4200	50 U	62 J	50 U	499	47	4.65	103	5.77					
08/2014	110	9400	150000	150	130	10000	51	1200	5600	50 U	81 J	50 U	467	152	2.39	119	6.53					
12/2014	170	16000	120000	160	110	11000	44	1700	7100	50 U	76 J	50 U	332	456	0.392 J	176	6.91					
04/2015	110	9800	73000	97 J	85 J	12000	48	1600	6700	50 U	50 U	50 U	479	60.5	4.78	85.8	6.6					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-07D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	1400 J	580000	7900	400 U	400 U	500 U	11	7.7	73	400 UJ	500 U	500 U	47.4	971	1.6	2.2	6.8	2.7E+02	8.7E+00	5.3E+01	4.6E+00	5.5E+00
08/2011	1500	270000	47000	500 U	170 J	140 J	9.4	32	45	620	500 U	500 U	286	562	15.3	26.2	6.06	1.1E+01	4.4E+03	5.8E+01	8.0E+01	1.7E+01
11/2011	1600	240000	63000	500 U	260 J	500 U	5.5	7.9	34	1400	500 U	500 U	149	317	0.32	98.6	6.47	6.0E+01	2.2E+04	2.3E+02	3.5E+02	1.6E+02
03/2012	2200 J	380000	100000	2500 U	2500 U	2500 U	12	16	110	530 J	2500 U	2500 U	117	413 J	0.931	40.3	6.33	1.1E+04	3.4E+04	2.9E+04	2.1E+03	1.5E+04
06/2012	2300	290000	56000	64 J	200	150	13	20	170	870	53 J	20 U	62.9	407	0.0333 U	97.6	6.56	2.8E+02	5.6E+03	1.6E+03	3.4E+01	2.2E+02
09/2012	2400	250000	64000	80 U	220 J	250 J	13	24	220	760	100 U	100 U	66.8	85.5 J	0.0333 U	161	7.03	2.2E+03	1.1E+04	2.4E+03	2.9E+03	1.6E+03
11/2012	2400	350000	61000	110 J	210 J	200 J				500	100 U	100 U	70.8									
12/2012	1200	330000	75000	84 J	100 J	260 J	8.8	18	140	230 J	100 U	100 U	941	92.4	45.7	1.5	6.27	1.1E+01	1.1E+01	3.0E+04	5.7E+04	1.1E+04
04/2013	1200	340000	280000	1900 J	460	1300	40	340	470 J	48	71	1 U	935	293	72.1	0.17	6.7	1.4E+05	3.1E+05	2.3E+06	2.2E+06	3.6E+04
07/2013	1600	360000	380000	240 J	870	3800	22	290	370	120 J	100 U	100 U	703	327	44.3	0.47	6.64	4.6E+04	2.4E+04	4.8E+04	3.8E+04	4.5E+02
10/2013	1200 J	300000	280000	800 U	800 U	5500	37	430	590	800 U	1000 U	1000 U	424	341	37.8	1.1	6.38	5.0E+04	1.4E+04	1.7E+05	1.7E+05	2.2E+03
12/2013	840	220000	360000	260 J	850	2400	20	340	740	80 U	100 U	100 U	251	158	25	0.66	6.26	8.8E+04	3.6E+03	2.7E+05	2.7E+05	1.4E+04
04/2014	450	120000	380000	390	900	4800	22	270	440	100 U	100 U	100 U	197	122	22.4	0.59	6.19	8.9E+04	7.3E+03	2.9E+05	8.7E+02	1.4E+04
08/2014	420	160000	380000	270	940	11000	38	430	1000	100 U	100 U	100 U	258	153	23.6	1.4	6.6	4.1E+05	9.6E+03	2.9E+06	1.5E+04	4.7E+04
12/2014	840	340000	410000	320	850	4500	25	350	1500	100 U	200 J	100 U	222	179	15.4	0.92	6.45	6.1E+05	4.2E+03	1.2E+06	4.5E+03	5.5E+03
03/2015	400	160000	180000	180	430	3700	10	140	380 J	25 U	25 U	25 U	109	116	9.81	0.46	7.21	4.8E+05	7.1E+03	1.7E+06	6.2E+03	5.7E+04
10/2015	330	120000	380000	420	590	6600	44	480	1800	100 U	100 U	100 U	148		25.9		8.11					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-08D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	63	2100	8200	14 J	73	210 J	3 J	11	49	1900	100	5 U	4.7	843	6.7	0.33	6.91					
08/2011	11 J	990	9100	21 J	25	82	5.6	3.5 J	35	1200	58	25 U	283	422	0.702	62.6	6.11					
11/2011	32	340	4100	9.2 J	22 J	79	2.4 J	2.4 J	63	2300	82	25 U	301	321	1.16	45	6.38					
03/2012	10 J	220	1700	4.2 J	21 J	65	5 U	5 U	180	2400	110	25 U	996	437	0.109 J	93.8	6.24					
06/2012	4 U	49	5500	6.8 J	12 J	250	8	6.1	15000	42	41	5 U	190	18.7	20.2	0.13 J	7.62					
09/2012	8.6	1400	2400	7.7	27	350	3.6 J	19	2700	760	99	1 U	46.5	121 J	0.0333 U	106	6.97					
12/2012	8 U	27 J	9500	27 J	19 J	180	5.6	12	7300	190	28 J	10 UJ	299	1.6 J	4.83	12.1	6.21					
04/2013	4 U	6.3 J	9800	12 J	15 J	2300	6.7	63	16000	110	200	5 U	463	7.3 J	3.36	55.3	7.47					
07/2013	8 U	10 U	3500	16 J	8 U	9400	23	450	20000	40 J	320	10 U	509	1.5 U	132	0.069 J	7.12					
10/2013	16 U	45 J	16000	16 U	16 U	2900	16	2300	7500	340	510	20 U	544	6.8	5.66	90.9	6.26					
12/2013	4 U	14 J	7600	21 J	8.3 J	2300	24	5100	19000	180	610	5 U	545	3.1 J	31.8	2.8	6.1					
04/2014	9.8	44	22000	36	42	2800	16	2100	12000	640	730	6.9	405	6.8	4.6	65.3	6.95					
08/2014	0.94 J	3.8	740	31	4.8	610	59	6600	24000	110	690	11	443	2.4 J	10	21.5	7.39					
12/2014	0.5 U	1.6	33	12	0.62 J	140	33	3500	15000	4.7	340	3.2	321	1.5 U	21.2	1.2	7.08					
04/2015	25 U	30 J	22000	37 J	26 J	2400	28	1700	7100	680	910	25 U	426	57.4	1.07	105	6.78					
10/2015	2.5 U	7.4	3600	18	5.7	1200	21	2600	15000	130	490	2.5 U	437		3.05							

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-09D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	370	22000	10000	16 U	68 J	190	2.4 J	11	52	790 J	65 J	20 U	3.7	835	0.628	1.3	6.55	1.5E+03	2.7E+01	1.6E+02	4.5E+00	2.5E+01
08/2011	30 J	910	14000	30 J	52	36 J	2 J	2.2 J	16	3800	56	50 U	251	354	1.66	66	5.96	1.0E-01	2.4E+02	2.3E+01	4.6E+00	1.5E+00
11/2011	8.6 J	130	8700	29 J	25 J	100	15	7	38	360	150	50 U	353	2.3 J	90.4	5.8	6.05	3.6E+01	2.6E+03	6.0E+01	1.2E+02	5.0E+02
03/2012	10 U	14	1600	4.2 J	4 J	17	1.3 J	1.2 J	75	22	8 J	10 U	31.3	5 U	13.3	0.16 U	7.45	7.2E+02	6.9E+02	4.5E+02	1.1E+02	2.7E+01
06/2012	1.6 U	25	550	1.6 U	1.7 J	21	1 U	1 U	97	73 J	3.9 J	2 U	26.7	20 J	0.539	3.9	7.67	1.8E+02	1.2E+02	4.8E+02	4.1E+00	7.8E+01
09/2012	0.99 J	32	250	0.8 U	0.98 J	56	1 U	1 U	370	24	1.8 J	1 U	10.9	3 J	0.195 J	2.4	8.03	3.9E+03	2.6E+03	3.5E+03	2.3E+01	1.1E+03
11/2012													51.5									
12/2012	270	29000	90000	51 J	43 J	340	13	27	140	190	80 J	20 U	1320	21.9	23.6	21.5	5.91	2.8E+02	1.1E+02	2.7E+04	5.3E+04	1.2E+04
04/2013	110	12000	81000	58	69	720	18	80	6000 J	170	100	10 U	709	15.9	67.5	13.5	6.27	2.8E+03	6.9E+03	1.7E+04	1.1E+04	1.3E+01
07/2013	80 U	3700	120000	110 J	140 J	13000	27	680	3600	150 J	210 J	100 U	679	31.9	67.1	5.1	6.34	2.9E+05	2.6E+03	4.3E+05	2.0E+05	3.1E+03
10/2013	400 U	20000	250000	400 U	400 U	11000	23	1100	1600	400 U	500 U	500 U	784	44.2	15.3	27.5	6.03	1.9E+05	9.7E+03	1.0E+06	1.7E+06	1.8E+04
12/2013	80 J	12000	110000	73 J	190 J	5900	12	730	3500	150 J	140 J	50 U	321	20.8	12.3	11.3	6.29	5.4E+05	1.4E+04	9.7E+05	3.6E+05	4.0E+04
04/2014	0.5 U	8.6	1800	11	4.1	890	7	1500	5000	5.3	21	0.5 U	89.5	1.5 U	34.7	0.18	6.84	5.0E+05	3.1E+03	3.4E+06	1.1E+04	3.6E+05
08/2014	74 J	11000	93000	110	170	14000	32	5400	11000	100 J	120	50 U	279	8.4	9.08	10.2	6.91	1.6E+05	1.9E+03	1.8E+06	9.2E+03	9.3E+04
12/2014	42 J	6200	60000	86	100	7800	16	4300	11000	60	100	25 U	216	7.2	7.25	10.4	6.37	3.8E+05	2.6E+03	2.3E+06	7.3E+03	2.6E+04
03/2015	10 J	2400	23000	41	47	5500	15	6300	8700	31	67	10 U	216	33.5	28.2	4.2	6.6	3.4E+05	2.2E+03	2.9E+06	1.3E+04	3.1E+05

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-10D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	140	1800	2900	8 U	130	110	1 U	3.4 J	23	12000	100	10 U	4.4	706 J	0.399	0.4	7.69	2.9E+02	2.3E+01	3.9E+01	4.6E+00	3.6E+00
08/2011	18 J	120	2600	8.7 J	41 J	73	5 U	2.4 J	13 J	5900	67	50 U	55.7	569	0.688	20.3	6.81	2.1E+00	4.1E+02	8.2E+00	1.5E+00	6.0E-01
11/2011	5.2	59	1200	6	15	51	3.9 J	2.4 J	82	1100	60	5 U	61.6	93	2.64	30.2	7.08	2.1E+01	4.9E+03	1.8E+01	1.4E+00	6.9E+00
03/2012	3.1 J	18	450	2.1 J	9.7	110	1.2 J	2.9 J	47	620	30	5 U	15.1	228	0.0172 J	18.1	6.97	8.4E+03	7.8E+03	2.1E+04	5.3E+04	1.2E+03
06/2012	5.8	23	710	4.1 J	16	210	1.1 J	23	85	1400 J	59	1 U	17.7	615 J	1.36	23.9	7.54	1.3E+03	2.5E+03	1.1E+04	4.9E+03	9.7E+03
09/2012	4.9 J	14	560	3.2 J	17	190	1.8 J	40	960	1000	55	1 U	17.4	425	0.0727 J	19.7	8.03	1.4E+03	1.2E+03	3.6E+04	1.2E+04	4.2E+04
11/2012													17.3									
12/2012	11 J	220	8000	16 J	19 J	220	2 J	6.3	170	590	86	5 U	152	53.6	0.0585 J	162	6.51	7.9E+01	3.6E+01	2.9E+02	2.6E+02	9.1E+01
04/2013	16	47	9900	19	33	1200	19	430	3500	400	280	2 U	629	4.1 J	28.2	51.2	6.03	2.4E+05	1.4E+04	3.7E+06	5.4E+06	3.4E+04
07/2013	8 U	18 J	4500	11 J	18 J	1100	24	890	6100	760	400	10 U	553	71	36.3	70.5	6.4	3.8E+04	2.4E+04	6.5E+05	2.6E+05	1.4E+04
10/2013	17 J	13 J	5200	16 J	150	770	15	470	9100	9900	1700	5 U	218	3.2 J	2.45	77.6	6.22	1.3E+04	3.9E+03	4.7E+05	1.8E+05	8.8E+04
12/2013	25 J	18 J	8000	22 J	170	840	12	190	4100	9100	1500	10 U	280	7.8	1.93	91.8	6.55	2.2E+04	7.7E+03	2.1E+05	1.2E+05	3.1E+04
04/2014	0.85 J	1.3	8.5	0.5 U	0.5 U	1.8	12	2 J	720	2.8	0.8 J	0.5 U	24.2	31.3	0.383 J	0.25	7.76	6.4E+02	2.6E+02	1.2E+03	5.2E+01	8.1E+02
08/2014	18	12	7600	32	130	2800	11	190	5600	2500	600	5 U	74.3	44.4	0.0599 J	138	7.12	4.2E+04	2.6E+03	2.8E+05	1.6E+03	5.4E+03
12/2014	3.8 J	2.5 U	5900	27	80	2400	12	170	8700	1500	550	2.5 U	84.2	5.4	0.0514 J	131	6.87	1.5E+05	4.4E+03	3.3E+05	2.1E+03	8.1E+02
03/2015	2.6	3.9	2100	15	34	1300	13	97	5000	540	250	0.98 J	40.9	46.3	0.0409 J	117	7.39	3.9E+04	5.4E+03	1.3E+05	9.8E+02	5.0E+03

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-11D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
04/2012	33 J	2500	8200	19 J	35 J	270	5 U	16	53	970	82	50 U	3.8	475 J	0.295	15.3						
06/2012	27	3500	14000	29	51	390	1.8 J	22	98	980 J	98	5 U	4.1	1070 J	0.149 J	17.1	6.87	1.2E+04	2.4E+02	2.1E+04	6.0E+02	5.2E+03
09/2012	8.6 J	500	14000	33 J	68	1300	11	120	370	1000	130	10 U	3.5	812 J	0.161 J	23.9	6.73					
11/2012													7.9									
12/2012	590	200000	83000	250 J	140 J	2700	83	460	2700	170 J	100 U	100 UJ	652	337	4.67	49.1	6.18					
04/2013	360	72000	170000	170	290	1700	62	420	970 J	170	78	10 U	270	325	0.457	206	6.68					
07/2013	310 J	40000	180000	180 J	320 J	3500	70	440	2500	160 U	200 U	200 U	265	334	0.0838 J	183	6.47					
10/2013	80 U	5200	72000	99 J	140 J	2200	13	85	1700	80 U	100 U	100 U	165	195	0.194 J	97	6.28					
12/2013	520	160000	110000	110 J	280 J	2800	16	170	2300	80 UJ	100 U	100 U	202	84.3	3.11	45.2	6.44					
04/2014	43 J+	7100	29000	58	75	2100	5.7	130	1500	11	19	5 U	66.8	23.1 J+	0.156 J	40.4	7.14					
08/2014	320	140000	230000	150 J	500	6800	34	550	5600	100 U	100 U	100 U	202	164	0.562	78.5	6.28					
12/2014	100	36000	95000	87 J	200	4700	53	700	7700	50 U	50 U	50 U	107	353	0.32 J	83.9	7.49					
04/2015	2.5 U	81	3600	10	8.3	980	7.4	150	3100	2.5 U	6.4	2.5 U	5.3	22.7	0.386 J	23.7	6.19					
10/2015	5 U	720	6600	17	15	2000	82	440	24000 J	5 U	7.5 J	5 U	67.8		0.177 J		7.6					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-12D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
03/2012																	6.25					
04/2012	43 J	3900	63000	57 J	100 J	1100	23	280	2200	110 J	250 U	250 U	17.4	251 J	0.0427 J	48.7						
06/2012	200	19000	17000	34 J	56 J	510	49	210	4100	540	31 J	20 U	17.5	267	0.0506 J	128	7.38					
09/2012	17	820	760	1.6 U	3.1 J	38	1 U	1.5 J	23	1.6 U	2 U	2 U	8.6	24.7	0.142 J	29.2	9.06					
11/2012													4.8									
12/2012	220 J	14000	120000	160 U	160 U	710 J	15	55	390	160 UJ	200 UJ	200 U	1420	86.5	8.7	76.8	5.89					
04/2013	130	10000	94000	110	80	2100	92	990	5900 J	120	70	10 U	659	36.1	18.2	31.3	6.34					
07/2013	320 J	31000	130000	160 U	160 U	2800	63	1200	4400	160 U	200 U	200 U	658	92.3	17.6	9.7	5.84					
10/2013	330 J	34000	210000	190 J	310 J	9200	85	2200	5100	160 U	200 U	200 U	668	176	43.3	80.8	6.06					
12/2013	380 J	42000	100000	110 J	170 J	9200	30	1800	4200	80 U	100 U	100 U	308	65.2	12.2	22.8	6.47					
04/2014	53	3900	21000	53	42 J	2000	49	690	5100	25 U	25 U	25 U	56.8	9.9	0.948	9.5						
08/2014	2.3	6	110	0.85 J	0.5 U	50	4 J	19	2000	0.5 U	0.5 U	0.5 U	58	1.5 U	11.7	0.24	7.05					
12/2014	5 U	93	5800	20	7.8 J	970	17	990	10000	5 U	5 U	5 U	103	13.3	3.13	82	7.04					
04/2015	27 J	2900	22000	38 J	51	2500	11	1200	4300	25 U	25 U	25 U	50.8	8.4	1.07	12.6	7					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: INJ-13D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
04/2012	340 J	47000	44000	40 J	92 J	260	1.6 J	21	57	710	79 J	250 U	15.6	820 J	0.0398 J	25						
06/2012	810	140000	26000	80 U	140 J	320 J	15	91	260	810	100 U	100 U	30	566	0.0333 U	108	6.8					
09/2012	990	100000	21000	80 U	80 U	640	13	63	310	680	100 U	100 U	13.9	703	0.0333 U	72	6.79					
11/2012													7.7									
12/2012	160 U	9800	130000	320 J	160 U	1600	34 J	130 J	1200	160 UJ	200 UJ	200 U	1420	57.2	4.78	64.4	6.02					
04/2013	120	15000	110000	130	100	1800	100	680	4500 J	110	79	10 U	767	80.4	1.97	65	6.47					
07/2013	290 J	33000	120000	140 J	130 J	2300	69	1400	5100	80 U	100 U	100 U	608	135	2.13	79.7	6.03					
10/2013	160 U	8300	86000	160 U	160 U	9400	52	5200	8500	160 U	200 U	200 U	530	133	2.2	60.7	6.07					
12/2013	110	17000	78000	98 J	100	7800	37	1500	3700	50 J	60 J	20 U	288	62.1	3.34	20.7	6.41					
04/2014	50 U	4300	65000	100	100	4700	77	1400	8000	50 U	50 U	50 U	142	37.2	0.107 J	51.6	7.04					
08/2014	50 U	1000	51000	100	95 J	6500	70	2700	15000	50 U	50 U	50 U	164	45.9	0.0627 J	62.7	6.85					
12/2014	1 U	38	2800	50	6.6	830	61	1800	15000	1 U	1 U	1 U	67.8	59.3	0.595	40.7	6.62					
04/2015	11 J	2000	13000	23	27	1100	11	560	3800	10 UJ	10 U	10 U	24.1	18.8	0.173 J	8.3	7.75					
10/2015	5 U	90	10000	54	12	2500	140	2100	7200	5 U	8.1 J	5 U	191		17.6		7.75					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 1S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	19	150	6.9	2.2 J	19	1.1 J	1.7 J	55	0.8 U	1 U		2.2	2140 J	1.98							
05/2009	5.0 U	7.1	150	6.0	1.6 J	16	1.0 U	1.0 U	29	5.0 U	5.0 U	5.0 U	3.0	2130	1.180	1.0 U						
07/2010	0.8 U	2.7 J	100 J	4.7 J	1.2 J	10	1 U	1 U	20	0.8 U	1 U	1 U	2.9	2350 J	2.44	0.16 J						
06/2011	0.8 U	2 J	88	3.6 J	0.8 U	5.3	1 U	1 U	15 J	0.8 U	1 U	1 U	3	2830	1.8	0.076 J	7					
08/2011	5 U	1.1 J	96	3.9 J	5 U	7.5	5 U	5 U	14 J	5 U	5 U	5 U	3.2	2750	1.56	0.093 J	7.03					
11/2011	5 U	3.5 J	120	5.1	1.2 J	14	5 U	5 U	25	5 U	5 U	5 U	1.3	2110	1.77	0.25						
03/2012	5 U	4.4 J	120	4.5 J	1.1 J	5.2	5 U	5 U	14 J	5 U	5 U	5 U	2.8	2420 J	0.421	0.24	6.12					
06/2012	0.8 U	14	170	7.4	2 J	15	1 U	1 U	32	0.8 U	1 U	1 U	2.6	2260	1.14	0.054 U						
09/2012	0.8 U	1.5 J	110	4.4 J	0.84 J	7.8	1 U	1.2 J	29	0.8 U	1 U	1 U	2.7	2120	1.02	0.054 U	7.21					
12/2012	0.8 U	17	170	7.2	2.1 J	15	1 U	1.2 J	37	0.8 U	1 U	1 UJ	1.1	2130	2.55	0.054 U	6.7					
04/2013	0.8 U	8.4	140	5.6	1.3 J	7.7	1 U	1 U	14	0.8 U	1 U	1 U	1.6	2030	0.427	0.054 U	7.58					
07/2013	0.8 U	14	170	7.1	1.7 J	12	1 U	1 U	25	0.8 UJ	1 U	1 U	1.3	2000	0.703	0.054 U	7.4					
10/2013	0.8 U	41	200	8.9	2.4 J	13	1 U	1 U	15	0.8 U	1 U	1 U	1.2	1940	0.043 U	0.054 U						
12/2013	0.8 U	7.8	170	7.4	1.6 J	8.9	1 U	1 U	22	0.8 U	1 U	1 U	2 J	1840	0.961	0.054 U						
04/2014	0.5 U	4.2	150	5.9	1.3	6.8	1 U	1 U	16	0.5 U	0.5 U	0.5 U	3	1920	0.984	0.054 U	6.67					
08/2014	0.5 U	1.8	24	1.3	0.5 U	1.4	1 U	1 U	9.9	0.5 U	0.5 U	0.5 U	5.7	533	1.68	0.23	7.87					
12/2014	0.5 U	2.7	28	1.5	0.5 U	1.7	1 U	1 U	19	0.5 U	0.5 U	0.5 U	2.3	290	0.46	0.4	7.41					
03/2015	0.5 U	2.1	17	0.89 J	0.5 U	1	1 U	1 U	3 UJ	0.5 U	0.5 U	0.5 U	1.7	256	0.229 J	0.054 U	7.14					
10/2015	0.5 U	0.5 U	14	0.82 J	0.5 U	1.4	1 U	1 U	260	0.5 U	0.5 U	0.5 U	2.7		0.238 J							

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 2S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	400 U	2700	400000	2300 J	1100 J	60000	44	650	290	400 U	500 U		7.6	1130 J	8.69							
06/2009	5000 U	31000	230000	1700 J	660 J	28000	40	390	210	5000 U	5000 U	5000 U	7.5	1120	4.390	0.98 U						
07/2010	400 U	2500	250000	1700 J	680 J	32000	30	320	120	400 U	500 U	500 U	7.9	1270 J	4.23	0.054 U						
06/2011	200 U	6400	230000	1400	610 J	26000	12	76	56	200 U	250 U	250 U	9.6	957 J	3.28	0.054 U	6.7	6.3E+03	3.0E+00	1.1E+04	5.7E+01	1.1E+01
08/2011	500 U	500 U	220000	1400	490 J	24000	12	120	55	500 U	500 U	500 U	7	1510 J	4.23	0.16 U	6.52	1.0E+05	7.0E+01	9.9E+04	8.3E+01	3.6E+02
11/2011	500 U	150 J	120000	1100	340 J	18000	15 J	92 J	62 J	500 U	500 U	500 U	5.4	868	1.32	0.16 U	6.95	2.1E+05	1.2E+02	3.4E+05	3.7E+02	1.7E+02
03/2012	1000 U	520 J	240000	1700	590 J	30000	17	140	98	1000 U	1000 U	1000 U	5	1100 J	1.28	0.16 U	6.5	2.5E+05	1.0E+02	2.3E+05	1.5E+02	1.4E+03
06/2012	40 U	600	250000	1700	560	27000	62	390	1800	40 UJ	50 U	50 U	5.5	1170	3.88	0.054 U	6.73	8.5E+04	8.6E+02	2.3E+05	1.5E+02	2.8E+02
09/2012	80 U	210 J	240000	1900	650	33000	80	450	2500	80 U	100 U	100 U	4.7	1090 J	3.05	0.054 U		6.6E+03	9.3E+02	2.3E+05	2.3E+04	6.3E+05
12/2012	80 U	760	230000	1700	620	27000	55	280	1800	80 U	100 U	100 U	5	1130	1.87	0.054 U	6.44	1.9E+04	2.8E+00	2.5E+04	2.9E+01	2.9E+01
04/2013	44 J	2000	250000	1800	560	28000	45	230	950 J	47 J	38 J	20 U	4	1230	0.958	0.054 U	7.07	6.8E+04	4.7E+02	1.4E+05	2.7E+02	8.0E-01
07/2013	80 U	1400	220000	1600	530	18000	18	130	300	80 U	100 U	100 U	4.3	1130	1.16	0.054 U	6.84	7.5E+03	3.1E+01	1.7E+03	1.5E+01	9.0E-01
10/2013	400 U	730 J	240000	1800 J	670 J	27000	43	460	860	400 U	500 U	500 U	5.7	1020	4.1	0.054 U	6.15	3.7E+03	1.9E+02	6.3E+03	3.7E+02	1.0E+01
12/2013	40 U	7100	190000	1200	540	14000	11	96	240	40 U	50 U	50 U	5	562	0.183 J	0.054 U		3.8E+05	2.7E+01	8.3E+05	6.1E+02	2.4E+02
04/2014	0.5 UJ	3.5	77	4.9	0.5 U	67	190	190	19000	0.5 U	1.2	0.5 U	10.3	32.1	0.376 J	17.7	6.4	1.7E+04	1.3E+02	5.9E+04	1.3E+02	2.4E+04
08/2014	130 U	630	300000	2000	810	30000	17	190	240	130 U	130 U	130 U	7	954	5.17	0.054 U	6.93	3.9E+05	3.1E+02	6.7E+05	1.3E+01	3.4E+00
12/2014	100 U	3500	240000	1300	450	12000	5.2	59	70	100 U	100 U	100 U	4.2	974	0.186 J	0.054 U	7.49	1.6E+05	1.6E+02	4.7E+05	3.1E+01	9.6E+00
03/2015	82 J	5300	240000	1400	500	14000	7.6	34	140 J	50 U	50 U	50 U	3	894	0.111 J	0.054 U		3.8E+05	1.3E+01	6.0E+05	2.7E+01	1.2E+02
10/2015	250 U	250 U	260000	1200	360 J	9300	14	170	210	250 U	250 U	250 U	4.4		3.4		6.85					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 3D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	9.7 J	150	2600	5.4 J	37	160	2.8 J	13	43	750	32		2.6	808 J	0.36							

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 3S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	1.8 J	0.8 U	0.8 U	1 U	1 U	1 U	11	0.8 U	1 U		2.8	2090 J	2.25							
06/2009	5.0 U	2.2 J	1.5 J	5.0 U	5.0 U	2.0 U	1.0 U	1.0 U	3.7	5.0 U	5.0 U	5.0 U		2680	0.832	1.0 U						
07/2010	0.8 U	1 U	0.81 J	0.8 U	0.8 U	1 U	1 U	1 U	23	0.8 U	1 U	1 U		2610	1.93	0.054 U						
06/2011	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	16	0.8 U	1 U	1 U	3.3	2740	0.637	0.054 U	7.59					
08/2011	5 U	1.3 J	7.1	5 U	5 U	5 U	5 U	5 U	11 J	5 U	5 U	5 U	3.8	3170 J	1.4	0.11 J	7.39					
11/2011	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	32	5 U	5 U	5 U	8.6	3470	2.31	0.16 U	6.8					
03/2012	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	7.3 J	5 U	5 U	5 U	14.1	283 J	0.0961 J	0.16 U	6.67					
06/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	5 U	0.8 U	1 U	1 U	19.8	462	0.945	0.054 U	7.49					
09/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	2.6 J	1 U	240	0.8 U	1 U	1 U	12.4	529	0.398	0.054 U	7.54					
12/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	140	0.8 U	1 U	1 UJ	8.4	662	1.98	0.054 U	6.6					
04/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	8.3	254	0.0842 J	0.054 U						
07/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	2.8 J	1.5 J	150	0.8 U	1 U	1 U	8.4	342	0.768	0.054 U	7.11					
10/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	69	0.8 U	1 U	1 U	4.4	450	0.228 J	0.054 U						
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	3.4 J	0.8 U	1 U	1 U	5.1 J	699	0.151 J	0.054 U						
04/2014	0.5 UJ	0.5 U	1.3	0.5 U	0.5 U	0.5 U	1 U	1 U	3 U	0.5 U	0.5 U	0.5 U	9.6	226 J+	0.162 J	0.054 U	7.31					
08/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	31	0.5 U	0.5 U	0.5 U	4.7	523	0.0397 J	0.054 U						
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	3 U	0.5 U	0.5 U	0.5 U	9.8	88.5	0.0334 U	0.054 U	6.56					
04/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	17	0.5 U	0.5 U	0.5 U	76.3	215	0.236 J	0.054 U						

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 4S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCEr (cells/ml)	VCR (cells/ml)
05/2008	34 J	15000	19000	31 J	43 J	360	13	9.8	140	16 U	20 U		3.9	2920 J	3.22							
06/2009	5.0 U	1.5 J	23	1.4 J	5.0 U	93	15	24	200	5.0 U	0.72 J	5.0 U	6.2	3750	0.671	1.7						
10/2009	5.0 U	6.7	92	2.4 J	0.51 J	79	8.8	11	120	0.38 J	0.78 J	5.0 U	11.4									
07/2010	0.8 U	1 U	34 J	1 J	0.8 U	130	16	13	170	0.8 U	1 U	1 U	3.5	3970 J	0.693	4.6						
06/2011	1.6 U	59	670	11	3 J	220	12	100	150	2.7 J	3.4 J	2 U	12.2	3730	0.338	45.4	7.69					
08/2011	5 U	10	130	3.6 J	5 U	91	12	75	110	5 U	1.8 J	5 U	5.4	4090 J	0.855	1.4	7.12					
11/2011	5 U	2.7 J	27	2.3 J	5 U	50	11	110	430	5 U	1.6 J	5 U	6.1	4190 J	0.498	11	7.04					
03/2012	5 U	1.4 J	46	5 U	5 U	140	14	42	180	5 U	1.4 J	5 U	4.1	4440 J	0.6	0.35	6.53					
06/2012	0.8 U	1.6 J	37	0.8 U	0.8 U	74	5.9	15	100 J	0.8 U	1 U	1 U	3.8	3190 J	0.72	5.1	7.14					
09/2012	0.8 U	1.8 J	96	1.2 J	0.8 U	190	13	83	380	0.8 U	1.1 J	1 U	6.7	3480 J	0.594	6.4	6.41					
12/2012	0.8 U	8	330	8.9	1.1 J	260	15	110	1400	0.8 U	1.3 J	1 UJ	2.5 U	2200	0.617	12.1	6.39					
04/2013	4 U	39	3400	55	8 J	1700	31	380	6100	4 U	6.2 J	5 U	9.2	2320	0.186 J	22.9	6.75					
07/2013	0.8 U	10	530	12	1.4 J	470	11	89	1300	1.3 J	2 J	1 U	5.1	3420	0.414	14.1	6.87					
10/2013	0.8 U	32	1300	27	4 J	920	20	300	4400	0.86 J	3.2 J	1 U	13.6	1840	0.24 J	29.1	6.25					
12/2013	0.8 U	27	660	20	2.9 J	810	16	230	3600	0.8 U	2.3 J	1 U	13.6	3050	0.587	26.1	6.44					
04/2014	2.5 U	23	3000	47	6.7	1400	54	350	5000	2.5 U	4.5 J	2.5 U	9	2190	0.684	19.5	6.73					
08/2014	0.5 U	10	1100	13	3.2	450	20	88	2900	0.5 U	2	0.5 U	7.7	2240	0.185 J	11.3						
12/2014	0.5 U	17	2600	20	8.7	1100	18	150	5500	0.5 U	2.4	0.5 U	7.8	2560	0.3 J	16.3	6.73					
03/2015	1 U	8.6	2500	29	7.4	1000	16	170	4700	1 J	3.4	1 U	7.3	1950	0.564	10.8	7.61					
10/2015	0.5 U	3.2	2300	5.7	5.2	420	15	79	2000	0.5 U	1.3	0.5 U	4.7		0.533		6.68					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 5S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2009	5.0 U	5.0 U	0.85 J	5.0 U	5.0 U	15	1.6	1.0 U	38	5.0 U	5.0 U	5.0 U		1110	1.160	0.98 U						
07/2010	0.8 U	1 U	1.5 J	0.8 U	0.8 U	34	2.6 J	2 J	44	0.8 U	1 U	1 U		1150	1.3	0.054 U						
08/2011	5 U	6.5	1.2 J	5 U	5 U	24	2.4 J	1.9 J	30	5 U	5 U	5 U	2.4	932	0.723	0.16 U	7.06					
03/2012	5 U	5 U	5 U	5 U	5 U	3.6 J	5 U	5 U	7.9 J	5 U	5 U	5 U	1.7	1200	0.193 J	0.16 U						
06/2012	0.8 U	1 U	1.3 J	0.8 U	0.8 U	27	1.6 J	1.1 J	24 J	0.8 U	1 U	1 U	1.6	966 J	0.678	0.054 U						
09/2012	0.8 U	1 U	1.4 J	0.8 U	0.8 U	35	1.4 J	1 U	19	0.8 U	1 U	1 U	1.5	859	0.818	0.054 U	7.32					
12/2012	0.8 U	1 U	2 J	0.8 U	0.8 U	33	1.8 J	1.1 J	20 J	0.8 U	1 U	1 U	1.8	945	0.549	0.054 U						
04/2013	0.8 U	1 U	0.99 J	0.8 U	0.8 U	3.3 J	1 U	1 U	5.6	0.8 U	1 U	1 U	1.5	1060	0.152 J	0.054 U	7.59					
07/2013	0.8 U	1 U	1.7 J	0.8 U	0.8 U	27	1.3 J	1 U	21	0.8 UJ	1 U	1 U	2.1	877	0.639	0.054 U	7.36					
10/2013	0.8 U	1 U	1.6 J	0.8 U	0.8 U	30	1.5 J	1 U	17	0.8 U	1 U	1 U	1.9	790	0.591	0.054 U	6.93					
12/2013	0.8 U	1 U	1.4 J	0.8 U	0.8 U	21	1.3 J	1 U	18	0.8 U	1 U	1 U	2.8 J	751	0.687	0.054 U	6.94					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 6S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	2.5 J	34	0.8 U	1.6 J	280	57	8.2	300	1.4 J	11		3.5	2440 J	0.149 J							
05/2009	5.0 U	0.76 J	72	3.1 J	1.0 J	410	58	7.5	290	0.86 J	6.8	5.0 U	6.5	2610	0.0514 J	1.0 U						
07/2010	0.8 U	1 U	58	0.8 U	1.1 J	300	56	6.6	200	0.86 J	6.7	1 U	5.5	3540	0.137 J	0.054 U						
06/2011	0.8 U	1.4 J	60	2.5 J	0.8 U	120	12	2 J	62	0.8 U	1.9 J	1 U					10.1					
08/2011	5 U	5 U	23	5 U	0.98 J	210	45	3.5 J	110	5 U	6.3	5 U					6.96					
11/2011	5 U	5 U	40	5 U	1.5 J	250	46	4.8 J	150	5.5	9.9	5 U					6.78					
03/2012	5 U	5 U	670	2.4 J	3.3 J	280	17	5.4	48	1.5 J	10	5 U										
06/2012	0.8 U	1 U	53	0.8 U	0.8 U	210	34	4 J	110	0.8 U	3.9 J	1 U										
09/2012	0.8 U	1 U	31	0.8 U	1.5 J	250	50	5.8	140 J	1.1 J	8.5	1 U					6.45					
12/2012	0.8 U	1 U	29	0.8 U	0.8 U	110	24	3.3 J	75 J	0.8 U	2.8 J	1 U					6.89					
04/2013	0.8 U	1 U	1.9 J	0.8 U	0.8 U	1.3 J	1 U	1 U	3 U	0.8 U	1 U	1 U					8.37					
07/2013	0.8 U	1 U	97	0.9 J	0.8 U	230	27	4.6 J	140	1.1 J	5.3	1 U					6.45					
10/2013	0.8 U	1 U	66	0.8 U	1.3 J	230	54	15	200	0.87 J	7.4	1 U					6.24					
12/2013	80 U	100 U	80 U	80 U	80 U	170 J	45	4.7 J	160	80 U	100 U	100 U										
04/2014	0.53 J	76	67	0.55 J	0.5 U	60	5.4	1.1 J	56	0.5 U	1.2	0.5 U					7.7					
08/2014	0.5 U	1.3	44	0.6 J	0.63 J	170	31	6.4	140	0.5 U	4.5	0.5 U										
12/2014	0.5 U	0.5 U	38	1.1	0.97 J	190	32	3.4 J	100	0.91 J	6.5	0.5 U					7.73					
04/2015	0.5 U	1	30	0.84 J	0.5 U	35	2.7 J	1 U	23	0.5 U	0.5 U	0.5 U					8.28					
10/2015	0.5 U	0.7 J	42	0.5 U	0.5 U	53	2.9 J	1.7 J	100	0.5 U	0.55 J	0.5 U					9.31					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 7D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCEr (cells/ml)	VCR (cells/ml)
01/2008	720 J	140000	26000	5000 U	5000 U	690 J	12	15	82	360 J	5000 U	5000 U	7.79	1150								
05/2008	740	75000	26000	80 U	110 J	1000	8.9	15	74	120 J	100 U		5.1	1400	1.57							
07/2008	5000 UJ	5000 UJ	130000 J	360 J	5000 UJ	900 J	16 J	28 J	72 J	5000 UJ	5000 UJ	5000 UJ	480 J	1190 J								
09/2008	2500 U	1200 J	59000	740 J	140 J	1500	4.4	13	55	2500 U	2500 U	2500 U	212	1280								
10/2008																						
12/2008	2500 U	2600	53000	350 J	2500 U	1400 J	5.3	15	62	2500 U	2500 U	2500 U	278	649								
06/2009	500 U	1600	19000	68 J	44 J	1200	7.8	18	380	500 U	53 J	500 U	124	1210	0.0430 J	304						
10/2009	100 J	3100	23000	88 J	55 J	940	12	21	890	64 J	100 J	500 U	117	485	0.0317 U							
07/2010	47 J	1800	17000	41 J	30 J	1400	13	110	3700	16 U	47 J	20 U	77	1310	0.0522 U	229						
06/2011	830 J	63000	80000	160 U	250 J	1300	8.3	56	130	730 J	200 U	200 U	56.1	856	0.106 J	128	7.64					
08/2011	500 U	770	140000	98 J	350 J	990	80	530	160	500 U	120 J	500 U	138	170	0.11 J	41.2	6.93					
11/2011	560	25000	29000	60 J	65 J	1300	38	210	3200	110 J	140 J	250 U	166	12.7 J	2.56	157	7.26					
03/2012	70	150	3100	50 U	12 J	890	19	93	170	50 U	50 U	50 U	4.4	5 U	0.977	0.27	7.42					
06/2012	390	19000	32000	56 J	60 J	630	17	190	3100	150	80 J	20 U	14.7	376	0.0333 U	230	8.67					
09/2012	420	20000	31000	63 J	75 J	1000	30	360	4200	210	110	20 U	28	212 J	0.0333 U	243	7.2					
12/2012	80 U	100 U	110000	110 J	80 U	930	22	250	2800	260 J	520	100 UJ	935	7.5	0.292	302	5.96					
04/2013	46 J	190 J	64000	81 J	130 J	740	8.1	79	1100	2600	1000	50 U	210	10 J	0.0459 J	224						
07/2013	89 J	1300	59000	91 J	80 U	1200	17	180	3400	900	1100	100 U	178	37.9	0.043 U	242	6.73					
10/2013	65 J	270	72000	89 J	81 J	850	9.9	120	2400	2100	1400	50 U	216	6.1	0.043 U	219	6.27					
12/2013	84 J	530	69000	110 J	190 J	1100	17	280	2000	2100	1900	100 U	192	22.2	0.043 U	208	6.55					
04/2014	50 U	360	44000	88 J	85 J	2100	45	360	4700	510	740	50 U	589	96.3	0.043 U	165	7.17					
08/2014	50 U	780	72000	140	93 J	3000	41	470	8600	360	650	50 U	219	12.2	0.0334 U	220	6.89					
12/2014	66 J	1100	98000	120	110	2200	27	410	6900	630	990	50 U	213	13.5 J+	0.183 J	212	6.58					
04/2015	100 U	320	72000	100 U	100 U	3500	58	410	8000	270	660	100 U	112	7.1	0.0579 J	119	6.76					
10/2015	290	24000	69000	140	53 J	2300	26	420	7900	150	310	50 U	85.4		0.0333 U		6.73					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 7D PUMP

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2009	53 J	2200	26000	79 J	37 J	1200	5.6 J	10 J	200 J	42 J	75 J	500 U										

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 7D SNAP

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2009	1300 U	1800	21000	65 J	1300 U	680	6.9 J	15 J	220 J	1300 U	60 J	1300 U										

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 7S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U				0.8 U	1 U											
06/2009	5.0 U	6.9	0.75 J	5.0 U	5.0 U	2.0 U	1.0 U	1.0 U	5.7	5.0 U	5.0 U	5.0 U		2070	0.122	1.0 U						
07/2010	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	7.6 J	0.8 U	1 U	1 U		2070	0.307	0.054 U						
08/2011	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	9.4 J	5 U	5 U	5 U	3.6	2170	0.716	0.16 U	6.65					
03/2012	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	5 U	5 U	5 U	2.7	2430 J	0.0756 J	0.16 U	6.89					
06/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	7.5 J	0.8 U	1 U	1 U	2.4	1750	0.709	0.054 U	6.54					
09/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	6.9 J	0.8 U	1 U	1 U		1970	1.32	0.054 U	6.6					
12/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 UJ	2	2070	0.239	0.054 U	6.53					
04/2013	0.8 U	1 U	2.1 J	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	2.6	2210	0.0446 J	0.054 U						
07/2013	0.8 U	1 U	0.95 J	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	2.4	1940	0.043 U	0.054 U						
10/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	2	12100	0.307 J	0.054 U	6.53					
12/2013	0.8 U	1 U	0.98 J	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	2.9 J	1880	0.235 J	0.054 U						
04/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	3 U	0.5 U	0.5 U	0.5 U	3.9	1800	0.0861 J	0.054 U						
08/2014	0.5 U	0.5 U	0.71 J	0.5 U	0.5 U	0.5 U	1 U	1 U	3 U	0.5 U	0.5 U	0.5 U	2.9	1700	4.44	0.054 U						
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	3 U	0.5 U	0.5 U	0.5 U	0.98 J	1780	0.25 J	0.054 U	6.72					
03/2015	0.5 U	0.5 U	0.66 J	0.5 U	0.5 U	0.5 U	1 U	1 U	3 U	0.5 UJ	0.5 U	0.5 U	2.7	1620	0.48	0.054 U						
10/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	22	0.5 U	0.5 U	0.5 U	1.8		2.15		6.57					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 8S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U				0.8 U	1 U											
05/2009	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	1.0 U	1.0 U	2.7	5.0 U	5.0 U	5.0 U		850	0.0088 J	0.99 U						
07/2010	0.8 U	1 U	14	0.8 U	0.8 U	18	1 U	1 U	10 U	0.8 U	1 U	1 U		3890 J	0.0522 U	0.054 U						
09/2011	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	5 U	5 U	5 U	14.9	424 J	0.0192 J	0.16 U	9.86					
03/2012	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	15 U	5 U	5 U	5 U	7	5270 J	0.0812 J	0.16 U	6.34					
06/2012	0.8 U	1 U	4 J	0.8 U	0.8 U	3.8 J	1 U	1 U	5 U	0.8 UJ	1 U	1 U	25.1	4390 J	0.0325 J	0.054 U						
09/2012	0.8 U	1 U	2.8 J	0.8 U	0.8 U	3.5 J	1 U	1 U	8.3 J	0.8 U	1 U	1 U	5.7	4010 J	0.0333 U	0.054 U	6.94					
12/2012	0.8 U	1.5 J	2.1 J	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 UJ	5.6	2450	0.0333 U	0.054 U	6.85					
04/2013	0.8 U	1 U	1.7 J	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	5.3	3840	0.0333 U	0.054 U						
07/2013	0.8 U	1 U	0.87 J	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	6.7	3270	0.594	0.054 U						
10/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	4.2	1250	0.122 J	0.054 U	6.97					
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	3.6	1360	0.043 U	0.054 U	7.05					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW- 9S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCEr (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	67	130	0.8 U	0.8 U	35				0.8 U	1 U											
06/2009	2500 U	30000	99000	2500 U	2500 U	4100	19	27	210	2500 U	2500 U	2500 U		1410	0.0658 J	50.2						
07/2010	0.8 U	1 U	410	2.2 J	1.6 J	140	1 U	3.2 J	24	0.8 U	1.2 J	1 U		3510	1.28	0.054 U						
08/2011	5 U	5 U	310	2 J	0.99 J	170	5 U	6	27	5 U	5 U	5 U	7.6	3190	1.61	0.16 U	5.92					
03/2012	5 U	5 U	1300	7.5	4.2 J	460	5 U	15	32	5 U	3.1 J	5 U	5.4	2640	0.81	0.16 U	6.44					
06/2012	0.8 U	1 U	1100	7.8	3.7 J	290	1 U	19	42	0.8 U	3.6 J	1 U	5.9	2300	1.06	0.054 U	6.84					
09/2012	1.6 U	2 U	930	5.4 J	2.7 J	510	1 U	20	43	1.6 U	2.8 J	2 U	5.8	2300	1.14	0.054 U	6.48					
12/2012	0.8 U	1 U	740	4.9 J	2.6 J	320	1 U	20	40	0.8 U	3.6 J	1 UJ	4.6	1990	0.752	0.054 U	6.52					
04/2013	0.8 U	1 U	1100	8.8	4.3 J	640	1 U	35	54	2.6 J	7.7	1 U	5.8	2480	0.627	15.2	7.28					
07/2013	0.8 U	1 U	480	4.1 J	0.8 U	360	1 U	25	50	0.8 U	3.6 J	1 U	7.5	2530	1.1	9	6.48					
10/2013	0.8 U	1 U	220	1.6 J	0.8 U	150	1 U	7.3	19	0.8 U	1.5 J	1 U	16.8	778	0.22 J	0.95	6.95					
12/2013	0.8 U	1 U	270	2.1 J	0.89 J	180	1 U	12	25	0.82 J	2.4 J	1 U	15.4	1740	0.896	1.3	6.61					
04/2014	0.5 U	2.4	1000	7.5	4.1	620	3.3 J	50	90	16	16	0.5 U	10.7	1160	0.549	13.3	6.93					
08/2014	0.5 U	0.9 J	460	3.8	2.3	330	1 U	26	58	5.6	7.3	0.5 U	10.8	2040	1.76	5.7	7.11					
12/2014	0.5 U	0.5 U	240	1.5	0.95 J	260	1 U	21	39	3.6	4.4	0.5 U	6	2490	2.98	4.6	6.65					
03/2015	0.5 U	2	710	4.9	5.1	500	1.6 J	30	100 J	19	18	0.5 U	14.7	892	1.37	2.6	7.13					
10/2015	0.5 U	0.5 U	1	0.5 U	0.5 U	0.5 U	1 U	1 U	19	0.5 U	0.5 U	0.5 U	8.9		2.02		6.74					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-10D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	98	0.8 U	0.8 U	27	14	2.3 J	150	1.4 J	1 U		2.7	722 J	0.751							
05/2009	5.0 U	5.0 U	34	5.0 U	5.0 U	17	7.4	1.0 U	110	0.89 J	5.0 U	5.0 U		706	1.030	1.15						
07/2010	0.8 U	1 U	24	0.8 U	0.8 U	10	13	1.1 J	190	1.3 J	1 U	1 U		934	0.822	4						
08/2011	13 U	53	5400	14	26	170	7.9	3.9 J	120	660	28	13 U	6.3	931	0.166 J	8.4	6.17					
03/2012	10 U	10	1500	3.5 J	10	120	4.6 J	2.2 J	71	290	17	10 U	3.2	766	0.751	1.7	6.97					
06/2012	1.6 U	2.3 J	1300	3.1 J	15	91	15	3.5 J	200	190	15	2 U	2.1	932	0.168 J	6.2	6.95					
09/2012	0.8 U	1.8 J	1000	2.7 J	11	120	25	3.4 J	310	180	19	1 U	1.7	916	0.103 J	5.3	6.72					
12/2012	1.6 U	4.9 J	810	2.6 J	10	160	4.7 J	3.8 J	78	250 J	15 J	2 U	13.3	627	0.716	4.7	6.85					
04/2013	0.8 U	2.6 J	770	2.3 J	9	160	19	5.5	270	230	17	1 U	2.5	815	0.0773 J	7.5	7.92					
07/2013	1.6 U	2.8 J	1100	2.5 J	8.9 J	170	11	7.4	150	140	21	2 U	2.2	657	0.104 J	4.7	7.89					
10/2013	0.8 U	4.6 J	1100	3.2 J	13	250	5	8.4	82	250	30	1 U	1.9	636	0.125 J	3.2	7.12					
12/2013	0.8 U	2.2 J	770	2.4 J	9.8	160	16	5.6	240	150	21	1 U	2.1	761	0.097 J	6.1	6.73					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-10S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	64	730	5.3	2.3 J	140	22	14	200	0.8 U	1 U		2.4	1350 J	13.3							
05/2009	5.0 U	120	1900	37	4.7 J	240	2.3	10	46	5.0 U	5.0 U	5.0 U		804	2.990	0.99 U						
07/2010	0.8 U	3.9 J	110	5.1	2.4 J	110	1.4 J	4.1 J	31	0.8 U	1 U	1 U		1020 J	1.65	0.054 U						
06/2011	0.8 U	14	1100	8.7	2.9 J	210	5.5	18	260	0.8 U	3.4 J	1 U					6.77					
08/2011	5 U	16	1100	12	3 J	270	25	42	4400	5 U	2.3 J	5 U					6.85					
11/2011	25 U	34	5600	27	8.9 J	640	7.3	69	3000	25 U	25 U	25 U					6.86					
03/2012	5 U	6.2	880	11	2.6 J	510	12	230	1700	5 U	5 U	5 U					6.85					
06/2012	0.8 U	10	1000	19	2.7 J	740	16	590	6600	0.8 U	2.3 J	1 U					6.69					
09/2012	0.8 U	4.9 J	410	25	0.8 U	810	7	1700	1700	0.8 U	1.2 J	1 U										
12/2012	0.8 UJ	3.2 J	300	12	0.8 U	280	6.5	380	350	0.8 U	1 U	1 UJ					6.62					
04/2013	0.8 U	3 J	330	6.8	0.91 J	280	5.2	280	570 J	0.8 U	1 U	1 U										
07/2013	0.8 U	4.9 J	340	13	0.8 U	250	9	570	2700	0.8 U	1 U	1 U					7.13					
10/2013	0.8 U	1 U	230	4.2 J	0.8 U	170	3.2 J	100	240	0.8 U	1 U	1 U					6.69					
12/2013	0.8 U	1 U	280	3.6 J	0.8 U	130	2.5 J	48	250	0.8 U	1 U	1 U					7.09					
04/2014	0.5 U	1.2	280	2.9	0.75 J	130	1.9 J	45	570	0.5 U	0.5 U	0.5 U					6.91					
08/2014	0.5 U	3	630	4.7	1.8	190	2.9 J	23	440	0.5 U	0.5 U	0.5 U					6.97					
12/2014	0.5 U	1.6	240	6.3	0.97 J	140	6.2	14	2100	0.5 U	0.5 U	0.5 U					6.9					
03/2015	0.5 U	1.5	170	1.5	0.5 U	49	1 U	5.6	200 J	0.5 U	0.5 U	0.5 U					6.98					
10/2015	0.5 U	5.5	410	2.7	0.89 J	79	3.3 J	14	91	0.5 U	0.5 U	0.5 U					6.57					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-11D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	8.4 J	260 J	190 J	0.8 U	7.3 J	9.3 J	76 J	1 U	460 J	200 J	4.6 J		4	1490 J	0.0522 U							
05/2009	21 J	1200	3500	100 U	19 J	640	46	13	280	220	48 J	100 U		1030	0.0616 J	3.0						
10/2009	10 J	280	2100	5.2 J	16 J	250	45	5.0 U	240	430	33 J	100 U	4.0									
07/2010	3.4 J	130	1300	3.6 J	12	310	60	7.4	320	140	33	1 U		1290	0.0522 U	11.9						
06/2011	310	5900	3100	40 U	490	50 U	18	1.4 J	95	25000	280	50 U					7.72					
08/2011	17	100	1300	2.8 J	44	30	250 J	5 UJ	1000 J	2300	69	10 U					6.93					
11/2011	5.8 J	21	550	10 U	17	30	170	5 U	1400	1700	33	10 U					6.87					
03/2012	2.8 J	9.8	380	1.3 J	12	38	100	5 U	430	990	37	5 U	1.4				6.52					
06/2012	1.2 J	10	150	0.8 U	4.2 J	53	110	1.9 J	750	430 J	21	1 U					7.31					
09/2012	0.8 U	9.1	150	0.8 U	6.9	67	67	2.1 J	280	320	26	1 U					6.59					
12/2012	0.8 U	7.2	120	0.8 U	3.7 J	47	81	1.3 J	350	270	26	1 UJ					6.72					
04/2013	1.1 J	9.6	210	1.3 J	9.6	160	9.6	6.9	59	630	55	1 U					7.42					
07/2013	0.8 U	5.3	99	0.8 U	4.3 J	69	24	2.3 J	110	290 J	35	1 U					7.33					
10/2013	0.8 U	8.2	170	1.2 J	7.7	140	10	5.1	63	500	60	1 U					6.77					
12/2013	0.8 U	7.9	170	1.5 J	6.6	140	4.6 J	13	110	480	66	1.9 J					7.51					
04/2014	0.54 J	6.3	140	1.3	14	110	1.7 J	21	260	340	62	1.9					7.48					
08/2014	0.5 U	4.3	53	0.87 J	4.8	100	18	13	220	290	43	3					7.11					
12/2014	0.5 U	5.2	110	1.2	8.1	94	1.8 J	11	140	320	63	2.6					7.11					
04/2015	0.5 U	1.6	23	0.65 J	0.98 J	40	7.7	12	150	68	23	1.5					6.71					
10/2015	0.5 U	1.5	15	0.5 U	1.3	21	41	8.6	220	35	16	0.69 J					7.86					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-11S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	240	920	26	14	140	2.3 J	1.9 J	140	110	67		2.7	2190 J	0.459							
05/2009	25 U	180	1700	59	13 J	240	1.5	1.0 U	97	65	88	25 U		1960	0.238	1.0 U						
07/2010	0.8 U	190	920	47	11	210	1.6 J	1.7 J	85	30	68	1 U		1850	0.599	0.054 U						
06/2011	8 U	93	4400	27 J	58	450	2.7 J	5 J	77	600	170	10 U					6.8					
08/2011	10 U	200	1300	20	21	210	2.9 J	3.6 J	110	210	81	10 U					6.79					
11/2011	5 U	150	2200	29	37	790	3.2 J	38	260	300	200	5 U					6.68					
03/2012	5 U	160	460	15	8.2	300	5.1	87	840	49	68	5 U					6.44					
06/2012	0.8 U	89	280	14	4.4 J	270	4 J	110	770	39 J	67	1 U					6.71					
09/2012	0.8 U	140	300	14	3.1 J	230	1.6 J	62	250	8.8	34	1 U					6.55					
12/2012	0.8 UJ	110	150	7.8	1.5 J	54	1 U	18	87	3.5 J	13	1 UJ					6.75					
04/2013	0.8 U	44	180	9.6	1.7 J	160	2 J	97	950	14	48	1 U					6.91					
07/2013	0.8 U	84	150	8.8	1.4 J	75	1.8 J	80	880	11	44	1 U					6.38					
10/2013	0.8 U	70	160	8.7	1.3 J	82	3.4 J	120	760	9.5	49	1 U					6.47					
12/2013	0.8 U	73	140	8.7	1.3 J	70	2.8 J	120	1200	11	58	1.3 J					6.87					
04/2014	0.5 U	60	120	7.1	1.1	53	2.1 J	91	770	6.8	41	0.97 J					7.16					
08/2014	0.5 U	87	160	8.4	1.2	50	4 J	98	1200	5.9	42	1					7.18					
12/2014	0.5 U	86	150	7.7	1.3	51	2.6 J	79	680	4.3	33	0.89 J					6.86					
03/2015	0.5 U	28	210	7.4	1.6	60	1.6 J	47	460	1.6	17	0.5 U					7.44					
10/2015	1 U	2.8	190	6.2	1 U	34	1.1 J	9	150	1.7 J	5	1 U					6.97					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-12D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2-DCE (ug/L)	Trans-1,2-DCE	1,1-DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1-Trichloro ethane (ug/L)	1,1-Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCEr (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	12	1.9 J	0.8 U	0.8 U	1 U				0.8 U	1 U											
05/2009	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	37	1.0 U	210	5.0 U	5.0 U	5.0 U		1460	0.0286 J	32.8						
07/2010	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	25	1 U	130	0.8 U	1 U	1 U		1520	0.0522 U	31.4						
09/2011	5 U	5 U	5 U	5 U	5 U	5 U	24	5 U	130	5 U	5 U	5 U	1.6	1790 J	0.0172 J	47.2	6.38					
03/2012	5 U	5 U	1.6 J	5 U	5 U	5 U	27	5 U	130	5 U	5 U	5 U	1 U	1650	0.2 U	41.8	6.74					
06/2012	0.8 U	1 U	5.1	0.8 U	0.8 U	1 J	28	1 U	160	1.7 J	1 U	1 U	4.9 J	1700	0.0141 U	36.7	6.83					
09/2012	0.8 U	1.9 J	3.7 J	0.8 U	0.8 U	1 U	39	1 U	200	0.8 U	1 U	1 U	1.7	1630	0.0333 U	35.2	6.91					
12/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	26	1.2 J	130	0.8 U	1 U	1 U	0.5 U	1330	0.0333 U	28.8	6.39					
04/2013	0.8 U	1 U	16	0.8 U	0.8 U	7.9	29	1 U	160	5.1	1 U	1 U	0.5 U	1540	0.0333 U	42.8	7.39					
07/2013	0.8 U	1 U	3.5 J	0.8 U	0.8 U	1.5 J	37	1 U	200	1.2 J	1 U	1 U	0.5 U	1500	0.043 U	41.2	7.14					
10/2013	0.8 U	1 U	5.5	0.8 U	0.8 U	2.7 J	42	1 U	200	1.3 J	1 U	1 U	0.88 J	1370	0.043 U	42.2	6.82					
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	41	1 U	210	0.8 U	1 U	1 U	1.4	1250	0.043 U	41.5	6.74					
04/2014	1.1	39	570	2	13	130	1 U	4.2 J	21	370	16	0.5 U	3	600	0.195 J	0.32	7.22					
08/2014	0.5 U	0.5 U	7.5	0.5 U	0.5 U	2.2	39	1 U	210	1.9	0.5 U	0.5 U	1.6	1490	0.0334 U	47.5	7.17					
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	33	1 U	170	0.5 U	0.5 U	0.5 U	0.5 U	1520	0.0334 U	42	6.75					
03/2015	0.5 U	1.6	170	0.59 J	2.1	70	26	2.8 J	140 J	24	4.8	0.5 U	1.5	1180	0.0334 U	23.7	7.16					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-12S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	21 J	11000	6200	35 J	54	240	20	10	290	400	52											
05/2009	100 U	2500	3800	26 J	23 J	1300	9.2	19	170	200	110	100 U	10.9	630	0.253	25.4						
07/2010	4 U	2900	2800	27	15 J	1500	8.1	29	110	150	93	5 U		1140	0.218	9.7						
06/2011	81 J	7700	8300	40 U	360	200 J	9.2	5.4	110	18000	400	50 U					7.62					
08/2011	18 J	5300	9300	33 J	170	370	7.2	3.8 J	86	9100	500	50 U					6.72					
11/2011	10 J	3300	4500	20 J	78	510	5.9	25	240	3000	480	25 U					6.88					
03/2012	25 U	4700	2900	26	15 J	230	20	150	2000	270	100	25 U					6.76					
06/2012	4 U	7000	2900	38	8 J	190	16	150	2000	120	48	5 U					7.19					
09/2012	8 U	4500	3000	29 J	8 U	450	13	210	2700	88	55	10 U					6.38					
12/2012	0.8 UJ	740	1100	14	5.5	280	18	320	3200	74	53	1.3 J					7.97					
04/2013	1.6 U	1800	960	22	2.6 J	210	27	400	6200	51	45	2 U					6.96					
07/2013	4 U	2700	2900	41	6.7 J	510	27	320	6200	45	49	5 U					6.29					
10/2013	0.8 U	980	2800	40	6.7	430	29	480	5600	24	28	1 U					6.58					
12/2013	1.6 U	2100	1500	29	4.8 J	300	34	450	7800	27	38	2 U					6.69					
04/2014	1 U	1300	610	22	2	130	20	370	4100	17	23	1 U					7.13					
08/2014	0.5 U	1400	1500	48	3.7	740	43	570	9000	23	34	0.5 U					6.84					
12/2014	2.5 U	3100	1700	35	2.7 J	430	24	380	5800	12	19	2.5 U					6.72					
04/2015	1 U	850	730	30	1.9 J	520	33	500	5200	10	19	1 U					7.52					
10/2015	2.5 U	1600	2000	42	3.8 J	770	30	690	6200	12	24	2.5 U					6.21					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-13D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	30	660	4.9 J	4.2 J	250	1.4 J	12	41	2.1 J	29		2.8	971 J	0.4							
05/2009	50 U	50 U	1000	6.2 J	50 U	420	2.9	15	44	50 U	42 J	50 U		923	0.169	1.0 U						
07/2010	0.8 U	1 U	700	6	4.2 J	240	1.6 J	6.9	22	1.1 J	36	1.3 J		98.6 J	0.218	0.78						
08/2011	5 U	1.4 J	510	4.2 J	2.9 J	280	2.5 J	12	27	5.6	29	5 U	3.7	1100	0.218	0.84	7.14					
03/2012	5 U	3.1 J	370	3.7 J	2.2 J	290	9.9	8.5	20	5 U	28	5 U	2.7	907 J	0.217	4.3	6.38					
06/2012	0.8 U	1 U	270	2.8 J	1.9 J	150	9.1	10	29	0.8 U	14	1 U	2.9	1700	0.242	3.1	6.88					
09/2012	0.8 U	1 U	280	2.3 J	1.5 J	140	13	7.9	29	0.8 U	10	1 U	1.8	1400	0.304	2.6	6.48					
12/2012	0.8 U	1.1 J	230	2.7 J	1.6 J	120	16	13	40	0.8 U	11	1 UJ	2	1070	0.158 J	2.8	6.53					
04/2013	0.8 U	1 U	230	2.2 J	0.99 J	230	15	26	110	0.8 U	16	1 U	2.2	1030	0.0333 U	27	6.92					
07/2013	0.8 U	1 U	250	2 J	0.97 J	170	13	32	370	0.8 U	11	1 U	2.6	936	0.0543 J	5	7.7					
10/2013	0.8 U	1 U	220	1.6 J	0.86 J	170	11	30	350	0.8 U	7.3	1 U	2.8	2350	0.176 J	5.9	6.25					
12/2013	0.8 U	1.3 J	180	0.8 U	0.8 U	81	9.7	21	310	0.8 U	4.9 J	1 U	4.1	673	0.072 J	4.9	6.91					
04/2014	0.5 UJ	0.5 U	150	1.1	0.59 J	130	8.9	28	840	0.5 U	4.8	0.5 U	5.1	783 J+	0.043 U	16	6.85					
08/2014	0.5 U	0.5 U	200	1.3	0.79 J	230	11	63	660	0.5 U	8.4	0.5 U	5.4	855	0.0838 J	7.1	6.58					
12/2014	0.5 U	0.5 U	170	0.96 J	0.5 U	190	16	51	1400	0.5 U	5.4	0.5 U	1.8	1070	0.17 J	8.7	6.79					
03/2015	0.5 U	0.68 J	180	1.1	0.68 J	160	11	62	1200	0.5 U	6.2	0.5 U	2.6	641	0.133 J	5.6	6.47					
10/2015	0.5 U	0.5 J	180	0.98 J	0.58 J	160	4 J	74	1500	0.5 U	4.7	0.5 U	3.7		0.222 J		6.62					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-14D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U				0.8 U	1 U											
05/2009	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	37	1.0 U	99	5.0 U	5.0 U	5.0 U		1060	0.155	2.50						
07/2010	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	35	1 U	95	0.8 U	1 U	1 U		1150	0.186 J	7						
09/2011	5 U	5 U	5 U	5 U	5 U	5 U	34	5 U	95	5 U	5 U	5 U	2.6	1150 J	0.0915 J	9.2	6.67					
03/2012	5 U	5 U	5 U	5 U	5 U	5 U	30	5 U	77	5 U	5 U	5 U	1.8	1150	0.0327 J	6.2	7.04					
06/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	28	1 U	82	0.8 U	1 U	1 U	2	1160 J	0.0966 J	7.4	6.99					
09/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	27	1 U	81	0.8 U	1 U	1 U	1.7	891	0.075 J	5.8	6.89					
12/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	12	1 U	51	0.8 UJ	1 UJ	1 U	1.6	764	0.0333 U	2.2	6.64					
04/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	15	1 U	45	0.8 U	1 U	1 U	1.8	1050	0.0333 U	3.8	7.29					
07/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	6.8	1 U	35	0.8 U	1 U	1 U	2	948	0.043 U	1.1	7.49					
10/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	4.3 J	1 U	28	0.8 U	1 U	1 U	2	875	0.043 U	0.69	7.14					
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	9.8	1 U	52	0.8 U	1 U	1 U	3.5	1030	0.043 U	1.8	7.18					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-15D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	1.6 U	3.1 J	1400	9.1 J	9.3 J	170	1 J	3.7 J	33	36	20		3	950 J	0.528							
05/2009	25 U	25 U	790	5.6 J	5.6 J	520	1.0 U	7.8	34	25	20 J	25 U		960	0.291	1.0 U						
07/2010	0.8 U	1.8 J	310	2.9 J	3.1 J	220	1 U	4.8 J	23	23	16	1 U		922	0.276	0.37						
08/2011	10 U	4.5 J	1700	4.8 J	11	540	5 U	2.5 J	18	30	20	10 U	4.2	740	0.164 J	3.5	7.66					
03/2012	5 U	2.9 J	720	3.6 J	6.1	260	5 U	1.1 J	7.5 J	34	14	5 U	0.93 J	420 J	0.16 J	0.37	7.12					
06/2012	0.8 U	2.9 J	560	3.7 J	4.3 J	220	1 U	1.1 J	10 J	41	14	1 U	1.5	52.1	0.15 J	0.47	7.24					
09/2012	0.8 U	23	820	5.8	6.3	390	1 U	2.9 J	21	40	25	1 U	2.1	958	0.309	1.5	6.57					
12/2012	0.8 U	10	940	6.2	6.6	360	1 U	2.9 J	20	53 J	37	1 U	2.7	499	0.184 J	2.4	6.08					
04/2013	0.8 U	2.7 J	480	4.5 J	4.2 J	240	1 U	3.3 J	15	49	25	1 U	1.1	506	0.169 J	1.8	7.59					
07/2013	0.8 U	1.9 J	290	3.1 J	2.5 J	260	1 U	2.7 J	17	37	23	1 U	3.1	511	0.332	1.7	7.83					
10/2013	0.8 U	1.8 J	290	3.1 J	2.3 J	320	1 J	10	67	44	27	1 U	2.1	726	0.267 J	7.4	5.95					
12/2013	0.8 U	3.2 J	420	4.2 J	4.3 J	350	1 U	4.9 J	42	99	46	1 U	3.7	530 J	0.214 J	4.8	7.24					
04/2014	0.5 U	2.9	290	4.1	3.2	260	1 U	5.6	45	59	36	0.5 U	1.8	458	0.145 J	3.5	7.58					
08/2014	0.5 U	2.9	270	3.6	2.9	300	1 U	3.6 J	27	63	31	0.5 U	3	389	0.111 J	1.2	7.32					
12/2014	0.5 U	4.1	470	6.4	5	460	1.4 J	17	170	110	58	0.5 U	2.5	69.4	0.124 J	7.1	7.94					
03/2015	0.5 U	7.6	870	8.2	8.2	740	1.4 J	22	220 J	280	97	0.5 U	2.3	763	0.098 J	12.5	7.22					
10/2015	0.5 U	4.5	370	5.3	6.1	370	1 U	6.8	46	160	51	0.5 U	1.8		0.125 J		7.21					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-16D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	2.2 J	520	2.7 J	2.9 J	160	4.3 J	5.6	31	3.3 J	12											
05/2009	25 U	25 U	560	2.6 J	25 U	200	7.0	6.3	38	25 U	11 J	25 U		1080	0.0723 J	1.6						
07/2010	0.8 U	1.5 J	490	2.1 J	2.7 J	180	24	4.9 J	68	1.4 J	7.7	1 U		1090	0.147 J	3.6						
08/2011	5 U	2.4 J	420	2 J	2.8 J	170	10	5.4	35	15	11	5 U	4	1140	0.249	1.6	6.13					
03/2012	5 U	1.8 J	380	1.8 J	2.8 J	220	5.7	4.4 J	36	6.5	12	5 U	2.9	961	0.178 J	1.6	6.98					
06/2012	0.8 U	2.2 J	450	2 J	3 J	230	6.9	8.8	46	8.7 J	14	1 U	2.7	983 J	0.228	0.54	7.27					
09/2012	0.8 U	12	330	1.5 J	2.5 J	180	5.1	7.7	41	3.9 J	11	1 U	2.3	1040	0.344	1.3	6.53					
12/2012	0.8 U	1.5 J	290	1.1 J	1.6 J	130	9.9	10	72 J	2.5 J	11	1 U	2.5	1040	0.327	1.6	7.13					
04/2013	0.8 U	1.3 J	270	1.3 J	2 J	180	11	21	150	1.7 J	11	1 U	2.6	1020	0.213	1.8	7					
07/2013	0.8 U	1.2 J	250	1.4 J	1.6 J	140	8.1	16	150	0.98 J	9.3	1 U	2.8	974	0.213	1.9						
10/2013	0.8 U	1 J	240	1.3 J	1.7 J	200	5.5	18	180	0.8 U	8.6	1 U	2.4	1020	0.17 J	2.4	6.86					
12/2013	0.8 U	1.2 J	300	1.5 J	1.7 J	200	9.7	31	370	0.8 U	9.8	1 U	4.6	1060	0.151 J	3	6.81					
04/2014	0.5 U	0.89 J	250	1.2	1.3	190	10	29	260	0.5 U	7	0.5 U	3.8	1010	0.0792 J	1.9	7.1					
08/2014	0.5 U	0.96 J	260	1.2	1.4	200	7.9	18	220	0.5 U	6.5	0.5 U	4.9	958	0.153 J	2.4	6.77					
12/2014	0.5 U	0.8 J	200	0.86 J	1.1	150	9.6	17	190	0.5 U	4.9	0.5 U	1.3	902	0.13 J	1.9	7.05					
04/2015	0.5 U	0.77 J	220	1.4	1.1	260	16	37	390	0.5 U	6.7	0.5 U	2.5	1090	0.117 J	3.5	7.02					
10/2015	0.5 U	0.72 J	200	0.95 J	1.2	120	2.2 J	12	130	0.5 U	3.4	0.5 U	2.1		0.157 J		7.48					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-17D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2-DCE (ug/L)	Trans-1,2-DCE	1,1-DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1-Trichloroethane (ug/L)	1,1-Dichloroethane (ug/L)	Chloroethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	57	700	1.4 J	14	34				260	33											
05/2009	50 U	50 U	1300	50 U	11 J	600	4.1	6.0	80	230	62	50 U		875	0.0078 J	18.0						
10/2009	50 U	12 J	1100	2.6 J	8.6 J	430	4.8	6.5	85	170	49 J	50 U	5.0									
07/2010	0.8 U	9.8	1000	3.6 J	11	490	5.7	7.8	77	150	64	1 U		1090	0.0522 U	15.7						
06/2011	0.8 U	12	250	0.8 U	4.5 J	44	5.3	1 U	61	120	12	1 U					6.92					
08/2011	50 U	220	4400	50 U	86	100	15	1.2 J	94	7200	210	50 U					6.97					
11/2011	8.8 J	350	2200	5.5 J	74	52	7.2	5 U	70	5800	150	13 U					6.99					
03/2012	1.4 J	6.2	450	1.7 J	12	43	6.7	5 U	65	730	41	5 U	3.4				7					
06/2012	1.2 J	6.1	350	1.6 J	16	85	6.9	1 U	68	660	41	1 U					6.92					
09/2012	0.8 U	6.4	240	1.2 J	7.9	110	6.2	1.4 J	51	420	37	1 U					6.76					
12/2012	0.8 UJ	5.9	170	1.1 J	4.6 J	79	6.7	1.6 J	61	330	35	1 UJ					6.97					
04/2013	0.8 U	3.4 J	75	0.8 U	2.8 J	50	4.1 J	1.4 J	59	210	29	1.7 J					7.41					
07/2013	0.8 U	2.6 J	47	0.8 U	2.3 J	47	3 J	2.5 J	55	130 J	31	1.3 J					7.04					
10/2013	0.8 U	2.3 J	39	0.8 U	1.5 J	50	4.2 J	11	110	110	31	2.8 J					7.04					
12/2013	0.8 U	2.2 J	33	0.8 U	1.2 J	39	3.4 J	4.3 J	72	83	29	3.6 J					6.96					
04/2014	0.5 UJ	1.7	19	0.5 U	1.5	30	2.6 J	17	280	50	29	4.2					6.68					
08/2014	0.5 U	1.6	18	0.5 U	1.1	35	3.2 J	6.9	100	45	26	3.2					6.8					
12/2014	0.5 U	1.3	13	0.5 U	0.93 J	28	2.7 J	13	95	39	22	4.3					6.98					
04/2015	0.5 U	0.9 J	9.9	0.5 U	0.5 U	22	3.3 J	8.2	130	23	15	3.9					6.8					
10/2015	0.5 U	0.67 J	7.2	0.5 U	0.5 U	12	2.9 J	6.5	75	11	11	2.5					8.12					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-18D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2-DCE (ug/L)	Trans-1,2-DCE	1,1-DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1-Trichloro ethane (ug/L)	1,1-Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCEr (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U				0.8 U	1 U											
05/2009	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.0 U	2.0	1.0 U	50	5.0 U	5.0 U	5.0 U		1540	0.0077 U	2.1						
07/2010	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1.7 J	1 U	36	0.8 U	1 U	1 U		1870	0.0522 U	2.8						
08/2011	5 U	5 U	5 U	5 U	5 U	5 U	1.9 J	5 U	32	5 U	5 U	5 U	4.4	1740	0.2 U	2.4	6.54					
03/2012	5 U	5 U	5 U	5 U	5 U	5 U	1.6 J	5 U	43	5 U	5 U	5 U	4.2	1750	0.2 U	5.4	6.76					
06/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1.2 J	1 U	47	0.8 U	1 U	1 U	4.4	1630	0.0141 U	4.1	7.01					
09/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1.6 J	1 U	24	0.8 U	1 U	1 U	2.4	1530 J	0.0333 U	1.9	7.14					
12/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1.5 J	1 U	43	0.8 U	1 U	1 U	3.6	1310	0.0333 U	3.6	7.52					
04/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	33	0.8 U	1 U	1 U	3.2	1320	0.0333 U	1.6	7.16					
07/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	44	0.8 U	1 U	1 U	4.7	1420	0.043 U	5.1	6.63					
10/2013	0.8 U	1 U	1.1 J	0.8 U	0.8 U	1 U	1 U	1 U	9.2	0.8 U	1 U	1 U	3.4	976	0.043 U	0.54	7.03					
12/2013	0.8 U	1 U	1.3 J	0.8 U	0.8 U	1 U	1 U	1 U	15	0.8 U	1 U	1 U	4.3	860 J	0.043 U	0.52	7.16					
04/2014	0.5 U	0.5 U	0.93 J	0.5 U	0.5 U	0.5 U	1 U	1 U	20	0.5 U	0.5 U	0.5 U	4.6	1150	0.043 U	0.87	6.95					
08/2014	0.5 U	0.5 U	1.2	0.5 U	0.5 U	0.5 U	1 U	1 U	14	0.5 U	0.5 U	0.5 U	4.9	1070	0.0334 U	0.45	6.91					
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	26	0.5 U	0.5 U	0.5 U	2.6	1370	0.0334 U	1.3	7					
03/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	50	0.5 UJ	0.5 U	0.5 U	4	1470	0.0334 U	2.5	6.82					
10/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.7 J	1 U	57	0.5 U	0.5 U	0.5 U	4		0.0333 U		6.63					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-19D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	42	0.8 U	0.8 U	6.5	1 U	1 U	21	0.8 U	1.3 J											
05/2009	5.0 U	5.0 U	58	5.0 U	5.0 U	10	1.0 U	1.0 U	23	5.0 U	1.7 J	5.0 U		3710	3.010	1.0 U						
07/2010	0.8 U	1 U	60	0.8 U	0.8 U	11	1 U	1 U	24	0.8 U	1.6 J	1 U		3170	2.54	0.054 U						
08/2011	5 U	5 U	39	5 U	5 U	3.5 J	5 U	5 U	19	5 U	5 U	5 U	8	3320	2.72	0.16 U	5.49					
03/2012	5 U	5 U	38	5 U	5 U	2.1 J	5 U	5 U	25	5 U	5 U	5 U	8.8	4060	2.23	0.16 U						
06/2012	0.8 U	1 U	34	0.8 U	0.8 U	1.4 J	1 U	1 U	19	0.8 U	1 U	1 U	8.7	3660	2.26	0.054 U	6.58					
09/2012	0.8 UJ	1 U	32	0.8 U	0.8 U	1.3 J	1 U	1 U	25	0.8 U	1 U	1 U	6.9	2950 J	2.42	0.054 U						
12/2012	0.8 U	1 U	26	0.8 U	0.8 U	1.9 J	1.9 J	1 U	27	0.8 UJ	1 U	1 U	7.9	3020	4.15	0.054 U	6.69					
04/2013	0.8 U	1 U	22	0.8 U	0.8 U	1 U	1 U	1 U	23	0.8 U	1 U	1 U	8.1	3120	2.31	0.054 U	7					
07/2013	0.8 U	1 U	19	0.8 U	0.8 U	1 U	1 U	1 U	20	0.8 U	1 U	1 U	9.2	3130	2.36	0.054 U	7.32					
10/2013	0.8 U	1 U	17	0.8 U	0.8 U	1 U	1 U	1 U	24	0.8 U	1 U	1 U	8.1	2670	2.31	0.054 U	5.46					
12/2013	0.8 U	1 U	17	0.8 U	0.8 U	1 U	1 U	1 U	22	0.8 U	1 U	1 U	10.9	2890	2.19	0.054 U	6.42					
04/2014	0.5 U	0.5 U	8.5	0.64 J	0.5 U	0.82 J	1 U	1 U	14	0.5 U	0.5 U	0.5 U	9.6	1690	0.116 J	0.054 U	7.06					
08/2014	0.5 U	0.5 U	11	1.2	0.5 U	0.6 J	1 U	1 U	20	0.5 U	0.5 U	0.5 U	11.3	2890	1.91	0.054 U	6.28					
12/2014	0.5 U	0.5 U	9.9	0.89 J	0.5 U	0.62 J	1 U	1 U	19	0.5 U	0.5 U	0.5 U	9.3	2890	1.98	0.054 U	7.22					
03/2015	0.5 U	0.5 U	8.7	0.5 U	0.5 U	0.52 J	1 U	1 U	8.5 J	0.5 U	0.5 U	0.5 U	6.4	1970	0.311 J	0.054 U	6.8					
10/2015	0.5 U	0.5 U	9.9	0.5 U	0.5 U	0.5 U	1 U	1.9 J	20	0.5 U	0.5 U	0.5 U	8.8		2.02		6.51					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-20D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2-DCE (ug/L)	Trans-1,2-DCE	1,1-DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1-Trichloroethane (ug/L)	1,1-Dichloroethane (ug/L)	Chloroethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	8 U	11 J	5900	12 J	47 J	380				210	73											
05/2009	100 U	26 J	3100	12 J	22 J	1300	1.0	6.0	31	93 J	66 J	100 U	2.9	558	0.0077 U	3.1						
10/2009	50 U	5.8 J	1300	8.7 J	11 J	710	1.0 U	5.6	19	54	40 J	50 U	3.5									
07/2010	0.8 U	2.9 J	960	5.6	7.9	930	1 U	13	20	42	43	1 U	2.9	695	0.0522 U	3.4						
06/2011	16 U	1200	24000	35 J	170	610	1.3 J	6.8	34	2900	290	20 U					6.84					
08/2011	100 U	160	24000	28 J	150	680	1.3 J	6.7	32	1900	260	100 U					7.15					
11/2011	50 U	20 J	5800	13 J	36 J	1400	5 U	5.5	20	550	81	50 U					7.18					
03/2012	130 U	850	13000	24 J	150	420	1.3 J	7.2	94	6200	1300	130 U	8.7				6.45					
06/2012	15	590	5200	19	180	160	1 U	3.7 J	42	14000 J	860	2 U					7.41					
09/2012	16 J	390	3500	12 J	150	160	1 U	2.7 J	23	9800	620	10 U										
12/2012	9.5 J	100	2800	9.5 J	240	120	1 U	2.9 J	33 J	7700	410	10 U					6.88					
04/2013	5.8 J	47	1700	8.6 J	53	330	1.4 J	22	190	3700	290	2.5 U					7.29					
07/2013	4.2 J	37	2700	9.7 J	65	470	1.6 J	16	170	4000	490	5 U					6.5					
10/2013	4 U	12 J	940	4.8 J	27	400	1.7 J	23	200	2000	170	5 U					6.92					
12/2013	1.7 J	9.1 J	630	4.5 J	23	380	2 J	31	260	1600	150	2 U					7.13					
04/2014	1.3	7.3	340	4.3	25	420	2.9 J	52	360	990	120	0.5 U					7.3					
08/2014	1.9 J	12	700	5.6	43	800	1.5 J	16	150	2300	230	1 U					7.03					
12/2014	1.9	9.4	220	3.5	13	500	2.1 J	31	210	890	96	0.5 U					7.06					
04/2015	1.3 J	7.4	150	3.3	6.2	500	3.9 J	70	360	560 J	78	1 U					7.24					
10/2015	1.9	9.4	170	3.7	20	390	2 J	49	230	970	110	0.5 U					6.95					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: MW-21D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1.1 J	290	1.5 J	1.7 J	43	1.2 J	5.7	37	3.4 J	2.8 J		3.9	1040 J	11.5							
05/2009	5.0 U	0.67 J	110	0.63 J	0.67 J	48	1.0 U	4.0	40	2.0 J	2.1 J	5.0 U	4.8	1170	0.623	1.0 U						
07/2010	0.8 U	1 U	85	0.8 U	0.8 U	38	1 U	2.4 J	25	1.8 J	1.5 J	1 U	4.3	1140	3.71	0.057 J						
06/2011	4 U	5 U	2800	5 J	15 J	75	1 U	1.6 J	20	39	7.7 J	5 U					6.93					
08/2011	25 U	25 U	5100	8.2 J	21 J	530	5 U	5.3	28	140	19 J	25 U					7.04					
11/2011	25 U	6.6 J	4100	10 J	19 J	650	1.7 J	6.5	35	340	33	25 U					7.12					
03/2012	25 U	7.1 J	4800	8.4 J	17 J	610	5 U	6.4	40	290	34	25 U	0.88 J				6.59					
06/2012	4 U	15 J	3600	7.9 J	13 J	580	1 U	8	37	310 J	35	5 U					6.8					
09/2012	1.6 U	11	2600	9.8 J	15	580	2.3 J	9.7	50	180	32	2 U					7.26					
12/2012	1.6 U	3.1 J	2200	7.3 J	12	1000	3.8 J	12	46 J	240	35	2 U					7.36					
04/2013	0.8 U	5.4	780	5.3	7	730	1 U	11	36	260	41	1 U					7.15					
07/2013	0.8 U	2.8 J	380	3.3 J	8.1	600	1 U	12	30	160	29	1 U					8.49					
10/2013	0.8 U	4.3 J	660	4.7 J	6.4	690	1.4 J	23	120	160	36	1 U										
12/2013	0.8 U	4.2 J	680	3.4 J	5.6	550	1.5 J	19	64	130	29	1 U					7.13					
04/2014	0.5 U	4.6	530	3.9	13	450	1.7 J	34	200	290	35	0.5 U					7.53					
08/2014	0.5 U	3	590	3.7	7.5	460	5.3	15	190	160	32	0.5 U					7.8					
12/2014	0.5 U	4.6	1100	5.1	12	660	2.2 J	23	120	160	39	0.5 U					6.87					
04/2015	1 U	4.4	790	3.7	7.2	580	1.7 J	16	72	86 J	26	1 U					8.15					
10/2015	0.5 U	1.5	410	3	4.9	380	3.4 J	16	120	47	24	0.5 U					8.50					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR- 3SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	4 U	9 J	7400	120	11 J	740	11 J	63 J	170 J	4 U	5 U	5 U	1030	11.3 J	44.5	0.84	5.99					
08/2011	10 U	10 U	4000	100	7 J	950	3.7 J	30	2300	10 U	10 U	10 U	2260	3.1 J	131	0.67	5.87					
11/2011	25 U	25 U	2300	80	25 U	1400	1.6 J	110	8800	25 U	25 U	25 U	1760	2.7 J	146	0.34	6.14					
03/2012	50 UJ	50 UJ	50 UJ	48 J	50 UJ	50 UJ	130	40	11000	50 UJ	50 UJ	14 J	39.3	5 U	86	0.16 J	6.52					
06/2012	0.8 U	1 U	0.81 J	48	0.8 U	1.8 J	42	1 U	13000	0.8 UJ	1 U	1.9 J	838	2 J	73.3	0.18	6.47					
09/2012	0.8 UJ	1 U	0.8 U	7	0.8 U	1 U	17	1 U	11000	0.8 U	1 U	1 U	293	1.5 UJ	48.7	0.14 J	6.38					
12/2012	0.8 UJ	1 UJ	0.8 UJ	0.8 UJ	0.8 UJ	1 UJ	99	1.2 J	15000	0.8 UJ	1 UJ	1 UJ	171	1.7 J	42.7	0.17	6.7					
04/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	170	1 U	23000	0.8 U	1 U	1 U	69.4	276	37.7	0.39	6.5					
07/2013	8 U	10 U	8 U	8 U	8 U	10 U	120 J	1 U	20000	8 U	10 U	10 U	40.1	13.7	12.2	1.2	6.67					
10/2013	8 U	10 U	8 U	8 U	8 U	10 U	170	1 U	16000	8 U	10 U	10 U	53.8	1.5 U	22.3	0.66	5.38					
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	180	1 U	15000	0.8 U	1 U	1 U	66.1	1.5 U	25.8	0.38	6.11					
04/2014	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	140	4.6 J	17000	0.5 U	0.5 U	0.5 U	21.8	27.1 J+	11.3	3.6	6.23					
08/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	160	1.8 J	16000	0.5 U	0.5 U	0.5 U	26.1	1.5 U	20.2	0.64	6.37					
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	130	1 U	16000	0.5 U	0.5 U	0.5 U	33.6	1.8 J	26.3	0.5	6.34					
03/2015	0.5 U	0.5 U	0.69 J	0.5 U	0.5 U	0.5 U	100	1 U	23000	0.5 U	0.5 U	0.5 U	24.6	148	22.7	0.71	6.08					
10/2015	0.5 U	0.5 U	1.3	0.5 U	0.5 U	0.83 J	58	1 U	10000	0.5 U	0.5 U	0.5 U	32.1		26.2		6.20					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR- 4SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	1.6 U	19	1100	11	5.5 J	81	2 J	5.4	1500	77	97	3.9 J	1560	17.1 J	91.7	1.6	6.01					
08/2011	50 U	50 U	1200	21 J	50 U	120	5 U	5 U	7800	50 U	50 U	50 U	993	1.8 J	73.1	0.34	6.3					
11/2011	25 U	25 U	25 U	17 J	25 U	25 U	3.5 J	15	12000	25 U	25 U	25 U	352	2.7 J	46.4	0.19	6.23					
03/2012	50 U	50 U	50 U	13 J	50 U	50 U	3.3 J	5 U	12000	50 U	50 U	50 U	98.6	1.6 J	42.6	0.21	6.12					
06/2012	0.8 U	1 U	0.8 U	13	0.8 U	1 U	2.2 J	1 U	12000	0.8 U	1 U	1 U	84.7	2.2 J	42.7	0.21	6.43					
09/2012	0.8 UJ	1 U	0.8 U	5.6	0.8 U	1 U	2.9 J	1 U	11000	0.8 U	1 U	1 U	79.7	1.5 UJ	41.8	0.18	6.64					
12/2012	0.8 UJ	1 U	0.8 U	1.5 J	0.8 U	1 U	2.6 J	1 U	3500	0.8 U	1 U	1 UJ	68.3	1.8 J	42	0.16 J	6.51					
04/2013	0.8 U	6.9	1 J	0.8 U	0.8 U	1 U	1.4 J	1 U	8100	0.8 U	1 U	1 U	54.6	2.8 J	48.2	0.15 J	6.39					
07/2013	8 U	10 U	8 U	8 U	8 U	10 U	2.5 J	1 U	12000	8 U	10 U	10 U	52	5.2	46.4	0.29						
10/2013	0.8 UJ	8.4 J	0.8 UJ	0.8 UJ	0.8 UJ	1 UJ	1.6 J	1 U	9200	0.8 UJ	1 UJ	1 UJ	62.8	14.7	43.7	0.21	6.5					
12/2013	0.8 U	2.3 J	0.8 U	0.8 U	0.8 U	1 U	1.9 J	1 U	14000	0.8 U	1 U	1 U	71.9	11.9	40.1	0.23	6.22					
04/2014	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.6 J	1 UJ	17000 J	0.5 U	0.5 U	0.5 U	63.4	165 J+	26.8	0.67	6.22					
08/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	9.8 J	1 UJ	12000 J	0.5 U	0.5 U	0.5 U	56.1	1.5 U	34.3	0.34	6.16					
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.4 J	1 UJ	13000 J	0.5 U	0.5 U	0.5 U	60.7	15.6	32.9	0.64	6.53					
03/2015	0.5 UJ	0.5 UJ	0.94 J	0.8 J	0.5 UJ	1.4 J	1 U	1 U	18000 J	0.5 UJ	0.5 UJ	0.5 UJ	42	122	17.9	3	6.2					
10/2015	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	2.3 J	1 U	7700	0.5 UJ	0.5 UJ	0.5 UJ	40.3		24.3		6.24					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR- 5SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	4 U	5 U	3100	31	5.4 J	350	3.3 J	48	3200	4 UJ	5 U	5 U	281	15	2.53	26.3	5.82	5.8E+02	1.9E+04	4.3E+03	1.3E+03	6.6E+03
08/2011	5 U	5 U	42	32	5 U	63	21	610	7600	5 U	2.4 J	5 U	203	12.4	0.676	49.6	6.54	5.4E+03	2.3E+03	1.7E+05	6.4E+03	7.6E+04
11/2011	5 U	5 U	2.9 J	28	5 U	9.4	220	440	14000	5 U	1.9 J	5 U	213	4.1 J	1.5	8.6	6.61	2.0E+03	1.6E+04	6.1E+04	2.5E+04	1.3E+05
03/2012	5 U	5 U	43	65	5 U	45	400	450	15000	5 U	2.3 J	1.8 J	258	2.4 J	12.1	4.2	5.87	2.2E+04	2.1E+03	3.8E+05	2.2E+04	3.7E+05
06/2012	0.8 U	1 U	5.3	56	0.8 U	11	130	76	12000	0.8 UJ	1.7 J	1.9 J	139	1.5 U	11.3	3.1	6.38	2.6E+03	1.0E+03	4.8E+04	2.8E+03	9.1E+04
09/2012	0.8 U	1 U	2.3 J	4.9 J	0.8 U	16	110	23 J	12000	0.8 U	1.2 J	2.1 J	36.4	1.5 UJ	5.4	1.3	6.4	2.5E+02	6.0E+02	2.0E+03	7.9E+02	7.1E+03
12/2012	0.8 U	1 U	2.6 J	0.8 U	0.8 U	13	190	20	15000	0.8 U	1.2 J	1 U	32.5	1.9 J	6.52	1.2	6.38	3.0E+02	4.6E+01	6.1E+03	3.6E+02	1.4E+02
04/2013	0.8 U	1 U	72	2.6 J	0.8 U	230	380	400	28000 J	0.8 U	1 U	1.6 J	12.8	276	11.5	1.7	6.68	1.3E+04	3.4E+02	1.1E+05	5.9E+03	8.7E+02
07/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1.6 J	350	10	15000	0.8 U	1.4 J	1.4 J	20.6	3 J	3.19	3.6	6.5	1.8E+03	1.4E+02	1.8E+04	2.0E+03	3.1E+03
10/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	130	1.7 J	16000	0.8 U	1.6 J	1 U	21.7	1.5 U	7.77	1.7	6.16	2.0E+03	5.9E+02	3.2E+04	4.3E+03	6.0E+02
12/2013	0.8 U	1 U	1.3 J	0.8 U	0.8 U	2.3 J	180	6.6	16000	0.8 U	1.2 J	1 J	29.8	9.4	10.7	1.1	6.15	1.6E+03	7.9E+01	4.4E+03	8.0E+02	3.3E+02
04/2014	0.5 U	0.5 U	3.2	3.6	0.5 U	7.5	820	140	25000	0.5 U	1.1	1.1	15.4	183	7.76	2.4	6.08	3.4E+03	6.6E+01	7.8E+03	2.5E+01	8.3E+03
08/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	190	2.7 J	20000	0.5 U	1.2	1.4	20.8	1.5 U	7.47	1.4	6.15	1.0E+04	6.0E+02	1.7E+05	1.3E+02	1.1E+04
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	130	1.8 J	18000	0.5 U	0.61 J	0.8 J	18.5	1.5 U	13	0.46	5.69	1.8E+04	3.3E+02	1.3E+05	3.5E+02	5.6E+03
03/2015	0.5 U	0.5 U	4.5	0.93 J	0.5 U	13	200	42	10000 J	0.5 U	0.65 J	0.5 U	17	73.5	14.1	0.56	6.28	2.8E+03	1.1E+02	1.1E+04	2.6E+01	1.0E+03
10/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	83	1.1 J	13000	0.5 U	0.5 U	0.5 U	21.2		9.74		5.89					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR- 6SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	4 UJ	10 J	4500 J	62 J	8.2 J	530 J	3.4 J	11 J	810 J	4 UJ	22 J	5 UJ	1420	263	97.7	1.2	5.46	1.3E+01	1.0E+04	1.4E+01	5.3E+00	9.7E+00
08/2011	25 U	25 U	2500	34	25 U	430	5 U	12	6600	25 U	7.3 J	10 J	1730	6.3	143	0.49	6.26	2.4E+03	1.5E+04	1.4E+04	1.3E+03	3.6E+03
11/2011	5 U	5 U	78	52	5 U	130	6.8	250	7000	5 U	5.2	16	982	4.7 J	97.7	0.9	6.73	1.1E+05	1.3E+04	5.5E+05	8.5E+04	1.6E+06
03/2012	50 UJ	50 UJ	530 J	56 J	50 UJ	420 J	49	140	13000	50 UJ	50 UJ	50 UJ	336	45	62.9	0.91	6.26	5.6E+04	1.0E+04	8.8E+05	2.8E+04	8.5E+05
06/2012	8 UJ	10 UJ	950 J	110 J	8 UJ	420 J	94 J	180 J	8000	8 UJ	10 UJ	19 J	243	6.5 J	45.4	3.4	6.43	2.6E+04	3.2E+03	8.5E+05	8.8E+03	6.3E+05
09/2012	0.8 U	1 U	3.8 J	12	0.8 U	4.4 J	42	1 U	8600	0.8 U	1 U	3.9 J	150	1.5 UJ	45.6	0.31	6.55	8.9E+02	5.0E+02	1.5E+04	7.1E+02	5.4E+04
12/2012	0.8 U	1 U	81	13	0.8 U	74	71	20	13000	0.8 U	1 U	2.7 J	91	53.6	38	1.4	6.5	1.0E+03	4.8E+02	2.9E+04	4.5E+02	3.0E+03
04/2013	0.8 U	3.6 J	8900	260	7.3	3000	1000	660	10000 J	3.6 J	12	1 U	64.9	254	15.2	18.4	6.8	3.8E+03	1.8E+03	5.1E+05	1.3E+04	4.9E+03
07/2013	2 U	9.3 J	10000	330	6.7 J	3100	900	670	9000	2 U	14	13	85	90.2	7.15	31.6	6.78	1.4E+03	1.8E+02	2.5E+04	7.0E+03	7.4E+03
10/2013	8 U	10 U	120	36 J	8 U	77	130 J	240 J	9500 J	8 U	10 U	10 U	88.3	4 J	7.04	10	6.52	1.4E+03	4.7E+02	1.1E+05	3.8E+04	1.3E+03
12/2013	0.8 U	1 U	800	32	0.8 U	180	88	74	12000	0.8 U	2.3 J	3.1 J	62.9	43.5	7.06	6.3	6.47	3.2E+03	3.2E+02	5.6E+04	4.6E+04	1.1E+04
04/2014	2.5 U	2.5 U	3800	90	4.8 J	1200	220 J	220 J	8300 J	2.5 U	4.5 J	3.6 J	48.3	143	7.61	15.7	6.36	2.5E+03	2.4E+02	3.2E+04	1.0E+03	1.7E+04
08/2014	2.5 U	4.6 J	3900	120	2.5 U	870	240	310	8500	2.5 U	6.2	2.5 U	50.8	37.4	4.66	28.6	6.41	2.1E+04	7.7E+02	7.6E+05	1.6E+03	5.5E+04
12/2014	0.5 U	1.8	2400	64	1.5	590	220 J	330 J	14000 J	0.5 U	3	2.4	44.3	76.8	3.8	17.4	6.16	1.8E+04	1.3E+02	1.5E+05	8.8E+02	4.6E+03
03/2015	2.5 U	11	15000	250	14	3700	730	780	17000 J	2.5 U	9.1	2.5 U	33.2	259	1.53	32.3	6.42	9.3E+03	1.4E+02	3.1E+05	2.8E+03	2.9E+04
10/2015	2.5 UJ	2.5 UJ	1700 J	57 J	2.5 UJ	500 J	300	280	8700	2.5 UJ	2.7 J	2.5 UJ	40.7		1.48		6.11					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR- 9SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	1.6 U	6.6 J	870	22	1.6 U	190	2.8 J	6.1	1700	1.6 U	2 U	2 U	830	24.6 J	9.48	18.6	5.8					
08/2011	25 U	95	8400	38	43	1100	2.7 J	58	4200	320	230	27	1290	66.5	35.7	6.4	5.71					
11/2011	5 U	5 U	26	10	5 U	18	16	78	11000	5.3	44	74	384	6.5	7.49	11.7	6.54					
03/2012	5 U	1.1 J	38	3.9 J	5 U	23	35	30	17000	4.4 J	6.5	13	56.4	48.6	0.0153 J	99.7	6.77					
06/2012	8 U	16 J	4000	19 J	12 J	910	14	170	13000	73	25 J	20 J	172	115 J	0.195 J	34.2	6.44					
09/2012	0.8 UJ	1.1 J	300	5.2	2 J	150	8	46	12000	9.9	7.4	14	67.1	30.6 J	0.164 J	25.8	6.22					
12/2012	0.8 U	1.7 J	350	3.3 J	2.2 J	130	6.6	29	14000	17	7.1	14	26.6	82.4	0.0333 U	42.7	6.42					
04/2013	0.8 U	1.5 J	530	3.8 J	2.3 J	290	50	160	16000 J	13	6.7	4 J	13.9	172	0.0333 U	104	7.07					
07/2013	0.8 U	4 J	1800	10	7.8	540	10	73	18000	27	12	4.7 J	19.3	104	0.043 U	60.9	6.67					
10/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1.6 J	8.1	6.8	13000	0.8 U	1 U	2.6 J	13.9	30.8	0.462	28.3	6.5					
12/2013	0.8 U	1 U	2.1 J	0.8 U	0.8 U	5.3	25	9.8	22000	0.8 U	1 U	1.6 J	10.1	32.2	0.043 U	37.6	6.84					
04/2014	0.5 U	0.5 U	1.6	0.5 U	0.5 U	3.2	15	7.3	4700	0.5 U	0.5 U	0.5 U	6.1	219	0.212 J	7.9	7.25					
08/2014	0.5 U	0.5 U	3.4	0.78 J	0.5 U	4.2	20	16	18000	0.5 U	1.3	0.5 U	15.7	27.1	0.0334 U	74.5	6.71					
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5	20	8.3	19000	0.5 U	0.5 U	1.6	9.9	102 J	0.0862 J	29.6	6.53					
03/2015	0.5 U	0.5 U	3	0.61 J	0.5 U	7.8	37	24	15000 J	0.5 U	0.78 J	0.5 U	9.1	318	0.379 J	12.5	6.86					
10/2015	0.5 U	0.5 U	4.3 J	0.73 J	0.5 U	4.3 J	7.8	25	11000	0.5 U	1	0.5 UJ	14.6		0.125 J		5.79					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR-10SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	0.8 UJ	3.1 J	270 J	3.6 J	2.6 J	37 J	1.5 J	3.5 J	690 J	14 J	42 J	1.9 J	1650	287 J	98.2	1.7	6.08					
08/2011	50 U	50 U	940	11 J	50 U	210	1.2 J	13	5200	28 J	73	15 J	1690	17.6	113	0.62	4.79					
11/2011	5 U	5 U	3.2 J	5.9	5 U	5.1	11	18	13000	5 U	9.5	39	616	4 J	62.6	0.14 J	6.86					
03/2012	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	9.5	5 U	9500	50 UJ	50 UJ	28 J	154	38.5	25.8	1.2	6.32					
06/2012	0.8 UJ	1 UJ	0.8 UJ	2.5 J	0.8 UJ	1 UJ	6.3 J	1 UJ	11000	0.8 UJ	1 UJ	12 J	102	27.8 J	14.6	3.1	6.9					
09/2012	0.8 UJ	1 U	0.8 U	2.8 J	0.8 U	1 U	14	1 U	7000	0.8 U	1 U	15	83.8	1.5 UJ	12	1	6.93					
12/2012	0.8 U	1 U	3.5 J	0.8 U	0.8 U	13	6.6	8.4 J	13000	0.8 U	1 U	5.9 J	36.4	33.9	8.64	1.6	6.47					
04/2013	0.8 U	1 U	0.8 U	0.84 J	0.8 U	1 U	30	1.2 J	18000 J	0.8 U	1 U	12	31.2	226	4	13.5	6.48					
07/2013	0.8 U	1 U	0.8 U	0.84 J	0.8 U	1 U	11	1 U	10000	0.8 U	1.1 J	5.5	33.7	107	1.96	25.6	6.66					
10/2013	8 U	10 U	55	8 U	8 U	170	19	130	16000	8 U	10 U	10 U	30.8	16.1	1.94	16.9	6.5					
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	15	1 U	17000	0.8 U	1 U	2.5 J	28.1	73.3	4.63	6.7	6.56					
04/2014	0.5 U	0.5 U	0.5 U	3.3	0.5 U	1.5	65	200	21000	0.5 U	3	5	14.6	70.8	0.655	100	6.83					
08/2014	0.5 U	0.5 U	0.5 U	2.6	0.5 U	1.2	34	46	10000	0.5 U	0.94 J	3.9	32.8	32.9	1.17	23.4	6.65					
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	8.3	1 U	12000	0.5 U	0.5 U	0.5 U	12.4	42.5	3.7	1.8	6.64					
03/2015	0.5 U	0.5 U	290	3	1.3	290	30	120	15000 J	1.1	6.3	1.3	18	363	14.2	7	7.19					
10/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4.8 J	2.5 J	6600	0.5 U	0.5 U	0.5 U	16.1		2.63		7.11					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR-13SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	1.6 U	14	900	10	7.8 J	210	1.7 J	12	240	35	150	2.8 J	1710	357 J	121	1.4 J	5.49	3.7E+00	2.2E+01	3.7E+00	3.7E+00	3.7E+00
08/2011	50 U	50 U	460	8.6 J	50 U	160	5 U	23	4500	50 U	95	47 J	1830	17	135	0.67	6.27	3.3E+02	1.0E+04	1.6E+04	1.5E+04	1.3E+04
11/2011	25 U	25 U	66	6.3 J	25 U	59	1.3 J	23	8300	25 U	25	43	1020	2.5 J	102	0.42	6.7	1.5E+02	1.2E+03	4.3E+04	9.2E+04	6.4E+04
03/2012	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	8.6	21	6800	50 UJ	50 UJ	62 J	233	19	70.6	1.3	6.27	3.6E+02	7.6E+03	7.0E+05	4.9E+04	3.2E+05
06/2012	0.8 U	1 U	0.91 J	11	0.8 U	1 U	7.4	6.8	7700	0.8 UJ	6.9	44	192	14.2 J	51	0.63	6.49	1.4E+02	3.0E+03	1.0E+05	7.1E+03	8.0E+04
09/2012	4 U	5 U	4 U	4 U	4 U	5 U	3.3 J	1 U	6800	4 U	5 U	18 J	146	1.5 U	53.3	0.21	6.39	2.0E+01	6.4E+02	1.2E+04	1.4E+03	1.3E+04
12/2012	0.8 U	1 U	0.8 U	2.2 J	0.8 U	1 U	4.3 J	1 U	13000	0.8 U	1 U	16	95.4	14.6	37	0.79	6.93	7.0E+00	1.2E+02	1.1E+03	5.2E+01	8.2E+00
04/2013	0.8 U	1 U	0.8 U	1.8 J	0.8 U	1 U	7.7	5.2	15000	0.8 U	1.9 J	17	54.9	50	25.5	11.4	6.58	2.5E+01	1.6E+03	6.1E+03	7.0E+02	1.6E+01
07/2013	0.8 U	1.2 J	0.8 U	1.1 J	0.8 U	1 U	1.9 J	1.1 J	8200	0.8 U	1 U	13	54.8	3.5 J	18.7	6	6.6	1.4E+02	3.7E+02	1.3E+02	4.7E+01	5.9E+00
10/2013	8 U	10 U	8 U	8 U	8 U	10 U	2.7 J	1.9 J	12000	8 U	10 U	10 U	51.3	13.4	20.1	4.5	6.4	5.7E+00	1.0E+03	1.1E+03	2.8E+02	8.2E+00
12/2013	4 U	5 U	4 U	4 U	4 U	5 U	3.1 J	1 U	12000	4 U	5 U	6.7 J	56.9	2.5 J	23.1	1.6	6.58	1.4E+00	3.0E+02	5.3E+02	2.2E+01	4.3E+01
04/2014	0.5 U	0.5 U	0.5 U	0.94 J	0.5 U	0.86 J	17	17	17000	0.5 U	2	6.8	32.1	176	13	10	6.45	1.4E+01	4.3E+02	5.2E+02	6.5E+00	4.6E+02
08/2014	0.5 U	0.5 U	0.5 U	0.79 J	0.5 U	0.53 J	14	3.4 J	16000	0.5 U	0.5 U	7.4	45.9	28.3	8.12	17.7	6.25	2.8E+01	4.3E+02	1.3E+04	1.8E+01	5.2E+02
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	6	1 U	14000	0.5 U	0.5 U	3.2	41.1	211	14.7	1.4	6.26	1.6E+01	6.7E+02	2.9E+03	2.3E+01	1.9E+01
03/2015	0.5 U	0.5 U	1.3	0.84 J	0.5 U	2.5	30	17	18000 J	0.5 U	1.3	4.3	26.9	211	10.5	6.1	6.35	7.8E+01	8.1E+02	1.5E+04	1.2E+02	7.4E+02
10/2015	10 U	10 U	10 U	10 U	10 U	10 U	2 J	1.7 J	10000	10 U	10 U	10 U	34.1		13.4		6.24					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR-14SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	1.6 U	2 U	450	2.9 J	1.6 U	17	1.5 J	2.4 J	6300	1.6 U	2 U	2 U	2030 J	11 J	136	0.52 J	5.28	7.4E+00	5.3E+03	4.1E+00	4.3E+00	4.3E+00
08/2011	50 U	50 U	350	50 U	50 U	50 U	5 UJ	5 UJ	5500 J	50 U	50 U	50 U	1870	2.1 J	122	0.15 J	6.43	1.9E+02	1.1E+04	9.7E+02	3.2E+02	4.1E+03
11/2011	25 U	25 U	25 U	25 U	25 U	25 U	5 UJ	1.9 J	9300	25 U	25 U	25 U	426	3.1 J	76.5	0.12 J	6.97	5.3E+02	2.4E+03	5.0E+04	1.4E+04	2.0E+05
03/2012	50 U	50 U	50 U	50 U	50 U	50 U	5 U	5 U	9300	50 U	50 U	50 U	202	33.3 J	69.3	0.11 J	6.07	1.1E+03	1.5E+04	1.8E+05	2.6E+04	3.1E+05
06/2012	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	10 UJ	3.6 J	2.1 J	11000	8 UJ	10 UJ	10 UJ	179	217	51	1.4	6.67	4.1E+01	1.9E+03	1.7E+04	9.9E+02	3.0E+04
09/2012	0.8 U	1 U	0.8 U	0.97 J	0.8 U	1 U	2.6 J	1 U	7700	0.8 U	1 U	1 U	162	51.9	40.1	2.7	6.8	1.1E+01	5.0E+02	3.9E+03	2.5E+02	4.3E+03
12/2012	4 U	5 U	4 U	4 U	4 U	5 U	4.9 J	3.8 J	12000	4 U	5 U	5 U	146	196	38.6	4.8	6.24	9.7E+01	2.7E+02	2.5E+03	2.6E+02	1.7E+03
04/2013	0.8 U	1 U	0.8 U	0.85 J	0.8 U	1 U	5.7	4.9 J	14000	0.8 U	1 U	1 U	99.7	233	17.4	7.4	6.6	7.4E+01	2.1E+03	1.1E+04	9.9E+02	5.1E+01
07/2013	0.8 U	1 U	0.8 U	0.8 J	0.8 U	1 U	6	6.9	11000	0.8 UJ	1 U	1 U	99.1	319	9.61	13.4	6.68	1.4E+02	5.3E+02	1.7E+03	1.4E+02	1.3E+02
10/2013	8 UJ	10 UJ	8 UJ	8 UJ	8 UJ	10 UJ	14 J	14 J	12000 J	8 UJ	10 UJ	10 UJ	79.8	19.6	5.14	8.4	6.58	3.3E+02	1.2E+03	6.2E+03	6.6E+02	1.0E+02
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1.9 J	8.4	7.5	11000	0.8 U	1 U	1 U	82.6	273 J	3.49	33.5	6.61	1.6E+03	9.2E+02	7.8E+03	2.0E+02	1.4E+03
04/2014	0.5 U	0.5 U	0.5 U	0.62 J	0.5 U	1.4	8.3 J	5.1 J	15000 J	0.5 U	0.5 U	0.5 U	81.8	48.9	2.84	37.5	6.62	5.7E+02	7.4E+03	7.1E+02	4.1E+01	5.1E+02
08/2014	0.5 U	0.5 U	3.9	0.5 U	0.5 U	14	9.7	19	18000	0.5 U	0.5 U	0.5 U	52	130	2.23	21.2	6.19	8.7E+02	2.8E+02	4.3E+04	2.0E+01	2.6E+03
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.2	4.7 J	1.8 J	16000	0.5 U	0.5 U	0.5 U	16.5	277	4.45	32.9	6.43	1.4E+02	5.7E+02	1.5E+04	1.3E+01	3.5E+02
03/2015	0.5 U	1.3	14	0.5 U	0.5 U	10	33	16	16000 J	0.5 U	0.5 U	0.5 U	33.1	159	1.28	61.7	7.14	1.4E+02	3.9E+02	3.5E+03	1.5E+01	2.8E+02
10/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.1 J	1 U	9800	0.5 U	0.5 U	0.5 U	14.3		2.04		5.94					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR-15SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	0.8 U	4.6 J	120	2.4 J	0.8 U	50	3 J	7.2 J	1900 J	0.8 U	1 U	1 U	2190	11 J	167	0.5	6.5					
08/2011	50 U	50 U	180	50 U	50 U	58	5 UJ	2.2 J	7200 J	50 U	50 U	50 U	2060	1.9 J	167	0.12 J	5.15					
11/2011	25 U	25 U	25 U	4.3 J	25 U	25 U	2.5 J	8.2 J	9000	25 U	25 U	25 U	682	5 U	106	0.16 U	6.75					
03/2012	50 U	50 U	50 U	50 U	50 U	50 U	3.6 J	5 U	8200	50 U	50 U	50 U	270	2.2 J	95.7	0.071 J	6.51					
06/2012	0.8 U	1 U	0.8 U	2 J	0.8 U	1 U	1.7 J	1 U	8300	0.8 U	1 U	1 U	267	1.5 U	67.3	0.054 U	6.64					
09/2012	0.8 UJ	1 U	0.8 U	0.8 U	0.8 U	1 U	2.3 J	1 U	11000	0.8 U	1 U	1 U	237	1.5 UJ	68.8	0.054 U	6.98					
12/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	1.8 J	1 U	11000 J	0.8 U	1 U	1 U	250	1.5 U	76.3	0.054 U	6.98					
04/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	1 U	2.3 J	1 U	17000	0.8 U	1 U	1 U	177	1.5 U	78.6	0.054 U	6.79					
07/2013	8 U	10 U	8 U	8 U	8 U	10 U	1.4 J	1 U	10000	8 U	10 U	10 U	173	1.5 U	71.4	0.055 J	6.54					
10/2013	40 UJ	50 UJ	40 UJ	40 UJ	40 UJ	50 UJ	1.1 J	1 U	14000	40 UJ	50 UJ	50 UJ	171	1.5 U	71.3	0.054 U	6.51					
12/2013	8 U	10 U	8 U	8 U	8 U	10 U	2.2 J	1 U	11000	8 U	10 U	10 U	170	1.5 U	72.7	0.054 U	6.75					
04/2014	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	1.9 J	1 UJ	15000 J	5 UJ	5 UJ	5 UJ	120	7.4	69.8	0.078 J	6.6					
08/2014	5 U	5 U	5 U	5 U	5 U	5 U	7.6 J	1 UJ	11000 J	5 U	5 U	5 U	136	1.5 U	66	0.069 J	6.34					
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5 J	1 UJ	11000 J	0.5 U	0.5 U	0.5 U	141	2.1 J	67.9	0.054 U	5.85					
03/2015	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	1 U	1 U	19000 J	0.5 UJ	0.5 UJ	0.5 UJ	93.1	5.1	62.7	0.12 J	7.22					
10/2015	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	2.5 UJ	1.3 J	1 U	9100	2.5 UJ	2.5 UJ	2.5 UJ	99		60.2		6.80					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: OR-18SM

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCEr (cells/ml)	VCR (cells/ml)
06/2011	0.8 U	2.3 J	370	6.6	0.8 U	180	5.5	20	2800	0.8 U	1.3 J	1 U	549	968 J	21.2	27	6.84					
08/2011	50 U	50 U	390	50 U	50 U	150	2.2 J	14	7800	50 U	50 U	50 U	485	600	0.767	89.4	6.27					
11/2011	5 U	5 U	17	2.1 J	5 U	29	3.7 J	26	15000	5 U	5 U	5 U	62.1	581 J	0.0159 J	92.8	6.69					
03/2012	5 U	5 U	3.4 J	3.3 J	5 U	13	8.8	28	12000	5 U	5 U	5 U	64.9	348 J	0.0529 J	44.3	6.15					
06/2012	0.8 U	1 U	9.4	3.7 J	0.8 U	22	14	38	17000	0.8 U	1 U	1 U	105	280	0.0597 J		6.49					
09/2012	0.8 UJ	1 U	9.3	4.1 J	0.8 U	30	18	190	7900	0.8 U	1 U	1 U	88.1	255 J	0.0333 U	81	6.26					
12/2012	0.8 U	1 U	160	7	0.8 U	210	12	340	14000 J	0.8 U	1 U	1 U	27.4	257	0.0333 U	68.8	6.89					
04/2013	0.8 U	1 U	16	2.3 J	0.8 U	22	23	27	16000	0.8 U	1 U	1 U	22.3	226	0.0333 U	29.6	6.9					
07/2013	0.8 U	1 U	5.7	1.4 J	0.8 U	14	18	26	11000	0.8 U	1 U	1 U	5.7	398	0.043 U	32.6	6.75					
10/2013	0.8 U	1 U	79	2.7 J	0.8 U	82	16	110	13000	0.8 U	1 U	1 U	14.9	210	0.043 U	67.5	6.42					
12/2013	0.8 U	1 U	16	1.5 J	0.8 U	33	15	52	17000	0.8 U	1 U	1 U	21.2 J	121	0.043 U	70.8	6.44					
04/2014	0.5 U	0.5 U	43	1.7	0.5 U	35	21	94	19000	0.5 U	0.5 U	0.5 U	11.5	274	0.043 U	46.9	6.84					
08/2014	0.5 U	0.5 U	11	0.8 J	0.5 U	12	18	38	14000	0.5 U	0.5 U	0.5 U	7.6	261	0.0334 U	51.1	6.97					
12/2014	0.5 U	0.5 U	2.6	0.79 J	0.5 U	9.9	12	41	18000	0.5 U	0.5 U	0.5 U	13.2	85.9	0.0334 U	53.8	6.63					
03/2015	0.5 U	0.5 U	18	0.99 J	0.5 U	19	40	36	16000 J	0.5 U	0.5 U	0.5 U	4.4	414	0.0334 U	20.4	7.23					
10/2015	0.5 U	0.5 U	2.3	0.5 U	0.5 U	7.7	5.4	20	8100	0.5 U	0.5 U	0.5 U	7.3		0.0333 U		6.78					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 1D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	930 J	180000	36000	5000 U	5000 U	2100	5.1	19	120	5000 U	5000 U	5000 U	11.8	1460								
07/2008	280 J	17000 J	82000 J	200 J	260 J	3900 J	3.8 J	16 J	68 J	2500 UJ	2500 UJ	2500 UJ	22.4 J	2200 J								
10/2008	5000 U	38000	110000	1900 J	310 J	2200	14	23	230	5000 U	5000 U	5000 U	33.1	1210								
12/2008	2500 U	14000	130000 J	1500 J	280 J	4800	18	25	200	2500 U	2500 U	2500 U	44.5	1530								
06/2009	5000 U	53000	97000	5000 U	5000 U	3400	18	23	190	5000 U	5000 U	5000 U	49.3	1380	0.0661 J	63.9						
10/2009	5000 U	64000	100000	5000 U	5000 U	5200	23	30	210	5000 U	5000 U	5000 U	22.9	1350	0.0317 U	56.3						
07/2010	80 U	8800	78000	110 J	180 J	8800	26	54	170	80 U	100 U	100 U	10.4	1820 J	0.0522 U	20.4						
06/2011	150 J	22000	42000	80 U	130 J	1900	5 J	26	64	230 J	100 U	100 U	7.9	1580	0.606	2.5	7.1					
08/2011	250 U	1100	49000	85 J	130 J	3300	10	80	890	55 J	250 U	250 U	26	1470 J	0.086 J	68.9	7.45					
11/2011	45 J	25000	22000	250 U	58 J	550	5	28	83	120 J	250 U	250 U	36.5	664	0.157 J	44.7	6.86					
03/2012	100 U	2100	19000	36 J	49 J	1200	3.9 J	34	160	150	48 J	100 U	6.2	900	0.2 U	36.9	6.95					
06/2012	16 U	1900	26000	60 J	71 J	2100	4.9 J	61	2200	240	43 J	20 U	6.2	1150	0.0333 U	29	6.97					
09/2012	8 U	860	17000	36 J	41 J	2200	8.2 J	57 J	1100	200	43 J	10 U	6.4	700 J	0.036 J	21.2	7.02					
12/2012	16 U	180	36000	190	26 J	840	10	49	250	18 J	20 U	20 U	1550	6.8	240	3	5.75					
04/2013	40 U	230 J	43000	180 J	40 U	3100	36	140	2600	40 U	50 U	50 U	1380	5.5 J	180	14.4	5.89					
07/2013	0.86 J	12	750	4.7 J	0.93 J	60	1.5 J	20	3000	0.95 J	1 U	1 U	73.6	4.8 J	1.29	7.7	7.15					
10/2013	8 U	10 U	9500	18 J	8 U	3400	27	1500	11000	8 U	10 U	10 U	316	1.5 U	36.4	1.8	6.09					
12/2013	2 U	4.9 J	3300	15	6.2 J	3100	21	1500	8200	2.2 J	7.3 J	2.5 U	146	12.7	11.8	1.2	6.17					
08/2014	0.93 J	0.84 J	680	2.4	1.1	300	25	730	14000	0.5 U	3.3	0.5 U	233	1.5 U	63	0.14 J	7.07					
12/2014	0.5 U	1.1	50	7.6	0.5 U	200	15	3900	15000	0.5 U	15	2.9	354	1.5 U	84.5	0.33	6.28					
04/2015	0.5 U	0.5 U	3.6	9.2	0.5 U	22	88	5500	20000	0.5 U	15	1.7	442	3.3 J	113	0.1 J	8.34					
10/2015	25 U	25 U	21000	25 U	25 U	1700	330	3100	14000	25 U	25 U	25 U	341		78.7		6.97					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 1S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	8 U	13 J	6700	38 J	11 J	400	1.2 J	11	34	8 U	10 U	10 U	196	133	0.305	63.8	6.59	1.0E+03	1.4E+04	1.1E+03	1.6E+02	4.7E+02
08/2011	25 U	25 U	4800	94	5.1 J	2600	8.6	690	3500	25 U	25 U	25 U	503	5 U	21.6	2	6.23	1.9E+04	4.3E+03	7.6E+05	2.2E+04	1.1E+05
11/2011	5 U	5 U	150	81	5 U	320	270	2100	8100	5 U	2.9 J	1.8 J	561	3.1 J	30.6	2	6.3	7.3E+03	5.1E+02	3.1E+04	2.1E+04	3.4E+04
03/2012	5 U	5 U	390	74	4 J	660	1000	590	22000	5 U	2.6 J	2 J	88.3	4.9 J	5.24	1.6	6.51	2.3E+04	3.0E+03	1.8E+06	8.0E+04	1.4E+06
06/2012	0.8 U	1.4 J	200	27	1.1 J	160	1700	500	20000	0.8 U	1.1 J	1 U	29.3	14.7	1.63	8.9	6.57	4.4E+03	1.3E+03	7.9E+05	2.3E+04	6.0E+05
09/2012	0.8 U	1.9 J	290	8.7	1.7 J	310	1600	1000	15000	0.8 U	1.3 J	1 U	15.6	51.7 J	1.64	4.8	6.58	7.0E+04	1.7E+03	4.9E+04	5.3E+01	1.8E+02
12/2012	0.8 U	1.7 J	420	11	1.3 J	410	410	420	9600	0.8 U	1.4 J	1 U	7.2	95.9	0.414	2.4	7.23	6.5E+03	4.9E+01	1.3E+05	4.5E+03	8.0E+04
04/2013	1.3 J	110	710	16	3.5 J	380	240	340	15000 J	0.8 U	5.5	1 U	20.3	136	1.65	9.1	6.79	6.8E+03	1.2E+03	3.0E+05	1.7E+04	1.1E+03
07/2013	0.8 U	4.8 J	320	16	1.2 J	270	220	360	4500	0.8 U	7.1	1 U	37	46.4	0.043 U	20.1	7.41	3.4E+03	2.7E+01	3.6E+05	9.8E+03	3.4E+04
10/2013	0.8 U	2.1 J	1300	27	8.6	820	900	350	14000	0.8 U	7.4	1 U	33.4	10.8	0.0631 J	17.1	6.9	1.5E+03	1.1E+03	1.2E+05	5.4E+03	9.8E+03
12/2013	0.8 U	4.4 J	720	27	5.8	650	1000	500	20000	0.8 U	6.2	3.7 J	6	8.3	0.206 J	9.3		2.4E+05	7.8E+03	6.0E+06	4.4E+05	9.0E+05
04/2014	0.5 U	4.2	490	19	1.9	280	330	470	13000	0.5 U	3.8	1.4	7	35.2	0.656	13.6	6.8	3.4E+04	3.3E+03	1.4E+05	9.5E+02	8.4E+04
08/2014	0.5 U	1.3	250	14	0.61 J	210	390	440	7300	0.5 U	2.5	4.7	5.8	9.9	0.0419 J	14	7.4	1.6E+04	6.2E+02	1.7E+06	9.6E+02	2.4E+05
12/2014	0.5 U	1.6	150	7.9	0.5 U	120	550	260	6200	0.5 U	0.84 J	3.6	3	38.7	0.141 J	5.5	7.26	2.2E+04	5.0E+02	4.2E+05	5.0E+03	2.4E+04
03/2015	0.5 U	6.1	670	20	2	340	180	430	7700	0.5 U	2.4	2.7	28.6	79.5	0.787	0.77	7.25	2.6E+04	8.6E+01	3.5E+05	6.2E+02	8.6E+04
10/2015	0.5 U	0.97 J	100	9.6	0.5 U	130	350	240	15000	0.5 U	0.63 J	3.3	4.5		0.0424 J		7.14					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 2D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	910 J	110000	27000	5000 U	5000 U	1600 J	6.9	19	87	5000 U	5000 U	5000 U	7.62	1410								
07/2008	5000 U	1100 J	150000	580 J	380 J	1800 J	7.6	34	110	5000 U	5000 U	5000 U	1020	1250								
09/2008	5000 U	3200 J	120000	680 J	210 J	2600	5.8	16	89	5000 U	5000 U	5000 U	748	843								
12/2008	1000 U	2300	76000	260 J	88 J	1600	6.6	9.3	39	1000 U	40 J	1000 U	194	270								
06/2009	2500 U	3600	61000	2500 U	2500 U	1400	14	50	390	2500 U	2500 U	2500 U	723	71.8	7.91							
10/2009	2500 U	3700	63000	140 J	2500 U	1400	9.3	26	110	2500 U	2500 U	2500 U	782	111	0.986	109						
07/2010	40 U	6900	100000	220 J	110 J	5000	11	200	660	40 U	63 J	50 U	442	69.6 J	0.105 J	165						
06/2011	160 U	12000	97000	270 J	160 U	1700	5.4	180	750	160 U	200 U	200 U	462	28.2 J	0.0272 J	210	5.83	3.0E+02	1.4E+03	6.3E+02	4.3E+01	1.9E+02
08/2011	500 U	15000	93000	250 J	140 J	2300	7.9	200	260	500 U	500 U	500 U	471	241 J	0.0279 J	207	6.77	2.1E+01	7.6E+01	9.0E+01	1.1E+01	1.6E+01
11/2011	1000 U	30000	130000	250 J	1000 U	3000	4.3 J	98	330	1000 U	1000 U	1000 U	356	76	1.21	165	6.5	1.6E+04	1.4E+04	1.6E+05	9.1E+03	8.0E+03
03/2012	310 J	49000	120000	210 J	180 J	2700	7.4	170	2000	500 U	500 U	500 U	137	665 J	0.0358 J	209	6.39	1.0E+04	2.2E+03	7.3E+03	4.0E+02	4.4E+03
06/2012	160	27000	80000	160	130	1700	19	180	2600	40 J	34 J	10 U	148	202 J	0.0141 U	150	6.68	8.2E+02	4.8E+02	4.8E+03	2.5E+02	4.3E+03
09/2012	73 J	16000	91000	190 J	160 J	2100	21	200	2200	40 U	50 U	50 U	215	118	0.0333 U	171	6.31	2.5E+03	3.0E+03	2.7E+04	8.1E+02	2.1E+03
12/2012	80 U	9500	150000	220 J	190 J	2500	14	160	2000	80 U	100 U	100 U	790	99.5	0.0569 J	106	6.3	6.5E+03	2.3E+03	1.2E+04	8.0E+03	9.6E+02
04/2013	40 U	700	130000	160 J	71 J	1500	15	140	2900	40 U	56 J	50 U	821	41.6	0.0333 U	206		1.8E+04	1.2E+04	4.6E+04	2.0E+03	9.2E+01
07/2013	40 U	1100	76000	94 J	52 J	2300	5 J	120	1800	40 UJ	50 U	50 U	288	180	0.043 U	193	6.68	2.5E+03	7.3E+03	1.8E+03	6.8E+02	1.3E+02
10/2013	160 U	9000	150000	230 J	160 J	3600	10	170	4700	160 U	200 U	200 U	485	81.6	0.043 U	223		4.6E+02	3.8E+02	8.9E+02	7.6E+02	1.7E+01
12/2013	140 J	22000	110000	180 J	140 J	4600	12	240	2800	80 U	100 U	100 U	286	300	0.043 U	159	6.64	2.6E+04	1.8E+03	3.9E+04	1.4E+04	2.9E+03
04/2014	120	8200	80000	160	120	8300	19	420	6700	50 U	50 U	50 U	163	206	0.043 U	141	6.73	4.5E+04	1.6E+03	1.8E+05	5.1E+02	9.9E+03
08/2014	50 U	2200	79000	180	120	18000	14	1700	9600	50 U	50 U	50 U	367	95.1	0.219 J	115	6.33	1.2E+05	5.4E+02	6.7E+05	2.8E+03	2.1E+04
12/2014	25 U	3800	89000	210	130	12000	17	3000	11000	25 U	37 J	25 U	422	74.2	0.0799 J	80.3	6.36	6.2E+05	5.6E+03	1.6E+06	1.1E+04	3.0E+04
03/2015	35 J	3300	110000	220	130	17000	34	2800	11000 J	25 U	37 J	25 U	220	51.5	0.0409 J	120	6.38	3.5E+05	3.6E+02	1.1E+06	1.3E+04	3.2E+04
10/2015	50 U	4100	110000	430	160	26000	22	8300	7500	50 U	86 J	50 U	382		0.412		6.23					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 2S**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	8 U	17 J	6000	66	9.2 J	710	2.5 J	19	370	8 U	10 U	10 U	292	87.2	1.54	45.8	6.18	7.4E+02	5.7E+03	1.0E+03	3.2E+02	5.9E+02
08/2011	25 U	25 U	2800	100	25 U	1400	9.5	1200	5900	25 U	25 U	25 U	447	5 U	10.4	9.1	6.19	1.8E+04	3.4E+03	3.6E+05	3.5E+04	1.4E+05
11/2011	5 U	5 U	630	88	1 J	680	150	1300	13000	5 U	2.8 J	5 U	437	2.6 J	23.9	1.7	6.12	1.5E+04	7.5E+02	5.3E+04	1.7E+04	1.4E+05
03/2012	10 U	10 U	1700	92	3.1 J	1300	300	390	14000	10 U	2.9 J	10 U	260	22.3	19.7	1.1	5.99	2.1E+05	7.3E+02	1.7E+06	8.8E+04	1.2E+06
06/2012	0.8 U	2.8 J	390	63	1.6 J	350	190	220	13000	0.8 UJ	2 J	1 U	234	1.8 J	21.6	1.1	6.54	1.2E+04	1.2E+03	4.2E+05	1.3E+04	3.5E+05
09/2012	1.6 U	2.7 J	550	31	1.6 U	490	220	130	14000	1.6 U	2 U	2 U	44.7	7.6	6.87	2.2	6.41	6.9E+03	1.2E+03	3.0E+05	2.9E+04	6.6E+04
12/2012	0.8 U	88	270	13	0.8 U	220	300	110	13000	0.8 U	1.1 J	1 U	19.4	34.1	5.73	0.89	6.58	5.1E+03	2.0E+02	1.0E+05	2.6E+03	6.6E+03
04/2013	0.8 U	1.5 J	180	7.1	0.8 U	130	340	74	20000 J	0.8 U	1.2 J	1 U	6.6	319	1.61	4.9	6.72	6.9E+03	4.1E+03	2.1E+05	1.1E+04	1.5E+03
07/2013	0.8 U	1 J	39	6	0.8 U	37	230	100	19000	0.8 UJ	1.8 J	1 U	21.4	5.3	0.671	10.3	6.51	2.6E+03	1.6E+02	2.4E+04	9.0E-01	8.6E+02
10/2013	0.8 U	1 U	100	9.1	0.8 U	130	380	300	16000	0.8 U	3.1 J	1 U	20.2	2.5 J	1.28	6.4	6.3	3.6E+03	5.9E+02	2.4E+05	1.2E+04	4.7E+03
12/2013	0.8 U	1 U	220	13	0.8 U	190	420	240	16000	0.8 U	2.8 J	1.3 J	26.1	1.6 J	5.6	1.5		8.2E+03	2.3E+02	5.1E+04	4.1E+03	7.2E+03
04/2014	0.5 U	2.5	320	13	0.89 J	260	160	100	19000	0.5 U	1.2	0.5 U	10.9	47.4	0.487	15.4	6.29	7.8E+03	2.7E+02	1.7E+04	1.1E+02	1.2E+04
08/2014	0.5 U	2.2	35	6.3	0.5 U	37	290	170	10000	0.5 U	1.8	5.1	6.4	3.3 J	0.111 J	13.8	7.01	1.6E+04	5.1E+02	1.1E+06	3.8E+03	7.7E+04
12/2014	0.5 U	0.5 U	4.9	2.9	0.5 U	10	380	38	8700	0.5 U	0.59 J	2.6	5.7	3.4 J	0.677	3.8	6.72	2.3E+04	3.3E+02	3.7E+05	2.2E+03	3.5E+04
03/2015	0.5 U	2	230	16	0.5 U	290	160	200	18000	0.5 U	1.1	2.2	12	123	5.36	0.79	6.53	2.2E+04	1.1E+02	2.5E+05	7.1E+02	4.2E+04
10/2015	0.5 U	0.5 U	1.3	0.97 J	0.5 U	2.8	190	13	15000	0.5 U	0.5 U	0.5 U	9.5		1.45		6.82					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 3D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	1400 J	240000	31000	5000 U	5000 U	640 J	9.6	20	82	5000 U	5000 U	5000 U	11	987								
07/2008	2500 U	540 J	83000	210 J	2500 U	760 J	16	24	120	2500 U	2500 U	2500 U	1800	1170								
09/2008	13 J	1000	9000	50 J	15 J	99 J	35	4.7	160	16 J	250 U	250 U	558	1010								
12/2008	250 U	550	5600	26 J	250 U	130 J	6.4	8.7	36	250 U	250 U	250 U	204	750								
06/2009	250 U	1200	9900	29 J	250 U	250	27	34	580	250 U	250 U	250 U	240	817	0.0562 J	166						
10/2009	250 U	2100	11000	32 J	30 J	150	25	15	250	250 U	11 J	250 U	141	858	0.0317 U	184						
07/2010	33 J	12000	29000	53 J	51 J	240	20	23	880	20 U	25 U	25 U	153	972 J	0.0522 U	156						
06/2011	57 J	19000	20000	46 J	55 J	540	16 J	13 J	2400 J	21 J	24 J	20 U	71.4	1060	0.0141 U	182	7.14					
08/2011	7.7 J	2600	4300	9.3 J	9.6 J	63	35	26	3300	25 U	6.7 J	25 U	107	731	0.2 U	211	7.17					
11/2011	50 J	11000	15000	26 J	31 J	430	22	50	2900	100 U	100 U	100 U	44.1	987	0.2 U	207	6.95					
03/2012	13 J	3300	6600	14 J	17 J	150	18	19	5800	25 U	15 J	25 U	132	482 J	0.2 U	224	6.83					
06/2012	20 J	5000	8900	18 J	20 J	210	5.3	14	1900	22 J	27 J	10 U	167	505 J	0.0333 U	173	6.67					
09/2012	38 J	5600	13000	25 J	31 J	290	29	58	4200	33 J	33 J	10 U	148	601	0.0333 U	173	6.87					
12/2012	30	3000	16000	20 J	22 J	270	14	18	3200	11 J	26	5 U	345	752	0.0333 U	323	6.36					
04/2013	40 U	1700	25000	40 U	40 U	350	12	28	5500	40 U	50 U	50 U	323	309 J	0.342	279	6.85					
07/2013	43 J	7400	66000	85 J	70 J	1100	15	72	5400	17 J	83 J	20 U	418	203	0.043 U	201	6.37					
10/2013	80 U	11000	57000	80 U	80 U	920	27	98	3300	80 U	100 U	100 U	351	326	0.043 U	252	6.45					
12/2013	40 U	6300	40000	56 J	51 J	630	26	76	2200	40 U	50 U	50 U	189	617	0.043 U	216	6.44					
04/2014	29 J	5100	77000	110	96	1700	24	270	4700	25 U	54	25 U	273	195	0.104 J	186	6.6					
08/2014	25 U	1200	61000	94	72	2000	33	340	8900	25 U	46 J	25 U	234	129	0.0334 U	179	6.65					
12/2014	50 U	3700	67000	100	79 J	2500	24	550	5000	50 U	50 U	50 U	195	570	0.0334 U	154	6.63					
03/2015	25 U	3800	60000	95	76	4100	19	840	8200	25 U	33 J	25 U	223	114	0.0334 U	201	7.5					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 3S**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	40 U	50 U	45000	610	76 J	6800	22	100	720	40 U	50 U	50 U	212	332	1.33	46.3	5.9	8.7E+02	4.3E+03	1.3E+03	3.1E+02	3.3E+02
08/2011	12 J	84	61000	1100	110	12000	32	810	4700	50 U	33 J	50 U	238	404 J	1.72	17.3	5.08	4.9E+04	5.8E+03	2.9E+05	1.8E+04	2.6E+05
11/2011	250 U	250 U	43000	960	65 J	27000	99	1700	9400	250 U	250 U	250 U	229	444	5.66	3.9	6.51	9.0E+04	1.7E+03	1.8E+05	2.5E+04	3.6E+05
03/2012	500 U	610	99000	1600	190 J	19000	260	1300	9400	500 U	500 U	500 U	78.3	849	2.64	8.7		2.0E+05	8.3E+02	7.7E+05	1.9E+04	6.0E+05
06/2012	80 U	660	65000	1200	150 J	13000	280	930	10000	80 U	100 U	100 U	84.8	1010	4.3	3.2	6.25	2.2E+05	9.3E+02	1.1E+06	1.1E+04	2.0E+05
09/2012	40 U	210 J	39000	760	60 J	8500	320	800	11000	40 U	50 U	50 U	31.2	228	3.4 J	2.5	6.2	2.9E+05	2.6E+02	4.8E+05	2.5E+04	8.7E+04
12/2012	40 U	600	85000	1300	150 J	13000	290	430	12000	40 U	50 U	50 U	12.8	883	4.56	0.37	6.08	6.6E+04	1.2E+01	1.2E+05	2.2E+03	1.5E+04
04/2013	23 J	330	29000	510	44 J	4900	660	1500	17000 J	16 U	24 J	20 U	13.7	950	0.502	17.2	6.56	1.7E+05	8.5E+02	1.4E+06	8.6E+04	1.9E+04
07/2013	80 U	310 J	45000	810	83 J	7600 J	260	1300	12000	80 UJ	100 U	100 U	15.9	648	0.628	21.2	6.56	3.6E+04	1.0E+02	6.1E+04	3.6E+03	7.6E+03
10/2013	40 U	200 J	30000	610	59 J	5100	400	2100	9900	40 U	50 U	50 U	30.6	552	0.847	16.9	6.4	1.7E+04	2.3E+02	2.5E+04	1.2E+04	3.0E+03
12/2013	5 J	86	13000	290	25 J	3100	310	900	9800	4 U	11 J	5 U	22.3	670	0.301 J	18.3		8.9E+04	3.1E+02	4.1E+05	1.4E+05	4.4E+04
04/2014	10 U	27	14000	350	24	5800	380	1700	14000	10 U	12 J	10 U	13.9	547	1.32	22.3	6.2	5.9E+04	2.0E+02	8.1E+05	6.7E+02	1.2E+05
08/2014	10 U	110	26000	480	41	5000	320	1200	10000	10 U	16 J	10 U	18.5	347	0.214 J	23.4	6.36	1.1E+05	1.1E+02	9.2E+05	1.2E+03	7.7E+04
12/2014	5 U	60	15000	260	27	2700	230	880	8200	5 U	9.8 J	5 U	11.6	638	0.217 J	13.9	6.47	6.8E+04	1.8E+02	5.1E+05	1.1E+03	6.1E+03
03/2015	2.5 U	28	13000	300	21	5300	440	1300	12000 J	2.5 U	9.8	2.5 U	20.7	503	0.709	16.5	6.28	1.9E+05	2.3E+02	5.0E+05	2.5E+03	5.4E+04
10/2015	5 U	63	13000	290	24	2400	170	1000	9500	5 U	11	5 U	12.5		0.39 J		6.64					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 4D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	1100 J	220000	36000	5000 U	5000 U	690 J	10	17	94	5000 U	5000 U	5000 U	12.2	1080								
07/2008	5000 U	3500 J	160000	510 J	350 J	1100 J	12	38	110	5000 U	5000 U	5000 U	237	1520								
09/2008	1300 U	5900	91000	990 J	140 J	1400	9.1	10	77	1300 U	1300 U	1300 U	227	108								
10/2008																						
12/2008	1000 U	1000	22000	140 J	1000 U	680 J	17	14	120	1000 U	1000 U	1000 U	113	635								
06/2009	1000 U	11000	65000	180 J	1000 U	1100	11	30	150	1000 U	1000 U	1000 U	105	2000	0.0322 J	173						
10/2009	500 U	3200	16000	59 J	39 J	550	20	19	250	500 U	23 J	500 U	63.2	1240	0.0317 U	232						
07/2010	40 U	3500	22000	66 J	40 U	620	20	24	1600	40 U	50 U	50 U	89.1	1230 J	0.0522 U	191						
06/2011	91 J	73000	69000	210 J	180 J	1300	11	48	2000	80 U	100 U	100 U	128	922	0.0141 U	177	7.53					
08/2011	100 U	16000	21000	56 J	45 J	510	31	95	3900	100 U	22 J	100 U	113	652 J	0.2 U	175	7.3					
11/2011	31 J	13000	20000	58 J	49 J	640	16	120	3900	100 U	29 J	100 U	95.5	460 J	0.0183 J	224	6.39					
03/2012	9.9 J	4600	14000	50	47	730	17	160	3900	9.6 J	29	25 U	133	450 J	0.2 U	224	6.79					
06/2012	13	1900	1800	9.2 J	9.1 J	83	31	61	4200	7 J	4.3 J	2 U	144	203 J	0.0333 J	187	6.87					
09/2012	150	15000	30000	64 J	78 J	960	15	150	3800	130	71 J	20 U	120	256 J	0.0333 U	215	6.77					
12/2012	24 J	930	51000	54 J	31 J	700	14	110	5000	61 J	96 J	20 U	1020	283	0.0333 U	247	6.67					
04/2013	78 J	730	24000	90 J	45 J	2500	37	620	7700	40 U	61 J	50 U	85.5	895	0.0333 U	157	6.69					
07/2013	18 J	470	39000	74 J	30 J	1200	16	210	6100	16 U	94 J	20 U	253	151	0.043 U	375	6.88					
10/2013	80 U	1100	53000	97 J	80 U	1400	28	360	5600	80 U	110 J	100 U	261	300	0.043 U	305	6.62					
12/2013	160 U	730 J	74000	160 U	160 U	2100	27	360	6600	160 U	200 U	200 U	301 J	284	0.043 U	230	6.87					
04/2014	130 U	670	77000	130 U	130 U	2800	36	430	7700	130 U	130 U	130 U	280	106	0.043 U	188						
08/2014	50 U	370	71000	140	110	4100	36	660	9200	50 U	120	50 U	196	281	0.0601 J	197	6.83					
12/2014	50 U	130	57000	110	78 J	3000	26	800	8400	50 U	83 J	50 U	213	468	0.0334 U	172	7.42					
03/2015	50 U	190	62000	130	91 J	6700	35	940	9400	50 UJ	80 J	50 U	238	103	0.0334 U	197	6.46					
10/2015	10 U	700	50000	120	43	5700	21	1100	9200	10 U	89	10 U	269		0.0333 U		6.91					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 4S**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	4 U	78	2000	63	4 U	68	16	2.2 J	47	4 U	5 U	5 U	12.5	467 J	0.0141 U	0.054 U	7.38					
08/2011	4.4 J	130	3900	120	7.9 J	300	21	17	86	13 U	4.6 J	13 U	16.2	604	0.0149 J	0.16 U	6.77					
11/2011	50 U	250	8600	240	15 J	460	17	19	170	50 U	10 J	50 U	6.5	1310	0.145 J	0.16 U	6.39					
03/2012	9.7 J	340	14000	310	24 J	840	43	44	1600	50 U	14 J	50 U	3.5	1970	0.151 J	0.16 U	6.83					
06/2012	7.6 J	270	11000	280	20 J	660	38	110	2000	4.5 J	14 J	5 U	3.8	1400	0.0155 J	0.054 U	6.66					
09/2012	8 U	230	11000	270	20 J	1300	53	180	2500	8 U	12 J	10 U	5.8	1510	2.24 J	0.054 U	6.54					
12/2012	16 U	230	14000	350	22 J	860	68	53	6900 J	16 U	20 U	20 U	3.7	1980	0.991	0.054 U	6.65					
04/2013	3.2 J	270	13000	400	33	1100	110	48	11000	0.8 U	19	1 U	2.7	1770	0.386	0.054 U	6.64					
07/2013	8 U	180	12000	350	26 J	830	73	31	8200	8 U	14 J	10 U	3.4	1770	1.69	0.054 U	6.62					
10/2013	16 U	100	8500	240	17 J	560	220	49	9200	16 U	20 U	20 U	6.7	921	1.83	0.054 U	6.53					
12/2013	8 U	140	12000	320	25 J	750	130	48	7200	8 U	14 J	10 U	8.4	1530	1.07	0.054 U	6.18					
04/2014	5 U	130	7400	220	17	440	91	27	6000	5 U	8.9 J	5 U	5.8	1490 J+	2.22	0.054 U	6.61					
08/2014	2.5 U	39	6000	160	9.1	240	47	31	2900	2.5 U	7.2	2.5 U	23.9	820	3.58	0.078 J	6.45					
12/2014	5 U	83	8200	210	14	410	81	75	5700	5 U	9.3 J	5 U	6.1	121	0.162 J	0.054 U	5.82					
03/2015	1 U	76	3500	110	8	210	41	25	2300	1 UJ	5.2	1 U	8.6	519	0.23 J	0.054 U						
10/2015	1 U	9.2	1800	45	4.6	150	21	26	1600	1 U	2.6	1 U	8.2		0.414		6.99					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 5D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	1700 J	91000	11000	2500 U	2500 U	420 J	5.9	19	60	750 J	2500 U	2500 U	4.8	710								
07/2008	5000 U	950 J	100000	430 J	5000 U	1800 J	10	72	120	5000 U	5000 U	5000 U	332	982								
09/2008	2500 U	4800	92000	500 J	200 J	2400	8.8	18	85	2500 U	2500 U	2500 U	383	730								
12/2008	2500 U	6900	71000	540 J	110 J	1300 J	15	21	100	2500 U	100 J	2500 U	196	352								
06/2009	1000 U	2100	27000	1000 U	1000 U	760	29	40	180	1000 U	1000 U	1000 U	306	179	0.0751 J	176						
10/2009	90 J	13000	73000	210 J	210 J	1900	20	35	200	1000 U	130 J	1000 U	351	490	0.0320 J	237						
07/2010	160 U	10000	94000	160 U	160 U	2300	17	130	290	160 U	200 U	200 U	334	171	0.0522 U	193						
08/2011	700	67000	69000	96 J	160 J	650	7.3	19	280	350	110 J	250 U	441	152	0.0212 J	241						
03/2012	500	47000	45000	56	120	580	24	140	1800	140	86	50 U	45.6	995	0.2 U	130						
06/2012	88 J	6800	8600	16 U	37 J	63 J	12	85	2400	44 J	20 U	20 U	57	246 J	0.0333 U	146						
09/2012	680	34000	34000	59 J	94 J	3700	14	150	4200	410	68 J	25 U	111	107 J	0.0333 U	146						
12/2012	80 J	1900	62000	40 U	40 U	1200	19	200 J	2900	140 J	100 J	50 U	1010	622	0.329	163						
04/2013	20 J	1200	45000	46	40	560	15	77	1500	99	85	5 U	455	97.7	0.0601 J	182						
07/2013	80 U	2700	52000	80 U	80 U	640	9.7	100	1300	80 U	100 U	100 U	293	83.3	0.043 U	188						
10/2013	90 J	8900	73000	91 J	81 J	2900	21	450	4600	44 J	97 J	50 U	254	326	0.043 U	184						
12/2013	250 J	21000	140000	150 J	210 J	4900	30	500	2600	80 UJ	140 J	100 U	307	150	0.043 U	161						
04/2014	520	25000	98000	190	170	4300	46	1100	6800	57	87	25 U	137	115	0.043 U	112						
08/2014	50 U	1300	88000	200	180	7400	41	1400	12000	50 U	59 J	50 U	142	413	0.0334 U	137	7.02					
12/2014	50 U	1400	50000	110	60 J	3900	39	700	11000	50 U	54 J	50 U	111	565	0.0334 U	172	7.72					
03/2015	61	8700	42000	100	100	3600	28	1000	8200	10 U	30	10 U	16.7	66.1	0.0334 U	67.3	8.04					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 5S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	80 U	2400	62000	1000	120 J	13000	42	250	300	81 J	100 U	100 U	6.7	1650 J	7.2	0.054 U	6.6					
08/2011	250 U	3000	56000	830	110 J	12000	54	320	670	250 U	250 U	250 U	5.5	1960	0.48	0.16 U	6.64					
11/2011	500 U	2600	59000	810	110 J	9300	31	200	250	500 U	500 U	500 U	5.8	1630	0.278	0.16 U	6.73					
03/2012	250 U	3000	48000	940	90 J	7800	53	230	680	250 U	250 U	250 U	6.6	1540	0.0387 J	0.16 U	6.83					
06/2012	8 U	3100	57000	1000	100	9800	68	450	800	8 UJ	16 J	10 U	5.8	1530	0.0551 J	0.054 U	6.61					
09/2012	1.6 U	2400	56000	710	82	10000	51	360	810	9.3 J	13	2 U	5.3	1310	0.623	0.054 U	6.83					
12/2012	16 U	1600	29000	550	47 J	4900	33	180	930 J	16 U	20 U	20 U	10.3	1000	0.0851 J	0.054 U	6.7					
04/2013	4 U	2300	39000	720	69	7800	58	350	2100 J	4 U	11 J	5 U	5.9	1390	0.258	0.054 U						
07/2013	8 U	1900	37000	710	68	7200	39	230	2700	8 U	11 J	10 U	8	1440	0.205	0.054 U	6.89					
10/2013	40 U	2300	37000	790	76 J	7800	56	370	2600	40 U	50 U	50 U	6.9	1390	0.17 J	0.054 U						
12/2013	16 U	1700	27000	580	56 J	5100	45	250	3100	16 U	20 U	20 U	8.2	1120	0.0705 J	0.054 U	6.39					
04/2014	25 UJ	1800	26000	640	61	5100	46	350	5300	25 U	25 U	25 U	9.1	1310 J+	0.0849 J	0.054 U	6.84					
08/2014	25 U	1700	29000	570	43 J	3700	60	330	5800	25 U	25 U	25 U	7.1	2760 J-	0.427	0.054 U	6.83					
12/2014	10 U	1700	26000	560	48	4200	60	440	6700	10 U	10 U	10 U	8.6	1360	0.196 J	0.054 U	6.49					
04/2015	10 U	1100	25000	490	44	3900	69	420	5700	10 U	10 U	10 U	6.3	1320	0.0805 J	0.054 U						
10/2015	10 U	1300	22000	450	39	3100	100	340	5900	10 U	10 U	10 U	6.8		0.353 J		6.51					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 6D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	1000 J	100000	17000	5000 U	5000 U	820 J	6.5	16	62	500 J	5000 U	5000 U	6.68	1030								
07/2008	5000 U	2200 J	140000	380 J	5000 U	1200 J	11	37	100	5000 U	5000 U	5000 U	627	1220								
09/2008	2500 U	2800	92000	540 J	160 J	1900 J	12	14	71	2500 U	2500 U	2500 U	565	610								
12/2008	500 U	310 J	17000	230 J	29 J	170 J	3.6	12	56	41 J	500 U	500 U	266	4.02								
06/2009	500 U	110 J	11000	53 J	500 U	650 J	8.9	53 J	23	34 J	500 U	500 U	199	12.9	0.0619 J	40.5						
10/2009	250 U	42 J	8200	57 J	250 U	2800	21	710	1900	30 J	14 J	250 U	701	36.7	1.59	43.8						
07/2010	16 U	300	8100	54 J	19 J	4000	33	650	4500	16 U	36 J	20 U	870	3.2 J	0.079 J	92						
06/2011	7.9	400	610	59	8.3	2000	16	1800	9400	8	59	1 U	989	4.3 J	0.0369 J	113	6.4	2.4E+03	3.9E+02	2.2E+05	1.0E+00	8.6E+04
08/2011	6.2 J	510	2100	48	13	1900	60	1800	8000	4.3 J	50	10 U	817	6.8 J	0.016 J	147	6.83	2.3E+02	5.6E+01	1.8E+04	7.0E-01	5.4E+03
11/2011	4.1 J	100	89	4.7 J	1.4 J	35	1.8 J	63	1700	0.86 J	2.5 J	5 U	28.8	21.6	0.0203 J	6.3	11.77	4.4E+01	1.4E+01	3.0E+02	5.0E-01	9.8E+02
03/2012	5 U	40	200	41	5 U	68	35	2800	17000	5 U	36	5 U	443 J	12.5	0.2 U	81.6	6.88	6.8E+04	1.6E+04	3.2E+06	6.1E+02	2.4E+06
06/2012	8.6 J	2200	21000	83	26	1600	24	980	8000	4 UJ	75	5 U	578	1050 J	0.0336 J	84.4	6.99	2.1E+04	7.0E+03	1.9E+06	2.4E+02	1.2E+06
09/2012	2.1 J	660	5100	54	9.7	2100	7.2 J	1300 J	7200 J	3.8 J	46	1 U	563	2.1 J	0.0333 U	111	6.79	1.3E+04	1.2E+03	2.2E+06	8.7E+04	1.1E+06
12/2012	16 U	850	38000	78 J	38 J	1800	20	330	8100	16 U	74 J	20 U	502	24.1	0.0333 U	149	6.9	6.3E+03	2.2E+02	1.2E+05	6.6E+03	3.1E+04
04/2013	40 U	2400	44000	92 J	40 U	1000	9.7	99	2800	40 U	83 J	50 U	466	428 J	0.0333 U	152		3.0E+04	5.2E+02	2.0E+05	1.7E+04	6.8E+03
07/2013	16 U	460	14000	42 J	16 U	480	21	210	2600	16 U	30 J	20 U	366	401	0.043 U	167	7	1.7E+04	1.4E+03	1.6E+05	1.2E+04	1.5E+02
10/2013	8 U	100	9000	28 J	11 J	280	9.7	300	3700	8 U	19 J	10 U	108	8.1	0.0858 J	3	7.13	4.1E+04	7.5E+03	1.0E+06	4.4E+05	7.5E+04
12/2013	4.6 J	3600	30000 J	70	40	1900	29	1000	4000	2.6 J	60	2 U	271	254	0.043 U	132		1.2E+05	1.4E+03	9.7E+05	6.4E+05	1.4E+05
04/2014	0.5 U	6.5	520	6.8	0.93 J	150	1 U	55	360	0.5 U	3.5	0.5 U	53.3	37.1	0.352 J	2.7		2.5E+04	2.0E+02	1.5E+05	1.3E+03	4.1E+04
08/2014	5 U	890	18000	45	19	3000	36	1800	10000	5 U	37	5 U	291	325	0.156 J	32.5		3.1E+04	3.3E+03	1.4E+06	6.2E+03	1.7E+04
12/2014	5 U	38	8300	49	6.2 J	4800	27	3400	6500	5 U	46	5 U	498	110	0.476	20.7	6.45	1.1E+04	8.6E+02	3.4E+05	6.2E+03	7.8E+03
03/2015	0.5 U	3.6	1800	55	1.5	4500	25	3700	6100	0.5 U	55	3.8	446	43.2	4.44	10		2.3E+04	5.7E+03	3.8E+06	6.9E+04	2.0E+05
10/2015	5 U	30	8100	77	5 U	6700	66	5600	6200	5 U	48	5 U	561		0.232 J		6.59					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 6S**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	16 U	28 J	10000	170	16 J	1400	13	59	1200	16 U	20 U	20 U	1400	244	104	1.3	5.59					
08/2011	25 U	22 J	8000	340	8.4 J	11000	30	630	4600	25 U	16 J	25 U	385	122	0.719	36.9	6.6					
11/2011	25 U	9.7 J	2700	270	25 U	3400	77	3900	8000	25 U	15 J	25 U	177	190	4.63	13.4	6.66					
03/2012	25 U	25 U	4300	220	8.2 J	3800	77	920	8700	25 U	8.4 J	25 U	48.3	372	29.6	0.35	6.58					
06/2012	8 U	10 U	3900	200	8 U	3100	78	510	11000	8 UJ	10 U	10 U	47.9	173 J	38.5	0.31	6.18					
09/2012	8 U	10 U	1500	88	8 U	2700	74	320	7900	8 U	10 U	10 U	56.3	140 J	35.7	0.26	6.76					
12/2012	1.6 UJ	4.1 J	3300	94	6.5 J	2400	68	360	10000	1.6 U	6.3 J	2 UJ	48.2	209	29.1	0.35	6.49					
04/2013	8 U	10 U	3300	110	8 U	1900	45	450	11000	8 U	10 U	10 U	39.8	184 J	27.8	0.68	6.38					
07/2013	0.8 U	2.1 J	1600	110	4 J	1600	22	220	6800	0.8 U	3.7 J	1 U	50.5	85.5	36.9	0.22	6.8					
10/2013	1.6 U	2 U	1000	57	1.9 J	1100	15	110	7400	1.6 U	2 U	2 U	55.8	88.2	32.3	0.25	6.37					
12/2013	1.6 U	4.5 J	2400	82	6.6 J	990	72	370	11000	1.6 U	4.1 J	2 U	45.7	137	27.5	0.32						
04/2014	0.5 U	14	8600	140	13	3600	110	520	11000	0.5 U	8.4	0.5 U	28.8	337	15.5	2.3	6.67					
08/2014	1 U	3.8	3300	93	5.5	1300	32 J	140 J	11000 J	1 U	3	1 U	42.9	134	24	0.22	6.19					
12/2014	0.5 U	2.1	1200	51	3.9	620	25 J	140 J	7600 J	0.5 U	2.4	0.5 U	39.9	113	34.5	0.14 J	6.39					
03/2015	0.5 UJ	2.6 J	400 J	12 J	1.2 J	160 J	30	60	15000	0.5 UJ	0.85 J	0.5 UJ	30.1	195	10.8	0.8	7.15					
10/2015	0.5 UJ	0.85 J	480 J	29 J	0.72 J	250 J	9	87	10000	0.5 UJ	1.9 J	0.5 UJ	32.7		0.423		6.45					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 7D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	950 J	160000	27000	5000 U	5000 U	860 J	7.2	18	80	5000 U	5000 U	5000 U	8.94	1170								
07/2008	5000 UJ	5000 UJ	120000 J	5000 UJ	5000 UJ	940 J	7.4 J	37 J	76 J	5000 UJ	5000 UJ	5000 UJ	417 J	984 J								
09/2008	5000 U	2300 J	100000	840 J	280 J	1700 J	7.5	13	59	5000 U	5000 U	5000 U	531	724								
10/2008																						
12/2008	1000 U	2400	84000	400 J	110 J	2600	7.8 J	6.3 J	230 J	1000 U	66 J	1000 U	476	72.3								
06/2009	2500 U	2600	50000	2500 U	2500 U	6300 J	9.9	120	2900	2500 U	2500 U	2500 U	483	42.4	0.0703 J	268						
10/2009	57 J	4500 J	58000	180 J	140 J	3900	10 U	420	4600 J	500 U	150 J	500 U	506	86.2	0.0461 J	178						
07/2010	24 J	1600	27000	63	66	790	33 U	150	7200	8 U	75	10 U	255	413	0.0522 U	195						
06/2011	270 J	45000	57000	120 J	150 J	1500	6.2 J	28 J	1600 J	89 J	100 U	100 U	58.1	1640	0.0354 J	155	6.8					
08/2011	150	19000	26000	48 J	61 J	530	15	57	1300	25 J	36 J	100 U	79.9	1890 J	0.0629 J	214	7.56					
11/2011	290	25000	32000	72 J	83 J	1400	11	160	4200	46 J	54 J	250 U	118	842 J	0.0461 J	168	5.99					
03/2012	180	15000	19000	42 J	43 J	890	17	270	4000	60 J	42 J	100 U	29.4	1020 J	0.0203 J	284	7.17					
06/2012	350	25000	31000	52 J	91 J	520	11	87	2600	270	77 J	50 UJ	25.5	950	0.0333 U	184	7.31					
09/2012	460	27000	32000	51 J	85 J	900	20	170	2900	260	81 J	25 U	29.1	358 J	0.0333 U	73.2	6.88					
12/2012	49 J	1200	51000	56 J	40 U	650	15	280	3900	78 J	120 J	50 UJ	689	965	0.13 J	293	5.95					
04/2013	68	840	28000	58	35 J	1000	32	430	4400	140	190	10 U	60.5	1300	0.0333 U	249	7.41					
07/2013	63 J	1400	21000	70 J	40 U	1300	34	340	4700	49 J	100 J	50 U	36.7	1150	0.043 U	220	7.34					
10/2013	86 J	830	31000	76 J	40 U	1800	30	400	8400	58 J	93 J	50 U	63.6	293	0.043 U	219	6.76					
12/2013	42 J	490	40000	66	49 J	1100	27	300	6200	89	270	10 U	72.9	927	0.043 U	228	6.99					
04/2014	60 J	1500	50000	94 J	76 J	2100	55	450	7100	50 U	69 J	50 U	81.3	1750	0.043 U	136	7.12					
08/2014	50 U	290	53000	110	65 J	2400	41	380	8000	50 U	92 J	50 U	88.9	990	0.0334 U	168	6.82					
12/2014	25	450	34000	72	39	2400	27	410	8800	13 J	64	10 U	50.7	1170	0.056 J	161	6.86					
04/2015	20 J	250	33000	95	45	8100	31	1000	8900	10 U	50	10 U	52.8	643	0.0484 J	133	5.34					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 7D PUMP

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCEr (cells/ml)	VCR (cells/ml)
06/2009	2500 U	3500	86000	220 J	2500 U	6600	10 UJ	30 J	640 J	2500 U	180 J	2500 U										

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 7D SNAP

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2009	2500 U	3600	73000	190 J	2500 U	3000	10 UJ	29 J	590 J	2500 U	130 J	2500 U										

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 7S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
07/2011	0.8 U	1 U	2 J	0.8 U	0.8 U	14	1.2 J	2.8 J	52 J	0.8 U	9.2	1 U	6.9	4820	3.14	0.054 U	6.53					
08/2011	5 U	5 U	13	5 U	5 U	11	5 U	1.2 J	18	5 U	140	5 U	7.6	4530	0.45	0.16 U	5.68					
11/2011	5 U	5 U	3 J	5 U	5 U	14	2 J	4.7 J	85	5 U	41	5 U	6	3840	3.17	0.16 U	6.66					
03/2012	5 U	5 U	11	5 U	5 U	1.7 J	5 U	5 U	7.4 J	5 U	84	5 U	6.3	3990	0.0784 J	0.16 U	0					
06/2012	0.8 U	1 U	3.7 J	0.8 U	0.8 U	2.8 J	1 U	1 U	10 J	0.8 UJ	54	1 U	6.3	4090 J	0.473	0.054 U	6.46					
09/2012	0.8 U	1 U	3.7 J	0.8 U	0.8 U	11	1 J	1 U	47	0.8 U	60	1 U	5.1	3900	0.607	0.054 U	6.77					
12/2012	0.8 U	1 U	9.8	0.8 U	0.8 U	1 U	1 U	1 U	4.9 J	0.8 U	150	1 U	3.5	2620	0.306	0.054 U	6.47					
04/2013	0.8 U	1 U	3.7 J	0.8 U	0.8 U	4.3 J	1 U	1.7 J	24 J	0.8 U	49	1 U	4	3300	0.621	0.054 U						
07/2013	0.8 U	1 U	5	0.8 U	0.8 U	1.3 J	1 U	1 U	6.9	0.8 U	78	1 U	4.5	3060	1.36	0.054 U	6.81					
10/2013	0.8 U	1 U	6.6	0.8 U	0.8 U	1.8 J	1 U	1 U	9.1	0.8 U	99	1 U	4.3	2900	0.594	0.054 U	6.55					
12/2013	0.8 U	1 U	4.9 J	0.8 U	0.8 U	1.2 J	1 U	1 U	3.9 J	0.8 U	83	1 U	5.3	2120	2.76	0.054 U						
04/2014	0.5 U	0.5 U	2	0.5 U	0.5 U	1.4	1 U	1 U	5.9	0.5 U	45	0.5 U	4	1140	0.043 U	0.054 U						
08/2014	0.5 U	0.5 U	5.6	0.5 U	0.5 U	1.6	1 U	1 U	4.3 J	0.5 U	120	2.1	16.7	1180	2.35	0.054 U						
12/2014	0.5 U	0.5 U	3.4	0.5 U	0.5 U	2.8	1 U	1 U	5.7	0.5 U	78	1.1	4.9	1010	0.0418 J	0.054 U	6.8					
03/2015	0.5 U	0.5 U	2.2	0.5 U	0.5 U	1.9	1 U	1 U	10	0.5 UJ	51	0.5 U	3.6	1590	0.166 J	0.054 U						
10/2015	0.5 U	0.5 U	5.1	0.5 U	0.5 U	10	1.1 J	2.4 J	61	0.5 U	76	0.5 U	4.5		0.963		6.72					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 8D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	1200 J	240000	28000	5000 U	5000 U	1100 J	5.1	17	78	5000 U	5000 U	5000 U	10.6	1590								
07/2008	1000 U	2900 J	110000	300 J	240 J	1500 J	7.2	29	100	1000 U	1000 U	1000 U	551	1810								
09/2008	240 J	34000	76000	420 J	200 J	2100	5.9	16	92	2500 U	2500 U	2500 U	190	2410								
12/2008	600 J	66000	48000	310 J	95 J	2300	6.2	2.0	4.6	1300 U	1300 U	1300 U	263	1210								
06/2009	400 J	26000	21000	1000 U	1000 U	1200	8.0	39	400	1000 U	1000 U	1000 U	166	1810	0.0567 J	191						
10/2009	260 J	35000	54000 J	150 J	130 J	1900	6.1	32	100	1000 U	1000 U	1000 U	101	2110	0.0317 U	132						
07/2010	200	45000	48000	120	98 J	1500	7.1	89	74	16 U	32 J	20 U	105	2300 J	0.0522 U	170						
08/2011	170	27000	31000	82 J	77 J	2000	5.1	37	180	17 J	23 J	100 U	70.7	1720	0.2 U	249	7.03					
03/2012	400 J	24000	20000	73	74	1800 J	8.9	93	1800	110	45	5 U	57.1	1740	0.2 U	186	6.86					
06/2012	240	18000	15000	46 J	45 J	1000	6.6	82	1400	470 J	39 J	20 U	28.4	1700 J	0.0333 U	131	6.95					
09/2012	170	12000	19000	67	63	1900	17	210	2100	120	30 J	10 U	38.4	1650	0.0333 U	148	6.97					
12/2012	52 J	1600	15000	51 J	40 J	1900	9.4	190	2800	16 U	20 U	20 U	299	1480	0.0333 U	258	6.06					
04/2013	33	3400	31000	73	43	1800	6	97	2700	18	34	2 U	209	1510	0.0333 U	247	6.93					
07/2013	40 U	4600	33000	79 J	40 U	2300	8.3	130	1800	40 U	50 U	50 U	117	1790	0.043 U	157	6.65					
10/2013	52 J	9900	44000	40 U	40 U	3000	19	350	3000	40 U	50 U	50 U	129	1230	0.043 U	190	6.23					
12/2013	80 J	19000	50000	95 J	72 J	2700	24	310	3700	40 U	50 U	50 U	194	1340	0.043 U	126	6.65					
04/2014	26 J	3500	35000	79	43	2800	29	370	6400	10 U	23	10 U	117	986	0.0866 J	121	6.67					
08/2014	10 U	1800	23000	65	38	3100	19	270	3200	10 U	20	10 U	52.9	2010	0.0334 U	142	6.93					
12/2014	25 U	5100	39000	99	66	4200	17	630	3300	25 U	29 J	25 U	76.4	1860	0.0334 U	153	7.36					
04/2015	29 J	7100	37000	85	51	3800	28	590	5800	25 U	26 J	25 U	39.1	859	0.0334 U	148	7.6					
10/2015	50 U	7000	34000	91 J	50 U	3400	9.4	400	2700	50 U	50 U	50 U	93.8		0.0333 U		7.01					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 8S**

			Cis-1,2- DCE	Trans- 1,2- DCE	1,1- DCE	Vinyl chloride	Ethane	Ethene	Methane	1,1,1- Trichloro ethane	1,1- Dichloro- ethane	Chloro ethane	TOC	Sulfate	Iron	Sulfide	pH	BVC	DHBt	DHC	TCer	VCR
Date	(PCE) (ug/L)	(TCE) (ug/L)	(ug/L)		(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(s.u.)	(cells/ml)	(cells/ml)	(cells/ml)	(cells/ml)	(cells/ml)
06/2011	4 U	21 J	1800	13 J	18 J	140	2.3 J	6.6	86	260	110	5 U	608	1330 J	19.1	2.5	6.42					
08/2011	2.3 J	67	3500	18	16	380	2.6 J	23	310	240	89	13 U	291	1480 J	0.379	74.2	6.7					
11/2011	5 U	9.7	870	14	4.6 J	320	8.3	300	2300	83	67	4.8 J	41.3	1080	0.158 J	24.8	6.25					
03/2012	5 U	3.6 J	93	6.6	5 U	85	17	210	3300	24	27	3.2 J	16.7	1770	0.986	21.7	6.82					
06/2012	0.8 U	1 U	45	6.7	0.8 U	48	11	280	2500	25 J	29	1.5 J	16.6	2210 J	0.652	15.1	6.43					
09/2012	0.8 U	1.2 J	28	6.6	0.8 U	52	19	340	4100	24	30	14	52.4	823	0.68	22.9	6.76					
12/2012	0.8 U	4.4 J	310	4.5 J	1.6 J	210	13	160	5800	26	22	2.2 J	11	1460	3.6	8.6	6.56					
04/2013	0.8 U	2 J	63	1.6 J	0.8 U	150	18	280	4000 J	14	13	4.9 J	7.8	1670	3.5	13.6	6.61					
07/2013	0.8 U	3.3 J	150	2.2 J	0.8 U	200	17	320	5200	9.2	12	1.4 J	9.6	1790	1.7	15.6	6.8					
10/2013	0.8 U	2.6 J	60	2.7 J	0.8 U	89	11	130	11000	8.3	12	2.6 J	10.4	1110	2	17	6.59					
12/2013	0.8 U	4.1 J	39	3.8 J	0.8 U	50	24	310	12000	15	14	1.7 J	16.3	1100	0.953	16.5	6.78					
04/2014	0.5 U	1.7	12	0.72 J	0.5 U	12	13	32	4600	2.9	2.7	0.5 U	6.6	301	2.41	0.17	6.55					
08/2014	0.5 U	2.5	540	5.5	1.4	400	24	280	8400	5.5	6.2	0.5 U	13.9	503	0.0996 J	25.7						
12/2014	0.5 U	0.5 U	4.2	0.5 U	0.5 U	2.3	1 U	3.5 J	320	0.5 U	0.65 J	0.5 U	5.2	204	0.318 J	0.054 U	6.99					
03/2015	0.5 U	1.3	63	1.5	0.5 U	57	9.2	22	2700 J	3.8	3	0.5 U	10.1	356	0.857	0.17	7.95					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW- 9D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	2100	370000	59000	80 U	120 J	450 J	5.1	7.8	42	370 J	100 U	100 U	15.2	1020	0.187 J	4.5	7.08					
08/2011	1900	80000	130000	360 J	270 J	280 J	5.3	5.8	37	1600	500 U	500 U	1170	518 J	1.08	21.3	6.38					
11/2011	1900 J	190000	200000	2500 U	440 J	530 J	4.6 J	14	120	1200 J	2500 U	2500 U	281	249	0.165 J	127	6.41					
03/2012	900 J	150000	170000	220 J	330 J	650 J	8.9	87	850	400 J	1000 U	1000 U	118	361	0.2 U	99.1	6.41					
06/2012	600	77000	86000	120 J	170 J	610	23	110	3500	790 J	100 U	100 U	61.7	267 J	0.0333 U	124	6.8					
09/2012	450 J	67000	120000	200 J	330 J	3500	29	120	1700	120 J	100 U	100 U	109	5.1	0.0333 U	130	6.7					
12/2012	1900	73000	170000	290 J	190 J	810	64	100	820	200 J	100 U	100 UJ	4420	15.8	5.94	87.2	5.91					
04/2013	1000	52000	200000	330	160	1300	45	340	1200	16 U	51 J	20 U	2110	43.3	116	6	6.09					
07/2013	680	51000	190000	180 J	240 J	1700	70	1200	5700	40 U	50 U	50 U	1040	46.4	113	2.6	6.44					
10/2013	400 U	7700	170000	400 U	500 J	18000	70	1600	4900	1500 J	500 U	500 U	830	26.8	153	0.82	6.16					
12/2013	650	75000	160000	210 J	420 J	31000	62	1900	4400	80 UJ	100 U	100 U	381	102	30.9	8.1	6.59					
04/2014	38	1600	47000	120	160	70000	39	3000	3000	10 U	20 J	10 U	397	12.4	123	0.34	7.41					
08/2014	85	16000	110000	160	210	18000	59	3300	8800	25 U	25 U	25 U	160	72.8	1.27	48	6.86					
12/2014	640	47000	90000	100	160	5000	33	11000	12000	50 U	50 U	50 U	255	49.2	17.6	5.1	6.72					
04/2015	270	30000	64000	110	170	10000	28	3600	6100	25 U	25 U	25 U	124	25.7	16.7	8.2	5.07					
10/2015	100 U	12000	76000	100 U	160 J	5400	89	10000	13000	100 U	100 U	100 U	226		69.7		7.52					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW- 9S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	2 U	2000	1200	10 J	5.8 J	84	13	12	130	2 U	2.5 U	2.7 J	4.6 J	3070 J	0.0141 U	0.054 U	6.55	4.8E+00	2.9E+00	1.2E+01	5.0E-01	2.0E-01
08/2011	10 U	2900	1700	14	9.7 J	91	14	9.6	120 J	10 U	10 U	5.7 J	4.9	3450 J	0.0324 J	0.16 U	7.4	2.0E-01	1.2E+02	2.1E+00	5.0E-01	5.0E-01
11/2011	25 U	2800	1800	17 J	9.5 J	66	5.4	2.8 J	30	25 U	25 U	9.1 J	3.4	5 U	0.0898 J	0.16 U	6.51	4.0E-01	1.0E+04	2.0E+01	4.0E-01	1.0E-01
03/2012	25 U	3400	3000	32	11 J	81	4.9 J	2.4 J	26	25 U	25 U	10 J	3.9	3780	0.2 U	0.16 U	6.51	6.8E+00	3.2E+03	1.5E+02	1.1E+01	3.0E-01
06/2012	0.8 U	5100	2700	32	14	93	8.8	7.1	91	1.5 J	1 U	8.4	3.4	3010 J	0.033 J	0.054 U	6.75	1.0E+00	1.2E+02	4.1E+02	3.9E+01	1.8E+00
09/2012	1.6 U	2400	1300	15	5.3 J	49	6	10	88	1.6 U	2 U	2 U	4.7	3380	0.262	0.054 U	6.48	7.0E-01	5.0E-01	7.0E-01	7.0E-01	7.0E-01
12/2012	8 U	4100	6500	62	12 J	12 J	2 J	1 U	3 U	8 U	10 U	10 U	4.6	3420	0.0839 J	0.054 U	7.07	5.0E-01	3.2E+01	2.8E+00	5.0E-01	5.0E-01
04/2013	0.8 U	4700	2500	27	11	49	3.8 J	2.7 J	51	1.6 J	1 U	5.2	2.7	2930	0.0333 U	0.054 U	6.81	1.6E+00	4.9E+01	2.6E+00	4.3E+00	5.0E-01
07/2013	4 U	5400	2500	21 J	8.9 J	40	3.1 J	2.3 J	53	4 UJ	5 U	5 U	2.7	3310	0.043 U	0.054 U	6.87	5.0E-01	8.1E+01	5.4E+00	4.7E+00	5.0E-01
10/2013	4 U	5700	3800	32	9.9 J	42	4.8 J	3.1 J	79	4 U	5 U	5 U	3.2	2870	0.043 U	0.054 U	6.63	5.0E-01	2.4E+01	2.3E+00	9.0E-01	5.0E-01
12/2013	8 U	3900	2100	18 J	8 U	30 J	3.5 J	1.7 J	43	8 U	10 U	10 U	5	1990 J	0.0943 J	0.054 U	6.84	1.1E+02	3.8E+01	3.3E+02	3.0E+02	1.1E+00
04/2014	5 U	4000	1700	14	6.5 J	43	6.9	4.5 J	140	5 U	5 U	5 U	5.1	2610	0.043 U	0.054 U	6.87	3.0E-01	6.0E+01	1.5E+00	1.0E-01	4.0E-01
08/2014	5 U	5000	8900	85	13	110	13	13	720	5 U	5 U	5 U	6	2630	0.0462 J	0.054 U	6.58	1.7E+00	4.5E+01	9.9E+01	8.0E-01	2.0E-01
12/2014	2.5 U	4200	4200	30	8.3	52	5.5	4.6 J	120	2.5 U	2.5 U	2.5 U	4.6	1450	0.0462 J	0.054 U	6.78	5.0E-01	1.2E+02	8.6E+01	6.0E-01	1.0E-01
03/2015	0.5 U	2300	2900	34	7.6	49	5.8	3.5 J	270 J	0.5 U	0.5 U	0.91 J	2.4	1870	0.0334 U	0.054 U	7.1	3.1E+00	4.7E+01	8.0E+01	5.9E-01	7.0E-01
10/2015	5 U	5800	4200	31	11	110	5.9	9	91	5 U	5 U	5 U	2.6		0.055 J		6.65					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-10D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	170	5400	7300	15 J	82	260 J	1.3 J	12	48	1500	94	10 U	6.8	913	0.434	0.74	7.43					
08/2011	670	38000 J	12000	250 U	47 J	70 J	8.8	3.8 J	40	3300	250 U	250 U	7190	333 J	6.52	43.4	5.93					
11/2011	59	5700	14000	28 J	39 J	100	18	16	45	1700	120	50 U	637	42.3	12.2	110	6.2					
03/2012	68	12000	28000	47 J	53	220	33	75	170	410	190	50 U	648	44	52.1	30.9	5.87					
06/2012	40 U	750	30000	42 J	83 J	210 J	27	120	810	250	240 J	50 UJ	450	53.8	69.5	4.8	6.09					
09/2012	18 J	1200	22000	26 J	49 J	330	24	91	2000	170	180	20 U	310	28.6	51.4 J	2.8	6.39					
12/2012	350 J	52000	190000	160 U	160 U	520 J	9.1	35	980	370 J	200 U	200 UJ	878	6.7	42.4	4.7	5.79					
04/2013	170 J	7600	140000	160 U	210 J	3300	15	280	1200	380 J	260 J	200 U	652	22.9	124	7.9	5.98					
07/2013	21 J	860	91000	90 J	120	3400	12	360	2800	220	210	20 U	414	4.1 J	50.4	13.3	6.42					
10/2013	160 U	740 J	99000	160 U	190 J	23000	24	1700	7700	160 U	230 J	200 U	520	2.3 J	141	3.5	6.02					
12/2013	80 U	3100	87000	91 J	170 J	17000	18	2000	5600	160 J	240 J	100 U	452	19.1	63.2	11	6.21					
04/2014	10 U	360	37000	63	59	14000	27	8300	11000	68	150	10 U	325	1.5 U	82	1.8	7.03					
08/2014	50 U	800	87000	110	150	15000	28	6500	8300	160	360	50 U	434	7.7	13.1	11.2	6.37					
12/2014	25 U	3200	76000	95	110	11000	19	5600	9800	190	340	25 U	436	20	5.55	35.2	6.55					
04/2015	11 J	960	32000	55	49	7700	20	8900	8000	85	190	10 U	262	6.8	6.69	15.9	6.95					
10/2015	24	1100	30000	61	44	2500	23	12000	8500	180	370	1 U	387		19.6		7.23					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-10S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	0.8 U	1 U	1.5 J	0.8 U	0.8 U	23	1.8 J	1.1 J	19	0.8 U	1 U	1 U	6.2 J	2980 J	0.0776 J	0.054 U	6.06	5.0E-01	3.3E+01	4.6E+00	5.0E-01	7.0E-01
08/2011	5 U	5 U	5 U	5 U	5 U	1.9 J	5 U	5 U	6 J	5 U	5 U	5 U	5.5	3550 J	0.152 J	0.16 U	6.73	5.0E-01	3.3E+02	1.9E+00	3.0E-01	3.0E-01
11/2011	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	6.4 J	5 U	5 U	5 U	2.7	3080	0.245	0.16 U	7.04	7.0E-01	1.2E+02	7.0E-01	7.0E-01	7.0E-01
03/2012	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2 J	5 U	5 U	5 U	2.5	3150	0.2 U	0.16 U	6.94	5.8E+00	4.2E+01	1.6E+01	5.0E-01	5.0E+00
06/2012	0.8 U	1 U	0.8 U	0.8 U	0.8 U	2.7 J	1 U	1 U	13 J	0.8 U	1 U	1 U	2.4	2820	0.0333 U	0.054 U	6.87	5.0E-01	3.8E+01	1.9E+00	5.0E-01	2.0E-01
09/2012	0.8 U	2.6 J	1.7 J	0.8 U	0.8 U	1 U	1 U	1 U	6.8 J	0.8 U	1 U	1 U	2.8	2980	0.0333 U	0.054 U		5.0E-01	1.6E+01	3.3E+00	1.0E+00	5.0E-01
12/2012	0.8 U	1.4 J	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	3 U	0.8 U	1 U	1 U	2.6	2930	0.0333 U	0.054 U	7.15	5.0E-01	3.3E+00	5.0E-01	5.0E-01	5.0E-01
04/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	3.2 J	1 J	1 U	44	0.8 U	1 U	1 U	2	2770	0.0333 U	0.054 U		5.0E-01	1.9E+02	4.1E+00	5.0E-01	5.0E-01
07/2013	0.8 U	7.6	0.96 J	0.8 U	0.8 U	1.3 J	1 U	1 U	7.6	0.8 UJ	1 U	1 U	1.9	2840	0.043 U	0.054 U	7	5.0E-01	2.4E+00	4.5E+00	4.2E+00	5.0E-01
10/2013	0.8 U	1.3 J	0.8 U	0.8 U	0.8 U	4.3 J	1.4 J	1 U	72	0.8 U	1 U	1 U	2.8	2710	0.043 U	0.054 U		5.0E-01	1.1E+01	2.6E+00	8.0E-01	5.0E-01
12/2013	0.8 U	1 U	0.8 U	0.8 U	0.8 U	4.2 J	1.3 J	1 U	50	0.8 U	1 U	1 U	5.3	2550 J	0.043 U	0.054 U		8.0E-01	4.0E+00	6.3E+00	4.7E+00	1.0E-01
04/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.9	1 U	1 U	33	0.5 U	0.5 U	0.5 U	3.8	2690	0.043 U	0.054 U	6.53	2.2E+00	8.2E+00	4.1E+00	1.0E-01	2.0E-01
08/2014	0.5 U	0.87 J	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	3 U	0.5 U	0.5 U	0.5 U	3.2	2190	0.0334 U	0.054 U	6.98	1.9E+00	1.2E+03	3.8E+01	7.0E-01	1.0E-01
12/2014	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.8	1 U	1 U	18	0.5 U	0.5 U	0.5 U	1.3	2760	0.0334 U	0.054 U		1.1E+00	4.1E+01	1.3E+01	3.0E-01	5.0E-01
03/2015	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	3	1 U	1.1 J	20	0.5 U	0.5 U	0.5 U	1.9	2180	0.0334 U	0.054 U		3.0E+00	1.3E+01	6.9E+01	1.0E-01	6.0E-01

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-11D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	560	11000	2200	40 U	1000	78 J	2.3 J	2.5 J	16	78000	680	50 U	3.5	797 J	0.445	0.67	6.67	6.9E+01	1.8E+01	3.7E+01	3.3E+00	3.1E+00
08/2011	500	7600	2400	250 U	490	250 U	5 U	5 U	8.3 J	48000	270	250 U	11	833 J	0.495	10	5.36	2.7E+01	1.4E+03	7.1E+02	1.2E+02	1.2E+02
11/2011	46 J	570	1800	50 U	45 J	56	9	1.7 J	25	6600	110	50 U	129	425	0.562	39.1	6.65	1.1E+02	3.9E+03	5.7E+02	4.2E+02	2.6E+02
03/2012	200 J	4000	7200	250 U	400	64 J	47	7.8	79	46000	680	250 U	115	583 J	12.9	11.7	5.45	2.8E+02	2.0E+03	1.5E+03	1.2E+02	1.1E+03
06/2012	330	3200	6700	23 J	620	29	21	2.9 J	19	74000 J	520	5 U	26	896 J	3.62	12	6.31	8.6E+01	1.6E+03	7.1E+02	2.0E+01	2.2E+03
09/2012	440	2400	3600	15	310	11	7.4	1 U	9.3 J	43000	310	2 U	8.6	542	0.692	5.2	6.72	5.3E+00	1.7E+02	3.1E+01	2.1E+00	3.0E+01
12/2012	81 J	1300	7100	22 J	960	64 J	19	3.8 J	35	29000	460	20 U	268	309	0.26	73.9	6.3	4.8E+00	1.1E+01	1.1E+02	1.3E+02	1.5E+01
04/2013	120	670	5800	31	1900	240	4.1 J	18	190	32000	470	5 U	32.6	520	0.753	34.9	6.73	1.9E+03	1.6E+03	3.3E+02	1.9E+02	2.5E+01
07/2013	110	760	8200	31 J	370	1000	15	48	470	30000	800	10 U	21.6	409	0.215	63.6	7.12	7.1E+02	2.3E+02	1.3E+03	7.0E+02	7.7E+02
10/2013	83 J	480	5600	20 J	240	700	6.7	25	260	22000	480	20 U	9.9	492	0.254 J	33.2	6.65	4.3E+04	1.8E+03	9.9E+04	4.2E+04	5.5E+01
12/2013	130 J	650	3300	40 U	170 J	370	5.5	16	190	15000	360	50 U	11.6	532 J	0.163 J	22.1	7.2	1.1E+05	1.7E+03	2.8E+05	2.8E+05	2.0E+03
04/2014	79	330	2800	10	310	180	3.5 J	11	120	14000	310	5 U	7.5	630	0.194 J	11.9	7.21	7.1E+04	7.5E+02	2.9E+05	2.0E+03	3.5E+04
08/2014	54	340	5100	22	340	570	5.7	39	410	17000	800	10 U	11.3	472	0.0829 J	70.4	7.02	2.1E+05	3.0E+03	7.6E+05	9.1E+03	4.7E+04
12/2014	40	180	3800	15	340	450	2.8 J	27	230	13000	530	2.5 U	4.8	498	0.144 J	40.7	7.02	3.3E+04	1.4E+03	7.2E+04	1.6E+03	1.1E+03
03/2015	26	130	2600	14	180	300	17	13	480	6600	730	1.7	60.6	245	0.177 J	27.3	6.83	2.3E+04	1.2E+03	6.2E+04	1.4E+03	1.9E+03
10/2015	46	300	3700	15	340	360	8.2	33	490	15000	680	1 U	9.8		0.129 J		7.43					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-11S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	0.8 U	320	11000	210	31	2300 J	19	110	150	1.7 J	42	1 U	5.2	2230	0.0568 J	0.054 U	6.94					
08/2011	50 U	270	17000	210	38 J	3600	29	140	280	50 U	38 J	50 U	4.9	2110	0.356	0.16 U	6.66					
11/2011	50 U	170	8600	140	18 J	760	21	59	160	50 U	32 J	50 U	2.3	2330	0.0367 J	0.16 U	6.77					
03/2012	100 U	170	9100	170	27 J	2000	25	100	1900	100 U	41 J	100 U	2.2	1800 J	0.11 J	0.16 U	6.32					
06/2012	4 U	320	13000	230	32	2600	32	170	1800	4 UJ	47	5 U	2.1	1880	0.27	0.054 U	6.95					
09/2012	16 U	390	17000	270	42 J	3600	40	300	1100	16 U	46 J	20 U	1.9	1960 J	0.814	0.054 U	6.84					
12/2012	8 U	340	16000	220	31 J	2400	27	180	1200	8 U	43 J	10 U	2	1960	0.552	0.054 U	6.67					
04/2013	4 U	310	15000	220	33	3100	40	390	5000	4 U	42	5 U	2.5	1650	0.714	0.054 U	7.01					
07/2013	8 U	230	12000	200	25 J	2200	26	220	5700	8 U	36 J	10 U	2.7	1470	0.593	0.054 U	6.63					
10/2013	20 U	250	16000	210	33 J	3000	43	400	2500	20 U	42 J	25 U	2.7	1690	1.08	0.054 U	6.51					
12/2013	8 U	170	12000	180	27 J	2100	30	210	3500	8 U	38 J	10 U	4.3	1850	0.768	0.054 U	6.48					
04/2014	2.5 U	220	10000	170	28	2200	32	280	4300	2.5 U	30	2.5 U	8.2	1450	0.926	0.054 U	6.45					
08/2014	5 U	230	15000	220	31	2900	35	270	5000	5 U	41	5 U	3.3	1610	1.36	0.054 U	6.82					
12/2014	0.5 U	290	13000	260	37	2300	35	270	4100	1.1	48	0.5 U	4.8	1830	1.19	0.054 U	6.59					
03/2015	2.5 U	130	9700	150	18	1800	24	110	4200 J	2.5 U	29	2.5 U	2.6	1720	0.355 J	0.054 U	7.42					
10/2015	10 U	75	7700	130	16 J	2700	26	420	4400	10 U	35	10 U	3.8		3.1		6.35					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-12D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	2900	29000	19000	160 U	460 J	740 J	9.7	41	85	660 J	200 U	200 U	47.7	792	2.25	16.2	7.6					
08/2011	6000	270000	95000	120 J	260 J	950	140 J	1900 J	180 J	140 J	500 U	500 U	818	645	22.7	1.8	6.6					
11/2011	1800 J	140000	250000	2500 U	570 J	910 J	100	1100	180	2500 U	2500 U	2500 U	242	780	26.1	3.6	6.88					
03/2012	2500 U	2500 U	370000	2500 U	1100 J	2500 U	49	210	86	2500 U	2500 U	2500 U	221	459 J	85.1	0.079 J	7.04					
06/2012	160 U	850 J	350000	160 U	910 J	210 J	38	140	110	160 U	200 U	200 U	169	291	59.8	0.054 U	7.17					
09/2012	190 J	5600	250000	160 U	600 J	280 J	36	120	120	200 J	200 U	200 U	87.8	6.5 J	1.65	16.2	7.67					
12/2012	380	1100	98000	140 J	92 J	460	28	77	210	76 J	90 J	50 UJ	3900	3.9 J	120	6.3	5.18					
04/2013	35	1300	19000	53 J	14	120	6.9	8.9	21	8.6 J	16	2.7 J	92.3	4.9 J	17.6	0.054 U	5.91					
07/2013	160 U	1600	230000	160 U	340 J	4800	46	440	2100	160 U	200 U	200 U	1150	9.4	166	3	6.31					
10/2013	160 U	6600	160000	160 U	300 J	33000	33	1200	1900	160 U	200 J	200 U	1200	16.1	278	0.53	5.79					
12/2013	80 U	5100	200000	160 J	470 J	40000	35	2200	2700	80 U	160 J	100 U	799	14.1	158	2.3	6.6					
04/2014	52 J	3800	82000	130	180	70000	28	5100	2400	50 U	99 J	50 U	526	5.2	184	0.65	7.06					
08/2014	150 J	19000	120000	230	260	40000	41	12000	7200	100 U	100 J	100 U	395	10.2	25.9	14.6	6.35					
12/2014	250 U	36000	150000	250 U	260 J	16000	28	8000	7200	250 U	250 U	250 U	270	69.1	2.23	38.4	6.35					
04/2015	350	61000	140000	220	330	17000	19	6800	5900	50 U	72 J	50 U	207	11.8	16.7	12.8	6.26					
10/2015	240	43000	120000	220	190	18000	1 U	12000	8700	17	75	1 U	480		6.83		6.64					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW-13D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	950 J	100000	18000	160 U	160 U	500 J	1.5 J	17	66	1100	200 U	200 U	8.9	959	1.11	5.7	7.08					
08/2011	85 J	5700	45000	81 J	98 J	110 J	4.8 J	7.9	40	1300	81 J	250 U	953	143	2.45	127	6.02					
11/2011	2100	170000	73000	110 J	250 J	240 J	24	19	29	750	120 J	500 U	4320	139	157	20.8	5.56					
03/2012	1100	190000	99000	140 J	270 J	180 J	15	43	46	470 J	140 J	500 U	360	179 J	8.13	115	5.48					
06/2012	370	38000	30000	60 J	150 J	100 J	37	230	37	350	99 J	50 U	618	104	69.5	10.6	6.12					
09/2012	570	66000	110000	80 U	480 J	350 J	49	380	80	80 U	120 J	100 U	367	87.3 J	20.1	35.1	6.13					
12/2012	3200	280000	120000	80 U	240 J	340 J	14	33	120	280 J	160 J	100 UJ	12.5 U	93	7.17	69.3	5.78					
04/2013	590 J	85000	120000	400 U	400 U	520 J	40	200	160	400 U	500 U	500 U	1500	46.4 J	266	2.7	6.21					
07/2013	720 J	90000	210000	160 U	440 J	2800	55	330	950	160 U	290 J	200 U	1020	45.3	238	1.6	6.31					
10/2013	780 J	98000	250000	400 U	760 J	6400	69	560	1000	400 U	500 U	500 U	715	59.1	134	6.4	5.87					
12/2013	850	130000	230000	100 J	700	25000	57	640	1600	210 J	400 J	100 U	578	73.9	49.5	23.5	6.17					
04/2014	150 J	11000	68000	100 U	310	8600	7.9	280	720	100 U	100 U	100 U	179	33.1	11.3	18.3	6.55					
08/2014	55 J	8900	82000	83 J	280	15000	24	3900	7000	82 J	130	50 U	304	13.7	14.7	15.5	6.38					
12/2014	100 U	16000	120000	110 J	220	14000	18	4600	11000	100 U	130 J	100 U	314	20.3	22.8	11.9	6.13					
03/2015	76 J	16000	84000	85 J	220	16000	14	5700	9000	100	120	50 U	252	22.1	8.38	11	5.97					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW-14D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	190	7900	12000	16 J	120	240 J	4.2 J	14	57	3300	150	5 U	4.7	885	2.93	0.43	8.02					
08/2011	72	1800	13000	36 J	22 J	64	6.7	5 U	23	2000	80	50 U	826	227	1.37	124	6.15					
11/2011	670	5400	29000	99 J	170	540	76	12	30	3500	340	100 U	2950	40.7 J	1.85	134	5.35					
03/2012	40 J	4700 J	25000 J	39 J	62 J	530 J	38 J	170 J	91 J	560 J	310 J	25 UJ	1740	26.6 J	77.5	50.1	5.54					
06/2012	80 U	19000	57000	80 U	110 J	580	29	140	94	270 J	440 J	100 U	987	55.3 J	55.6	30.3	5.63					
09/2012	85 J	23000	65000	82 J	180 J	800	34	310	160	240 J	480	50 U	826	21.8	52.3	65.4	5.57					
11/2012													556									
12/2012	130 J	14000	74000	72 J	89 J	570	7.8	83	230 J	500	420	50 U	1470	76.9	6.84	79.9	5.9					
04/2013	99 J	2100	95000	80 U	130 J	1100	14	460	1700	740	770	100 U	765	11.7 J	16.6	72.7	5.95					
07/2013	80 U	1000	74000	80 U	80 U	1100	12	300	4400	300 J	730	100 U	838	2.7 J	43	88.6	5.88					
10/2013	80 U	670	75000	80 U	120 J	1500	22	830	7700	1300	1100	100 U	719	1.7 J	73.1	23.7	5.93					
12/2013	80 U	2500	57000	87 J	140 J	9100	37	4100	22000	2100	1300	100 U	600	8.7	38.3	24.5	6.08					
04/2014	86 J	9800	120000	120	210	5600	21	2000	3300	1600	1100	50 U	595	15	6.2	80.4	5.97					
08/2014	5 U	36 J	4200 J	54	6.1 J	2200	62	16000	20000	30	730	5.7 J	788	1.5 U	97.9	3.9	7.37					
12/2014	150	41000	99000	110	140	5800	29	5500	7500	460	740	25 U	493	28.8	4.18	45.6	6.98					
04/2015	74	3400	38000	81	62	6500	37	5400	9300	540	570	25 U	426	5.8	22.6	40.7	6.01					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-15D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	69	2200	7900	17 J	69	210	3.1 J	9.8	59	2400	100	10 U	3.3 J	823 J	1.32 J	0.25 J		2.3E+03	4.1E+01	1.1E+03	6.6E+00	4.0E+01
08/2011	48 J	780	17000	43 J	90 J	370	6.4	6.6	32	4600	530	100 U	563	281	1.08	84.5	5.93	9.5E+02	3.1E+03	3.5E+02	1.3E+02	4.5E+01
11/2011	44 J	1900	15000	47 J	140	510	24	9	44	11000	990	100 U	303	56	21	103	6.27	1.6E+03	1.2E+04	1.3E+03	8.0E+01	5.1E+02
03/2012	12 J	760	5100	30	79	5100	54	45	1300	5000	1100	25 U	307	26.4	11.4	15.8	6.23					
06/2012	48	2900	10000	44	320	1500	19	66	900	49000 J	3000	5 U	134	133 J	0.0574 J	127	6.94	3.6E+05	3.3E+04	1.5E+06	8.1E+03	4.4E+04
09/2012	67	2900	14000	50	530	970	12	22	260	58000	3800	2 U	108	106	0.137 J	153	6.94	5.3E+04	7.4E+03	3.7E+05	2.9E+04	1.5E+05
11/2012													2090									
12/2012	18 J	540	19000	33 J	210	550	3.8 J	10	76	7700	1600	20 U	739	44.3	0.15 J	238	6.24	1.7E+01	2.5E+02	1.1E+02	7.9E+01	1.1E+01
04/2013	60 J	3200	14000	27 J	620	370	17	19	270	48000	3100	20 U	421	139	0.85	125	6.34	3.1E+04	3.8E+04	1.6E+04	4.6E+04	7.8E+02
07/2013	22 J	1100	10000	33	480	4100	280	140	1600	16000	7400	17 J	480	3.2 J	40.8	84.6	7.29	1.2E+05	1.6E+05	7.5E+04	3.6E+05	1.0E+02
10/2013	71	1400	2200	59	200	11000	380	210	1100	10000	9200	29 J	319	3.1 J	33.3	0.58	6.22	3.2E+05	1.7E+04	1.1E+06	9.2E+05	2.4E+01
12/2013	140	840	1800	73 J	150	9700	980	260	820	3400	13000	100	223	3.7 J	1.27	124	6.88	6.8E+04	8.7E+04	2.3E+05	2.1E+05	4.4E+02
04/2014	600	5400	7700	25 U	690	720	32	100	1000	42000	3000	25 U	194	46.5	0.114 J	139		4.4E+04	1.5E+04	1.0E+05	1.5E+03	1.8E+03
08/2014	620	5200	9400	50 U	970	2200	76	210	1900	51000	4000	50 U	158	32.9	0.234 J	139	7.13	4.2E+05	1.5E+04	2.1E+06	3.5E+04	4.7E+03
12/2014	3.3	2.5	5.6	9.7	0.65 J	340	250	850	3700	28	2300	64	36.4	1.5 U	4.87	0.054 U	7.43	5.2E+05	1.7E+04	2.3E+06	4.7E+04	1.9E+04
03/2015	110	470	4500	15	230	2000	230	130	1500 J	4000	5300	32	127	1.5 U	14.3	0.075 J	7.11	9.1E+04	9.2E+03	1.4E+05	6.7E+03	8.5E+02
10/2015	67	550	3100	18 J	230	1100	15	220	6400	10000	1600	10 U	101		0.464		6.55					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-15S

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
03/2012																		8.7E+05	7.8E+03	3.3E+06	7.2E+02	1.4E+04

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: **PMW-16D**

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	610	41000	24000	40 U	140 J	390	1.4 J	13	53	1800	120 J	50 U	7.1	801	0.661	3.4	7.36					
08/2011	70	5200	2100	7.5 J	4.4 J	13 J	2.8 J	5 U	13 J	15 J	25 U	25 U	33.8	39.4	0.054 J	1.1	12.19					
11/2011	110	9900	5700	14 J	13 J	43 J	7.5	1.2 J	27	59	18 J	50 U	80.5	91.5 J	0.0976 J	7.2	12.65					
03/2012	13	110	110	5 U	5 U	3.3 J	5 U	5 U	15	5 U	5 U	5 U	2.5	30.3	0.2 U	0.16 U	10.48					
06/2012	30	1200	3000	9.8 J	7.1 J	530	3 J	7.1	57	39	17 J	5 U	20.9	44.4 J	0.244	2.6	11.59					
09/2012	16	240	220	0.81 J	0.8 U	56	1 U	1 U	10 J	4.8 J	1.2 J	1 U	7.3	27.4 J	0.0333 U	0.28	11.14					
12/2012	130 J	5500	67000	47 J	56 J	470	5.6	45	330 J	770	430	50 U	728	219	0.107 J	182	6.14					
04/2013	160 J	5300	47000	41 J	92 J	1500	11	730	1500	1500	950	50 U	370	28.7	0.988	103	6.29					
07/2013	330 J	12000	64000	80 U	220 J	1000	6.8	170	940	8900	2000	100 U	294	16.5	0.111 J	172	6.34					
10/2013	380	12000	40000	42 J	300	640	5.7	59	290	18000	2000	50 U	183	91.1	0.043 U	191	6.16					
12/2013	430	15000	52000	60 J	320	810	9.9	140	700	15000	1900	20 U	214	32.7	0.043 U	182	6.27					
04/2014	290	23000	87000	88 J	260	2700	15	490	1800	4300	830	50 U	262	17.4	0.822	104	6.48					
08/2014	520	35000	170000	170 J	400	6100	22	810	3200	6300	1200	100 U	347	19.7	0.216 J	132	6.55					
12/2014	350	19000	160000	200 J	350	7200	18	1600	6500	2000	550	100 U	335	7.6	0.373 J	99.3	6.27					
03/2015	510	26000	110000	130	200	4900	32	1600	5900	820 J	460	50 U	214	11	0.593	102	6.03					
10/2015	84	1400	52000	100	160	2800	13	790	4500	1800	660	2.5 U	105		0.116 J		9.04					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: PMW-17D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2011	330	18000	15000	16 U	80 J	210	1.6 J	11	50	1600	100	20 U	3.7 J	775 J	0.445	1.3	6.25	1.6E+03	5.7E+01	4.9E+02	3.9E+00	1.5E+01
08/2011	40 J	780	18000	34 J	110	100	3.4 J	2.2 J	27	7300	130	50 U	193	551 J	0.657	96.9	5.24	1.7E+02	6.9E+03	3.4E+02	1.0E+02	2.3E+02
11/2011	42 J	890	16000	39 J	66 J	130	19	6	53	6900	240	100 U	501	193	9.03	96.9	6.21	2.7E+02	1.9E+03	6.4E+02	3.4E+02	1.8E+02
03/2012	11 J	720	13000	37 J	26 J	120	28	7.5	75	450	330	50 U	335	62.7	22.9	35.4		7.6E+00	2.5E+02	2.8E+01	7.4E+01	2.9E+00
06/2012	190	11000	13000	26	63	140	11	4.7 J	79	3900 J	610	5 U	94.5	201	0.216	157	6.55	7.8E+02	1.6E+03	2.6E+03	2.6E+02	1.6E+03
09/2012	200	6400	6700	17	65	190	9.8	7.6	380	3000	420	1 U	43.8	210	0.0686 J	137	6.89	6.5E+02	2.8E+02	5.3E+03	2.5E+02	2.8E+03
12/2012	97 J	5100	23000	23 J	54 J	280	5.6	6	120	1300	520	20 U	547	21.2	0.178 J	235	6.22	1.5E+01	3.8E+01	4.4E+02	2.7E+02	8.0E+00
04/2013	22 J	370	10000	16 J	93	360	9.1	10	6400	5600	860	10 U	230	21 J	2.43	47.3	6.35	3.4E+04	2.4E+03	1.3E+04	6.8E+04	2.8E+01
07/2013	65	1500	15000	30 J	380	790	12	140	1300	29000	2300	10 U	181	40.4	0.043 U	71	7.86	4.9E+04	4.9E+02	9.3E+04	1.8E+05	2.3E+03
10/2013	5.1	30	100	5.6	6	510	23	40	3900	470	160	1 U	57.5	3.5 J	0.0954 J	212	7.46	2.5E+04	1.7E+03	5.3E+04	8.8E+04	7.7E+02
12/2013	78	1100	10000	26 J	180	370	12	35	600	15000	1500	10 U	103	49.1	0.043 U	200	6.86	4.5E+04	7.4E+02	8.1E+04	4.4E+04	1.4E+03
04/2014	33	830	9500	14 J	140	650	26	39	820	5400	1100	10 U	124	5.2	0.239 J	66.3	6.99	2.4E+04	1.9E+03	3.0E+04	2.0E+03	4.5E+03
08/2014	2.5	92	310	0.64 J	3.3	75	17	15	740	29	72	1	67.5	8.8	0.0558 J	105	8.05	4.6E+05	5.5E+03	3.0E+06	2.8E+04	3.2E+04
12/2014	71 J	5800	28000 J	26 J	120 J	1000 J	13 J	170 J	2500	3400 J	840 J	10 U	116	6.4	0.0399 J	76.3	9.86	1.1E+05	4.3E+03	5.2E+05	6.6E+03	2.0E+03
03/2015	26	400	6200	13	70	860	27	92	2200 J	2700	700	1 U	97.9	56.2	0.233 J	50	6.7	5.5E+04	2.4E+03	8.7E+04	3.3E+03	1.9E+03
10/2015	0.5 U	5	30	0.5 U	0.5 U	9.5	2.8 J	3.9 J	890	6.8	3.9	0.5 U	13		0.509		8.68					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: RMW-1D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	0.8 U	1 U	0.98 J	0.8 U	0.8 U	1 U	19	1 U	73	0.8 U	1 U		2.5	738 J	0.46							
06/2009	5.0 U	3.2 J	7.4	5.0 U	5.0 U	0.86 J	15	1.0 U	63	5.0 U	5.0 U	5.0 U	3.3	758	0.660	1.69						
07/2010	0.8 U	1 U	0.96 J	0.8 U	0.8 U	1 U	49	1 U	160	0.8 U	1 U	1 U	2.6	1070	0.332	13.3						
09/2011	3.8 J	100	290	1.3 J	5.2	8.8	15	5 U	65	270	6.4	5 U	3.2	1070 J	0.316	8.2						
03/2012	3.4 J	69	340	1.4 J	7.2	2.9 J	11	5 U	49	390	8.2	5 U	2	1560	0.263	4.5						
06/2012	2.2 J	24	380	1.4 J	6.1	5.8	12	1 U	54	500 J	9.4	1 U	1.9	934	0.273	5.2						
09/2012	0.8 U	4.9 J	300	1 J	4.8 J	2.9 J	16	1 U	61	290	6.2	1 U	1.4	867	0.27	6.3						
12/2012	5.6	61	370	1.3 J	8.1	4 J	3.2 J	1 U	26	850	11	1 UJ	2.4	601	0.264	0.44						
04/2013	1.3 J	10	330	1 J	6.5	5.5	14	1 U	58	440	8.3	1 U	1.7	759	0.21	4.4						
07/2013	0.8 U	6.5	290	0.95 J	3.4 J	7	14	1 U	63	280 J	7	1 U	1.9	844	0.246	6.4						
10/2013	0.8 U	12	280	0.98 J	4.3 J	7.6	17	1 U	76	270	6.4	1 U	1.6	780	0.26 J	7.6						
12/2013	0.8 U	11	270	1 J	3.4 J	5.7	12	1 U	64	230	6.8	1 U	2.6 J	716	0.299 J	4.7						
04/2014	5.1	57	420	1.5	21	14	6.7	1 U	39	460	13	0.5 U	3.1	720	0.303 J	1.7	7.17					
08/2014	2.2	15	450	1.6	6.9	14	15	1 U	72	210	9.7	0.5 U	4	819	0.403	5.2	7.63					
12/2014	0.5 U	3.3	280	0.71 J	2.9	6.5	36	1 U	160	110	6.2	0.5 U	0.5 U	864	0.23 J	11.8	6.87					
03/2015	0.5 U	11	390	1.2	3.9	19	4.4 J	1 J	24 J	60	7.2	0.5 U	2	679	0.297 J	0.94	7.22					
10/2015	0.5 U	2.3	290	0.92 J	2.4	8.6	27	1 U	120	27	4.1	0.5 U	1.5		0.265 J							

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: RMW-2D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
05/2008	1100	140000	21000	80 U	110 J	1500	22	86	160	300 J	100 J		6	1120	0.182 J							
06/2009	1600 J	180000	49000	5000 U	5000 U	2000 U	83	12	390	5000 U	5000 U	5000 U	29.7	1190	0.0416 J	53.8						
07/2010	780	99000	52000	80 U	110 J	200 J	89	5.1	340	80 U	100 U	100 U	15.1	1480 J	0.0522 U	51.7						
06/2011	920 J	210000	36000	160 U	160 J	310 J	11	8.2	63	1200	200 U	200 U	12.1	969 J	0.269	4.8	6.26	4.4E+02	3.7E+01	1.8E+02	8.0E+01	9.5E+01
08/2011	680 J	56000	110000	1000 U	430 J	1000 U	28	5.3	89	1100	1000 U	1000 U	377	759 J	0.162 J	58.4		6.6E+01	4.8E+02	5.3E+01	7.1E+01	2.5E+01
11/2011	1100	110000	110000	85 J	390 J	110 J	32 J	3.3 J	120 J	600	500 U	500 U	267	466	0.0368 J	125	6.78	2.0E+02	3.1E+04	1.1E+03	1.1E+03	1.5E+03
03/2012	1300	140000	78000	500 U	230 J	500 U	60	5.1	210	320 J	100 J	500 U	129	813 J	0.0518 J	138	6.78	1.1E+03	4.9E+03	2.1E+03	2.5E+02	1.9E+02
06/2012	800	69000	16000	24 J	68 J	52 J	18	1.2 J	80	860 J	66 J	20 U	43.2	485	0.0141 U	94.9	6.82	6.1E+02	3.4E+03	1.6E+03	1.9E+01	9.8E+01
09/2012	1100	130000	39000	80 U	130 J	200 J	23	4.3 J	250	480 J	110 J	100 U	128	264 J	0.0333 U	141	6.7	3.5E+03	1.4E+03	3.2E+03	6.3E+01	1.7E+03
12/2012	3200	410000	62000	40 U	99 J	240 J	28	12	160	160 J	84 J	50 U	1620	395	39.5	27.2	6.25	6.8E+02	9.5E+02	7.2E+05	9.2E+05	5.4E+04
04/2013	1500	300000	150000	80 U	210 J	450 J	35	54	250	210 J	160 J	100 U	1170	266	58.2	6.8	6.46	1.1E+04	2.7E+03	8.6E+04	7.6E+04	4.6E+02
07/2013	1200 J	240000	170000	800 U	800 U	1000 U	23	240	290	800 U	1000 U	1000 U	758	217	46	6.2	6.4	2.4E+03	5.9E+02	4.5E+03	2.3E+03	1.8E+01
10/2013	1200 J	290000	250000	400 U	500 J	860 J	31	230	330	400 U	500 U	500 U	578	317	26.8	14.2	5.96	1.6E+04	8.3E+03	4.2E+04	3.5E+04	2.2E+03
12/2013	1500 J	320000	260000	400 U	610 J	1200 J	34	200	470	400 U	500 U	500 U	508 J	177	16.3	25.9	6.32	2.4E+04	5.3E+03	3.5E+05	9.8E+04	1.5E+04
04/2014	1200	200000	260000	250 U	510	520	44	130	320	250 U	250 U	250 U	464	249	8.16	40.2	6.38	2.3E+04	4.2E+02	3.3E+04	6.0E+02	6.1E+03
08/2014	1500	310000	310000	250 U	610	1600	36	440	860	250 U	250 U	250 U	410	221	5.86	35.7	5.95	3.8E+05	4.5E+03	2.0E+06	1.0E+04	7.2E+04
12/2014	1800	230000	190000	140	320	990	42	420	1500	50 U	160	50 U	313	295	4.26	42	6.07	4.0E+05	6.7E+03	1.2E+06	4.7E+03	5.8E+03
03/2015	1500	210000	190000	160	370	1100	35	420	2000	50 U	150	50 U	328	269	3.92	40.4	7.11	1.1E+05	1.7E+03	7.4E+05	4.3E+03	3.7E+04
10/2015	1400	150000	220000	250 U	420 J	1300	56	400	970	250 U	250 U	250 U	302		2.44		7.17					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: RMW-3D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2009	13 U	3.2 J	300	13 U	3.2 J	21	1.0 U	1.1	12	110	8.0 J	13 U	3.3	802	0.485	1.0 U						
07/2010	0.8 U	3.9 J	760	2.2 J	11	70 J	1 U	3 J	27	280	15	1 U	3	882	0.474	0.46						
06/2011	770 J	14000	1900	160 U	1200	200 U	2.7 J	1.1 J	19	96000	700 J	200 U	3.1	781	0.414	0.49	7.37					
08/2011	1400	14000	14000	73 J	1100	250 U	9.2	1.7 J	33	64000	620	250 U	10500	529	0.866	21.4	6.1					
11/2011	130 J	1500	9300	500 U	570	500 U	4 J	5 U	25	53000	340 J	500 U	7.4	614	0.0541 J		6.97					
03/2012	90 J	620	5900	250 U	260	250 U	4.7 J	5 U	26	33000	190 J	250 U	8.6	710	0.0326 J	36.4	6.88					
06/2012	100	460	3800	16 U	210	20 U	5.7	1 U	27	25000	130	20 U	9	978	0.0697 J	15.2	6.96					
09/2012	45 J	170	3100	16 U	160	27 J	3.6 J	1 UJ	22 J	18000	130	20 U	8.2	552 J	0.0954 J	19.4	7.09					
12/2012	39 J	200	4100	12 J	790	14 J	3.5 J	1 U	21	19000	150	10 U	23.6	435	0.063 J	48.6	6.91					
04/2013	19	99	3500	20	810	51	2.6 J	3.4 J	41	17000	210	2 U	21.2	471	0.0333 U	63	7.46					
07/2013	9.7 J	42 J	2800	12 J	750	61	2.4 J	2.8 J	38	17000	160	10 U	3.8	574	0.043 U	30	6.99					
10/2013	11 J	32 J	2600	8.1 J	140	59	1 J	3.9 J	36	10000	150	10 U	21.1	462	0.0701 J	22.7	6.97					
12/2013	16 U	45 J	1600	16 U	71 J	33 J	14	1.5 J	70	7000	96 J	20 U	5.8	590 J	0.0701 J	22.3	7.1					
04/2014	8.7	49	1800	5.3	190	45	1 U	2.9 J	43	8000	120	2.5 U	8.6	461	0.0485 J	11.8	7.21					
08/2014	6.3 J	39	2100	6.8 J	86	71	3.3 J	3.8 J	60	9100	180	5 U	3.9	637	0.0382 J	21.5	7.34					
12/2014	5.7	17	1700	5.7	130	82	4.5 J	5.9	66	7400	160	2.5 U	1.5	554	0.0466 J	22.2	7.67					
03/2015	5 U	25	1900	5.2 J	110	120	1.7 J	7.9	200	7100 J	180	5 U	4.5	358	0.0334 U	27.7	7.24					
10/2015	5 U	16	2400	9.3 J	210	96	2.5 J	4.6 J	150	8700	170	5 U	5.3		0.0712 J		6.52					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: RMW-4D

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2- DCE (ug/L)	Trans- 1,2- DCE	1,1- DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1- Trichloro ethane (ug/L)	1,1- Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
01/2008	570 J	130000	18000	5000 U	5000 U	430 J	19	14	110	5000 U	5000 U	5000 U	7.67	1340								
05/2008	600	67000	21000	80 U	80 U	610	16	12	95	80 U	100 U		4.9	1370 J	0.351							
07/2008	5000 UJ	450 J	100000 J	5000 UJ	5000 UJ	1100 J	15 J	46 J	110 J	5000 UJ	5000 UJ	5000 UJ	387 J	1060 J								
09/2008	1300 UJ	3700 J	38000 J	370 J	75 J	680 J	23	7.1	130	1300 UJ	1300 UJ	1300 UJ	294	810								
12/2008	250 U	660	5400	28 J	250 U	79 J	28	2.1	130	250 U	250 U	250 U	168	130								
06/2009	9.4 J	620	2800	12 J	100 U	95	32	7.0	510	12 J	100 U	100 U	160	572	0.0723 J	247						
10/2009	11 J	1100	3800	10 J	8.4 J	74	35	7.6	210	8.4 J	8.0 J	100 U	149	569	0.0317 U							
07/2010	6.1	380	900	6.9	2.8 J	73	36	160	3800	5.5	5.1	1 U	140	803	0.0522 U	189						
06/2011	130 J	54000	32000	81 J	89 J	880	19	52	1900	40 U	50 U	50 U	133	843	0.0141 U	173	7.41					
08/2011	50 J	26000	19000	42 J	42 J	470	39	97	4800	100 U	25 J	100 U	124	395 J	0.0153 J	172	7.11					
11/2011	68 J	20000	17000	36 J	38 J	510	39 J	230 J	3900	100 U	23 J	100 U	109	342 J	0.0208 J	157	7.29					
03/2012	50 U	800	1700	50 U	50 U	300	12	210	8800	50 U	50 U	50 U	80.1	94.9 J	0.0271 J	176	7.12					
06/2012	87 J	18000	24000	40 J	59 J	830	19	400	5600	180	49 J	25 U	55.9	241 J	0.0333 U	192	6.96					
09/2012	82	11000	18000	33 J	51	1000	21	350	6000	96	45 J	10 U	82.8	111 J	0.0333 U	209	6.7					
12/2012	50 J	4300	48000	55 J	32 J	950	22	360	5500	72 J	94 J	20 UJ	754	496	0.0681 J	247	5.85					
04/2013	19 J	2100	31000	57 J	38 J	1300	24	420	6500	22 J	66 J	20 U	197	1090	0.0333 U	209	6.62					
07/2013	40 U	3200	31000	62 J	40 U	1400	34	390	6500	40 U	71 J	50 U	368	51.7	0.043 U	241	6.85					
10/2013	80 U	8500	55000	97 J	80 U	1400	33	300	2800	80 U	100 U	100 U	390	189	0.043 U	276	6.46					
12/2013	20 J	2500	61000	87 J	75 J	1400	36	390	4100	21 J	120	20 U	208	313	0.043 U	250	6.73					
04/2014	25 U	2500	67000	100	91	1800	25	560	9600	25 U	88	25 U	294	17	0.283 J	198	6.51					
08/2014	50 U	1500	57000	93 J	80 J	3500	38	740	10000	50 U	70 J	50 U	226	131	0.0512 J	154	6.77					
12/2014	25 U	1400	61000	100	94	3500	32	700	9700	25 U	69	25 U	247	248	0.0334 U	190	6.35					
03/2015	25 U	1400	44000	91	55	4500	50	830	10000	25 UJ	59	25 U	233	133	0.0334 U	236	6.52					

June 2008: Completion of Pilot Test Injections
 April 2011: Completion of Bioreactor Trenches construction
 July 2011: Remediation Injections completed
 November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: RMW-4D PUMP

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2-DCE (ug/L)	Trans-1,2-DCE	1,1-DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1-Trichloro ethane (ug/L)	1,1-Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2009	250 U	1300	4900	16 J	250 U	110	27	19 J	270	250 U	250 U	250 U										

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

EKONOL FACILITY

Well Id: RMW-4D SNAP

Date	(PCE) (ug/L)	(TCE) (ug/L)	Cis-1,2-DCE (ug/L)	Trans-1,2-DCE	1,1-DCE (ug/L)	Vinyl chloride (ug/L)	Ethane (ug/L)	Ethene (ug/L)	Methane (ug/L)	1,1,1-Trichloro ethane (ug/L)	1,1-Dichloro- ethane (ug/L)	Chloro ethane (ug/L)	TOC (mg/L)	Sulfate (mg/L)	Iron (mg/L)	Sulfide (mg/L)	pH (s.u.)	BVC (cells/ml)	DHBt (cells/ml)	DHC (cells/ml)	TCer (cells/ml)	VCR (cells/ml)
06/2009	250 U	1200	5200	16 J	250 U	82 J	31 J	9.7 J	240 J	250 U	250 U	250 U										

June 2008: Completion of Pilot Test Injections
April 2011: Completion of Bioreactor Trenches construction
July 2011: Remediation Injections completed
November 2012: Bedrock Injections completed

ATTACHMENT E

**LABORATORY TREATABILITY STUDY TO EVALUATE REMEDIATION
OF CHLORINATED VOLATILE ORGANIC COMPOUNDS IN
GROUNDWATER**

Prepared for:

Parsons
275 State Route C
Rolla, MO
65401

Final Report

**Laboratory Treatability Study to
Evaluate Remediation of Chlorinated
Volatile Organic Compounds in
Groundwater**

EkonoI Bedrock Site

Prepared by:



130 Research Lane, Suite 2
Guelph, Ontario N1G 5G3

SiREM Ref: TL0311.13

9 July 2014

siremlab.com

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION.....	1
1.1 Summary of Biodegradation Processes.....	1
2. MATERIALS AND METHODS	2
2.1 Microcosm Construction and Incubation	2
2.2 SiREM Microcosm Sampling and Analysis	3
2.2.1 Microcosm Sampling	3
2.2.2 Analysis of pH	3
2.2.3 Analysis of cVOCs.....	4
2.2.4 Analysis of Anions	4
2.2.5 Analysis of Volatile Fatty Acids.....	5
2.2.6 Analysis of Ferrous Iron.....	5
2.2.7 Analysis of Sulfide Performed At SGS Environmental Services.....	5
2.2.8 Analysis of Total Organic Carbon (TOC).....	5
2.2.9 Genetic and GeneTrac® <i>Dehalococcoides</i> and <i>Dehalobacter</i> Testing	6
3. RESULTS AND DISCUSSION.....	6
3.1 pH Results.....	7
3.2 Redox Processes	8
3.3 cVOC Biodegradation Results	9
PMW-14D.....	9
3.3.1 Sterile Controls (PMW-14D).....	9
3.3.2 Active Controls – SRS®-FR Amended (PMW-14D).....	10
3.3.3 SRS®-FR and FeCl ₂ Amended Microcosms (PMW-14D)	10
3.3.4 SRS®-FR and FeCl ₂ Amended and NaHCO ₃ buffered to pH 6.5 (PMW-14D).....	10
3.3.5 SRS®-FR and FeCl ₂ Amended and NaHCO ₃ buffered to pH 7.0 (PMW-14D).....	10
3.3.6 SRS®-FR, FeCl ₂ and nutrient Amended and NaHCO ₃ buffered to pH 7.0 (PMW-14D)	11
PMW-2D	11
3.3.7 Active Controls - SRS®-FR Amended (PMW-2D).....	11

3.3.8	SRS [®] -FR and FeCl ₂ Amended Microcosms (PMW-2D)	11
3.3.9	SRS [®] -FR and FeCl ₂ Amended and NaHCO ₃ buffered to pH 7.0 (PMW-2D).....	12
3.3.10	SRS [®] -FR, FeCl ₂ and nutrient Amended and NaHCO ₃ buffered to pH 7.0 (PMW-2D)	12
3.4	Degradation Half-Lives for cVOCs	12
3.5	Volatile Fatty Acids.....	13
3.6	Gene-Trac [®] Dehalobacter and Vinyl Chloride Reductase and External Genetic Analysis Results	13
3.7	External Laboratory Total Organic Carbon Results	14
4.	SUMMARY AND CONCLUSIONS.....	15
5.	REFERENCES.....	16

LIST OF TABLES

Table 1:	Summary of Microcosm Controls, Treatments and Amendments
Table 2:	Summary of cVOC and Ethene Results
Table 3:	Summary of Microcosm Anion Results
Table 4:	Summary of Microcosm VFA Results
Table 5:	Summary of Microcosm pH, Ferrous Iron, Sulfide and TOC Results
Table 6:	Half-Lives (Days) of Chlorinated Ethenes Detected in Microcosms
Table 7:	Summary of Gene-Trac [®] and Genetic Testing Results

LIST OF FIGURES

Figure 1:	Pathways for the Degradation of Chlorinated Ethenes
Figure 2:	Chlorinated Ethene and Ethene Concentration Trends in Anaerobic Sterile Control Microcosms (PMW-14D)
Figure 3:	Chlorinated Ethene and Ethene Concentration Trends in Anaerobic Active Control Microcosms (PMW-14D)
Figure 4:	Chlorinated Ethene and Ethene Concentration Trends in SRS [®] -FR and Ferrous Iron Amended Microcosms (PMW-14D)
Figure 5:	Chlorinated Ethene and Ethene Concentration Trends in SRS [®] -FR and Ferrous Iron Amended and Buffered to pH 6.5 Microcosms (PMW-14D)
Figure 6:	Chlorinated Ethene and Ethene Concentration Trends in SRS [®] -FR and Ferrous Iron Amended and Buffered to pH 7.0 Microcosms (PMW-14D)
Figure 7:	Chlorinated Ethene and Ethene Concentration Trends in SRS [®] -FR, Ferrous Iron and Nutrient Amended and Buffered to pH 7.0 Microcosms (PMW-14D)
Figure 8:	Chlorinated Ethene and Ethene Concentration Trends in Anaerobic Active Control Microcosms (PMW-2D)
Figure 9:	Chlorinated Ethene and Ethene Concentration Trends in SRS [®] -FR and Ferrous Iron Amended Microcosms (PMW-2D)
Figure 10:	Chlorinated Ethene and Ethene Concentration Trends in SRS [®] -FR and Ferrous Iron Amended and Buffered to pH 7.0 Microcosms (PMW-2D)
Figure 11:	Chlorinated Ethene and Ethene Concentration Trends in SRS [®] -FR, Ferrous Iron and Nutrient Amended and Buffered to pH 7.0 Microcosms (PMW-2D)

LIST OF APPENDICES

APPENDIX A: Chain of Custody Documentation

APPENDIX B: SRS®-FR Substrate Specifications

APPENDIX C: Henry's Law Calculation

APPENDIX D: Base Titration and Buffering Evaluation

APPENDIX E: HACH Ferrous Iron Test Kit Procedure

APPENDIX F: SGS and MI External Laboratory and SiREM Gene-Trac® Reports

LIST OF ABBREVIATIONS

NH ₄ Cl	Ammonium Chloride
bvcA	BAV1 vinyl chloride reductase
CO ₂	carbon dioxide
cells/L	cells per liter
cVOC	chlorinated volatile organic compound
cDCE	cis-1,2-dichloroethene
DI	de-ionized
°C	degrees Celsius
°C/min	degrees Celsius per minute
<i>Dhb</i>	<i>Dehalobacter</i>
<i>Dhc</i>	<i>Dehalococcoides</i>
DNA	deoxyribonucleic acid
ERD	enhanced reductive dechlorination
Fe ³⁺	ferric iron
FeCl ₂	ferrous chloride
Fe ²⁺	ferrous iron
FeS	ferrous sulfide
gene copies/L	gene copies per liter
g	grams
g/L	grams per liter
g NaHCO ₃ /L	grams of sodium bicarbonate per liter
H ₂ S	hydrogen sulfide
IC	ion chromatograph
Fe	Iron
Mn	manganese
MI	Microbial Insights, Inc.
μL	microliters
μm	micrometer
mg/L	milligram per liter
mL	milliliters
mL/min	milliliter per minute
mM	millimolar
mmol/bottle	millimoles per bottle
min	minutes
N	nitrogen
ORP	oxidation reduction potential
%	percent
PO ₄	phosphate
QL	quantification limit
qPCR	quantitative polymerase chain reaction
RPM	revolutions per minute
SGS	SGS Environmental Services

SiREM	SiREM Laboratory
NaHCO ₃	sodium bicarbonate
NaOH	sodium hydroxide
Na ₅ P ₃ O ₁₀	sodium tripolyphosphate
H ₂ SO ₄	sulfuric acid
tceA	tceA reductase
PCE	tetrachloroethene
TOC	total organic carbon
TCE	trichloroethene
VC	vinyl chloride
vcrA	vinyl chloride reductase
VFA	volatile fatty acids

1. INTRODUCTION

Parsons retained SiREM Laboratory (SiREM) to conduct a laboratory treatability study to assess amendments for stimulating the anaerobic in-situ biodegradation of chlorinated volatile organic compounds (cVOCs) namely chlorinated ethenes (tetrachloroethene [PCE], trichloroethene [TCE], cis-1,2-dichloroethene [cDCE] and vinyl chloride [VC]) in groundwater from the Ekonol Bedrock site (the Site).

Groundwater samples used in this study were collected by Parsons personnel on 19 December 2013 from two site locations labelled PMW-2D_121913 and PMW-14D_121913. The materials were received on 20 December 2014 in good condition at 4 degrees Celsius (°C) and stored in a cold room at 4 °C until required for the microcosm construction. The chain of custody received with these samples is provided in Appendix A.

The remainder of this report contains a summary of key biodegradation processes (Section 1.1), the experimental materials and methods (Section 2), the results and discussions of the microcosms study (Section 3), conclusions (Section 4) and report references (Section 5).

1.1 Summary of Biodegradation Processes

Biological degradation products of PCE and TCE include cDCE, VC and the fully dechlorinated end product ethene. Figure 1 contains degradation pathways for the chlorinated ethenes.

Natural attenuation processes can occur in situ and are often mediated by indigenous microbial populations present at contaminated sites. Enhanced reductive dechlorination (ERD), can in certain cases, be achieved by stimulating the indigenous microbial populations through the addition of electron donors.

In this study SRS[®]-FR (Terra Systems, Claymont, Delaware), an emulsified vegetable oil substrate specially formulated for fractured rock, which contains 60% soybean oil, an average of 5% lactate and small amounts of nutrients and Vitamin B₁₂ (less than [$<$] 1 percent [%] each), was the selected electron donor. Refer to Appendix B for SRS[®]-FR specifications. The oil and lactate contained within the product provide both soluble and slow release electron donors to promote biostimulation. In certain cases nutrients (nitrogen and phosphorous) can be limiting and amending with additional nutrients may promote a more rapid stimulation of the biodegradation process. In this study, ammonium chloride (NH₄Cl) and sodium tripolyphosphate (Na₅P₃O₁₀) were used as the additional nutrients.

As part of the anaerobic bioremediation process, electron acceptors (such as nitrate and sulfate) consume a portion of the electron donor and can produce toxic degradation products when they are reduced. Sulfate itself is not inhibitory, but sulfate reducing bacteria reduce sulfate to hydrogen sulfide (H₂S), which can be toxic to dechlorinating organisms at concentrations in the range of 70 milligrams per liter (mg/L) to 160 mg/L and higher (He et al., 2005). The impact of H₂S toxicity can be limited by precipitation of H₂S to non-inhibitory metal sulphides. In cases where metal concentrations may be limited, Ferrous Chloride (FeCl₂) or

other iron sources can be added to react with the H_2S and precipitate ferrous sulphide (FeS) alleviating sulfide inhibition. In this study the addition of FeCl_2 to precipitate sulfide as FeS was evaluated along with the biostimulation amendments.

2. MATERIALS AND METHODS

The following sections describe the materials and methods used for microcosm construction and incubation (Section 2.1), and reactor sampling and analysis (Section 2.2).

2.1 Microcosm Construction and Incubation

On 2 January 2014, prior to the construction of the microcosms for the treatability study, six microcosms were constructed, three treatments in duplicate, for a baseline pH buffering assay test. The buffer assay was completed to determine the amount of saturated sodium bicarbonate (NaHCO_3) solution (concentration of 96 grams per liter [g/L]) needed to reach and maintain a target pH of 6.5 or 7.0 in the Site water. Two microcosms were constructed from location PMW-2D groundwater to target a pH of 7.0 ± 0.2 . In addition duplicate microcosms were constructed using PMW-14D groundwater to target a pH of 6.5 ± 0.2 and 7.0 ± 0.2 for a total of four bottles. All microcosms were constructed by adding 100 milliliters (mL) of groundwater to 110 mL screw cap Boston round amber glass bottles and capped with Mininert™ closures to allow repetitive sampling. The site water was mixed thoroughly prior to microcosm construction to improve reproducibility. Microcosms were incubated for 5 days and pH was adjusted at time 0 to achieve the target pH and monitored at Day 1 and Day 5.

The microcosms for the treatability study were constructed on 9 January 2014 (Day -5) by filling sterile 250 mL (nominal volume) screw cap Boston round clear glass bottles (Systems Plus, New Hamburg, ON) with 200 mL of Site groundwater. The bottles were capped with Mininert™ closures to allow repetitive sampling with minimal gas loss and to allow amendments, as needed, throughout the incubation period. Sacrificial reactors were also constructed due to high sample volume requirements for external analysis of sulfide. The control and treatment microcosms were constructed in duplicate with additional sacrificial microcosms to provide a sacrificial test bottle for three additional sampling points.

All microcosms were constructed, sampled and incubated in an anaerobic chamber (Coy Laboratory Products, Grass Lake, Michigan) filled with an atmosphere of approximately 80 percent (%) nitrogen, 10% carbon dioxide (CO_2) and 10% hydrogen (Linde Gases, Guelph, ON). Hydrogen in the anaerobic chamber functions to scavenge trace oxygen via a palladium catalyst. Anaerobic conditions in the anaerobic chamber were verified using an indicator containing resazurin (Sigma, St. Louis, Missouri) in a mineral medium, which turns pink in the presence of oxygen. During quiescent incubation, all microcosms were covered to minimize photodegradation, and stored horizontally to minimize cVOC losses via the (submerged) Mininert™ closure. Microcosms were incubated for a period of up to 127 Days at approximately 22 °C (room temperature).

On 13 January 2014 (Day -1) Treatment microcosms were amended with FeCl_2 to target concentrations of 0.4557 g/L at the PMW-14D location and 2.958 g/L in the PMW-2D location microcosms. The FeCl_2 was added to the microcosms based on the baseline concentration of sulfate at a 3 times stoichiometric demand to reduce existing sulfide in the groundwater as well as the generation of sulfide during the sulfate reduction process by producing FeS . Due to concerns of pH changes post FeCl_2 additions, all respective microcosms were buffered using saturated NaHCO_3 to attain a target pH of 6.5 or 7.0. On 14 January 2014 (Day 0) all treatment microcosms were amended with SRS[®]-FR (Terra Systems Incorporated, Claymont, Delaware) as electron donor at a target concentration of 0.02% as oil. In consultation with Parsons nutrient amendment concentrations were determined to be 10 mg/L of nitrogen (N) and 1 mg/L of phosphate (PO_4). Nutrient amended microcosms at each of the locations were amended with NH_4Cl and $\text{Na}_5\text{P}_3\text{O}_{10}$ to achieve the target concentrations.

On 4 February 2014 (Day 21) anaerobic active control microcosms were amended with SRS[®]-FR at a target concentration of 0.02% as oil to reduce the potential for substrate availability to be a variable between controls and treatments. On 7 April 2014 (Day 83), all microcosms previously amended with SRS[®]-FR were amended with additional SRS[®]-FR at a concentration of 0.1% as oil to reduce the possibility of electron donor limitation. Table 1 summarizes the details of the treatability study microcosm construction and the amendments used for the treatment and control microcosms.

2.2 SiREM Microcosm Sampling and Analysis

2.2.1 Microcosm Sampling

Aqueous samples were collected from the control and treatment microcosms for analysis of pH, Ferrous Iron (Fe^{2+}), cVOCs, Anions and Volatile Fatty Acids (VFAs) at SiREM and external analysis of sulfide at SGS Laboratories (SGS, Lakefield, ON) on Days 7, 28, 99 and 127 and from the active controls at time 0. Aqueous samples were collected from buffered microcosms for analysis of pH more frequently to ensure microcosms were maintained at the target treatment pH. Additional aqueous samples were collected for the external analysis of total organic carbon (TOC) at SGS and DNA testing of *Dehalobacter* (*Dhb*), and *Vinyl Chloride reductase* (*vcrA*) at SiREM and *Dehalococcoides* (*Dhc*), *tceA* Reductase (*tceA*) and BAV1 Vinyl Chloride Reductase (*bvcA*) at Microbial Insights, Inc. (MI) in Knoxville, Tennessee on 24 March 2014 (Day 69) from the active controls and the nutrient amended microcosms. All reactors were agitated by hand and allowed to settle immediately before sampling. The analytical methods employed by SiREM are described in the following sections.

2.2.2 Analysis of pH

The pH measurements were performed on the lab bench using an Oakton pH spear with combination pH electrode (Oakton, Vernon Hills, Illinois). A 500 microliter (μL) sample was collected using a 1,000 μL Hamilton glass syringe. Separate sets of syringes were used for the different reactors to reduce the potential for cross contamination. Syringes were cleaned with acidified water (pH ~2) and rinsed 10 times with de-ionized (DI) water between samples. The

pH spear was calibrated weekly according to the manufacturer's instructions using pH 4.0, 7.0 and 10 standards.

2.2.3 Analysis of cVOCs

This section describes the methods used to quantify the cVOCs. The quantitation limits (QL) for the chlorinated ethenes were typically 0.1 mg/L in the microcosms based on the lowest concentration standards that were included in the linear calibration trend.

Aqueous cVOC concentrations in the microcosms were measured using a Hewlett-Packard (Hewlett Packard 7890) gas chromatograph (GC) equipped with an auto sampler (Hewlett Packard G1888) programmed to heat each sample vial to 75°C for 45 minutes (min) prior to headspace injection into a GSQ Plot column (0.53 millimeters x 30 meters, J&W) and a flame ionization detector. Sample vials were heated to ensure that all VOCs in the aqueous sample would partition into the headspace. The injector temperature was 200°C, and the detector temperature was 250°C. The oven temperature was programmed as follows: 35°C for 2 min, increased to 100°C at 50 degrees Celsius per minute (°C/min), then increased to 185°C at 25°C/min and held at 185°C for 6.80 min. The carrier gas was helium at a flow rate of 11 milliliters per minute (mL/min).

After withdrawing a 100 µL sample (as described in section 2.2.1), the sample was injected into a 10 mL auto sampler vial containing 5.9 mL of acidified de-ionized water (pH ~2). The water was acidified to inhibit microbial activity between microcosm sampling and GC analysis. The vial was sealed with an inert Teflon[®]-coated septum and aluminium crimp cap for automated injection of 3 mL of headspace onto the GC. One cVOC standard was analysed with each set of samples to verify the instrument five-point calibration curve. Calibration was performed using external standard solutions (Sigma, St Louis, MO), where known volumes of standard solutions were added to acidified water in auto sampler vials and analysed as described above for microcosm samples. Data were integrated using Chemstation Software (Agilent Technologies, Santa Clara, CA).

2.2.4 Analysis of Anions

Anion analysis was performed on a Dionex DX-600 ion chromatograph (IC) equipped with a Dionex AS-40 auto sampler and an AS18 column, the sample loop volume was 25 µL. An isocratic separation was performed using 33 millimolar (mM) reagent grade sodium hydroxide (NaOH) (Fisher Scientific, Ottawa, ON) eluent for 13 min. One standard was analyzed with each set of samples tested in order to verify the seven-point calibration using external standards of known concentrations. External standards were prepared gravimetrically using chemicals of the highest purity available (Sigma St Louis, MO or Bioshop, Burlington, ON). Data were integrated using Peaknet Chromatography software (Dionex, Oakville, ON). The QL for sulfate was 0.07 mg/L.

A 0.5 mL sample was withdrawn using a 1,000 µL Hamilton glass syringe, after which the sample was placed in a 1.5 mL micro-centrifuge tube. Samples were centrifuged for five

minutes at 13,000 revolutions per minute (RPM) to remove solids. The supernatant was removed, diluted 50-fold in deionized water and placed in a Dionex auto sampler vial with a cap that filters the sample during automated injection onto the IC.

2.2.5 Analysis of Volatile Fatty Acids

VFAs (lactate, acetate, propionate, formate, butyrate and pyruvate) analysis was performed on a Dionex DX-600 IC equipped with a Dionex AS-40 auto sampler and an AS11-HC column, the sample loop volume was 25 μ L. A gradient separation was performed using the following eluent profile; 1.0 mM NaOH for 8.0 min to 15 mM at 18.0 min and proceeding to 30 mM at 28.0 min. with a flow rate of 1.0 mL/min. Calibration was performed using external standards of known concentrations. One standard was analysed with each set of samples to verify the instrument's seven-point calibration curve produced using external standards of known concentrations. External standards were prepared gravimetrically using chemicals of the highest purity available (Sigma St Louis, MO or Bioshop, Burlington, ON). Data were integrated using Peaknet chromatography software (Dionex, Oakville, ON). The QLs were as follows: lactate 0.40 mg/L, acetate 0.54 mg/L, propionate 0.31 mg/L, formate 0.23 mg/L, butyrate 0.41 mg/L and pyruvate 0.69 mg/L.

A 0.5 mL sample was withdrawn using a 1,000 μ L Hamilton glass syringe, after which the sample was placed in a 1.5 mL micro-centrifuge tube. Samples were centrifuged for five minutes at 13,000 RPM to remove solids. The supernatant was removed, diluted 50-fold in deionized water and placed in a Dionex auto sampler vial with a cap that filters the sample during automated injection onto the IC.

2.2.6 Analysis of Ferrous Iron

For analysis of ferrous iron a 2.5 mL aqueous sample was removed from the control and treatment microcosms with a 5 mL plastic syringe (Becton Dickinson, Fisher Scientific). The 2.5 mL aliquot was transferred to 25 mL volumetric flasks and diluted 10 times to a final volume of 25 mL. These diluted samples were used to quantify ferrous iron by a HACH kit method (Hach Company, Loveland, CO). Refer to Appendix E for the HACH Ferrous iron test kit procedure.

2.2.7 Analysis of Sulfide Performed At SGS Environmental Services

Samples were collected from sacrificial microcosms for sulfide analysis and were sent to SGS Environmental Services (SGS) (Lakefield, ON). Aqueous samples for sulfide were filtered through a 0.45 micrometer (μ m) filter and collected in two 40 mL glass VOA vials and preserved with NaOH and Zinc Acetate. All samples were placed on ice packs in a cooler and shipped by overnight courier to SGS for analysis.

2.2.8 Analysis of Total Organic Carbon (TOC)

Active controls and nutrient amended microcosms from both locations were sampled for TOC on Day 69. Each replicate was sampled at a volume of 30 mL for TOC and collected in 30 mL

plastic bottles preserved with sulfuric acid (H_2SO_4). The samples were placed on ice packs in a cooler and shipped by overnight courier to SGS for analysis.

2.2.9 Genetic and GeneTrac[®] *Dehalococcoides* and *Dehalobacter* Testing

Genetic testing including Gene-Trac[®] quantitative polymerase chain reaction (qPCR) testing was performed in this study to quantify and characterize the *Dhb* and *Dhc* microorganisms as well as *Dhc* functional genes *tceA*, *bvcA* and *vcrA* known to facilitate the dechlorination of chlorinated ethenes to ethene. Gene-Trac[®] *Dhc* and *Dhb* tests quantify the total microbial populations by targeting their 16S rRNA genes, whereas the Gene-Trac[®] VC test targets the *Dhc vcrA* gene. The *tceA*, *bvcA* and *vcrA* genes are present in only a subset of *Dhc* populations. The *tceA* gene is a functional gene responsible for dechlorination of TCE through cDCE to VC, *vcrA* and *bvcA* are comparable functional genes responsible for the dechlorination of VC to ethene (Mueller et al., 2004). There is a strong correlation between the presence of *bvcA* and *vcrA* and the complete dechlorination of chloroethenes to non-toxic ethene. Although generally prominent for chlorinated ethane and chloroform dechlorination, the presence of *Dhb* populations may assist in promoting dechlorination of TCE to cDCE.

On 24 March 2014 (Day 69), 10 mL samples were withdrawn from each replicate of the continuous active control and nutrient amended microcosms and combined for a 20 mL total sample. The 10 mL samples collected from the sacrificial duplicate microcosms were combined in sterile 15 mL centrifuge tubes and submitted for Deoxyribonucleic acid (DNA) extraction and Gene-Trac[®] VC and *Dhb* testing at SiREM (Refer to Appendix F for the method). The DNA extracted at SiREM was separated in half and an aliquot was sent to MI for analysis of *Dhc* and *Dhc* functional genes. Samples were placed on ice packs in a cooler and shipped by overnight courier to MI for analysis.

3. RESULTS AND DISCUSSION

The following sections present and discuss the results of the treatability study:

- pH Results (Section 3.1),
- Redox processes (Section 3.2),
- cVOC biodegradation results (Section 3.3),
- Degradation half-lives for cVOCs (Section 3.4),
- VFA Results (Section 3.5),
- Gene-Trac[®] *Dhc*, *Dhb*, *vcrA* and *Dhc* functional gene results(Section 3.6), and
- External Laboratory Results (Section 3.7)

Tables 2, 3, 4, and 5 provide cVOC, anion, VFA, ferrous iron, TOC, sulfide, and pH data from the control and treatment microcosms over the incubation period for the study. All cVOC concentrations are presented in units of mg/L and millimoles per microcosm bottle (mmol/bottle) to demonstrate mass balances on a molar basis. Concentrations were converted from mg/L to mmol/bottle using Henry's Law as demonstrated in Appendix C. Figures 2 through 11 present trends in the concentrations of cVOCs and ethene in the control and treatment microcosms over the incubation period of the study. Table 6 presents the chlorinated ethene half-lives and Table 7. Appendix D summarizes results from the initial buffering assay and external laboratory reports from SGS and MI are provided in Appendix F.

3.1 pH Results

An initial buffering assay was completed on Site groundwater to determine the amount of NaHCO_3 required to maintain a specified target pH. In the PMW-2D location a pH of 7.0 ± 0.2 was targeted and after 5 days of incubation an average pH of 7.02 was obtained with an average buffer demand of 0.55 g of NaHCO_3 per Liter of groundwater (g NaHCO_3 /L). In the PMW-14D location reactors targeting a pH of 6.5 ± 0.2 an average final pH was measured at 6.56 with a buffer demand of 0.39 g NaHCO_3 /L and reactors targeting 7.0 ± 0.2 measured an average final pH of 7.08 with a calculated buffer demand of 1.36 g NaHCO_3 /L. Results from the buffering assay are summarized in Appendix D.

The pH was monitored in all controls and treatment microcosms over the incubation period (Table 5) for both site locations. Average pH results were calculated by combining all continuous and sacrificial pH results at the respective sampling event.

PMW-14D

The initial pH of the groundwater in the constructed microcosms was approximately 6.21. The pH of the sterile and active controls remained relatively stable fluctuating by ± 0.2 over the incubation period. In the Iron (Fe) amended and un-buffered microcosms the pH decreased from 6.29 to 5.69 over the 127 day incubation period.

Microcosms that were buffered with saturated NaHCO_3 were continually monitored and buffered to maintain their respective target pH of 6.5 or 7.0 ± 0.2 . Microcosms targeting a pH of 6.5 were amended with 1 mL of NaHCO_3 throughout the study period and after 127 Days the pH was measured at an average of 6.31. Treatment microcosms buffered to a target pH of 7.0 were amended with a total of 3.0 mL of NaHCO_3 over the 127 day incubation period and at the endpoint pH was at an average of 6.99. The nutrient amended microcosms were buffered to a pH of 7.0 and required 3.5 mL over 127 days to end with a final pH of 6.86.

PMW-2D

The initial pH of the groundwater in the constructed microcosms was approximately 6.46. The pH of the active controls remained relatively stable over the incubation period. In the Fe

amended and un-buffered microcosms the pH decreased from 6.01 after Fe addition to an average pH of 5.89 over the 127 days of incubation.

Similar to location PMW-14D, the microcosms that were buffered with saturated NaHCO_3 were continually monitored and buffered to maintain a target pH of 7.0 ± 0.2 . Microcosms targeting a pH of 7.0 were amended with a total of 4.0 mL of NaHCO_3 over the 127 day incubation period and at the endpoint pH was at an average of 6.78. The nutrient amended microcosms were buffered to a pH of 7.0 and required 5.5 mL of NaHCO_3 over 127 days to end with a final pH of 6.85.

This data indicates that the acid buffering properties of the Site groundwater was not sufficient to maintain a target pH during reductive dechlorination and electron donor fermentation (Both acid producing processes). Monitoring of pH and buffering with saturated NaHCO_3 was required at both Site locations throughout the study. The optimum pH for reductive dechlorination has been reported to be 6.8 to 7.5 (Middledorp et al., 1999) and complete dechlorination can occur between a pH range of 6.0 and 8.0 (SiREM, unpublished data).

3.2 Redox Processes

The addition of electron donor typically results in microbial activity that promotes changes in the redox conditions in groundwater. Aerobic or mildly reducing redox conditions will be reduced, resulting in the more strongly reducing conditions required to support anaerobic degradation of cVOCs. Measuring dissolved oxygen and oxidation reduction potential (ORP) (primary indicators of redox status) directly in microcosms is challenging due to the high sample volume requirements for these analyses and the small aqueous volumes associated with batch microcosms. Other indicators of reducing conditions (e.g., changes in redox sensitive chemical species) were monitored during this biotreatability study.

The sequence of redox reactions in groundwater is well known (Appelo and Postma, 1994). Oxygen is first consumed, followed by nitrate (denitrification), iron, manganese and sulfate reduction. Ferric iron (Fe^{3+}) is reduced to Fe^{2+} , Manganese (Mn^{4+}) is reduced to manganese (Mn^{2+}) and sulfate is reduced producing sulfides. The final step is CO_2 reduction producing methane (methanogenesis). The consumption of each species in sequence indicates that conditions are becoming increasingly reducing. Dechlorination of chlorinated solvents typically occurs in the range of sulfate reducing to methanogenic conditions.

At time 0 Nitrate concentrations were very low in both PMW-14D and PMW-2D Site location microcosms. Sulfate concentrations were moderate at the PMW-14D location at approximately 20 mg/L and higher at the PMW-2D location between 200 mg/L and 400 mg/L (Table 3).

PMW-14D

Sulfate concentrations remained relatively stable over the course of the study in the sterile control microcosms. Active control microcosms were amended with SRS[®]-FR on Day 21 and by Day 28 sulfate had reduced to 2.9 mg/L and remained relatively stable until Day 127. The

reduction of sulfate was observed by Day 28 in all treatment microcosms (Table 3) indicating a reduced environment had been achieved.

At time 0 sulfide was analysed in the active control microcosms and a moderate result of 46 mg/L was measured (Table 5). After 28 days of incubation sulfide levels had decreased to 1 non-detect or near non-detect levels in all FeCl_2 amended microcosms and remained low for the remainder of the study. At Day 28 active control sulfide results decreased to an average of 5 mg/L and to levels of non-detect by Day 99 indicating that there may be residual metal components in the site material to precipitate metal sulfides. By Day 127 sulfide concentrations rebounded to 18 mg/L in the active control microcosms.

PMW-2D

Sulfate concentrations at time 0 were approximately 200 mg/L in the control and Iron amended microcosms and 400 mg/L in the buffered treatment microcosms. The reason for the higher sulfate concentrations at time 0 in the buffered treatment microcosms is unclear. Similar to the PMW-14D location the sulfate concentration in active controls decreased slightly by Day 28 and by Day 127 the concentration of sulfate had reduced to 6.1 mg/L. In all of the buffered treatment microcosms the onset of sulfate reduction was observed by Day 28 and reduction of sulfate was near completion by Day 99 in the treatment microcosms amended with SRS[®]-FR, FeCl_2 and nutrients and buffered to a pH of 7.0 indicating that reducing conditions were achieved.

At time 0 sulfide in the active control microcosms was measured at 93 mg/L, which is higher than the reported toxicity of 70 mg/L (Table 5). Similarly to the PMW-14D location after 28 days sulphide concentrations decreased although only to a moderate concentration of 49 mg/L. By Day 127 sulfide concentrations increased in one replicate to a very high concentration of 406 mg/L in the active controls. These results indicate that residual metals may be limited in the site material and sulfide concentrations may be high enough to inhibit bioremediation. In the microcosms amended with FeCl_2 similarly to the PMW-14D location sulfide levels decreased by Day 28 to non-detect or near non-detect levels. Sulfide concentrations remained relatively low for the remainder of the study with a slight increase to 37 mg/L at Day 99 in the microcosms buffered to pH 7. These results indicate that the addition of FeCl_2 may be required at the Site to reduce sulfide concentrations to below microbial toxicity.

3.3 cVOC Biodegradation Results

PMW-14D

3.3.1 Sterile Controls (PMW-14D)

The cVOC concentrations in the sterile control microcosms for the PMW-14D location remained stable over the incubation period with no increases in degradation products (Table 2 and Figure 2). These results indicate that there was no mass loss in the control microcosms resulting from

abiotic degradation or experimental losses (e.g., sorption or loss through microcosm closures) during the incubation period.

3.3.2 Active Controls – SRS[®]-FR Amended (PMW-14D)

At time 0 the concentration of TCE in the active control microcosms was at an average of 1.4 mg/L. On Day 21 the active control microcosms were amended with SRS[®]-FR to limit the possibility of the electron donor substrate to be a variable between the control and treatment microcosms. After the addition of SRS[®]-FR the concentration of TCE in the first replicate of the active control microcosms decreased to levels of non-detect by Day 28 with a corresponding increase in cDCE. After an additional amendment of SRS[®]-FR on Day 85, TCE continued to decrease in the second replicate to a concentration of 0.67 mg/L by Day 127 with a corresponding increase in cDCE (Figure 3). cDCE concentrations otherwise remained relatively stable over the study period with no increases in VC. These data suggest that amendment of SRS[®]-FR alone as an electron donor may be capable of promoting partial dechlorination of TCE to cDCE at the PMW-14D location.

3.3.3 SRS[®]-FR and FeCl₂ Amended Microcosms (PMW-14D)

In the PMW-14D unbuffered SRS[®]-FR and FeCl₂ amended microcosms, TCE concentrations were observed to decrease to levels of non-detect by Day 28 in the second replicate with corresponding increases in cDCE. After an additional amendment of SRS[®]-FR at a concentration of 0.1% as oil on Day 85 the first replicate began to show TCE degradation to cDCE. On Day 99 a decrease in cDCE was observed in the second replicate with a corresponding increase in VC. (Figure 4).

These data suggest that amendment with SRS[®]-FR as an electron donor and FeCl₂ to reduce the production of toxic sulfide may promote the onset of partial dechlorination of TCE to VC.

3.3.4 SRS[®]-FR and FeCl₂ Amended and NaHCO₃ buffered to pH 6.5 (PMW-14D)

With the addition of NaHCO₃ to maintain the microcosm at a pH of 6.5, dechlorination of TCE to levels of non-detect was observed by Day 28 with a corresponding increase in cDCE. After amending with additional SRS[®]-FR on Day 85, a decrease in cDCE was observed on Day 99 with a corresponding increase in VC (Figure 5). After Day 99 concentrations remained relatively stable to Day 127. These data suggest that neutralizing the SRS[®]-FR and FeCl₂ amended microcosms to a pH of 6.5 may promote partial dechlorination of TCE to VC more quickly than an environment at a pH of 6.0.

3.3.5 SRS[®]-FR and FeCl₂ Amended and NaHCO₃ buffered to pH 7.0 (PMW-14D)

By maintaining the pH of the system at 7.0 dechlorination of TCE to cDCE was observed by Day 28. After the addition of SRS[®]-FR at a concentration of 0.1% as oil on Day 85 concentrations of cDCE were observed to decrease with a corresponding increase in VC and some production of the final dechlorination product ethene was observed by Day 99. By Day 127 cDCE continued

to dechlorinate and decreased to levels of non-detect in the second replicate with an increase in VC and ethene (Figure 6). With a longer incubation time complete dechlorination of TCE to ethene may be promoted by the addition of SRS[®]-FR, FeCl₂ and buffering the microcosms to a pH of 7.0.

3.3.6 SRS[®]-FR, FeCl₂ and nutrient Amended and NaHCO₃ buffered to pH 7.0 (PMW-14D)

The addition of nutrients promoted rapid dechlorination of TCE to cDCE by Day 7. TCE decreased to levels of non-detect by Day 28 and cDCE concentrations had decreased with a corresponding increase in VC. After the Day 85 amendment of SRS[®]-FR, cDCE concentrations were at levels of non-detect by Day 99 and ethene concentrations began to increase. By Day 127 complete dechlorination of TCE to ethene was observed in both replicates (Figure 7). These data suggest that amendment with SRS[®]-FR, FeCl₂ and nutrients as well as buffering to a neutral pH of 7.0, was capable of promoting complete dechlorination of TCE to ethene.

PMW-2D

3.3.7 Active Controls - SRS[®]-FR Amended (PMW-2D)

The TCE concentrations in the active control microcosms decreased from 7.5 mg/L at time 0 to 0.96 mg/L after 7 days of incubation. After the amendment of SRS[®]-FR on Day 21, TCE concentrations decreased to levels of non-detect by Day 28 (Figure 8). After Day 28 the active control microcosms remained at a cDCE stall until Day 127. These results indicate that the amendment of SRS[®]-FR and the intrinsic microbial species present in the Site materials was able to promote partial dechlorination of TCE to cDCE with no increases of VC or ethene concentrations.

3.3.8 SRS[®]-FR and FeCl₂ Amended Microcosms (PMW-2D)

In the PMW-2D unbuffered SRS[®]-FR and FeCl₂ amended microcosms, TCE concentrations decreased from 3.5 mg/L at time 0 to 0.88 mg/L by Day 7 in the first replicate with corresponding increases in cDCE. After an additional amendment of SRS[®]-FR at a concentration of 0.1% as oil on Day 85 TCE to cDCE degradation was observed in the second replicate. On Day 99 TCE concentrations in both microcosms had decreased to an average of 0.49 mg/L and remained relatively stable to Day 127 (Figure 9).

These data suggest that amendment with SRS[®]-FR as an electron donor and FeCl₂ to reduce the production of toxic sulfide may promote partial dechlorination of TCE to cDCE with no increases of VC or ethene. Slower degradation may have been observed in the unbuffered SRS[®]-FR and FeCl₂ amended treatment microcosms due to a pH below the optimum dechlorination range.

3.3.9 SRS®-FR and FeCl₂ Amended and NaHCO₃ buffered to pH 7.0 (PMW-2D)

With the addition of NaHCO₃ to maintain the microcosms at a pH of 7.0, dechlorination of TCE to cDCE was observed by Day 28. After amending with additional SRS®-FR on Day 85, TCE concentrations continued to decrease to Day 99 and remained relatively stable until Day 127 when TCE decreased to levels of non-detect (Figure 10). These data suggest that neutralizing the SRS®-FR and FeCl₂ amended microcosms to a pH of 7.0 had little effect on the dechlorination process. Similarly to the unbuffered microcosms only partial dechlorination of TCE to cDCE with no increases of VC or ethene was observed.

3.3.10 SRS®-FR, FeCl₂ and nutrient Amended and NaHCO₃ buffered to pH 7.0 (PMW-2D)

The addition of nutrients promoted the dechlorination of TCE which decreased to levels of non-detect by Day 28 in the second replicate with a corresponding increase in cDCE. After the Day 85 amendment of SRS®-FR, cDCE concentrations decreased with increases of VC observed by Day 99. By Day 127, TCE concentrations had decreased to levels of non-detect and cDCE continued to decrease with a corresponding increase in VC. Some ethene production was observed in the second replicate and with a longer incubation time complete dechlorination of TCE to ethene may have occurred (Figure 11).

These data suggest that amendment with SRS®-FR, FeCl₂ and nutrients as well as buffering to a neutral pH of 7.0 promoted partial dechlorination of TCE to VC and may promote complete dechlorination of TCE to ethene.

3.4 Degradation Half-Lives for cVOCs

Laboratory half-lives were calculated based on the average dechlorination observed in the treatment microcosms as indicated in Table 6. First order reaction kinetics was assumed for all calculations as described in Newell et al, 2002. The half-lives were calculated using the following relationship:

$$\text{Half-life} = \frac{\ln(2)}{\frac{\ln\left(\frac{C_2}{C_1}\right)}{t_2 - t_1}}$$

where,

C₁ is the concentration at early time (t₁ days)

C₂ is the concentration at later time (t₂ days)

Based on the data collected from each location, the calculated dechlorination half-lives for TCE, cDCE and VC were determined. Half-lives were not calculated for compounds where the concentration increased or did not change over the study period. The time in days (i.e., t₁ and t₂) used to calculate the half-lives and the half-life results are provided in Table 6.

PMW-14D

In the sterile control microcosms, which were used to represent both Site locations, a TCE half-life was calculated to be 172 days. The active control microcosms had half-lives for TCE and cDCE at 62 days and 923 days respectively. With the addition of ferrous iron TCE half-lives decreased to 37 days and cDCE concentrations increased therefore no half-lives were determined. At a pH of 6.5 TCE half-lives continued to decrease to 5 days and the slow decrease of cDCE concentrations gave a half-life of 483 days. With a pH of 7.0 the half-life of TCE remained the same as at a pH of 6.5 at 5 days but cDCE half-lives decreased to 56 days. In optimal conditions, at a pH of 7.0 with SRS[®]-FR, nutrients and ferrous iron amendments half-lives were much faster for TCE, cDCE and VC at 6 days, 10 days and 3 days respectively.

PMW-2D

The active control microcosms had half-lives for TCE, cDCE and VC at 4 days, 2,948 days and 923 days respectively. In the ferrous iron amended microcosms TCE and VC half-lives were 33 days and 1,100 days respectively. Concentrations of cDCE remained relatively stable over the study and therefore no half-life was determined. At a pH of 7.0, TCE, cDCE and VC half-lives were 35 days, 1,716 days and 1,276 days respectively. With the addition of nutrients, SRS[®]-FR and ferrous iron at a pH of 7.0 TCE and cDCE half-lives were 21 days and 23 days respectively. VC concentrations in this treatment increased over the study and therefore no half-life was determined.

3.5 Volatile Fatty Acids

The SRS[®]-FR formulation contains approximately 60% soybean oil, an average of 5% lactate and <1% Nutrients and Vitamin B₁₂. The fermentation of SRS[®]-FR results in the production of long chain fatty acids that can be fermented to hydrogen, which is the ultimate electron donor used by dechlorinators. At both locations PMW-14D and PMW-2D, VFAs were produced by fermentation of the electron donor and the VFAs remained relatively constant over the study period indicating sufficient electron donor was present to promote biostimulation of the chlorinated ethenes (Table 4).

3.6 Gene-Trac[®] Dehalobacter and Vinyl Chloride Reductase and External Genetic Analysis Results

Table 7 summarizes the results of Gene-Trac[®] and genetic testing performed at an external laboratory for aqueous samples collected from the microcosms at Day 69. Both Site locations, PMW-14D and PMW-2D active controls and microcosms amended with SRS[®]-FR, FeCl₂ and nutrients as well as buffered to a pH of 7.0 were sampled internally at SiREM for *Dhb* and *vcrA* and shipped to MI for the analysis of *Dhc* and DHC functional genes (*bvcA* and *tceA*). Typically *Dhc* concentrations above 1×10^7 cells per liter (cells/L) are required for high rates of in situ reductive dechlorination and ethene production (Lu et al, 2006).

PMW-14D

The analysis performed on the anaerobic active controls at SiREM indicated moderate populations of *Dhb* and *vcrA* at 3×10^6 gene copies/liter (gene copies/L). These results indicate that there are indigenous bacteria present in the Site material capable of promoting dechlorination of chlorinated compounds. MI results indicated high populations of *Dhc*, *tceA* and *bvcA* at 1×10^9 , 3×10^7 and 3×10^8 gene copies/L respectively. Dechlorinating populations in the nutrient and FeCl_2 amended and buffered microcosms to a pH of 7 were higher than the active controls. *Dhb* and *vcrA* population results from SiREM increased to 5×10^6 and 1×10^8 gene copies/L respectively. MI results for *Dhc*, *tceA* and *bvcA* increased to 2×10^{12} , 9×10^{10} and 8×10^{11} gene copies/L respectively. These results indicate that the addition of nutrients, FeCl_2 and a pH of 7.0 provides an environment which supports the growth of indigenous bacteria present at the Site. The presence of the *vcrA* gene at the Site correlated with the ability for indigenous bacteria to promote the dechlorination of TCE to ethene.

PMW-2D

At the PMW-2D location the genetic testing of the active controls performed at SiREM indicated moderate to high populations of *Dhb* and *vcrA* at 1×10^8 and 1×10^6 gene copies/L respectively. These results indicate that there are indigenous bacteria present in the Site capable of promoting dechlorination of chlorinated compounds. Results received from MI genetic testing indicated high populations of *Dhc*, *tceA* and *bvcA* at 3×10^8 , 5×10^7 , 2×10^8 and 2×10^7 gene copies/L respectively. Populations in the nutrient and FeCl_2 amended and buffered microcosms to a pH of 7 decreased slightly from the active control results. The analysis of *Dhb* performed at SiREM indicated low populations between the detection limit and the limit of quantification (J qualifier) at 4×10^3 gene copies/L. The decrease in the *Dhb* populations is likely because the low concentrations of TCE were reduced prior to collecting the samples and *Dhb* is not known to dechlorinate cDCE or VC. The populations of *vcrA* determined at SiREM decreased slightly to 3×10^5 gene copies/L. MI results for *Dhc*, *tceA* and *bvcA* were at 9×10^8 , 4×10^6 and 8×10^8 gene copies/L respectively. Samples were collected for genetic testing prior to ethene production; these concentrations may have increased later in the incubation period. The lower microbial concentrations at the PMW-2D location may correlate to slower dechlorination rate.

3.7 External Laboratory Total Organic Carbon Results

External samples were collected on 24 March 2014 (Day 69) for the analysis of TOC to provide another measurement in addition to VFAs for electron donor availability. A summary of results is provided in Table 5. Active control and FeCl_2 and nutrient amended and buffered to pH 7 treatment microcosms from both PMW-14D and PMW-2D locations were collected for TOC analysis. PMW-14D location active controls measured TOC at 547 mg/L and treatment microcosms were measured at 363 mg/L. At the PMW-2D location TOC was measured in the active controls at 416 mg/L and in the treatment microcosms at 233 mg/L. A TOC concentration in excess at a concentration of 20 mg/L is favourable for reductive dechlorination (AFCEE, 2004). The TOC results for the PMW-14D and PMW-2D locations indicate that substrate was

not limited and at concentrations required for reductive dechlorination in both the control or treatment microcosms at Day 69.

4. SUMMARY AND CONCLUSIONS

The laboratory treatability study results indicate the following:

1. The addition of SRS[®]-FR, FeCl₂ and buffering to a pH of 6.5 promoted partial dechlorination of TCE at location PMW-14D.
2. The addition of SRS[®]-FR, nutrients, FeCl₂ and buffering to a pH of 7.0 promoted complete dechlorination of TCE, cDCE and VC to ethene and the increase in *Dhc* and *vcrA* at location PMW-14D.
3. The addition of SRS[®]-FR, nutrients, FeCl₂ and buffering to a pH of 7.0 promoted dechlorination of TCE, cDCE and VC to ethene at location PMW-2D and with further incubation time complete dechlorination may be observed.
4. Sulfide generated from sulfate reduction did not accumulate in the aqueous phase and did not appear to cause inhibition to reductive dechlorination with the addition of FeCl₂ indicating that FeCl₂ amendment may be required at the Site.
5. pH adjustment may be required to maintain the pH in the optimal range of 7.0 ± 0.2 to promote dechlorination.

The results of this study indicate that SRS[®]-FR, FeCl₂ and nutrient amendment in combination with pH adjustment has the potential to stimulate indigenous bacteria to completely dechlorinate TCE, cDCE and VC to ethene at the Site.

5. REFERENCES

AFCEE, 2004. Principals and Practices of Enhanced Bioremediation of Chlorinated Solvents.

Duhamel, M., S.D. Wehr, L. Yu, H. Rizvi, D. Seepersad, S. Dworatzek, E.E. Cox, and E.A. Edwards. 2002. Comparison of anaerobic dechlorinating enrichment cultures maintained on tetrachloroethene, trichloroethene, *cis*-1,2-dichloroethene and vinyl chloride. *Water Research* 36: 4193-4202.

He, J., Sung, Y., Krajmalnik-Brown, R., Ritalahti, K. and Löffler, F. 2005. Isolation and characterization of *Dehalococcoides* sp. Strain FL2, a trichloroethene (TCE)- and 1,2-dichloroethene-respiring anaerobe. *Environmental Microbiology*.

Lu, X., Wilson, J.T., Kampbell, D.H. 2006. Relationship between *Dehalococcoides* DNA in ground water and rates of reductive dechlorination at field scale. *Water Research*. 40:3131-3140.

Major, D.W., M.L. McMaster, E.E. Cox, E.A. Edwards, S.M. Dworatzek, E.R. Hendrickson, M.G. Starr, J.A. Payne, and L.W. Buonamici. 2002. Field demonstration of successful bioaugmentation to achieve dechlorination of tetrachloroethene to ethene. *Environmental Science and Technology* 36: 5106-5116.

Middledorp, P.J.M., Luijten, M.L.G.C., van de Pas, B.A., van Eedert, M.H.A., Kengen, S.W.M., Schraa, G., Stams, A.J.M. 1999. Anaerobic Microbial Reductive Dechlorination of Chlorinated Ethenes. *Bioremediation J.* 3:151-169.

TABLES

TABLE 1: SUMMARY OF MICROCOSM CONTROLS, TREATMENTS AND AMENDMENTS
Ekonomol Bedrock Site

Groundwater Location	Treatment/Control	Assigned Bottle Number	Number of Microcosms	Groundwater (mL)	Headspace (mL)	Sodium Azide	Mercuric Chloride	Rezasurin	SRS [®] -FR	Ferrous Iron	Ammonium Chloride	Sodium Tripolyphosphate	Sodium Bicarbonate
PMW-14D	Anaerobic Sterile Control	1 to 2	2	200	50	Amended with 0.5 mL of a 5% solution on Day -1.	Amended with 2.8 mL of a 2.7% solution on Day -1.	Amend first replicate with 100 µL of resazurin.	NA	NA	NA	NA	NA
	Anaerobic Active Control	3 to 4	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	NA	NA	NA	NA
	SRS [®] -FR and Ferrous Iron Amended	5 to 6	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	Amended with 2 mL of a 50 g/L FeCl ₂ ·4H ₂ O stock to a target concentration of 0.4557 g/L on Day -1.	NA	NA	NA
	SRS [®] -FR and Ferrous Iron Amended,Sodium Bicarbonate to pH 6.5	7 to 8	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	Amended with 2 mL of a 50 g/L FeCl ₂ ·4H ₂ O stock to a target concentration of 0.4557 g/L on Day -1.	NA	NA	Amended with Saturated Sodium Bicarbonate to a target pH of 6.5
	SRS [®] -FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0	9 to 10	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	Amended with 2 mL of a 50 g/L FeCl ₂ ·4H ₂ O stock to a target concentration of 0.4557 g/L on Day -1.	NA	NA	Amended with Saturated Sodium Bicarbonate to a target pH of 7.0
	SRS [®] -FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0	11 to 12	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	Amended with 2 mL of a 50 g/L FeCl ₂ ·4H ₂ O stock to a target concentration of 0.4557 g/L on Day -1.	Amended with 760 µL of a 10 g/L Ammonium Chloride stock to a target concentration of 10 mg/L of Nitrate on Day 0.	Amended with 26 µL of a 10 g/L sodium tripolyphosphate stock to a target concentration of 1 mg/L phosphate on Day 0.	Amended with Saturated Sodium Bicarbonate to a target pH of 7.0
PMW-2D	Anaerobic Active Control	13 to 14	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	NA	NA	NA	NA
	SRS [®] -FR and Ferrous Iron Amended	15 to 16	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	Amended with 2 mL of a 300 g/L FeCl ₂ ·4H ₂ O stock to a target concentration of 2.958 g/L on Day -1.	NA	NA	NA
	SRS [®] -FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0	17 to 18	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	Amended with 2 mL of a 300 g/L FeCl ₂ ·4H ₂ O stock to a target concentration of 2.958 g/L on Day -1.	NA	NA	Amended with Saturated Sodium Bicarbonate to a target pH of 7.0
	SRS [®] -FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0	19 to 20	2	200	50	NA	NA	Amend first replicate with 100 µL of resazurin.	Amended with 66 µL of SRS [®] -FR (60% oil) to a target concentration of 0.02% as oil on Day 0 and with 333 µL to a target concentration of 0.1% as oil on Day 83.	Amended with 2 mL of a 300 g/L FeCl ₂ ·4H ₂ O stock to a target concentration of 2.958 g/L on Day -1.	Amended with 760 µL of a 10 g/L Ammonium Chloride stock to a target concentration of 10 mg/L of Nitrate on Day 0.	Amended with 26 µL of a 10 g/L sodium tripolyphosphate stock to a target concentration of 1 mg/L phosphate on Day 0.	Amended with Saturated Sodium Bicarbonate to a target pH of 7.0

Notes:
% - percent
µL - microliters
FeCl₂·4H₂O - Ferrous Chloride Hexahydrate
g - grams
g/L - grams per liter
mg/L - milligrams per liter
mL - milliliters
NA - not applicable

TABLE 2: SUMMARY OF cVOC AND ETHENE RESULTS
Ekonol Bedrock Site

Treatment	Date	Day	Replicate	Chlorinated Ethenes					Comment	
				TCE	cDCE	VC	Ethene	Total Ethenes		
				mg/L	mg/L	mg/L	mg/L	mmol/bottle		
Anaerobic Sterile Control (PMW-14D)	09-Jan-14	-5							Poisoned with mercuric chloride and sodium azide.	
									Amended first replicate with 100 µL of resazurin.	
	14-Jan-14	0	ANSC (PMW-14D)-1	1.7	52	2.3	0.12	--		
			ANSC (PMW-14D)-2	1.8	56	2.4	0.11	--		
			Average Concentration (mg/L)	1.7	54	2.4	0.11	--		
			Standard Deviation (mmoles)	1.0E-04	5.9E-03	9.5E-05	7.7E-05	--		
	Average Total mmoles		0.003	0.12	0.0094	0.0026	1.4E-01			
	21-Jan-14	7	ANSC (PMW-14D)-1	1.8	56	2.6	0.15	--		
			ANSC (PMW-14D)-2	1.8	57	2.6	0.12	--		
			Average Concentration (mg/L)	1.8	56	2.6	0.14	--		
			Standard Deviation (mmoles)	7.4E-05	1.0E-03	1.9E-04	3.8E-04	--		
	Average Total mmoles		0.0031	0.13	0.01	0.0031	1.5E-01			
	11-Feb-14	28	ANSC (PMW-14D)-1	1.4	45	2.2	0.14	--		
			ANSC (PMW-14D)-2	1.7	57	2.5	0.11	--		
			Average Concentration (mg/L)	1.5	51	2.3	0.12	--		
			Standard Deviation (mmoles)	4.1E-04	1.8E-02	9.5E-04	4.1E-04	--		
	Average Total mmoles		0.0026	0.11	0.0092	0.0028	1.2E-01			
	23-Apr-14	99	ANSC (PMW-14D)-1	0.48	54	2.4	0.12	--		
			ANSC (PMW-14D)-2	1.5	52	2.4	0.11	--		
			Average Concentration (mg/L)	0.98	53	2.4	0.11	--		
			Standard Deviation (mmoles)	1.2E-03	4.1E-03	1.2E-04	8.5E-05	--		
	Average Total mmoles		0.0017	0.12	0.0096	0.0025	1.3E-01			
	21-May-14	127	ANSC (PMW-14D)-1	0.55	57	2.4	<0.10	--		
			ANSC (PMW-14D)-2	1.6	59	2.7	0.15	--		
			Average Concentration (mg/L)	1.1	58	2.5	0.074	--		
			Standard Deviation (mmoles)	1.3E-03	2.2E-03	9.8E-04	2.3E-03	--		
	Average Total mmoles		0.0018	0.13	0.01	0.0017	1.4E-01			
Anaerobic Active Control (PMW-14D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.	
	14-Jan-14	0	ANAC (PMW-14D)-1	1.4	47	1.5	<0.10	--		
			ANAC (PMW-14D)-2	1.4	48	1.8	<0.10	--		
			Average Concentration (mg/L)	1.4	47	1.7	ND	--		
			Standard Deviation (mmoles)	9.4E-05	4.5E-04	8.9E-04	0.0E+00	--		
	Average Total mmoles		0.0024	0.11	0.0066	ND	1.2E-01			
	21-Jan-14	7	ANAC (PMW-14D)-1	1.4	49	1.6	<0.10	--		
			ANAC (PMW-14D)-2	1.8	55	2.1	<0.10	--		
			Average Concentration (mg/L)	1.6	52	1.9	ND	--		
			Standard Deviation (mmoles)	3.9E-04	9.6E-03	1.6E-03	0.0E+00	--		
	Average Total mmoles		0.0027	0.12	0.0074	ND	1.3E-01			
	04-Feb-14	21								Amended with SRS®-FR to a target concentration of 0.02 % as oil.
			ANAC (PMW-14D)-1	0.69	48	1.5	<0.10	--		
			ANAC (PMW-14D)-2	1.4	51	1.7	<0.10	--		
			Average Concentration (mg/L)	1.1	49	1.6	ND	--		
	Standard Deviation (mmoles)	9.1E-04	3.8E-03	6.4E-04	0.0E+00	--				
	Average Total mmoles		0.0018	0.11	0.0064	ND	1.2E-01			
	11-Feb-14	28	ANAC (PMW-14D)-1	<0.10	51	1.6	<0.10	--		
			ANAC (PMW-14D)-2	1.2	53	1.7	<0.10	--		
			Average Concentration (mg/L)	0.62	52	1.6	ND	--		
			Standard Deviation (mmoles)	1.5E-03	2.7E-03	1.8E-04	0.0E+00	--		
	Average Total mmoles		0.0011	0.12	0.0065	ND	1.3E-01			
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1 % as oil.	
	23-Apr-14	99	ANAC (PMW-14D)-1	<0.10	47	1.7	<0.10	--		
			ANAC (PMW-14D)-2	0.66	45	1.7	<0.10	--		
			Average Concentration (mg/L)	0.33	46	1.7	ND	--		
			Standard Deviation (mmoles)	7.9E-04	2.7E-03	8.8E-05	0.0E+00	--		
	Average Total mmoles		0.00056	0.1	0.0068	ND	1.1E-01			
	21-May-14	127	ANAC (PMW-14D)-1	<0.10	43	1.7	<0.10	--		
			ANAC (PMW-14D)-2	0.67	51	1.9	<0.10	--		
			Average Concentration (mg/L)	0.34	47	1.8	ND	--		
			Standard Deviation (mmoles)	8.1E-04	1.2E-02	6.5E-04	0.0E+00	--		
	Average Total mmoles		0.00058	0.1	0.007	ND	1.1E-01			
SRS®-FR and Ferrous Iron Amended (PMW-14D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.	
	13-Jan-14	-1							Amended with FeCl₂.	
	14-Jan-14	0							Amended with SRS®-FR to a target concentration of 0.02 % as oil.	

TABLE 2: SUMMARY OF cVOC AND ETHENE RESULTS
Ekonol Bedrock Site

Treatment	Date	Day	Replicate	Chlorinated Ethenes					Comment
				TCE	cDCE	VC	Ethene	Total Ethenes	
				mg/L	mg/L	mg/L	mg/L	mmol/bottle	
SRS®-FR and Ferrous Iron Amended (PMW-14D) Continued	14-Jan-14	0	SRS/Fe (PMW-14D)-1	2.4	53	1.6	<0.10	--	
			SRS/Fe (PMW-14D)-2	1.2	42	1.4	<0.10	--	
			Average Concentration (mg/L)	1.8	47	1.5	ND	--	
			Standard Deviation (mmoles)	1.5E-03	1.7E-02	6.9E-04	0.0E+00	--	
			Average Total mmoles	0.0031	0.11	0.0059	ND	1.2E-01	
	21-Jan-14	7	SRS/Fe (PMW-14D)-1	2.5	56	1.8	<0.10	--	
			SRS/Fe (PMW-14D)-2	1.4	50	1.7	<0.10	--	
			Average Concentration (mg/L)	1.9	53	1.7	ND	--	
			Standard Deviation (mmoles)	1.3E-03	9.9E-03	1.4E-04	0.0E+00	--	
			Average Total mmoles	0.0033	0.12	0.0069	ND	1.3E-01	
	11-Feb-14	28	SRS/Fe (PMW-14D)-1	2.4	57	1.8	<0.10	--	
			SRS/Fe (PMW-14D)-2	<0.10	49	1.6	<0.10	--	
			Average Concentration (mg/L)	1.2	53	1.7	ND	--	
			Standard Deviation (mmoles)	2.9E-03	1.3E-02	5.1E-04	0.0E+00	--	
			Average Total mmoles	0.0021	0.12	0.0067	ND	1.3E-01	
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1% as oil.
	23-Apr-14	99	SRS/Fe (PMW-14D)-1	0.32	57	1.8	<0.10	--	
			SRS/Fe (PMW-14D)-2	<0.10	43	4.4	<0.10	--	
			Average Concentration (mg/L)	0.16	50	3.1	ND	--	
			Standard Deviation (mmoles)	3.9E-04	2.2E-02	7.2E-03	0.0E+00	--	
			Average Total mmoles	0.00027	0.11	0.012	ND	1.2E-01	
	21-May-14	127	SRS/Fe (PMW-14D)-1	0.33	57	1.6	<0.10	--	
			SRS/Fe (PMW-14D)-2	<0.10	43	4.0	<0.10	--	
			Average Concentration (mg/L)	0.17	50	2.8	ND	--	
			Standard Deviation (mmoles)	4.0E-04	2.2E-02	6.7E-03	0.0E+00	--	
			Average Total mmoles	0.00029	0.11	0.011	ND	1.2E-01	
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 6.5 (PMW-14D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.
	13-Jan-14	-1							Amended with FeCl₂.
	14-Jan-14	0							Amended with SRS®-FR to a target concentration of 0.02 % as oil.
			SRS/Fe/pH 6.5 (PMW-14D)-1	2.5	52	1.6	<0.10	--	
			SRS/Fe/pH 6.5 (PMW-14D)-2	2.0	59	2.8	0.16	--	
			Average Concentration (mg/L)	2.2	55	2.2	0.082	--	
			Standard Deviation (mmoles)	6.1E-04	1.2E-02	3.5E-03	2.6E-03	--	
			Average Total mmoles	0.0038	0.12	0.0087	0.0018	1.3E-01	
	21-Jan-14	7	SRS/Fe/pH 6.5 (PMW-14D)-1	1.9	52	1.7	<0.10	--	
			SRS/Fe/pH 6.5 (PMW-14D)-2	1.8	59	2.8	0.15	--	
			Average Concentration (mg/L)	1.9	56	2.2	0.075	--	
			Standard Deviation (mmoles)	1.5E-04	1.1E-02	3.2E-03	2.4E-03	--	
			Average Total mmoles	0.0032	0.12	0.0088	0.0017	1.3E-01	
	11-Feb-14	28	SRS/Fe/pH 6.5 (PMW-14D)-1	<0.10	51	1.5	<0.10	--	
			SRS/Fe/pH 6.5 (PMW-14D)-2	<0.10	63	2.7	0.12	--	
			Average Concentration (mg/L)	ND	57	2.1	0.06	--	
			Standard Deviation (mmoles)	0.0E+00	1.9E-02	3.3E-03	1.9E-03	--	
			Average Total mmoles	ND	0.13	0.0083	0.0014	1.4E-01	
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1% as oil.
	23-Apr-14	99	SRS/Fe/pH 6.5 (PMW-14D)-1	<0.10	41	5.7	<0.10	--	
			SRS/Fe/pH 6.5 (PMW-14D)-2	<0.10	47	7.7	<0.10	--	
			Average Concentration (mg/L)	ND	44	6.7	ND	--	
			Standard Deviation (mmoles)	0.0E+00	9.4E-03	5.6E-03	0.0E+00	--	
			Average Total mmoles	ND	0.097	0.027	ND	1.2E-01	
	21-May-14	127	SRS/Fe/pH 6.5 (PMW-14D)-1	<0.10	42	6.1	<0.10	--	
			SRS/Fe/pH 6.5 (PMW-14D)-2	<0.10	48	7.2	<0.10	--	
			Average Concentration (mg/L)	ND	45	6.7	ND	--	
			Standard Deviation (mmoles)	0.0E+00	9.1E-03	3.2E-03	0.0E+00	--	
			Average Total mmoles	ND	0.1	0.026	ND	1.3E-01	
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.
	13-Jan-14	-1							Amended with FeCl₂.
	14-Jan-14	0							Amended with SRS®-FR to a target concentration of 0.02 % as oil.
			SRS/Fe/pH 7.0 (PMW-14D)-1	2.3	51	1.4	<0.10	--	
			SRS/Fe/pH 7.0 (PMW-14D)-2	1.2	54	3.2	0.19	--	
			Average Concentration (mg/L)	1.8	53	2.3	0.094	--	
			Standard Deviation (mmoles)	1.4E-03	5.4E-03	5.0E-03	3.0E-03	--	
			Average Total mmoles	0.003	0.12	0.0092	0.0021	1.3E-01	

TABLE 2: SUMMARY OF cVOC AND ETHENE RESULTS
Ekonol Bedrock Site

Treatment	Date	Day	Replicate	Chlorinated Ethenes					Comment	
				TCE	cDCE	VC	Ethene	Total Ethenes		
				mg/L	mg/L	mg/L	mg/L	mmol/bottle		
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D) Continued	21-Jan-14	7	SRS/Fe/pH 7.0 (PMW-14D)-1	2.1	51	1.4	<0.10	--		
			SRS/Fe/pH 7.0 (PMW-14D)-2	1.2	55	3.2	0.17	--		
			Average Concentration (mg/L)	1.7	53	2.3	0.086	--		
			Standard Deviation (mmoles)	1.1E-03	6.1E-03	5.1E-03	2.7E-03	--		
			Average Total mmoles	0.0029	0.12	0.0093	0.0019	1.3E-01		
	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-14D)-1	<0.10	55	1.7	<0.10	--		
			SRS/Fe/pH 7.0 (PMW-14D)-2	<0.10	54	3.5	0.15	--		
			Average Concentration (mg/L)	ND	55	2.6	0.076	--		
			Standard Deviation (mmoles)	0.0E+00	9.8E-04	5.0E-03	2.4E-03	--		
			Average Total mmoles	ND	0.12	0.01	0.0017	1.3E-01		
	07-Apr-14	83								Amended with SRS®-FR to a target concentration of 0.1% as oil.
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-14D)-1	<0.10	34	12	<0.10	--		
			SRS/Fe/pH 7.0 (PMW-14D)-2	<0.10	25	19	0.14	--		
			Average Concentration (mg/L)	ND	29	15	0.072	--		
			Standard Deviation (mmoles)	0.0E+00	1.3E-02	2.1E-02	2.3E-03	--		
			Average Total mmoles	ND	0.065	0.06	0.0016	1.3E-01		
	21-May-14	127	SRS/Fe/pH 7.0 (PMW-14D)-1	<0.10	23	19	<0.10	--		
			SRS/Fe/pH 7.0 (PMW-14D)-2	<0.10	<0.10	30	0.46	--		
Average Concentration (mg/L)			ND	11	24	0.23	--			
Standard Deviation (mmoles)			0.0E+00	3.5E-02	2.9E-02	7.2E-03	--			
Average Total mmoles			ND	0.025	0.097	0.0051	1.3E-01			
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.	
	13-Jan-14	-1							Amended with FeCl ₂ .	
	14-Jan-14	0							Amended with Nitrogen to a target concentration of 10 mg/L.	
									Amended with Phosphate to a target concentration of 1 mg/L.	
									Amended with SRS®-FR to a target concentration of 0.02 % as oil.	
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	1.1	51	2.9	0.17	--		
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	1.2	52	3.2	0.19	--		
			Average Concentration (mg/L)	1.1	52	3.1	0.18	--		
			Standard Deviation (mmoles)	9.4E-05	1.7E-03	8.0E-04	4.3E-04	--		
			Average Total mmoles	0.002	0.11	0.012	0.004	1.3E-01		
	21-Jan-14	7	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	0.98	51	2.9	0.18	--		
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	1.2	56	3.4	0.21	--		
			Average Concentration (mg/L)	1.1	53	3.2	0.19	--		
			Standard Deviation (mmoles)	2.1E-04	7.6E-03	1.4E-03	4.7E-04	--		
			Average Total mmoles	0.0018	0.12	0.013	0.0043	1.4E-01		
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	<0.10	45	11	0.20	--		
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	<0.10	44	12	0.17	--		
			Average Concentration (mg/L)	ND	44	11	0.19	--		
			Standard Deviation (mmoles)	0.0E+00	9.7E-04	4.2E-03	5.3E-04	--		
			Average Total mmoles	ND	0.099	0.045	0.0042	1.5E-01		
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1% as oil.	
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	<0.10	<0.10	16	2.4	--		
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	<0.10	<0.10	19	2.1	--		
			Average Concentration (mg/L)	ND	ND	17	2.3	--		
			Standard Deviation (mmoles)	0.0E+00	0.0E+00	7.7E-03	5.4E-03	--		
			Average Total mmoles	ND	ND	0.069	0.051	1.2E-01		
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	<0.10	<0.10	<0.10	6.4	--		
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	<0.10	<0.10	<0.10	4.3	--		
Average Concentration (mg/L)			ND	ND	ND	5.4	--			
Standard Deviation (mmoles)			0.0E+00	0.0E+00	0.0E+00	3.3E-02	--			
Average Total mmoles			ND	ND	ND	0.12	1.2E-01			
Anaerobic Active Control (PMW-2D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.	
	14-Jan-14	0	ANAC (PMW-2D)-1	6.9	150	2.6	<0.10	--		
			ANAC (PMW-2D)-2	8.1	160	3.2	<0.10	--		
			Average Concentration (mg/L)	7.5	150	2.9	ND	--		
			Standard Deviation (mmoles)	1.5E-03	2.7E-02	1.8E-03	0.0E+00	--		
			Average Total mmoles	0.013	0.34	0.011	ND	3.6E-01		
	21-Jan-14	7	ANAC (PMW-2D)-1	0.63	150	2.5	<0.10	--		
			ANAC (PMW-2D)-2	1.3	160	3.0	<0.10	--		
			Average Concentration (mg/L)	0.96	150	2.8	ND	--		
			Standard Deviation (mmoles)	8.0E-04	2.8E-02	1.3E-03	0.0E+00	--		
Average Total mmoles			0.0016	0.34	0.011	ND	3.5E-01			

TABLE 2: SUMMARY OF cVOC AND ETHENE RESULTS
Ekonol Bedrock Site

Treatment	Date	Day	Replicate	Chlorinated Ethenes					Comment
				TCE	cDCE	VC	Ethene	Total Ethenes	
				mg/L	mg/L	mg/L	mg/L	mmol/bottle	
Anaerobic Active Control (PMW-2D) Continued	04-Feb-14	21							Amended with SRS®-FR to a target concentration of 0.02 % as oil.
			ANAC (PMW-2D)-1	0.34	160	2.7	<0.10	--	
			ANAC (PMW-2D)-2	0.11	170	3.2	<0.10	--	
			Average Concentration (mg/L)	0.22	170	2.9	ND	--	
			Standard Deviation (mmoles)	2.8E-04	2.1E-02	1.5E-03	0.0E+00	--	
			Average Total mmoles	0.00038	0.37	0.012	ND	3.8E-01	
	11-Feb-14	28	ANAC (PMW-2D)-1	<0.10	160	2.6	<0.10	--	
			ANAC (PMW-2D)-2	<0.10	170	3	<0.10	--	
			Average Concentration (mg/L)	ND	160	2.8	ND	--	
			Standard Deviation (mmoles)	0.0E+00	1.6E-02	8.7E-04	0.0E+00	--	
			Average Total mmoles	ND	0.37	0.011	ND	3.8E-01	
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1% as oil.
	23-Apr-14	99	ANAC (PMW-2D)-1	<0.10	140	2.4	<0.10	--	
			ANAC (PMW-2D)-2	0.11	140	2.5	<0.10	--	
			Average Concentration (mg/L)	0.057	140	2.4	ND	--	
			Standard Deviation (mmoles)	1.4E-04	3.5E-03	1.2E-04	0.0E+00	--	
			Average Total mmoles	0.000097	0.32	0.0097	ND	3.3E-01	
	21-May-14	127	ANAC (PMW-2D)-1	<0.10	140	2.4	<0.10	--	
			ANAC (PMW-2D)-2	<0.10	160	2.7	<0.10	--	
			Average Concentration (mg/L)	ND	150	2.5	ND	--	
			Standard Deviation (mmoles)	0.0E+00	2.2E-02	7.9E-04	0.0E+00	--	
			Average Total mmoles	ND	0.33	0.01	ND	3.4E-01	
SRS®-FR and Ferrous Iron Amended (PMW-2D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.
	13-Jan-14	-1							Amended with FeCl₂.
	14-Jan-14	0							Amended with SRS®-FR to a target concentration of 0.02 % as oil.
			SRS/Fe (PMW-2D)-1	3.5	93	1.6	<0.10	--	
			SRS/Fe (PMW-2D)-2	7.9	140	2.4	<0.10	--	
			Average Concentration (mg/L)	5.7	120	2.0	ND	--	
			Standard Deviation (mmoles)	5.3E-03	7.7E-02	2.2E-03	0.0E+00	--	
			Average Total mmoles	0.0097	0.26	0.0078	ND	2.8E-01	
	21-Jan-14	7	SRS/Fe (PMW-2D)-1	0.88	110	1.6	<0.10	--	
			SRS/Fe (PMW-2D)-2	6.0	140	2.5	<0.10	--	
			Average Concentration (mg/L)	3.4	130	2.1	ND	--	
			Standard Deviation (mmoles)	6.2E-03	5.7E-02	2.5E-03	0.0E+00	--	
			Average Total mmoles	0.0059	0.28	0.0082	ND	2.9E-01	
	11-Feb-14	28	SRS/Fe (PMW-2D)-1	0.46	110	1.6	<0.10	--	
			SRS/Fe (PMW-2D)-2	5.5	140	2.3	<0.10	--	
			Average Concentration (mg/L)	3.0	130	2.0	ND	--	
			Standard Deviation (mmoles)	6.1E-03	5.0E-02	1.9E-03	0.0E+00	--	
			Average Total mmoles	0.0051	0.28	0.0078	ND	2.9E-01	
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1% as oil.
	23-Apr-14	99	SRS/Fe (PMW-2D)-1	0.34	110	1.7	<0.10	--	
			SRS/Fe (PMW-2D)-2	0.65	140	2.4	<0.10	--	
			Average Concentration (mg/L)	0.49	130	2.0	ND	--	
			Standard Deviation (mmoles)	3.8E-04	5.5E-02	2.1E-03	0.0E+00	--	
			Average Total mmoles	0.00084	0.28	0.008	ND	2.9E-01	
	21-May-14	127	SRS/Fe (PMW-2D)-1	0.33	100	1.5	<0.10	--	
			SRS/Fe (PMW-2D)-2	0.43	140	2.1	<0.10	--	
			Average Concentration (mg/L)	0.38	120	1.8	ND	--	
			Standard Deviation (mmoles)	1.1E-04	4.9E-02	1.6E-03	0.0E+00	--	
			Average Total mmoles	0.00065	0.27	0.0072	ND	2.8E-01	
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.
	13-Jan-14	-1							Amended with FeCl₂.
	14-Jan-14	0							Amended with SRS®-FR to a target concentration of 0.02 % as oil.
			SRS/Fe/pH 7.0 (PMW-2D)-1	2.7	84	3.2	<0.10	--	
			SRS/Fe/pH 7.0 (PMW-2D)-2	3.3	94	4.6	<0.10	--	
			Average Concentration (mg/L)	3.0	89	3.9	ND	--	
			Standard Deviation (mmoles)	6.4E-04	1.5E-02	3.9E-03	0.0E+00	--	
			Average Total mmoles	0.0051	0.2	0.015	ND	2.2E-01	
	21-Jan-14	7	SRS/Fe/pH 7.0 (PMW-2D)-1	1.4	81	3.1	<0.10	--	
			SRS/Fe/pH 7.0 (PMW-2D)-2	0.55	95	4.4	<0.10	--	
			Average Concentration (mg/L)	0.99	88	3.7	ND	--	
			Standard Deviation (mmoles)	1.1E-03	2.1E-02	3.6E-03	0.0E+00	--	
			Average Total mmoles	0.0017	0.2	0.015	ND	2.2E-01	

TABLE 2: SUMMARY OF cVOC AND ETHENE RESULTS
Ekonol Bedrock Site

Treatment	Date	Day	Replicate	Chlorinated Ethenes					Comment
				TCE	cDCE	VC	Ethene	Total Ethenes	
				mg/L	mg/L	mg/L	mg/L	mmol/bottle	
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D) Continued	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-2D)-1	0.71	85	3.1	<0.10	--	
			SRS/Fe/pH 7.0 (PMW-2D)-2	<0.10	97	4.2	<0.10	--	
			Average Concentration (mg/L)	0.36	91	3.7	ND	--	
			Standard Deviation (mmoles)	8.6E-04	1.9E-02	3.1E-03	0.0E+00	--	
			Average Total mmoles	0.00061	0.2	0.014	ND	2.1E-01	
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1% as oil.
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-2D)-1	0.46	80	3.0	<0.10	--	
			SRS/Fe/pH 7.0 (PMW-2D)-2	<0.10	92	4.0	<0.10	--	
			Average Concentration (mg/L)	0.23	86	3.5	ND	--	
			Standard Deviation (mmoles)	5.5E-04	1.8E-02	2.8E-03	0.0E+00	--	
			Average Total mmoles	0.00039	0.19	0.014	ND	2.0E-01	
	21-May-14	127	SRS/Fe/pH 7.0 (PMW-2D)-1	0.48	83	3.0	<0.10	--	
			SRS/Fe/pH 7.0 (PMW-2D)-2	<0.10	90	3.9	<0.10	--	
			Average Concentration (mg/L)	0.24	86	3.4	ND	--	
			Standard Deviation (mmoles)	5.9E-04	1.2E-02	2.6E-03	0.0E+00	--	
			Average Total mmoles	0.00041	0.19	0.014	ND	2.0E-01	
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	09-Jan-14	-5							Amended first replicate with 100 µL of resazurin.
	13-Jan-14	-1							Amended with FeCl ₂ .
	14-Jan-14	0							Amended with Nitrogen to a target concentration of 10 mg/L.
									Amended with Phosphate to a target concentration of 1 mg/L.
									Amended with SRS®-FR to a target concentration of 0.02 % as oil.
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	3.0	94	4.3	<0.10	--	
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	2.6	92	4.0	<0.10	--	
			Average Concentration (mg/L)	2.8	93	4.2	ND	--	
			Standard Deviation (mmoles)	4.0E-04	3.7E-03	8.4E-04	0.0E+00	--	
			Average Total mmoles	0.0048	0.21	0.017	ND	2.3E-01	
	21-Jan-14	7	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	1.6	94	4.5	<0.10	--	
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	0.15	96	4.0	<0.10	--	
			Average Concentration (mg/L)	0.87	95	4.2	ND	--	
			Standard Deviation (mmoles)	1.7E-03	3.5E-03	1.6E-03	0.0E+00	--	
			Average Total mmoles	0.0015	0.21	0.017	ND	2.3E-01	
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	0.60	98	4.3	<0.10	--	
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	<0.10	95	3.7	<0.10	--	
			Average Concentration (mg/L)	0.30	97	4.0	ND	--	
			Standard Deviation (mmoles)	7.2E-04	4.5E-03	1.6E-03	0.0E+00	--	
			Average Total mmoles	0.00051	0.22	0.016	ND	2.4E-01	
	07-Apr-14	83							Amended with SRS®-FR to a target concentration of 0.1% as oil.
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	0.13	42	6.5	<0.10	--	
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	<0.10	60	21	<0.10	--	
			Average Concentration (mg/L)	0.063	51	14	ND	--	
			Standard Deviation (mmoles)	1.5E-04	2.8E-02	4.0E-02	0.0E+00	--	
			Average Total mmoles	0.00011	0.11	0.054	ND	1.6E-01	
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	<0.10	4.4	54	<0.10	--	
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	<0.10	<0.10	46	0.33	--	
			Average Concentration (mg/L)	ND	2.2	50	0.16	--	
			Standard Deviation (mmoles)	0.0E+00	6.9E-03	2.1E-02	5.2E-03	--	
			Average Total mmoles	ND	0.0049	0.2	0.0037	2.1E-01	

Notes: -- not analyzed
% - percent
< - compound not detected, the associated value is the detection limit
ANAC - anaerobic active control
ANSC - anaerobic sterile control
cDCE - cis-1,2-dichloroethene
Fe - iron
mg/L - milligrams per liter
mmoles - millimoles
mmoles/bottle - millimoles per bottle
ND - not detected
TCE - trichloroethene
VC - vinyl chloride

TABLE 3: SUMMARY OF MICROCOSM ANION RESULTS

Ekonol Bedrock Site

SIREM

Treatment	Date	Day	Treatment Replicate	Total VFAs	Chloride	Nitrite-N	Nitrate-N	Sulfate	Phosphate
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Anaerobic Sterile Control (PMW-14D)	14-Jan-14	0	ANSC (PMW-14D)-1	530	326	<0.09	<0.09	20	<0.07
			ANSC (PMW-14D)-2	531	334	<0.09	<0.09	22	2.3
			Average Concentration	531	330	ND	ND	21	1.1
	11-Feb-14	28	ANSC (PMW-14D)-1	466	348	<0.09	<0.09	21	<0.07
			ANSC (PMW-14D)-2	473	352	<0.09	<0.09	23	3.1
			Average Concentration	469	350	ND	ND	22	1.5
	23-Apr-14	99	ANSC (PMW-14D)-1	552	369	<0.09	0.43	19	<0.07
			ANSC (PMW-14D)-2	568	388	<0.09	<0.09	21	<0.07
			Average Concentration	560	379	ND	0.22	20	ND
	21-May-14	127	ANSC (PMW-14D)-1	535	336	<0.09	<0.09	19	<0.07
			ANSC (PMW-14D)-2	581	378	<0.09	<0.09	21	1.7
			Average Concentration	558	357	ND	ND	20	0.85
Anaerobic Active Control (PMW-14D)	14-Jan-14	0	ANAC (PMW-14D)-1	562	260	<0.09	0.18	21	2.6
			ANAC (PMW-14D)-2	560	261	<0.09	0.21	21	3.1
			Average Concentration	561	260	ND	0.19	21	2.9
	11-Feb-14	28	ANAC (PMW-14D)-1	414	226	<0.09	<0.09	3.6	4.0
			ANAC (PMW-14D)-2	419	234	<0.09	0.19	2.2	1.6
			Average Concentration	416	230	ND	0.10	2.9	2.8
	23-Apr-14	99	ANAC (PMW-14D)-1	584	252	<0.09	0.34	2.9	<0.07
			ANAC (PMW-14D)-2	576	252	<0.09	0.40	1.7	<0.07
			Average Concentration	580	252	ND	0.37	2.3	ND
	21-May-14	127	ANAC (PMW-14D)-1	588	256	<0.09	0.11	3.6	2.2
			ANAC (PMW-14D)-2	585	248	<0.09	<0.09	3.2	1.6
			Average Concentration	586	252	ND	0.06	3.4	1.9
SRS®-FR and Ferrous Iron Amended (PMW-14D)	14-Jan-14	0	SRS/Fe (PMW-14D)-1	521	414	<0.09	0.17	18	2.0
			SRS/Fe (PMW-14D)-2	573	442	<0.09	0.14	21	1.9
			Average Concentration	547	428	ND	0.16	20	2.0
	11-Feb-14	28	SRS/Fe (PMW-14D)-1	410	360	<0.09	0.15	0.63	1.8
			SRS/Fe (PMW-14D)-2	451	395	<0.09	0.16	1.3	2.1
			Average Concentration	431	378	ND	0.16	0.95	1.9
	23-Apr-14	99	SRS/Fe (PMW-14D)-1	570	441	<0.09	0.14	0.59	<0.07
			SRS/Fe (PMW-14D)-2	581	426	<0.09	0.18	0.56	<0.07
			Average Concentration	576	434	ND	0.16	0.58	ND
	21-May-14	127	SRS/Fe (PMW-14D)-1	558	415	<0.09	<0.09	1.6	1.4
			SRS/Fe (PMW-14D)-2	648	461	<0.09	<0.09	1.5	1.2
			Average Concentration	603	438	ND	ND	1.5	1.3
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 6.5 (PMW-14D)	14-Jan-14	0	SRS/Fe/pH 6.5 (PMW-14D)-1	514	395	<0.09	0.12	17	2.5
			SRS/Fe/pH 6.5 (PMW-14D)-2	528	408	<0.09	0.11	18	1.8
			Average Concentration	521	402	ND	0.11	17	2.1
	11-Feb-14	28	SRS/Fe/pH 6.5 (PMW-14D)-1	467	417	<0.09	0.35	1.3	2.5
			SRS/Fe/pH 6.5 (PMW-14D)-2	446	432	<0.09	0.18	1.1	<0.07
			Average Concentration	456	424	ND	0.26	1.2	1.3
	23-Apr-14	99	SRS/Fe/pH 6.5 (PMW-14D)-1	560	424	<0.09	0.32	0.52	<0.07
			SRS/Fe/pH 6.5 (PMW-14D)-2	592	460	<0.09	0.12	0.54	<0.07
			Average Concentration	576	442	ND	0.22	0.53	ND
	21-May-14	127	SRS/Fe/pH 6.5 (PMW-14D)-1	612	446	<0.09	<0.09	1.3	1.5
			SRS/Fe/pH 6.5 (PMW-14D)-2	575	435	<0.09	<0.09	1.1	1.5
			Average Concentration	594	440	ND	ND	1.2	1.5

TABLE 3: SUMMARY OF MICROCOSM ANION RESULTS
Ekonomol Bedrock Site

Treatment	Date	Day	Treatment Replicate	Total VFAs	Chloride	Nitrite-N	Nitrate-N	Sulfate	Phosphate
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	14-Jan-14	0	SRS/Fe/pH 7.0 (PMW-14D)-1	509	395	<0.09	0.19	17	1.9
			SRS/Fe/pH 7.0 (PMW-14D)-2	529	384	<0.09	0.16	16	1.9
			Average Concentration	519	389	ND	0.17	16	1.9
	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-14D)-1	408	385	<0.09	0.10	0.90	3.3
			SRS/Fe/pH 7.0 (PMW-14D)-2	480	440	<0.09	<0.09	0.72	1.9
			Average Concentration	444	413	ND	0.05	0.81	2.6
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-14D)-1	579	444	<0.09	0.10	0.53	<0.07
			SRS/Fe/pH 7.0 (PMW-14D)-2	726	597	<0.09	<0.09	0.72	<0.07
			Average Concentration	652	521	ND	0.05	0.63	ND
	21-May-14	127	SRS/Fe/pH 7.0 (PMW-14D)-1	577	418	<0.09	<0.09	1.2	1.4
			SRS/Fe/pH 7.0 (PMW-14D)-2	576	431	<0.09	<0.09	1.0	1.2
			Average Concentration	576	424	ND	ND	1.1	1.3
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	14-Jan-14	0	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	586	472	<0.09	0.15	17	<0.07
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	564	459	<0.09	0.33	18	2.4
			Average Concentration	575	466	ND	0.24	18	1.2
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	492	471	<0.09	<0.09	0.72	<0.07
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	516	537	<0.09	<0.09	0.67	2.4
			Average Concentration	504	504	ND	ND	0.70	1.2
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	627	484	<0.09	1.1	3.3	<0.07
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	649	529	<0.09	0.42	5.9	<0.07
			Average Concentration	638	506	ND	0.77	4.6	ND
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	663	525	<0.09	0.11	3.6	<0.07
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	623	479	<0.09	0.14	1.2	1.6
			Average Concentration	643	502	ND	0.13	2.4	0.82
Anaerobic Active Control (PMW-2D)	14-Jan-14	0	ANAC (PMW-2D)-1	509	519	<0.09	0.49	213	2.5
			ANAC (PMW-2D)-2	498	508	<0.09	0.36	214	1.9
			Average Concentration	504	514	ND	0.43	213	2.2
	11-Feb-14	28	ANAC (PMW-2D)-1	437	516	<0.09	<0.09	151	3.8
			ANAC (PMW-2D)-2	420	483	<0.09	0.13	139	0.71
			Average Concentration	429	499	ND	0.06	145	2.3
	23-Apr-14	99	ANAC (PMW-2D)-1	633	526	<0.09	0.59	6.0	<0.07
			ANAC (PMW-2D)-2	578	522	<0.09	<0.09	6.3	0.17
			Average Concentration	606	524	ND	0.29	6.1	0.09
	21-May-14	127	ANAC (PMW-2D)-1	628	477	<0.09	0.16	9.7	2.1
			ANAC (PMW-2D)-2	551	471	<0.09	0.17	3.9	<0.07
			Average Concentration	590	474	ND	0.16	6.8	1.0
SRS®-FR and Ferrous Iron Amended (PMW-2D)	14-Jan-14	0	SRS/Fe (PMW-2D)-1	444	1382	<0.09	0.42	235	1.4
			SRS/Fe (PMW-2D)-2	478	1523	<0.09	0.12	196	0.71
			Average Concentration	461	1452	ND	0.27	215	1.0
	11-Feb-14	28	SRS/Fe (PMW-2D)-1	434	1788	<0.09	<0.09	161	<0.07
			SRS/Fe (PMW-2D)-2	460	1710	<0.09	<0.09	151	<0.07
			Average Concentration	447	1749	ND	ND	156	ND
	23-Apr-14	99	SRS/Fe (PMW-2D)-1	499	1431	<0.09	0.28	5.7	<0.07
			SRS/Fe (PMW-2D)-2	562	1699	<0.09	0.11	4.2	<0.07
			Average Concentration	530	1565	ND	0.20	4.9	ND
	21-May-14	127	SRS/Fe (PMW-2D)-1	481	1297	<0.09	0.23	3.3	<0.07
			SRS/Fe (PMW-2D)-2	516	1448	<0.09	0.16	2.5	<0.07
			Average Concentration	498	1373	ND	0.20	2.9	ND

TABLE 3: SUMMARY OF MICROCOSM ANION RESULTS
EkonoI Bedrock Site

Treatment	Date	Day	Treatment Replicate	Total VFAs	Chloride	Nitrite-N	Nitrate-N	Sulfate	Phosphate
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	14-Jan-14	0	SRS/Fe/pH 7.0 (PMW-2D)-1	279	1465	<0.09	0.38	309	0.84
			SRS/Fe/pH 7.0 (PMW-2D)-2	324	1752	<0.09	0.26	394	0.47
			Average Concentration	301	1608	ND	0.32	352	0.66
	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-2D)-1	341	1498	<0.09	0.17	274	<0.07
			SRS/Fe/pH 7.0 (PMW-2D)-2	287	1618	<0.09	<0.09	290	<0.07
			Average Concentration	314	1558	ND	0.09	282	ND
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-2D)-1	487	1584	<0.09	1.3	62	<0.07
			SRS/Fe/pH 7.0 (PMW-2D)-2	532	2045	<0.09	1.2	167	<0.07
			Average Concentration	509	1814	ND	1.2	115	ND
	21-May-14	127	SRS/Fe/pH 7.0 (PMW-2D)-1	604	1803	<0.09	0.20	1.3	<0.07
			SRS/Fe/pH 7.0 (PMW-2D)-2	506	1549	<0.09	0.16	14	3.5
			Average Concentration	555	1676	ND	0.18	7.6	1.7
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	14-Jan-14	0	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	339	1910	<0.09	0.16	432	0.88
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	309	1754	<0.09	0.27	359	0.67
			Average Concentration	324	1832	ND	0.22	395	0.77
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	303	1779	<0.09	0.26	318	<0.07
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	303	1727	<0.09	0.37	290	<0.07
			Average Concentration	303	1753	ND	0.32	304	ND
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	606	1858	<0.09	0.46	0.55	<0.07
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	619	2006	<0.09	0.24	0.28	<0.07
			Average Concentration	612	1932	ND	0.35	0.42	ND
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	624	1805	<0.09	<0.09	0.79	0.82
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	574	1762	<0.09	0.13	1.0	4.3
			Average Concentration	599	1784	ND	0.07	0.92	2.6

Notes:
< - compound not detected, the associated value is the detection limit
ANAC - anaerobic active control
ANSC - anaerobic sterile control
Fe - iron
mg/L - milligrams per liter
ND - not detected
VFAs - total volatile fatty acids, calibrated as lactate but may include other VFAs such as formate, acetate, propionate, pyruvate and butyrate

TABLE 4: SUMMARY OF MICROCOSM VFA RESULTS
Ekonol Bedrock Site

Treatment	Date	Day	Treatment Replicate	Lactate	Acetate	Propionate	Formate	Butyrate	Pyruvate
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Anaerobic Active Control (PMW-14D)	11-Feb-14	28	ANAC (PMW-14D)-1	<0.39	614	123	<0.22	118	51
			ANAC (PMW-14D)-2	<0.39	603	119	<0.22	114	44
			Average Concentration	ND	609	121	ND	116	47
	23-Apr-14	99	ANAC (PMW-14D)-1	<0.39	604	158	2.3	126	40
			ANAC (PMW-14D)-2	<0.39	651	170	2.3	136	40
			Average Concentration	ND	627	164	2.3	131	40
	21-May-14	127	ANAC (PMW-14D)-1	<0.39	542	160	<0.22	102	30
			ANAC (PMW-14D)-2	<0.39	689	206	<0.22	145	40
			Average Concentration	ND	615	183	ND	124	35
SRS®-FR and Ferrous Iron Amended (PMW-14D)	14-Jan-14	0	SRS/Fe (PMW-14D)-1	2.1	579	127	2.0	110	34
			SRS/Fe (PMW-14D)-2	1.8	615	133	2.4	120	33
			Average Concentration	1.9	597	130	2.2	115	34
	11-Feb-14	28	SRS/Fe (PMW-14D)-1	<0.39	617	131	<0.22	113	49
			SRS/Fe (PMW-14D)-2	<0.39	630	128	<0.22	121	52
			Average Concentration	ND	624	130	ND	117	50
	23-Apr-14	99	SRS/Fe (PMW-14D)-1	<0.39	604	186	2.4	146	36
			SRS/Fe (PMW-14D)-2	<0.39	604	188	2.3	122	36
			Average Concentration	ND	604	187	2.4	134	36
	21-May-14	127	SRS/Fe (PMW-14D)-1	<0.39	619	191	<0.22	153	33
			SRS/Fe (PMW-14D)-2	<0.39	633	212	<0.22	126	36
			Average Concentration	ND	626	202	ND	139	35
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 6.5 (PMW-14D)	14-Jan-14	0	SRS/Fe/pH 6.5 (PMW-14D)-1	1.6	607	132	2.3	118	36
			SRS/Fe/pH 6.5 (PMW-14D)-2	1.3	620	137	2.5	125	38
			Average Concentration	1.5	613	135	2.4	122	37
	11-Feb-14	28	SRS/Fe/pH 6.5 (PMW-14D)-1	<0.39	641	126	<0.22	118	52
			SRS/Fe/pH 6.5 (PMW-14D)-2	<0.39	609	127	<0.22	117	50
			Average Concentration	ND	625	127	ND	118	51
	23-Apr-14	99	SRS/Fe/pH 6.5 (PMW-14D)-1	<0.39	611	181	2.4	116	34
			SRS/Fe/pH 6.5 (PMW-14D)-2	<0.39	619	200	2.4	133	38
			Average Concentration	ND	615	191	2.4	124	36
	21-May-14	127	SRS/Fe/pH 6.5 (PMW-14D)-1	<0.39	599	195	<0.22	110	32
			SRS/Fe/pH 6.5 (PMW-14D)-2	<0.39	604	197	<0.22	151	35
			Average Concentration	ND	601	196	ND	130	34
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	14-Jan-14	0	SRS/Fe/pH 7.0 (PMW-14D)-1	0.79	588	126	2.0	109	32
			SRS/Fe/pH 7.0 (PMW-14D)-2	0.75	648	142	2.4	132	37
			Average Concentration	0.77	618	134	2.2	121	34
	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-14D)-1	<0.39	641	128	0.76	117	51
			SRS/Fe/pH 7.0 (PMW-14D)-2	<0.39	591	122	1.2	113	49
			Average Concentration	ND	616	125	1.0	115	50
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-14D)-1	<0.39	629	170	2.3	105	34
			SRS/Fe/pH 7.0 (PMW-14D)-2	<0.39	616	144	2.3	112	36
			Average Concentration	ND	622	157	2.3	108	35
	21-May-14	127	SRS/Fe/pH 7.0 (PMW-14D)-1	<0.39	624	168	<0.22	103	32
			SRS/Fe/pH 7.0 (PMW-14D)-2	<0.39	703	158	1.2	131	39
			Average Concentration	ND	664	163	0.6	117	35

TABLE 4: SUMMARY OF MICROCOSM VFA RESULTS
Ekonomol Bedrock Site

Treatment	Date	Day	Treatment Replicate	Lactate	Acetate	Propionate	Formate	Butyrate	Pyruvate
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	14-Jan-14	0	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	0.72	635	142	2.4	132	39
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	0.74	607	137	2.2	126	38
			Average Concentration	0.73	621	139	2.3	129	39
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	<0.39	609	126	1.9	116	50
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	<0.39	589	123	0.87	114	48
			Average Concentration	ND	599	124	1.4	115	49
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	<0.39	699	176	2.3	129	37
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	<0.39	750	197	2.8	143	43
			Average Concentration	ND	725	187	2.6	136	40
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	<0.39	707	167	<0.22	126	35
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	<0.39	716	179	<0.22	125	35
			Average Concentration	ND	712	173	ND	125	35
Anaerobic Active Control (PMW-2D)	11-Feb-14	28	ANAC (PMW-2D)-1	<0.39	569	4.8	1.1	47	14
			ANAC (PMW-2D)-2	<0.39	687	16	2.3	63	18
			Average Concentration	ND	628	11	1.7	55	16
	23-Apr-14	99	ANAC (PMW-2D)-1	<0.39	744	23	1.7	11	3.8
			ANAC (PMW-2D)-2	<0.39	770	4.2	2.2	16	7.7
			Average Concentration	ND	757	14	2.0	14	5.8
	21-May-14	127	ANAC (PMW-2D)-1	<0.39	719	25	2.7	33	<0.69
			ANAC (PMW-2D)-2	<0.39	761	4.9	1.1	49	7.3
			Average Concentration	ND	740	15	1.9	41	3.6
SRS®-FR and Ferrous Iron Amended (PMW-2D)	14-Jan-14	0	SRS/Fe (PMW-2D)-1	2.3	528	63	1.2	50	9.0
			SRS/Fe (PMW-2D)-2	2.2	595	74	1.2	58	10
			Average Concentration	2.3	562	69	1.2	54	9.7
	11-Feb-14	28	SRS/Fe (PMW-2D)-1	<0.39	515	0.41	<0.22	2.9	8.5
			SRS/Fe (PMW-2D)-2	<0.39	512	50	<0.22	13	12
			Average Concentration	ND	514	25	ND	7.7	10
	23-Apr-14	99	SRS/Fe (PMW-2D)-1	<0.39	738	2.0	1.7	4.1	3.5
			SRS/Fe (PMW-2D)-2	<0.39	749	3.1	1.8	2.1	2.2
			Average Concentration	ND	743	2.5	1.7	3.1	2.9
	21-May-14	127	SRS/Fe (PMW-2D)-1	<0.39	611	23	0.83	15	<0.69
			SRS/Fe (PMW-2D)-2	<0.39	705	21	0.78	6.8	<0.69
			Average Concentration	ND	658	22	0.80	11	ND
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	14-Jan-14	0	SRS/Fe/pH 7.0 (PMW-2D)-1	3.0	453	43	0.69	45	7.6
			SRS/Fe/pH 7.0 (PMW-2D)-2	4.4	378	35	0.47	34	5.8
			Average Concentration	3.7	416	39	0.58	39	6.7
	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-2D)-1	<0.39	422	<0.31	0.68	1.1	4.1
			SRS/Fe/pH 7.0 (PMW-2D)-2	<0.39	427	0.35	0.61	1.2	4.5
			Average Concentration	ND	425	0.17	0.65	1.1	4.3
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-2D)-1	<0.39	643	<0.31	0.79	3.2	1.8
			SRS/Fe/pH 7.0 (PMW-2D)-2	<0.39	604	<0.31	0.81	4.2	1.6
			Average Concentration	ND	624	ND	0.80	3.7	1.7
	21-May-14	127	SRS/Fe/pH 7.0 (PMW-2D)-1	<0.39	677	20	0.56	35	<0.69
			SRS/Fe/pH 7.0 (PMW-2D)-2	<0.39	657	<0.31	<0.22	4.3	<0.69
			Average Concentration	ND	667	10	0.28	20	ND

TABLE 4: SUMMARY OF MICROCOSM VFA RESULTS

Ekonol Bedrock Site

SiREM

Treatment	Date	Day	Treatment Replicate	Lactate	Acetate	Propionate	Formate	Butyrate	Pyruvate
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	14-Jan-14	0	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	2.8	333	31	0.45	30	4.9
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	2.7	312	29	0.41	28	4.7
			Average Concentration	2.8	322	30	0.43	29	4.8
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	<0.39	409	<0.31	0.30	<0.41	2.4
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	<0.39	383	<0.31	0.54	<0.41	2.9
			Average Concentration	ND	396	ND	0.42	ND	2.7
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	<0.39	735	61	<0.22	99	0.84
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	<0.39	734	68	<0.22	109	1.0
			Average Concentration	ND	734	64	ND	104	0.92
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	<0.39	683	57	0.34	102	<0.69
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	<0.39	682	61	4.3	102	0.86
			Average Concentration	ND	683	59	2.3	102	0.43

Notes:

ANAC - anaerobic active control
ANSC - anaerobic sterile control
Fe - iron
mg/L - milligrams per liter
ND - not detected
< - compound not detected, the associated value is the detection limit

TABLE 5: SUMMARY OF MICROCOSM pH, FERROUS IRON, SULFIDE AND TOC RESULTS

Ekonol Bedrock Site

SiREM

Treatment	Date	Day	Treatment Replicate	pH	Sacraficial Bottle pH	Fe ²⁺ (mg/L)	Sulfide (mg/L)	TOC (mg/L)
Anaerobic Sterile Control (PMW-14D)	14-Jan-14	0	ANSC (PMW-14D)-1	6.19	--	--	--	--
			ANSC (PMW-14D)-2	6.16	--	--	--	--
			Average Concentration	6.18	--	--	--	--
	21-Jan-14	7	ANSC (PMW-14D)-1	6.05	--	--	--	--
			ANSC (PMW-14D)-2	6.00	--	--	--	--
			Average Concentration	6.03	--	--	--	--
	11-Feb-14	28	ANSC (PMW-14D)-1	6.05	6.22	6.0	<0.20	--
			ANSC (PMW-14D)-2	6.03	6.24	8.0	0.62	--
			Average Concentration	6.04	6.23	7.0	0.31	--
	23-Apr-14	99	ANSC (PMW-14D)-1	5.97	6.37	2.0	<0.20	--
			ANSC (PMW-14D)-2	5.96	6.40	2.0	<0.20	--
			Average Concentration	5.97	6.39	2.0	ND	--
21-May-14	127	ANSC (PMW-14D)-1	6.08	6.17	5.0	<0.20	--	
		ANSC (PMW-14D)-2	6.06	6.14	10	2.2	--	
		Average Concentration	6.07	6.16	7.5	1.1	--	
Anaerobic Active Control (PMW-14D)	14-Jan-14	0	ANAC (PMW-14D)-1	6.46	--	0.0	51.8	--
			ANAC (PMW-14D)-2	6.44	--	2.0	39.9	--
			Average Concentration	6.45	--	1.0	45.9	--
	21-Jan-14	7	ANAC (PMW-14D)-1	6.38	--	--	--	--
			ANAC (PMW-14D)-2	6.38	--	--	--	--
			Average Concentration	6.38	--	--	--	--
	11-Feb-14	28	ANAC (PMW-14D)-1	6.40	6.40	0.0	1.9	--
			ANAC (PMW-14D)-2	6.32	6.28	0.0	7.8	--
			Average Concentration	6.36	6.34	0.0	4.9	--
	24-Mar-14	69	ANAC (PMW-14D)-1	--	--	--	--	589
			ANAC (PMW-14D)-2	--	--	--	--	504
			Average Concentration	--	--	--	--	547
	23-Apr-14	99	ANAC (PMW-14D)-1	6.18	6.59	2.0	<0.20	--
			ANAC (PMW-14D)-2	6.14	6.24	2.0	<0.20	--
			Average Concentration	6.16	6.42	2.0	ND	--
	21-May-14	127	ANAC (PMW-14D)-1	6.02	6.26	12	24	--
			ANAC (PMW-14D)-2	6.01	6.04	0.0	12	--
			Average Concentration	6.02	6.15	6.0	18	--
SRS®-FR and Ferrous Iron Amended (PMW-14D)	13-Jan-14	-1	SRS/Fe (PMW-14D)-1	6.17	--	--	--	--
			SRS/Fe (PMW-14D)-2	6.24	--	--	--	--
			Average Concentration	6.21	--	--	--	--
	14-Jan-14	0	SRS/Fe (PMW-14D)-1	6.22	--	7.0	--	--
			SRS/Fe (PMW-14D)-2	6.36	--	24	--	--
			Average Concentration	6.29	--	16	--	--
	21-Jan-14	7	SRS/Fe (PMW-14D)-1	6.07	--	--	--	--
			SRS/Fe (PMW-14D)-2	6.21	--	--	--	--
			Average Concentration	6.14	--	--	--	--
	11-Feb-14	28	SRS/Fe (PMW-14D)-1	5.97	6.05	10	0.52	--
			SRS/Fe (PMW-14D)-2	6.15	6.04	22	<0.20	--
			Average Concentration	6.06	6.05	16	0.26	--
	23-Apr-14	99	SRS/Fe (PMW-14D)-1	5.80	6.24	19	<0.20	--
			SRS/Fe (PMW-14D)-2	5.88	6.34	35	<0.20	--
			Average Concentration	5.84	6.29	27	ND	--
	21-May-14	127	SRS/Fe (PMW-14D)-1	5.65	6.00	24	<0.20	--
			SRS/Fe (PMW-14D)-2	5.73	5.70	28	2.2	--
			Average Concentration	5.69	5.85	26	1.1	--
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 6.5 (PMW-14D)	13-Jan-14	-1	SRS/Fe/pH 6.5 (PMW-14D)-1	6.14	--	--	--	--
			SRS/Fe/pH 6.5 (PMW-14D)-2	6.07	--	--	--	--
			Average Concentration	6.11	--	--	--	--
			Buffered with 0.5 mL of saturated sodium bicarbonate					
			SRS/Fe/pH 6.5 (PMW-14D)-1	6.46	--	--	--	--
			SRS/Fe/pH 6.5 (PMW-14D)-2	6.44	--	--	--	--
	14-Jan-14	0	Average Concentration	6.45	--	--	--	--
			SRS/Fe/pH 6.5 (PMW-14D)-1	6.58	--	2.0	--	--
			SRS/Fe/pH 6.5 (PMW-14D)-2	6.57	--	30	--	--
	21-Jan-14	7	Average Concentration	6.58	--	16	--	--
			SRS/Fe/pH 6.5 (PMW-14D)-1	6.45	--	--	--	--
			SRS/Fe/pH 6.5 (PMW-14D)-2	6.38	--	--	--	--
	11-Feb-14	28	Average Concentration	6.42	--	--	--	--
			SRS/Fe/pH 6.5 (PMW-14D)-1	6.44	6.24	14	1.4	--
			SRS/Fe/pH 6.5 (PMW-14D)-2	6.34	6.43	20	0.63	--
	23-Apr-14	99	Average Concentration	6.39	6.34	17	1.0	--
			SRS/Fe/pH 6.5 (PMW-14D)-1	6.16	6.49	12	<0.20	--
			SRS/Fe/pH 6.5 (PMW-14D)-2	6.14	6.50	19	<0.20	--
	9-May-14	115	Average Concentration	6.15	6.50	16	ND	--
			Buffered with 0.5 mL of saturated sodium bicarbonate					
			SRS/Fe/pH 6.5 (PMW-14D)-1	6.32	--	--	--	--
21-May-14	127	SRS/Fe/pH 6.5 (PMW-14D)-2	6.23	--	--	--	--	
		Average Concentration	6.28	--	--	--	--	
		SRS/Fe/pH 6.5 (PMW-14D)-1	6.26	6.31	13	5.0	--	
SRS®-FR, Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	13-Jan-14	-1	SRS/Fe/pH 6.5 (PMW-14D)-2	6.24	6.42	24	<0.20	--
			Average Concentration	6.25	6.37	19	2.5	--
			SRS/Fe/pH 7.0 (PMW-14D)-1	6.13	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-14D)-2	6.00	--	--	--	--
			Average Concentration	6.07	--	--	--	--
			Buffered with 2.0 mL of saturated sodium bicarbonate					
	14-Jan-14	0	SRS/Fe/pH 7.0 (PMW-14D)-1	7.03	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-14D)-2	6.80	--	--	--	--
			Average Concentration	6.92	--	--	--	--
	21-Jan-14	7	SRS/Fe/pH 7.0 (PMW-14D)-1	7.11	--	8.0	--	--
			SRS/Fe/pH 7.0 (PMW-14D)-2	6.85	--	14	--	--
			Average Concentration	6.98	--	11	--	--
	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-14D)-1	6.94	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-14D)-2	6.74	--	--	--	--
			Average Concentration	6.84	--	--	--	--
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-14D)-1	6.89	6.93	4.0	0.75	--
			SRS/Fe/pH 7.0 (PMW-14D)-2	6.76	6.86	6.0	<0.20	--
			Average Concentration	6.83	6.90	5.0	0.38	--
9-May-14 end	115	SRS/Fe/pH 7.0 (PMW-14D)-1	6.62	6.85	3.0	<0.20	--	
		SRS/Fe/pH 7.0 (PMW-14D)-2	6.69	6.68	22	<0.20	--	
		Average Concentration	6.66	6.77	13	ND	--	
21-May-14	127	Buffered with 1.0 mL of saturated sodium bicarbonate						
		SRS/Fe/pH 7.0 (PMW-14D)-1	6.80	--	--	--	--	
		SRS/Fe/pH 7.0 (PMW-14D)-2	6.88	--	--	--	--	
21-May-14	127	Average Concentration	6.84	--	--	--	--	
		SRS/Fe/pH 7.0 (PMW-14D)-1	6.80	7.43	22	<0.20	--	
		SRS/Fe/pH 7.0 (PMW-14D)-2	6.85	6.86	22	<0.20	--	
Average Concentration	6.83	7.15	22	ND	--			

TABLE 5: SUMMARY OF MICROCOSM pH, FERROUS IRON, SULFIDE AND TOC RESULTS

Ekonol Bedrock Site

SIREM

Treatment	Date	Day	Treatment Replicate	pH	Sacraficial Bottle pH	Fe ²⁺ (mg/L)	Sulfide (mg/L)	TOC (mg/L)
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	13-Jan-14	-1	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.06	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.02	--	--	--	--
			Average Concentration	6.04	--	--	--	--
			Buffered with 2.0 mL of saturated sodium bicarbonate					
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.85	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.83	--	--	--	--
			Average Concentration	6.84	--	--	--	--
	14-Jan-14	0	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.86	--	10	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.87	--	24	--	--
			Average Concentration	6.87	--	17	--	--
	21-Jan-14	7	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.78	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.76	--	--	--	--
			Average Concentration	6.77	--	--	--	--
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.71	7.18	4.0	<0.20	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.70	7.20	6.0	0.50	--
			Average Concentration	6.71	7.19	5.0	0.25	--
	24-Mar-14	69	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	--	--	--	--	531
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	--	--	--	--	194
			Average Concentration	--	--	--	--	363
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.48	6.73	20	<0.20	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.39	6.72	22	<0.20	--
			Average Concentration	6.44	6.73	21	ND	--
			Buffered with 1.5 mL of saturated sodium bicarbonate					
	9-May-14	115	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.83	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.85	--	--	--	--
			Average Concentration	6.84	--	--	--	--
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-1	6.82	6.94	19	<0.20	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-14D)-2	6.73	6.95	26	<0.20	--
			Average Concentration	6.78	6.95	23	ND	--
Anaerobic Active Control (PMW-2D)	14-Jan-14	0	ANAC (PMW-2D)-1	6.60	--	4.0	100	--
			ANAC (PMW-2D)-2	6.46	--	2.0	85	--
			Average Concentration	6.53	--	3.0	93	--
	21-Jan-14	7	ANAC (PMW-2D)-1	6.45	--	--	--	--
			ANAC (PMW-2D)-2	6.44	--	--	--	--
			Average Concentration	6.45	--	--	--	--
	11-Feb-14	28	ANAC (PMW-2D)-1	6.48	6.82	0.0	26	--
			ANAC (PMW-2D)-2	6.48	6.91	0.0	72	--
			Average Concentration	6.48	6.87	0.0	49	--
	24-Mar-14	69	ANAC (PMW-2D)-1	--	--	--	--	436
			ANAC (PMW-2D)-2	--	--	--	--	395
			Average Concentration	--	--	--	--	416
	23-Apr-14	99	ANAC (PMW-2D)-1	6.31	7.04	0.0	55	--
			ANAC (PMW-2D)-2	6.21	6.67	0.0	70	--
			Average Concentration	6.26	6.86	0.0	62	--
	21-May-14	127	ANAC (PMW-2D)-1	6.20	6.45	9.0	406	--
			ANAC (PMW-2D)-2	6.35	6.43	0.0	3.0	--
			Average Concentration	6.28	6.44	4.5	205	--
SRS®-FR and Ferrous Iron Amended (PMW-2D)	13-Jan-14	-1	SRS/Fe (PMW-2D)-1	6.10	--	--	--	--
			SRS/Fe (PMW-2D)-2	5.91	--	--	--	--
			Average Concentration	6.01	--	--	--	--
	14-Jan-14	0	SRS/Fe (PMW-2D)-1	6.09	--	50	--	--
			SRS/Fe (PMW-2D)-2	5.97	--	30	--	--
			Average Concentration	6.03	--	40	--	--
	21-Jan-14	7	SRS/Fe (PMW-2D)-1	6.14	--	--	--	--
			SRS/Fe (PMW-2D)-2	5.99	--	--	--	--
			Average Concentration	6.07	--	--	--	--
	11-Feb-14	28	SRS/Fe (PMW-2D)-1	6.05	6.01	44	<0.20	--
			SRS/Fe (PMW-2D)-2	5.89	6.10	46	0.55	--
			Average Concentration	5.97	6.06	45	0.28	--
	23-Apr-14	99	SRS/Fe (PMW-2D)-1	5.79	6.01	32	<0.20	--
			SRS/Fe (PMW-2D)-2	5.70	5.98	24	0.237	--
			Average Concentration	5.75	6.00	28	0.12	--
	21-May-14	127	SRS/Fe (PMW-2D)-1	5.81	6.01	42	<0.02	--
			SRS/Fe (PMW-2D)-2	5.71	6.03	56	<0.02	--
			Average Concentration	5.76	6.02	49	ND	--
SRS®-FR and Ferrous Iron Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	13-Jan-14	-1	SRS/Fe/pH 7.0 (PMW-2D)-1	6.47	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.45	--	--	--	--
			Average Concentration	6.46	--	--	--	--
			Buffered with 1.5 mL of saturated sodium bicarbonate					
			SRS/Fe/pH 7.0 (PMW-2D)-1	6.85	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.83	--	--	--	--
			Average Concentration	6.84	--	--	--	--
	14-Jan-14	0	SRS/Fe/pH 7.0 (PMW-2D)-1	6.76	--	40	--	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.79	--	34	--	--
			Average Concentration	6.78	--	37	--	--
	21-Jan-14	7	SRS/Fe/pH 7.0 (PMW-2D)-1	6.38	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.43	--	--	--	--
			Average Concentration	6.41	--	--	--	--
			Buffered with 1.5 mL of saturated sodium bicarbonate					
			SRS/Fe/pH 7.0 (PMW-2D)-1	6.83	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.84	--	--	--	--
			Average Concentration	6.84	--	--	--	--
	11-Feb-14	28	SRS/Fe/pH 7.0 (PMW-2D)-1	6.69	6.91	6.0	0.30	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.68	6.99	4.0	0.64	--
			Average Concentration	6.69	6.95	5.0	0.47	--
	23-Apr-14	99	SRS/Fe/pH 7.0 (PMW-2D)-1	6.57	6.75	7.0	35	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.68	6.86	5.0	39	--
			Average Concentration	6.63	6.81	6.0	37	--
			Buffered with 1.0 mL of saturated sodium bicarbonate					
	9-May-14	115	SRS/Fe/pH 7.0 (PMW-2D)-1	6.75	--	--	--	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.77	--	--	--	--
			Average Concentration	6.76	--	--	--	--
	21-May-14	127	SRS/Fe/pH 7.0 (PMW-2D)-1	6.67	6.86	12	<0.02	--
			SRS/Fe/pH 7.0 (PMW-2D)-2	6.73	6.86	6.0	5.2	--
			Average Concentration	6.70	6.86	9.0	2.6	--
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	13-Jan-14	-1	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.47	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.45	--	--	--	--
			Average Concentration	6.46	--	--	--	--
			Buffered with 1.5 mL of saturated sodium bicarbonate					
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.85	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.90	--	--	--	--
			Average Concentration	6.88	--	--	--	--

Treatment	Date	Day	Treatment Replicate	pH	Sacraficial Bottle pH	Fe ²⁺ (mg/L)	Sulfide (mg/L)	TOC (mg/L)
SRS [®] -FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D) Continued	14-Jan-14	0	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.77	--	54	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.75	--	44	--	--
			Average Concentration	6.76	--	49	--	--
	21-Jan-14	7	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.37	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.33	--	--	--	--
			Average Concentration	6.35	--	--	--	--
			Buffered with 1.5 mL of saturated sodium bicarbonate					
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.83	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.90	--	--	--	--
			Average Concentration	6.87	--	--	--	--
	11-Feb-14	28	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.59	7.16	8.0	0.77	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.71	7.02	6.0	<0.02	--
			Average Concentration	6.65	7.09	7.0	0.39	--
	24-Mar-14	69	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	--	--	--	--	218
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	--	--	--	--	248
			Average Concentration	--	--	--	--	233
	23-Apr-14	99	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.38	6.71	10	4.7	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.39	6.38	20	0.42	--
			Average Concentration	6.39	6.55	15	2.55	--
			Buffered with 2.5 mL of saturated sodium bicarbonate					
	9-May-14	115	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.81	--	--	--	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.69	--	--	--	--
			Average Concentration	6.75	--	--	--	--
	21-May-14	127	SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-1	6.77	6.98	22	<0.02	--
			SRS/Fe/Nutrients/pH 7.0 (PMW-2D)-2	6.83	6.82	9.0	<0.02	--
			Average Concentration	6.80	6.90	16	ND	--

Notes:

- not analyzed
- < - compound not detected, the associated value is the detection limit
- ANAC - anaerobic active control
- ANSC - anaerobic sterile control
- Fe - iron
- Fe²⁺ - ferrous iron
- mg/L - milligrams per liter
- mL - milliliter
- ND - not detected
- TOC - total organic carbon

TABLE 6: HALF-LIVES (DAYS) OF CHLORINATED ETHENES DETECTED IN MICROCOSMS
Ekonol Bedrock Site

Groundwater Location	Treatment/Control	TCE			cDCE			VC		
		Half Life (Days)	T ₁ (Day)	T ₂ (Days)	Half Life (Days)	T ₁ (Day)	T ₂ (Days)	Half Life (Days)	T ₁ (Day)	T ₂ (Days)
PMW-14D	Anaerobic Sterile Control	172	0	127	~	0	127	~	0	127
	Anaerobic Active Control	62	0	127	923	0	127	~	0	127
	SRS [®] -FR and Ferrous Iron Amended	37	0	127	~	0	127	~	0	127
	SRS [®] -FR and Ferrous Iron Amended, Bicarbonate to pH 6.5	5	0	28	483	0	127	~	0	127
	SRS [®] -FR and Ferrous Iron Amended, Bicarbonate to pH 7.0	5	0	28	56	0	127	~	0	127
	SRS [®] -FR, Ferrous Iron and Nutrient Amended, Bicarbonate to pH 7.0	6	0	28	10	0	99	3	99	127
PMW-2D	Anaerobic Active Control	4	0	28	2,948	0	127	923	0	127
	SRS [®] -FR and Ferrous Iron Amended	33	0	127	~	0	127	1,100	0	127
	SRS [®] -FR and Ferrous Iron Amended, Bicarbonate to pH 7.0	35	0	127	1,716	0	127	1,276	0	127
	SRS [®] -FR, Ferrous Iron and Nutrient Amended, Bicarbonate to pH 7.0	21	0	127	23	0	127	~	0	127

Notes:
~ - net degradation of compound was not detected over duration of study
cDCE - cis-1,2-dichloroethene
TCE - trichloroethene
VC - vinyl chloride

TABLE 7: SUMMARY OF GENE-TRAC® AND GENETIC TESTING RESULTS
Ekonol Bedrock Site

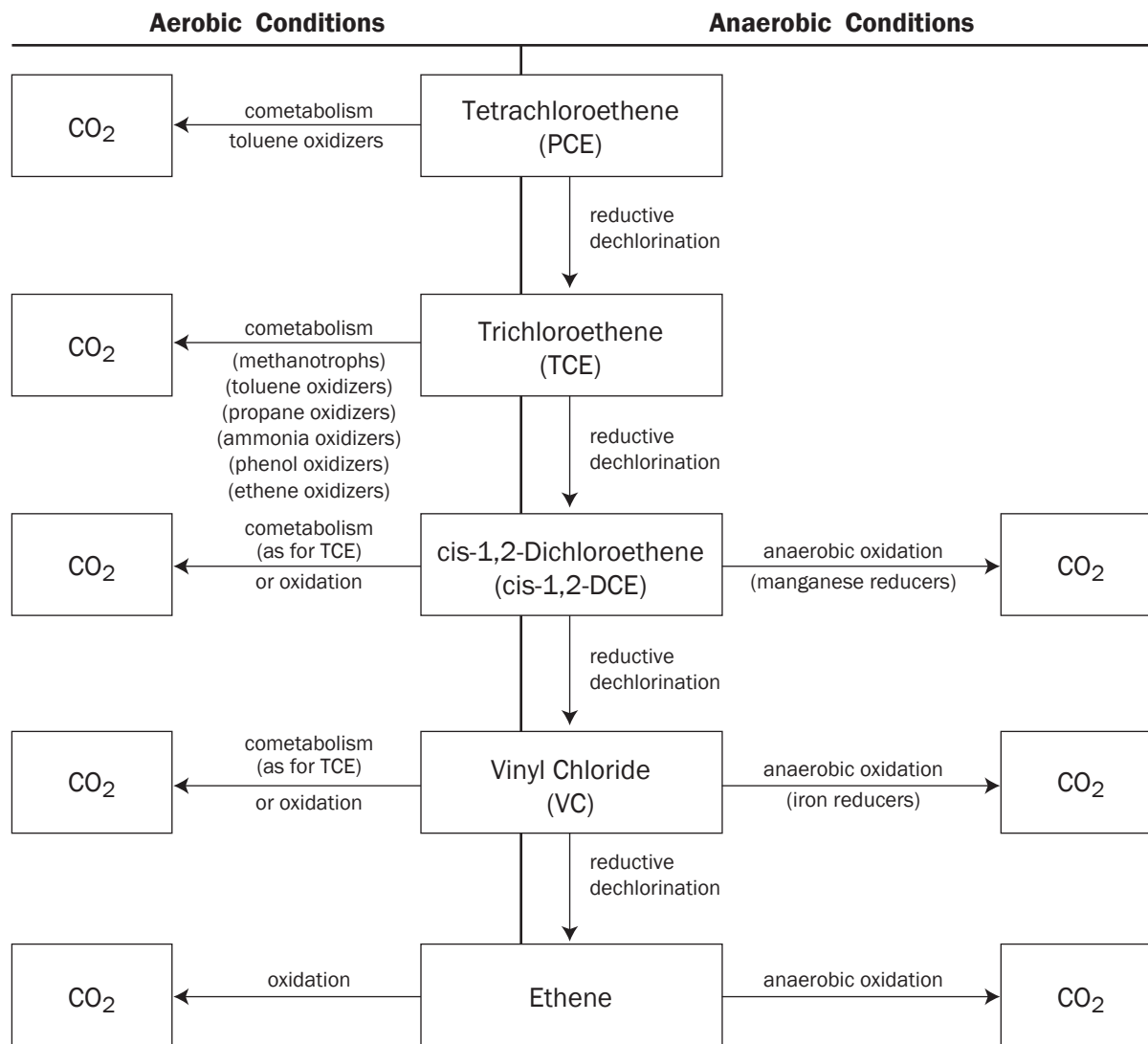
SiREM

Sample ID	Replicate Sample ID	GDNA Sample ID	Sample Date	Day	SiREM Gene-Trac® Testing		Microbial Insights Genetic Testing		
					Dehalobacter Enumeration/Liter (Gene-Trac® Dhb) Gene Copies	Vinyl Chloride Reductase Enumeration/Liter (Gene-Trac® VC) Gene Copies	Dehalococcoides cells/L Groundwater (MI DHC)	tceA Reductase cells/L Groundwater (MI TCE)	BAV1 Vinyl Chloride Reductase cells/L Groundwater (MI BVC)
Anaerobic Active Control (PMW-14D)	EKO-14D-ANAC-3/4	14351	24-Mar-14	69	3×10^6	3×10^6	1×10^9	3×10^7	3×10^8
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-14D)	EKO-14D-Fe/Nut/7.0-11/12	14352	24-Mar-14	69	5×10^6	1×10^8	2×10^{12}	9×10^{10}	8×10^{11}
Anaerobic Active Control (PMW-2D)	EKO-2D-ANAC-13/14	14353	24-Mar-14	69	1×10^8	1×10^6	3×10^8	5×10^7	2×10^8
SRS®-FR, Ferrous Iron and Nutrient Amended, Sodium Bicarbonate to pH 7.0 (PMW-2D)	EKO-2D-Fe/Nut/7.0-19/20	14354	24-Mar-14	69	4×10^3 J	3×10^5	9×10^8	4×10^6	8×10^8

Notes:

BVC - BAV1 vinyl chloride reductase
cell/L - cells per liter
DHB - Dehalobacter
DHC - Dehalococcoides
J - estimated value
MI - Microbial Insights Laboratory
SiREM - SiREM laboratory
TCE - Trichloroethene
U - Not detected, the associated value is the quantification limit.
VC - vinyl chloride

FIGURES

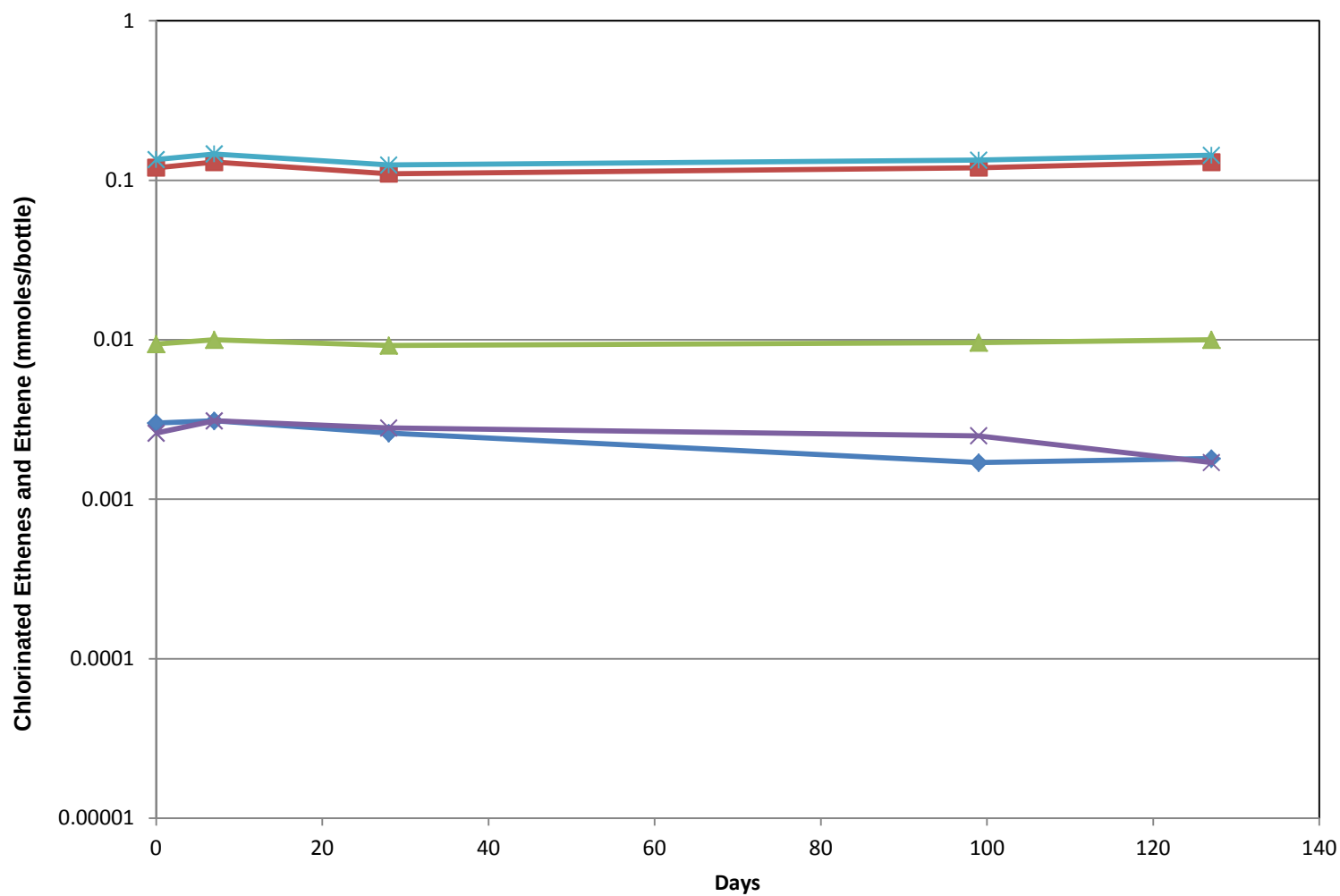


**Pathways for the Degradation
of Chlorinated Ethenes**



June 2012

Figure: 1



◆ TCE
 ■ cDCE
 ▲ VC
 × Ethene
 ✱ Total Ethenes

Note: non-detect values are plotted at half of the detection limit

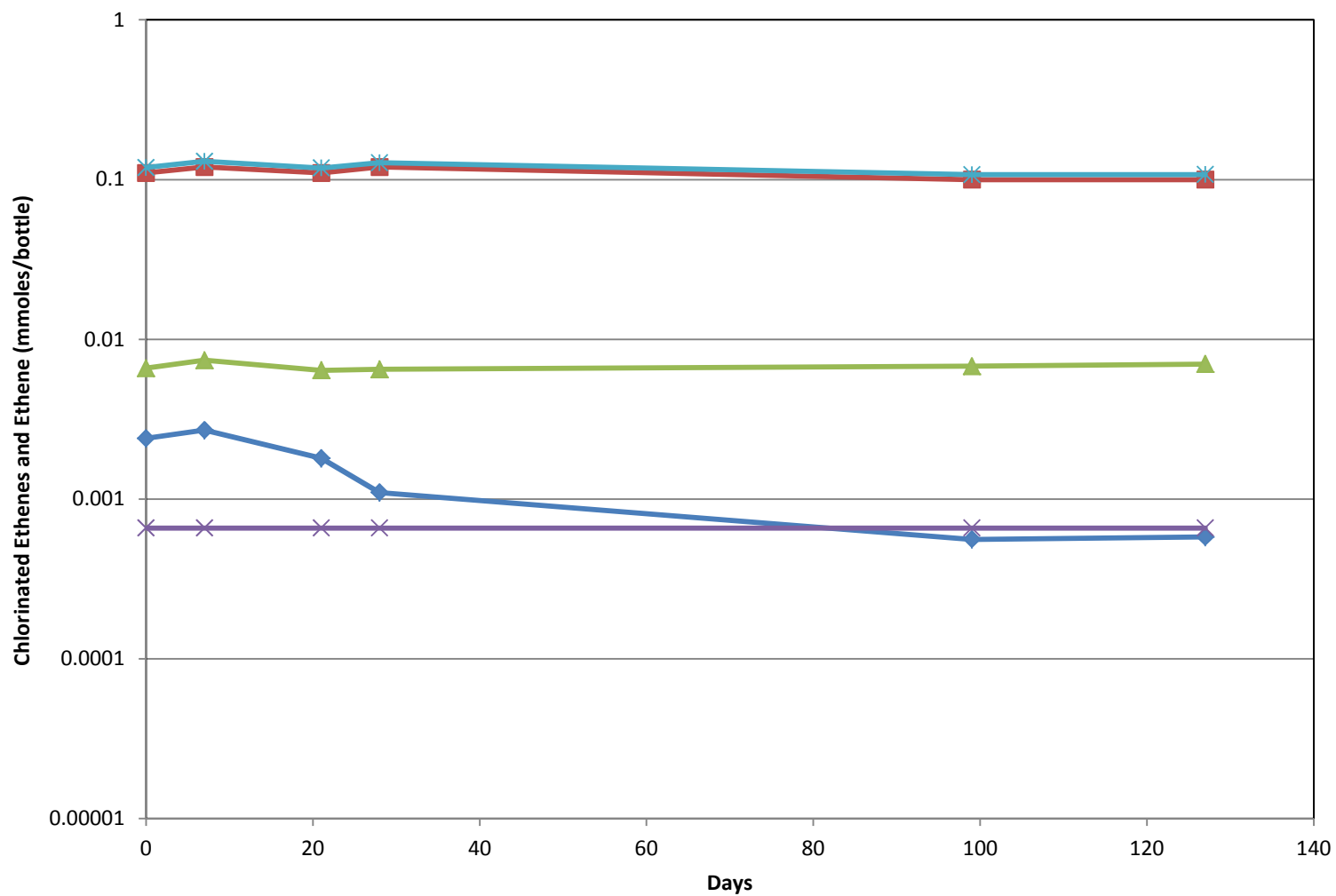
**Chlorinated Ethene and Ethene Concentration Trends
in Anaerobic Sterile Control Microcosms (PMW-14D)**

EkonoI Bedrock Site



July-14

Figure: 2



Note: non-detect values are plotted at half of the detection limit

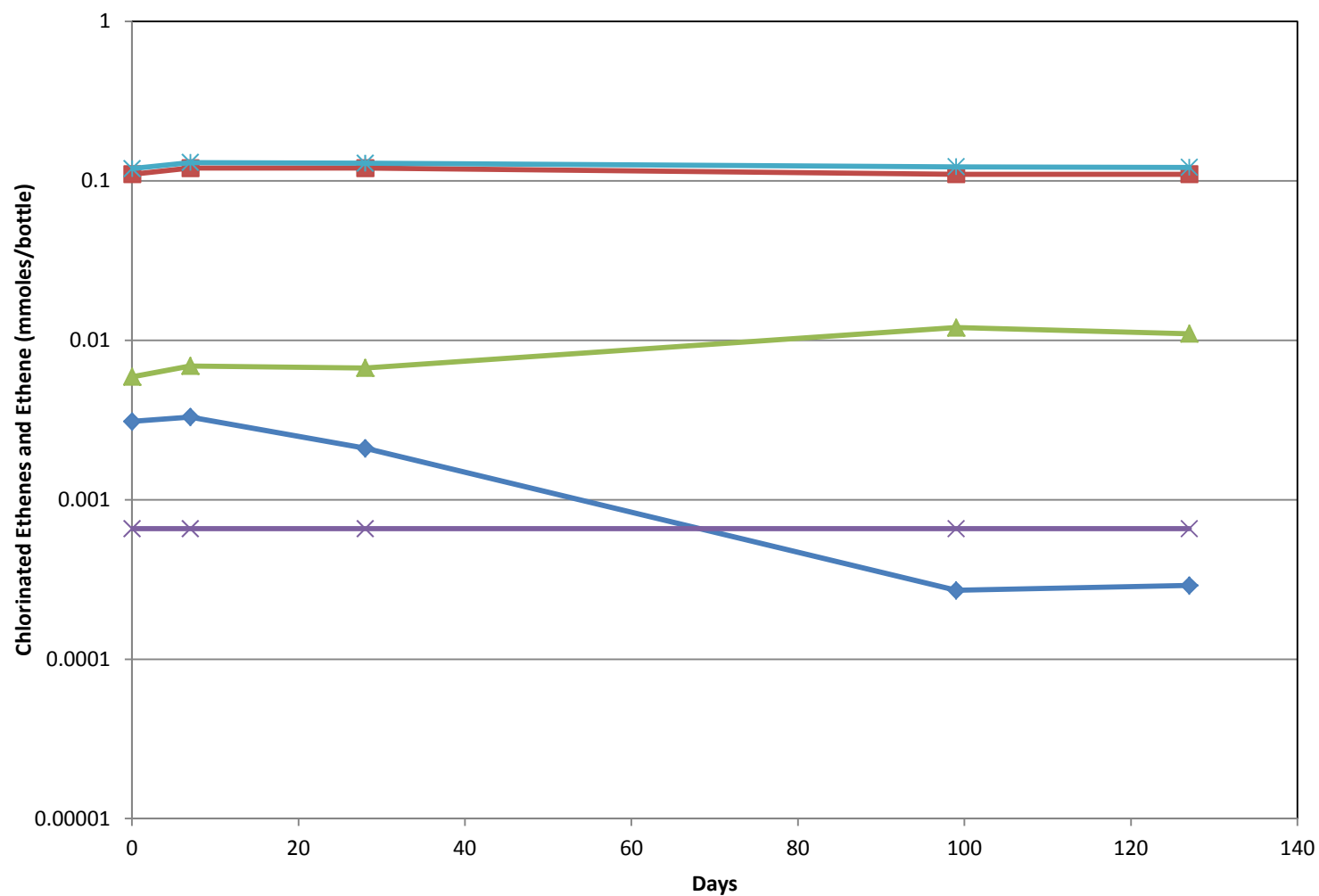
**Chlorinated Ethene and Ethene Concentration Trends
in Anaerobic Active Control Microcosms (PMW-14D)**

EkonoI Bedrock Site



July-14

Figure: 3



Note: non-detect values are plotted at half of the detection limit

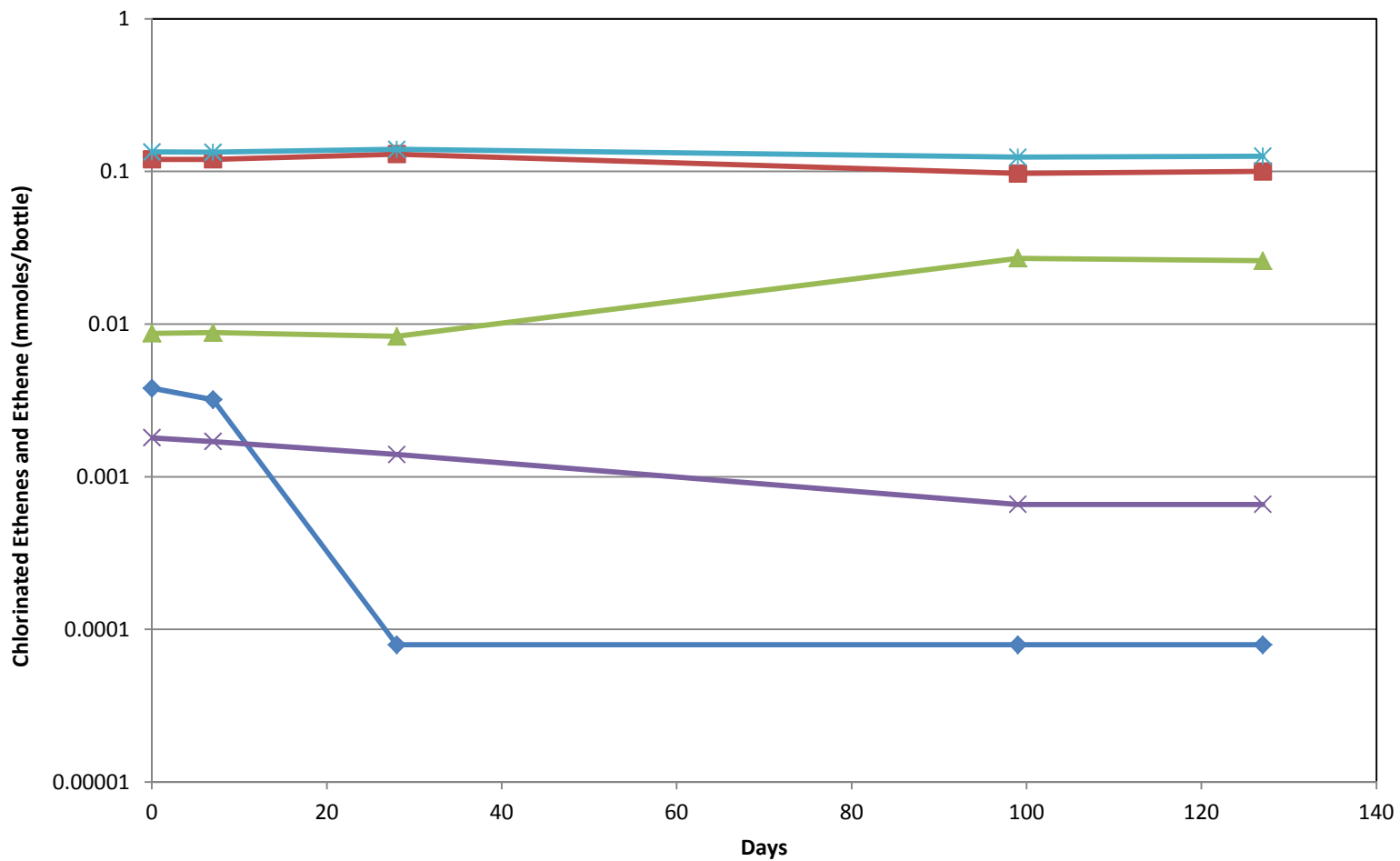
**Chlorinated Ethene and Ethene Concentration Trends
in SRS®-FR and Ferrous Iron Amended Microcosms (PMW-14D)**

EkonoI Bedrock Site



July-14

Figure: 4



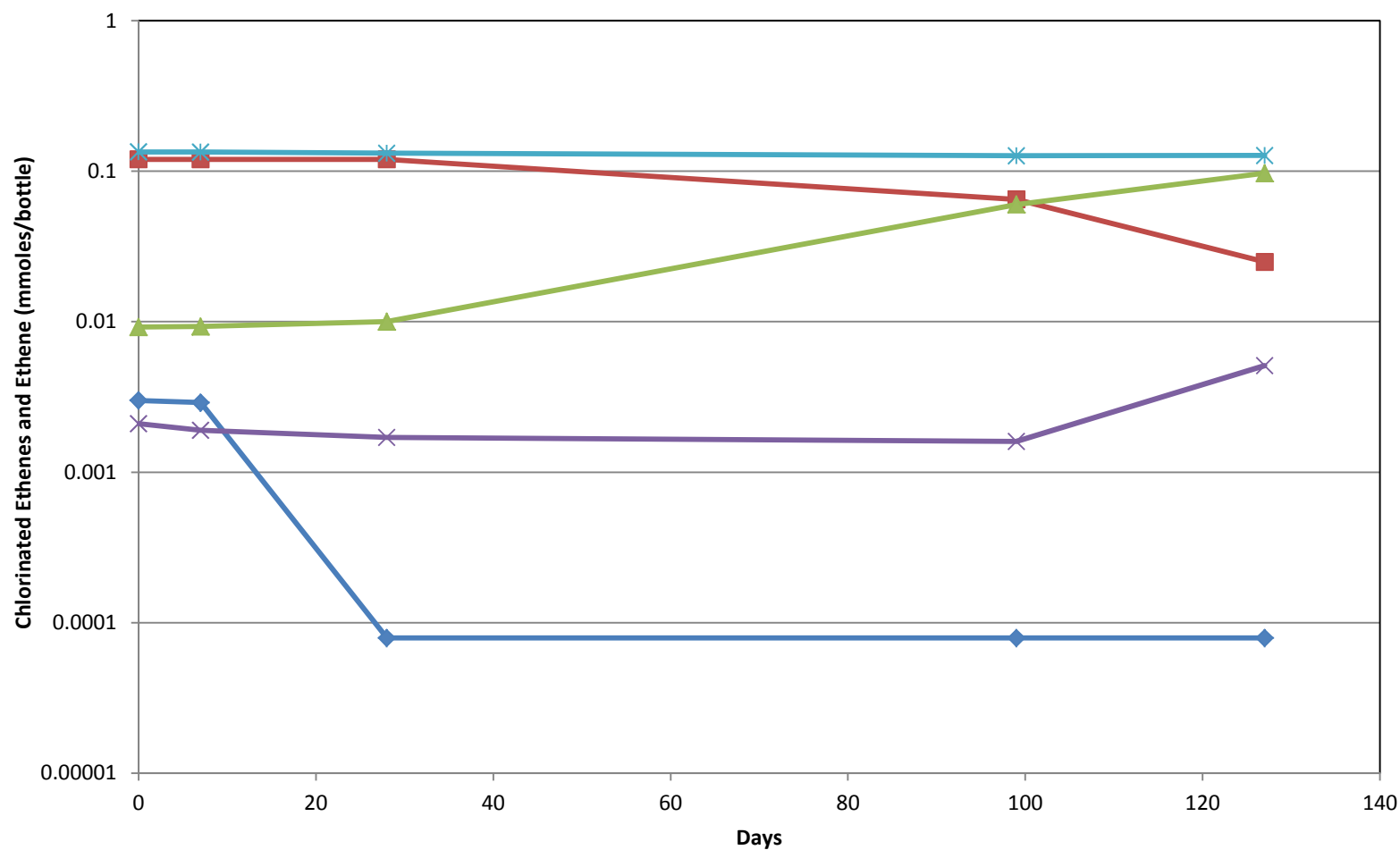
Note: non-detect values are plotted at half of the detection limit

**Chlorinated Ethene and Ethene Concentration Trends
in SRS®-FR and Ferrous Iron Amended Microcosms
Buffered to pH 6.5 (PMW-14D)
EkonoI Bedrock Site**



July-14

Figure: 5



Note: non-detect values are plotted at half of the detection limit

**Chlorinated Ethene and Ethene Concentration Trends
in SRS®-FR and Ferrous Iron Amended Microcosms**

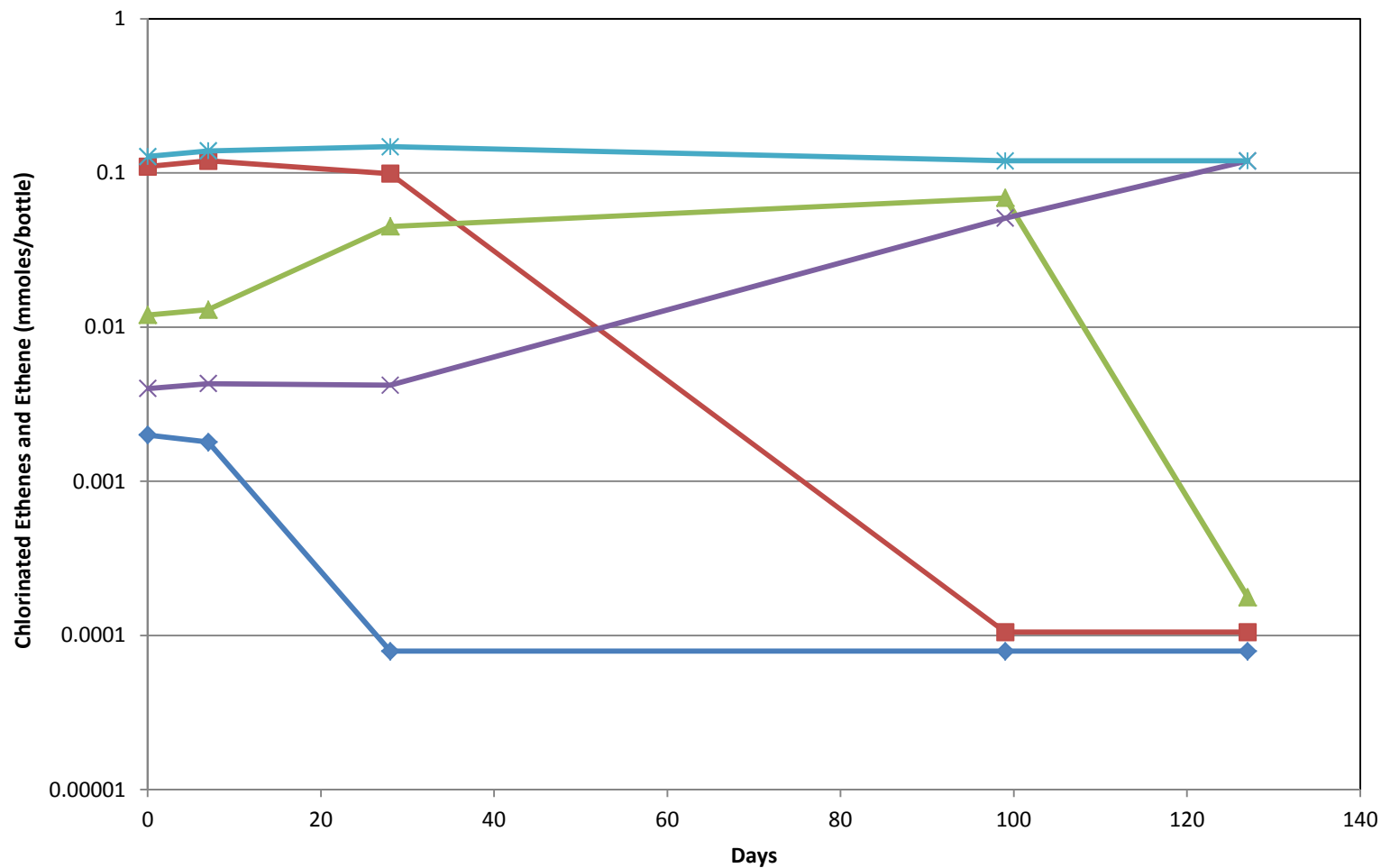
Buffered to pH 7.0 (PMW-14D)

EkonoI Bedrock Site



July-14

Figure: 6



Note: non-detect values are plotted at half of the detection limit

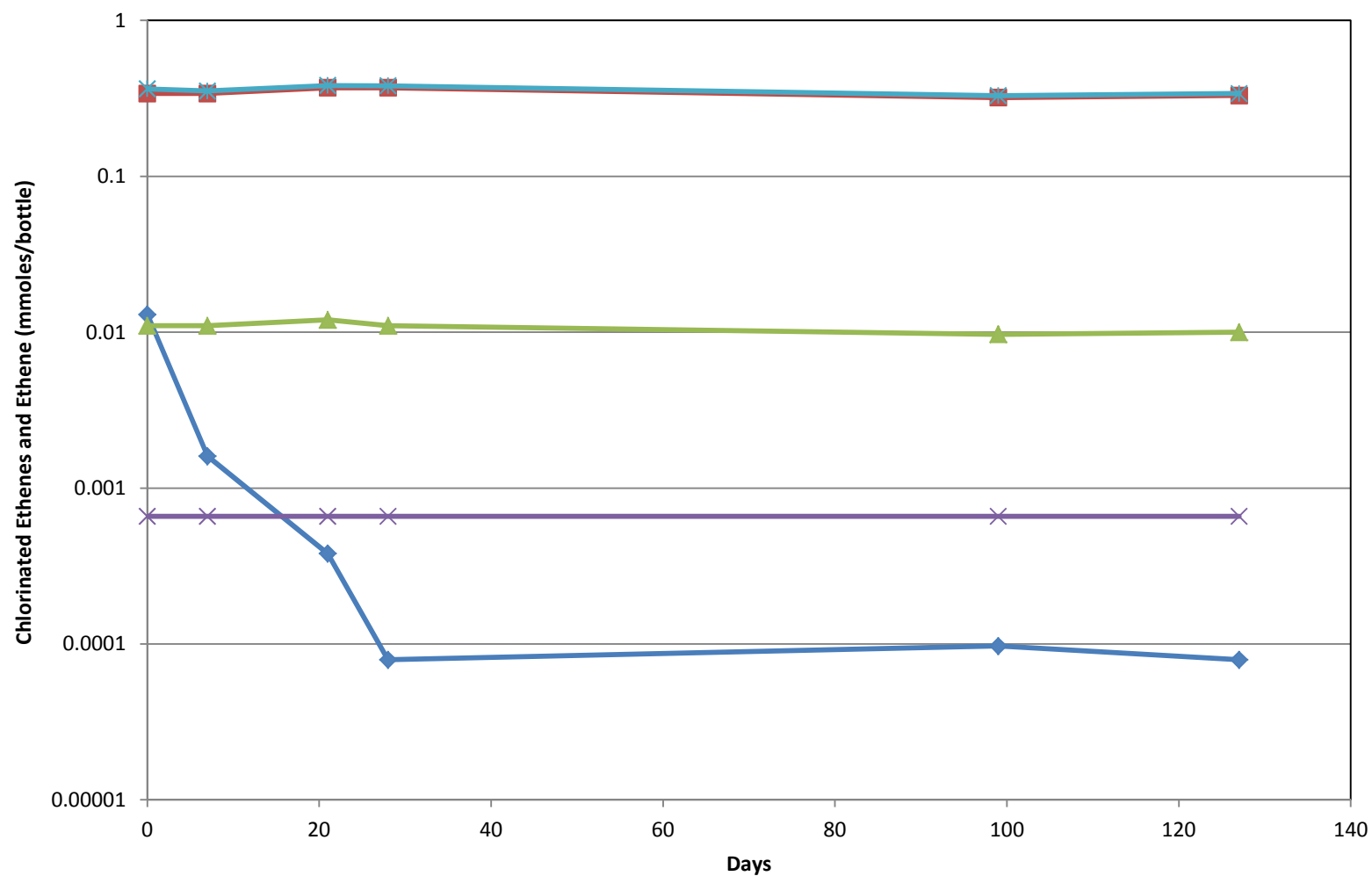
**Chlorinated Ethene and Ethene Concentration Trends
in SRS®-FR, Ferrous Iron and Nutrient Amended Microcosms
Buffered to pH 7.0 (PMW-14D)**

EkonoI Bedrock Site



July-14

Figure: 7



Note: non-detect values are plotted at half of the detection limit

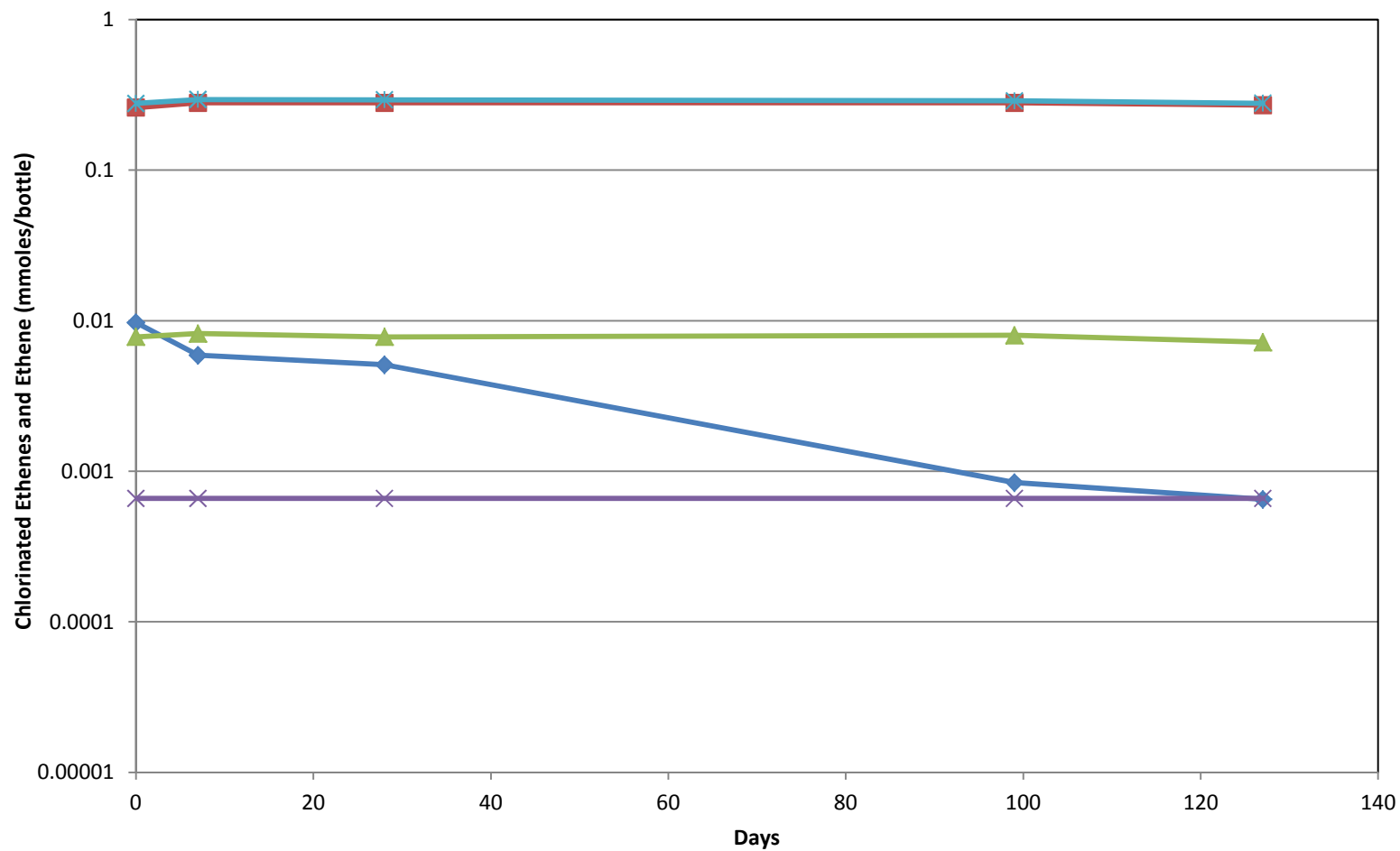
**Chlorinated Ethene and Ethene Concentration Trends
in Anaerobic Active Control Microcosms (PMW-2D)**

EkonoI Bedrock Site



July-14

Figure: 8



Note: non-detect values are plotted at half of the detection limit

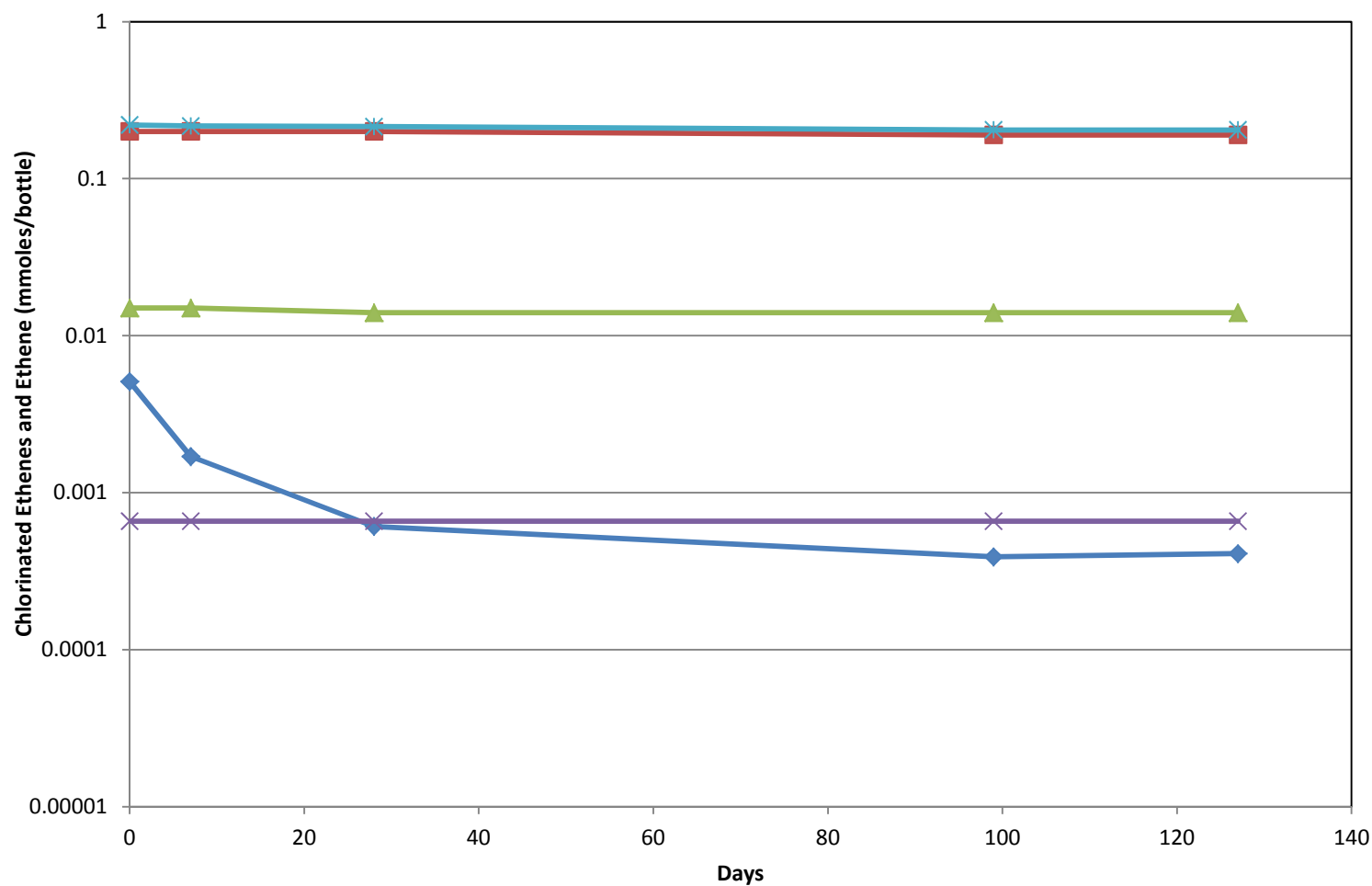
**Chlorinated Ethene and Ethene Concentration Trends
in SRS and Ferrous Iron Amended Microcosms (PMW-2D)**

EkonoI Bedrock Site



July-14

Figure: 9



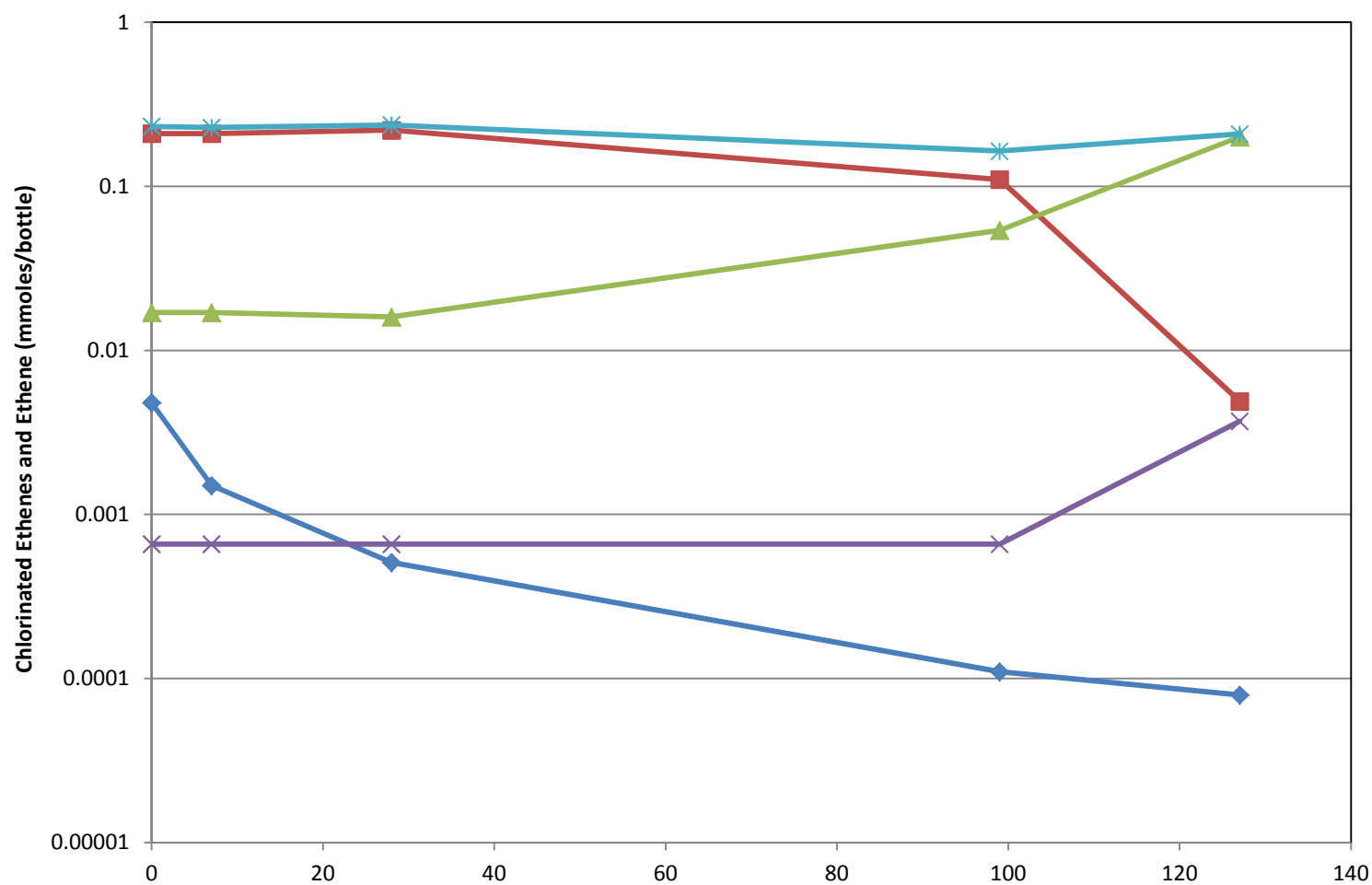
Note: non-detect values are plotted at half of the detection limit

**Chlorinated Ethene and Ethene Concentration Trends
in SRS®-FR and Ferrous Iron Amended Microcosms
Buffered to pH 7.0 (PMW-2D)
EkonoI Bedrock Site**



July-14

Figure: 10



Note: non-detect values are plotted at half of the detection limit

◆ TCE ■ cDCE ▲ VC × Ethene * Total Ethenes

Chlorinated Ethene and Ethene Concentration Trends
in SRS®-FR, Ferrous Iron and Nutrient Amended Microcosms
Buffered to pH 7.0 (PMW-2D)
EkonoI Bedrock Site



July-14

Figure: 11

APPENDIX A: Chain of Custody Documentation



Relinquished By: Signature 	Received By: Signature 	Relinquished By: Signature	Received By: Signature	Relinquished By: Signature	Received By: Signature
Printed Name <u>J. Peropoli</u>	Printed Name <u>J. Peropoli</u>	Printed Name	Printed Name	Printed Name	Printed Name
Firm <u>PARSONS</u>	Firm <u>SIREM</u>	Firm	Firm	Firm	Firm
Date/Time <u>12/19/13 1330</u>	Date/Time <u>Dec 20 2013 16:30</u>	Date/Time	Date/Time	Date/Time	Date/Time

In the absence of an executed agreement, submission of samples to SiREM implies consent for performance of analyses specified on this Chain-of-Custody form and agreement with the terms and conditions of the SiREM Laboratory Services Agreement. The entity submitting samples shall be responsible for payment in full for said analyses.

APPENDIX B: SRS[®]-FR Substrate Specifications

Terra Systems, Inc.

SRS[®]-FR Large Droplet Emulsified Vegetable Oil (EVO)

Substrate for Fractured Rock Formations

United States Patent No. RE40,448

The anaerobic bioremediation process uses either native or introduced microorganisms to degrade chlorinated solvents such as tetrachloroethene (PCE) and trichloroethene (TCE) to innocuous end products including ethene and ethane. An organic substrate must be added to the groundwater to generate reducing conditions and provide the necessary carbon and hydrogen to support biodegradation of the chlorinated solvents. The organic substrate can be a slow release substrate like Terra Systems' patented small droplet SRS[®] emulsified vegetable oil substrate. Terra Systems new and patented SRS[®]-FR, which has a larger droplet size is designed specifically for applications where adherence to the formation is key to making contact with the bacteria. It is designed to release bio-available hydrogen over a period of 3 to 5 years thus enhancing the long-term anaerobic biodegradation of the chlorinated solvents. SRS[®]-FR optimizes the naturally occurring biodegradation system by supplying the rate limiting factor (in this case hydrogen) in the degradation of CVOC's, certain pesticides/herbicides, perchlorate, and immobilization of certain metals (Cr, As, and some radionuclides).

SRS[®]-FR Substrate Specifications

Terra Systems, Inc.'s manufacturing facility is configured to allow us to provide our customers with custom blended substrate packages without a cost premium. SRS[®]-FR package contains the following components:

Ingredient	Percent	SRS[®]-FR Emulsified Soybean Oil and Sodium Lactate Substrate
Food Grade Soybean Oil	60%	SRS [®] -FR is added to the groundwater to generate reducing conditions and provide the necessary carbon and hydrogen to support biodegradation of chlorinated solvents.
Food Grade Sodium Lactate	4 – 6%	At least 4% sodium lactate to rapidly generate anaerobic conditions.
Food grade Additives/Preservatives/Proprietary Nutrients	<1%	Proprietary organic and inorganic nutrients such as yeast extract, nitrogen and phosphorus. Organic and inorganic nutrients have been shown to support the growth of the anaerobic microbial population.
Vitamin B ₁₂	<1%	At least 25 ppb of Vitamin B ₁₂ , which has been demonstrated to be an important micronutrient to enhance dechlorination activity. He et al. 2007 investigated the effects of Vitamin B ₁₂ on reductive dechlorination by <i>Dehalococcoides</i> . They found that 25 ppb of Vitamin B₁₂ gave the maximum stimulation of dechlorination.
Proprietary Emulsification Package	4-8%	The proprietary emulsion package combined with the large droplet size allows the soybean oil to adhere to the formation.
Droplet Size	NA	Mean Droplet size of 5 micron

KEY BENEFITS OF SRS[®]-FR Emulsified Vegetable Oil (EVO) Substrate Include:

- Promotes biodegradation of PCE and TCE to non-toxic end products
- Large droplet size and proprietary emulsion package is ideal for maximum adherence.
- Low cost
- In situ application minimizes site disruptions
- Slow release formula eliminates continuous substrate additions
- SRS[®]-FR contains only non-toxic food grade materials, which results in green, sustainable remediation
- Can be used as a PRB to cut off plume migration
- Effective in source zones
- Reduces treatment time from decades to months and years

For more information contact:

Michael Free

Terra Systems, Inc. 1035 Philadelphia Pike Suite E, Wilmington, DE 19809

(office): (302)798-9553 or (cell) 484-889-2214

e-mail: mfree@terrasystems.net

On the Web@ <http://www.terrasystems.net/>

APPENDIX C: Henry's Law Calculation

The following Henry's Law calculation was used to convert aqueous concentrations (Table 2) to total mmoles of each analyte per microcosm bottle (Figures 1 to 9):

$$\text{Total mmoles} = \frac{C_{\text{liq}} \times (V_{\text{liq}} + H \times V_{\text{gas}})}{\text{Molecular Weight (mg/mmol)}}$$

Where

C_{liq} = liquid concentration (mg/L)

V_{liq} = liquid volume (0.230 L) per bottle

V_{gas} = headspace volume (0.020 L) per bottle

H = Henry's Law constant (dimensionless)

The Henry's Law constants used are summarized in the table below.

Analyte	Henry's Law Constant ^a (dimensionless)
Trichloroethene	0.42
Cis-1,2-dichloroethene	0.18
Vinyl chloride	1.08
Ethene	8.76

^a Source: Montgomery, J.H. 2000. *Groundwater Chemicals Desk Reference, Third Edition*. CRC Press LLC, Boca Raton, FL.

APPENDIX D: Base Titration and Buffering Evaluation

PMW-14D pH 6.5
Replicate 1
Average volume of groundwater (mL) 91.20
Average mass of soil (g) 0.00
Sodium Bicarbonate (g/L) 96
Target pH 6.5

Date	Time (h)	pH	Volume of Buffer solution added (mL)	Culmulative Buffer solution added (mL)	Buffer Demand (g NaHCO ₃ /L Groundwater)
2-Jan-14	0	5.99	0.10	0.10	--
--	--	6.18	0.15	0.25	--
--	--	6.34	0.10	0.35	--
--	--	6.45	0.00	0.35	--
3-Jan-14	24	6.37	0.00	0.35	--
6-Jan-14	96	6.53	0.00	0.35	--
--	--	--	--	--	0.37

PMW-14D pH 6.5
Replicate 2
Average volume of groundwater (mL) 93.40
Average mass of soil (g) 0.00
Sodium Bicarbonate (g/L) 96
Target pH 6.5

Date	Time (h)	pH	Volume of Buffer solution added (mL)	Culmulative Buffer solution added (mL)	Buffer Demand (g NaHCO ₃ /L Groundwater)
2-Jan-14	0	5.99	0.10	0.10	--
--	--	6.30	0.10	0.20	--
--	--	6.28	0.10	0.30	--
--	--	6.35	0.05	0.35	--
--	--	6.38	0.05	0.40	--
--	--	6.45	0.00	0.40	--
3-Jan-14	24	6.41	0.00	0.40	--
6-Jan-14	96	6.59	0.00	0.40	--
--	--	--	--	--	0.41

PMW-14D pH 7.0
Replicate 1
Average volume of groundwater (mL) 89.00
Average mass of soil (g) 0.00
Sodium Bicarbonate (g/L) 96
Target pH 7.0

Date	Time (h)	pH	Volume of Buffer solution added (mL)	Culmulative Buffer solution added (mL)	Buffer Demand (g NaHCO ₃ /L Groundwater)
2-Jan-14	0	5.99	0.10	0.10	--
--	--	6.18	0.20	0.30	--
--	--	6.46	0.20	0.50	--
--	--	6.51	0.20	0.70	--
--	--	6.63	0.20	0.90	--
--	--	6.79	0.20	1.10	--
--	--	6.80	0.20	1.30	--
--	--	6.96	0.00	1.30	--
3-Jan-14	24	6.96	0.00	1.30	--
6-Jan-14	96	7.07	0.00	1.30	--
--	--	--	--	--	1.40

PMW-14D pH 7.0
Replicate 2
Average volume of groundwater (mL) 88.00
Average mass of soil (g) 0.00
Sodium Bicarbonate (g/L) 96
Target pH 7.0

Date	Time (h)	pH	Volume of Buffer solution added (mL)	Culmulative Buffer solution added (mL)	Buffer Demand (g NaHCO ₃ /L Groundwater)
2-Jan-14	0	5.99	0.10	0.10	--
--	--	6.17	0.20	0.30	--
--	--	6.38	0.20	0.50	--
--	--	6.51	0.20	0.70	--
--	--	6.64	0.20	0.90	--
--	--	6.74	0.20	1.10	--
--	--	6.87	0.10	1.20	--
--	--	6.99	0.00	1.20	--
3-Jan-14	24	6.94	0.00	1.20	--
6-Jan-14	96	7.09	0.00	1.20	--
--	--	--	--	--	1.31

PMW-2D pH 7.0

Replicate 1

Average volume of groundwater (mL)	96.40
Average mass of soil (g)	0.00
Sodium Bicarbonate (g/L)	96
Target pH	7.0

Date	Time (h)	pH	Volume of Buffer solution added (mL)	Culmulative Buffer solution added (mL)	Buffer Demand (g NaHCO ₃ /L Groundwater)
2-Jan-14	0	6.32	0.10	0.10	- -
--	--	6.42	0.20	0.30	- -
--	--	6.67	0.20	0.50	- -
--	--	6.98	0.00	0.50	- -
3-Jan-13	24	6.85	0.00	0.50	- -
6-Jan-14	96	6.99	0.00	0.50	- -
--	--	--	--	--	0.50

PMW-2D pH 7.0

Replicate 2

Average volume of groundwater (mL)	95.30
Average mass of soil (g)	0.00
Sodium Bicarbonate (g/L)	96
Target pH	7.0

Date	Time (h)	pH	Volume of Buffer solution added (mL)	Culmulative Buffer solution added (mL)	Buffer Demand (g NaHCO ₃ /L Groundwater)
2-Jan-14	0	6.32	0.10	0.10	- -
--	--	6.49	0.20	0.30	- -
--	--	6.70	0.20	0.50	- -
--	--	6.88	0.05	0.55	- -
--	--	6.91	0.05	0.60	- -
--	--	7.04	0.00	0.60	- -
3-Jan-14	24	6.96	0.00	0.60	- -
6-Jan-14	96	7.04	0.00	0.60	- -
--	--	--	--	--	0.60

Notes:

- h - hours
- g - grams
- g/L - grams per liter
- mL - milliliter
- NaHCO₃ - sodium bicarbonate

APPENDIX E: HACH Ferrous Iron Test Kit Procedure

- **Iron, Ferrous, Test Kit**

1,10 Phenanthroline Iron Reagent Method

- **Trousse d'analyse fer ferreux**

Méthode réactif fer 1, 10 Phéanthroline

- **Eisen, 2wertig Test Kit**

1,10 Phenanthrolin-Eisenreagenz Methode

- **Kit de análisis para hierro ferroso**

Método reactivo de fenatrolina de hierro 1,10

0.0 – 10.0 mg/L

• Mod. IR-18C

• # 26672-00

- To ensure accurate results, read carefully before proceeding.
- Pour obtenir des résultats exacts, lire attentivement le mode d'emploi avant d'utiliser la trousse.
- Um genaue Ergebnisse zu gewährleisten, lesen Sie das Folgende bitte aufmerksam durch, bevor Sie fortfahren.
- Para obtener resultados precisos, lea detenidamente las instrucciones antes de proceder al análisis.

WARNING

Handling chemical samples, standards, and reagents can be dangerous. Review the Material Safety Data Sheets before handling any chemicals.

ATTENTION

La manipulation des échantillons chimiques, étalons et réactifs peut être dangereuse. Lire les fiches de données de sécurité des produits avant de manipuler tout produit chimique.

WARNUNG

Die Handhabung chemischer Proben, Standards und Reagenzien kann gefährlich sein. Bitte gehen Sie die Materialsicherheitsdatenblätter durch, bevor Sie Chemikalien handhaben.

ADVERTENCIA

El manejo de sustancias químicas, patrones y reactivos, puede resultar peligroso. Lea las fichas de informaciones de seguridad de materiales antes de manipular cualquier producto químico.



Introduction

The 1,10 phenanthroline indicator in the Ferrous Iron Reagent reacts with ferrous iron in the sample to form an orange color in proportion to the ferrous iron concentration. Ferric iron does not react. The ferric iron (Fe^{3+}) concentration can be determined by subtracting the ferrous iron concentration from the results of a total iron test.

Introduction

L'indicateur 1,10 phénanthroline dans le réactif fer ferreux réagit avec le fer ferreux présent dans l'échantillon pour former une coloration orange proportionnelle à la concentration de fer ferreux. Le fer ferrique ne réagit pas. La concentration de fer ferrique (Fe^{3+}) peut être déterminée en soustrayant la concentration de fer ferreux des résultats d'une analyse de fer total.

Einleitung

Der 1,10 Phenantrolin Indikator im Eisen(II)-Reagenz reagiert mit Eisen(II) in der Probe durch Bildungen einer orangen Farbe, proportional zur Konzentration des zweiwertigen Eisens. Eisen(III) reagiert nicht. Die Konzentration des dreiwertigen Eisen (Fe^{3+}) kann bestimmt werden, indem man die Konzentration des zweiwertigen Eisens von den Ergebnissen eines Eisen Gesamt Tests subtrahiert.

Introducción

El indicador de 1,10-fenantrolina en el Reactivo para Hierro Ferroso reacciona con el hierro ferroso de la muestra para formar un color anaranjado en proporción con la concentración de hierro ferroso. El hierro férrico no reacciona. La concentración de hierro férrico (Fe^{3+}) puede ser determinada restando la concentración de hierro ferroso de el resultado de una prueba de hierro total.

Measuring Hints and General Test Information

- Wash all labware between tests. Contamination may alter test results. Clean with a non-abrasive detergent or a solvent such as isopropyl alcohol. Use a soft cloth for wiping or drying. Do not use paper towels or tissue on plastic tubes as this may scratch them. Rinse with clean water (preferably deionized water).
- Rinse all viewing tubes thoroughly with the sample water before testing.
- Use clippers to open plastic powder pillows.
- For critical testing, reagent accuracy should be checked with each new lot of reagents. Prepare a ferrous iron stock solution (100 mg/L Fe) by dissolving 0.702 grams of ferrous ammonium sulfate, hexahydrate, in one liter deionized water. Dilute 5.00 mL of this solution to 100 mL with deionized water to make a 5.0 mg/L standard solution. Prepare this immediately before use. Follow the ferrous iron test instructions using this solution instead of a water sample.

Conseils pour les mesures et informations générales sur l'analyse

- Laver toute la verrerie entre les analyses. La contamination peut fausser les résultats d'analyses. Laver avec un détergent non abrasif ou un solvant tel que l'isopropanol. Utiliser un tissu doux pour essuyer ou sécher. Ne pas utiliser de tissu ou papier d'essuyage sur les tubes en plastique pour ne pas les rayer. Rincer à l'eau propre (de préférence de l'eau désionisée).
- Rincer soigneusement tous les tubes colorimétriques avec l'échantillon d'eau avant l'analyse.
- Utiliser la pince coupante pour ouvrir les gélules en plastique.
- Pour des analyses critiques, l'exactitude du réactif doit être vérifiée pour chaque nouveau lot de réactifs. Préparer une solution-mère de fer ferreux (100 mg/L Fe) en dissolvant 0,702 grammes d'ammonium-fer (II) sulfate, hexahydrate, dans un litre d'eau désionisée. Diluer 3,00 mL de cette solution à 100 mL avec de l'eau désionisée pour obtenir une solution étalon à 3,0 mg/L. Préparer cette solution immédiatement avant emploi. Suivre les instructions d'analyse du fer ferreux en remplaçant l'échantillon par cette solution étalon.

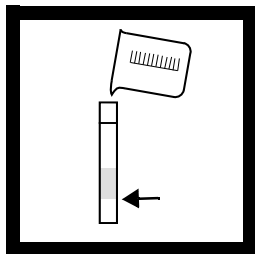
Meßtips und allgemeine Testinformationen

- Waschen Sie alle Laborartikel zwischen den Tests. Verunreinigung kann die Testergebnisse verfälschen. Reinigen Sie sie mit einem nicht scharfen Detergent oder einem Lösungsmittel wie zum Beispiel Isopropylalkohol. Verwenden Sie für das Abwischen oder Abtrocknen ein weiches Tuch. Verwenden Sie bei den Plastikröhrchen keine Papierhandtücher oder Tissue-Papier, da dieses sie zerkratzen kann. Spülen Sie mit sauberem Wasser (vorzugsweise entsalztes Wasser).
- Spülen Sie alle Prüfröhrchen vor dem Test gründlich mit dem Probenwasser.
- Verwenden Sie eine Schere zur Öffnung der Plastik-Pulverkissen.
- Um genaue Bestimmungen zu erzielen, sollte die Genauigkeit der Reagenzien für jede neue Charge überprüft werden. Bereiten Sie eine Eisen-II Stammlösung (100mg/L Fe) auf, indem Sie 0,702 Gramm Eisen-II Ammoniumsulfat, hexahydrat, in einem Liter entsalzten Wasser lösen. 3,00 mL dieser Lösung werden mit 100 mL entsalztem Wasser verdünnt, so dass eine 3,0 mg/L Standardlösung entsteht. Diese Lösung wird unmittelbar vor Gebrauch angesetzt. Arbeiten Sie, unter Benutzung dieser Lösung anstelle einer Wasserprobe, gemäß den Anweisungen für den Eisen(II) Test.

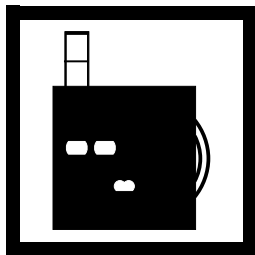
Consejos para la medición e información general sobre el análisis

- Lavar todo el material de laboratorio entre los análisis. La contaminación puede alterar los resultados. Limpiar con un detergente no abrasivo o con un solvente como el alcohol isopropílico. Utilizar un paño suave para limpiar o secar. No utilizar ni toallitas ni pañuelos de papel para limpiar los tubos de plástico para no rayarlos. Aclarar con agua limpia (preferentemente agua desionizada).
- Enjuagar todos los tubos para colorimetría abundantemente con la muestra de agua antes de realizar el análisis.
- Utilice las pinzas cortantes para abrir las cápsulas de plástico.
- Para pruebas exigentes o difíciles, la precisión del reactivo debe ser verificada cada vez que se comienza con un nuevo lote. Preparar una solución de reserva de hierro ferroso (100 mg/L Fe), disolviendo 0,702 gs. de sulfato de amonio ferroso, hexahidrato, en un litro de agua desionizada. Diluya 3,00 mL de esta solución en 100 mL de agua desionizada para hacer una solución estándar de 3,00 mg/L. Esta debe ser preparada inmediatamente antes de usarla. Siga las instrucciones de la prueba de hierro ferroso empleando esta solución en vez de una muestra de agua.

• Procedure • Technique • Verfahren • Procedimiento



1. Fill a viewing tube to the first (5-mL) line with sample water. This is the blank.
 - ♦ Remplir un tube colorimétrique jusqu'au premier trait (5 mL) avec l'échantillon d'eau. Ceci est le blanc.
 - ♦ Füllen Sie ein Prüfröhrchen bis zur ersten (5 mL) Linie mit Probenwasser. Dieses ist die Blindprobe.
 - ♦ Llène un tubo para colorimetría hasta la primera marca (5 mL) con la muestra de agua. Esto constituye el blanco.



2. Place this tube in the top left opening of the color comparator.
 - ♦ Placer ce tube dans l'ouverture supérieure gauche du comparateur.
 - ♦ Stellen Sie dieses Röhrchen in die obere linke Öffnung des Farbkomparators.
 - ♦ Coloque este tubo en la abertura superior izquierda del comparador.



3. Fill the measuring vial to the 25-mL mark with sample water.
 - ♦ Remplir le tube de mesure jusqu'au trait 25 mL avec l'échantillon d'eau.
 - ♦ Füllen Sie das Messröhrchen bis zur 25 mL Markierung mit dem Probenwasser.
 - ♦ Llène el frasco medidor hasta la marca de 25 mL con el agua de la muestra.

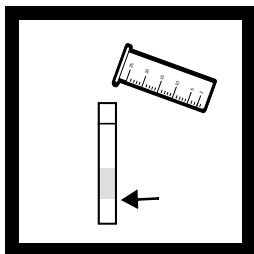


4. Add the contents of one Ferrous Iron Reagent Powder Pillow to the measuring vial.
 - ♦ Ajouter le contenu d'une gélule de réactif du fer ferreux au tube de mesure.
 - ♦ Geben Sie den Inhalt eines Eisen(II)-Reagenz-Pulverkissens in das Messröhrchen.
 - ♦ Agregue el contenido de una cápsula del Reactivo para Hierro Ferroso al frasco medidor.



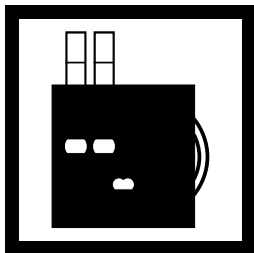
5. Swirl to mix. An orange color will develop if ferrous iron is present. Allow three minutes for full color development.

- ♦ Agiter pour mélanger. En présence de fer ferreux, une coloration orange se développe. Attendre le développement complet de la coloration.
- ♦ Schwenken Sie zum Vermischen. Ist Eisen(II) vorhanden, entwickelt sich eine orange Färbung. Warten Sie drei Minuten, bis sich die Farbe vollständig ausgebildet hat.
- ♦ Agite para mezclar. Se formará un color anaranjado en presencia de hierro ferroso. Deje pasar tres minutos para que el color se desarrolle completamente.



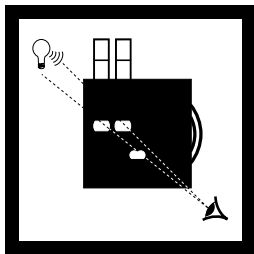
6. Fill another viewing tube to the first (5-mL) mark with the prepared sample.

- ♦ Remplir un autre tube jusqu'au premier trait (5 mL) avec l'échantillon préparé.
- ♦ Füllen Sie ein weiteres Prüfröhrchen bis zur ersten (5 mL-) Linie mit der vorbereiteten Probe.
- ♦ Llène otro tubo para colorimetría hasta la marca de 5mL con la muestra preparada en los puntos 4 y 5.



7. Place the second tube in the top right opening of the color comparator.

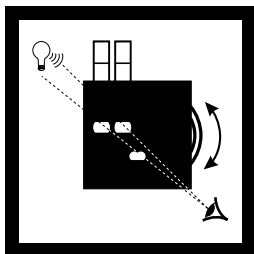
- ♦ Placer le second tube dans l'ouverture supérieure droite du comparateur.
- ♦ Setzen Sie das zweite Röhrchen in die obere rechte Öffnung des Farbkomparators.
- ♦ Coloque el segundo tubo en la abertura superior derecha del comparador.



- 8.** Hold comparator up to a light source such as the sky, a window or a lamp. Look through the openings in front.
- ♦ Tenir le comparateur face à une surface uniformément éclairée (ciel, lampe, fenêtre) et regarder par les ouvertures de la face antérieure du comparateur.

♦ Halten Sie den Komparator gegen eine Lichtquelle wie zum Beispiel den Himmel, ein Fenster oder eine Lampe. Sehen Sie durch die Öffnungen vorn.

♦ Lleve el comparador hasta una fuente de luz, tal como el cielo, una ventana o una lámpara. Mire a través de las aberturas frontales del comparador.

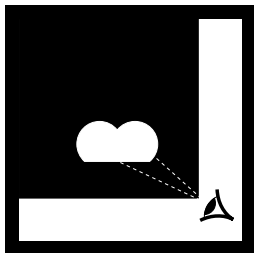


- 9.** Rotate the color disc until the color matches in the two openings.

♦ Tourner le disque jusqu'à égalité des teintes dans les deux ouvertures.

♦ Drehen Sie die Farbscheibe, bis die Farbe in den beiden Öffnungen übereinstimmt.

♦ Haga girar el disco de color hasta que el color coincida en ambas aberturas.



- 10.** Read the mg/L ferrous iron in the scale window.

♦ Lire la concentration du fer ferreux en mg/L dans la fenêtre de l'échelle.

♦ Lesen Sie die mg/L Eisen(II) im Skalenfenster ab.

♦ Lea la concentración de hierro ferroso en mg/L en la ventanilla graduada.

REPLACEMENTS

Description	Unit	Cat. No.
Clippers	each.....	968-00
Color Comparator.....	each.....	1732-00
Color Disc, Iron Phenanthroline.....	each.....	1874-00
Ferrous Iron Reagent Powder Pillows, 25 mL	100/pkg.....	1037-69
Instruction Card, IR-18C Test Kit	each.....	26672-88
Vial, measuring, with 2, 5, 10, 15, 20 and 25-mL marks	each.....	2193-00
Viewing Tube, plastic	4/pkg.....	46600-04
Water, deionized	4 L.....	272-56

REACTIFS ET PIECES DE RECHANGE

Désignation	Unité	Réf. N°
Pince coupante pour gélules moyennes.....	1.....	968-00
Comparateur.....	1.....	1732-00
Disque coloré fer, phénanthroline	1.....	1874-00
Réactif du fer ferreux en gélules pour 25 mL	100/paq.....	1037-69
Mode d'emploi de la trousse IR-18C	1.....	26672-88
Tube de mesure marqué 2, 5, 10, 15, 20 et 25 mL	1.....	2193-00
Tube colorimétrique en plastique avec bouchon	4/paq.....	46600-04
Eau désionisée	4 L.....	272-56

VERBRAUCHSMATERIAL UND ERSATZTEILE

Beschreibung	Einheit	Kat. Nr.
Abschneider.....	1.....	968-00
Farbkomparator	1.....	1732-00
Farbscheibe, Eisenphenanthrolin.....	1.....	1874-00
Eisen(II) Reagenz-Pulverkissen, 25 mL.....	100/Stck.....	1037-69
Anleitungskarte, IR-18C Test Kit.....	1.....	26672-88
Messröhrchen m. 2, 5, 10, 15, 20 und 25 mL Markierungen	1.....	2193-00
Farbprüfröhrchen, Plastik, mit Kappe	4/Stck.....	46600-04
Entsalztes Wasser	4 L.....	272-56

REACTIVOS Y MATERIALES

Descripción	Unidad	Nº Ref.
Pinzas cortantes para cápsulas intermedias.....	1.....	968-00
Comparador de Colores.....	1.....	1732-00
Disco de colores, fenantrolina de hierro.....	1.....	1874-00
Reactivo para Hierro Ferroso, Bolsas de Polvo, 25 mL	100/lote.....	1037-69
Tarjeta de Instrucciones, Juego de Prueba IR-18C.....	1.....	26672-88
Frasco medidor, con marcas a 2, 5, 10, 15, 20 y 25 mL.....	1.....	2193-00
Tubo para colorimetría de plástico, con tapa protectora	4/lote.....	46600-04
Agua desionizada	4 L.....	272-56

OPTIONAL REAGENTS AND EQUIPMENT

Description	Unit	Cat. No.
Caps, for plastic Color Viewing Tubes 46600-04	4/pkg.....	46600-14
Ferrous Ammonium Sulfate, Hexahydrate.....	113 g.....	11256-14
Flask, volumetric, Class A, 100-mL.....	each.....	26366-42
Flask, volumetric, Class A, 1000-mL.....	each.....	26366-53
Pipet, volumetric, Class A, 5-mL.....	each.....	14515-37
Pipet Filler, safety bulb.....	each.....	14651-00

REACTIFS ET EQUIPEMENTS OPTIONNELS

Désignation	Unité	Réf. N°
Bouchons pour tubes en plastique 46600-04.....	4/paq.....	46600-14
Ammonium, fer (II) sulfate, 6 H ₂ O ACS	113 g.....	11256-14
Fiole jaugée, classe A, 100ml.....	1.....	26366-42
Fiole jaugée, classe A, 1000 ml.....	1.....	26366-53
Pipette jaugée, classe A, 5,00ml.....	1.....	14515-37
Poire à pipetter	1.....	14651-00

ZUSÄTZLICHE REAGENZIEN UND ZUBEHÖR

Beschreibung	Einheit	Kat. Nr.
Kappen, für Plastik-Farbprüfröhrchen 46600-04	4/Stck.....	46600-14
Eisen(II)-Ammoniumsulfat, hexahydrat	113 g.....	11256-14
Messkolben, Klasse A, 100 mL.....	1.....	26366-42
Messkolben, Klasse A, 1000 mL.....	1.....	26366-53
Messpipette, Klasse A, 5mL	1.....	14515-37
Pipettenfüller, Sicherheitsball.....	1.....	14651-00

REACTIVOS Y EQUIPAMIENTO OPCIONALES

Descripción	Unidad	Nº Ref.
Tapas protectoras para tubos de plástico 46600-04.....	4/lote.....	46600-14
Sulfato de Amonio Ferroso, Hexahidratado	113 g.....	11256-14
Frasco volumétrico, clase A, 100-mL	1.....	26366-42
Frasco volumétrico, clase A, 1000-mL	1.....	26366-53
Pipeta volumétrica, clase A, 5-0 mL	1.....	14515-37
Bulbo de seguridad para llenador de pipeta.	1.....	14651-00

-
- **Pour assistance technique, informations de prix ou informations pour commander, contactez HACH Company ou votre distributeur HACH.**
 - **Technische Unterstützung, aktuelle Preisauskünfte und Bestellhilfe erhalten Sie bei Ihrer HACH Vertretung.**
 - **Para obtener asistencia técnica así como información sobre los precios y pedidos, ponerse en contacto con HACH Company o la agencia local de distribución.**
-



HACH COMPANY
WORLD HEADQUARTERS
P.O. Box 389
Loveland, Colorado 80539-0389
Telephone : (970) 669-3050
FAX : (970) 669-2932
Telex : 160840

HACH EUROPE
Chaussée de Namur, 1
B-5150 Floriffoux (Namur), Belgium
Telephone : (32) (81) 44.71.71
FAX : (32) (81) 44.13.00

FOR TECHNICAL ASSISTANCE, PRICE INFORMATION AND ORDERING:
In the U.S.A. - **Call 800-227-4224 toll-free for more information.**
Outside the U.S.A. - **Contact the HACH office or distributor serving you.**

APPENDIX F: SGS and MI External Laboratory and SiREM Gene-Trac[®] Reports

**SGS Canada Inc.**

P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

SiREM Laboratory

Attn : Sandra Dworatzek

130 Research Lane, Suite 2, Guelph
, N1G 5G3
Phone: 519-822-2265, Fax:519-822-3151

16-January-2014

Date Rec. : 14 January 2014
LR Report: CA14303-JAN14
Reference: S-3065 Ekonol

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample Date & Time	Temperature Upon Receipt °C	Sulphide mg/L
1: Analysis Start Date		---	14-Jan-14
2: Analysis Start Time		---	14:47
3: Analysis Approval Date		---	16-Jan-14
4: Analysis Approval Time		---	07:55
5: Ekonol-ANAC-3	13-Jan-14 15:40	15.0	51.8
6: Ekonol-ANAC-4	13-Jan-14 15:40	15.0	39.9
7: Ekonol-ANAC-13	13-Jan-14 15:40	15.0	100.0
8: Ekonol-ANAC-14	13-Jan-14 15:40	15.0	85.2

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

**SGS Canada Inc.**

P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

SiREM Laboratory

Attn : Jeff Roberts

130 Research Lane, Suite 2, Guelph
, N1G 5G3
Phone: 519-822-2265, Fax:519-822-3151

27-February-2014

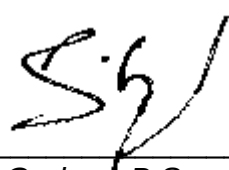
Date Rec. : 12 February 2014
LR Report: CA14262-FEB14

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample Date & Time	Temperature Upon Receipt °C	Sulphide mg/L
3: Analysis Approval Date		---	21-Feb-14
4: Analysis Approval Time		---	14:52
5: Ekonol-ANSC-1a	11-Feb-14	4.0	< 0.2
6: Ekonol-ANSC-2a	11-Feb-14	4.0	0.62
7: Ekonol-ANSC-3a	11-Feb-14	4.0	1.9
8: Ekonol-ANSC-4a	11-Feb-14	4.0	7.8
9: Ekonol-Fe-5a	11-Feb-14	4.0	0.52
10: Ekonol-Fe-6a	11-Feb-14	4.0	< 0.2
11: Ekonol-Fe/6.5-7a	11-Feb-14	4.0	1.4
12: Ekonol-Fe/6.5-8a	11-Feb-14	4.0	0.63
13: Ekonol-Fe/7.0-9a	11-Feb-14	4.0	0.75
14: Ekonol-Fe/7.0-10a	11-Feb-14	4.0	< 0.2
15: Ekonol-Fe/Nut/7.0-11a	11-Feb-14	4.0	< 0.2
16: Ekonol-Fe/Nut/7.0-12a	11-Feb-14	4.0	0.50
17: Ekonol-ANAC-13a	11-Feb-14	4.0	26.1
18: Ekonol-ANAC-14a	11-Feb-14	4.0	71.8
19: Ekonol-Fe-15a	11-Feb-14	4.0	< 0.2
20: Ekonol-Fe-16a	11-Feb-14	4.0	0.55
21: Ekonol-Fe/7.0-17a	11-Feb-14	4.0	0.30
22: Ekonol-Fe/7.0-18a	11-Feb-14	4.0	0.64
23: Ekonol-Fe/Nut/7.0-19a	11-Feb-14	4.0	0.77
24: Ekonol-Fe/Nut/7.0-20a	11-Feb-14	4.0	< 0.2



Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

**SGS Canada Inc.**

P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

05-May-2014

SiREM Laboratory

Attn : Jeff Roberts

130 Research Lane, Suite 2, Guelph
, N1G 5G3
Phone: 519-822-2265, Fax:519-822-3151

Date Rec. : 25 April 2014
LR Report: CA13851-APR14
Reference: S-3065 Ekonol

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample Date & Time	Temperature Upon Receipt °C	Sulphide mg/L
3: Analysis Approval Date		---	01-May-14
4: Analysis Approval Time		---	15:28
5: Ekonol-ANSC-1b	23-Apr-14	4.0	< 0.2
6: Ekonol-ANSC-2b	23-Apr-14	4.0	< 0.2
7: Ekonol-ANSC-3b	23-Apr-14	4.0	< 0.2
8: Ekonol-ANSC-4b	23-Apr-14	4.0	< 0.2
9: Ekonol-Fe-5b	23-Apr-14	4.0	< 0.2
10: Ekonol-Fe-6b	23-Apr-14	4.0	< 0.2
11: Ekonol-Fe/6.5-7b	23-Apr-14	4.0	< 0.2
12: Ekonol-Fe/6.5-8b	23-Apr-14	4.0	< 0.2
13: Ekonol-Fe/7.0-9b	23-Apr-14	4.0	< 0.2
14: Ekonol-Fe/7.0-10b	23-Apr-14	4.0	< 0.2
15: Ekonol-Fe/Nut/7.0-11b	23-Apr-14	4.0	< 0.2
16: Ekonol-Fe/Nut/7.0-12b	23-Apr-14	4.0	< 0.2
17: Ekonol-ANAC-13b	23-Apr-14	4.0	54.6
18: Ekonol-ANAC-14b	23-Apr-14	4.0	70.3
19: Ekonol-Fe-15b	23-Apr-14	4.0	< 0.2
20: Ekonol-Fe-16b	23-Apr-14	4.0	0.237
21: Ekonol-Fe/7.0-17b	23-Apr-14	4.0	34.9
22: Ekonol-Fe/7.0-18b	23-Apr-14	4.0	39.3
23: Ekonol-Fe/Nut/7.0-19b	23-Apr-14	4.0	4.68
24: Ekonol-Fe/Nut/7.0-20b	23-Apr-14	4.0	0.419



SGS Canada Inc.

P.O. Box 4300 - 185 Concession St.

Lakefield - Ontario - KOL 2H0

Phone: 705-652-2000 FAX: 705-652-6365

LR Report : CA13851-APR14

*Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical*

**SGS Canada Inc.**

P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

SiREM Laboratory

Attn : Sandra Dworatzek

130 Research Lane, Suite 2, Guelph
, N1G 5G3
Phone: 519-822-2265, Fax:519-822-3151

30-May-2014

Date Rec. : 22 May 2014
LR Report: CA12667-MAY14
Reference: S-3065 Ekonol

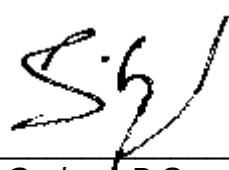
Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample Date & Time	Temperature Upon Receipt °C	Sulphide mg/L
3: Analysis Approval Date		---	29-May-14
4: Analysis Approval Time		---	11:33
5: Ekonol-ANSC-1c	21-May-14	4.0	< 0.2
6: Ekonol-ANSC-2c	21-May-14	4.0	2.2
7: Ekonol-ANAC-3c	21-May-14	4.0	24
8: Ekonol-ANAC-4c	21-May-14	4.0	12
9: Ekonol-Fe-5c	21-May-14	4.0	< 0.2
10: Ekonol-Fe-6c	21-May-14	4.0	2.2
11: Ekonol-Fe/6.5-7c	21-May-14	4.0	5.0
12: Ekonol-Fe/6.5-8c	21-May-14	4.0	< 2
13: Ekonol-Fe/7.0-9c	21-May-14	4.0	< 2
14: Ekonol-Fe/7.0-10c	21-May-14	4.0	< 2
15: Ekonol-Fe/Nut/7.0-11c	21-May-14	4.0	< 2
16: Ekonol-Fe/Nut/7.0-12c	21-May-14	4.0	< 2
17: Ekonol-ANAC-13c	21-May-14	4.0	406
18: Ekonol-ANAC-14c	21-May-14	4.0	3.0
19: Ekonol-Fe-15c	21-May-14	4.0	< 0.02
20: Ekonol-Fe-16c	21-May-14	4.0	< 0.02
21: Ekonol-Fe/7.0-17C	21-May-14	4.0	< 0.02
22: Ekonol-Fe/7.0-18c	21-May-14	4.0	5.2
23: Ekonol-Fe/Nut/7.0-19c	21-May-14	4.0	< 0.2
24: Ekonol-Fe/Nut/7.0-20c	21-May-14	4.0	< 0.2

Reporting limit elevated for some samples due to matrix interferences.



Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

**SGS Canada Inc.**

P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - K0L 2H0
Phone: 705-652-2000 FAX: 705-652-6365

SiREM Laboratory

Attn : Sandra Dworatzek

130 Research Lane, Suite 2, Guelph
, N1G 5G3
Phone: 519-822-2265, Fax:519-822-3151

27-March-2014

Date Rec. : 25 March 2014
LR Report: CA13531-MAR14
Reference: S-3065 Ekonol

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Sample Date & Time	Temp Upon Receipt °C	TOC mg/L
3: Analysis Approval Date		---	27-Mar-14
4: Analysis Approval Time		---	07:50
5: Eko-14D-ANAC-3b	24-Mar-14 14:30	1.0	589
6: Eko-14D-ANAC-4b	24-Mar-14 14:30	1.0	504
7: Eko-14D-Fe/Nut/7.0-11b	24-Mar-14 14:30	1.0	531
8: Eko-14D-Fe/Nut/7.0-12b	24-Mar-14 14:30	1.0	194
9: Eko-14D-ANAC-13b	24-Mar-14 14:30	1.0	436
10: Eko-14D-ANAC-14b	24-Mar-14 14:30	1.0	395
11: Eko-14D-Fe/Nut/7.0-19b	24-Mar-14 14:30	1.0	218
12: Eko-14D-Fe/Nut/7.0-20b	24-Mar-14 14:30	1.0	248

Brian Graham B.Sc.
Project Specialist
Environmental Services, Analytical

Certificate of Analysis: Gene-Trac® VC, Vinyl Chloride Reductase (*vcrA*) Assay

Customer: Glenn Ulrich, Parsons

Project: Ekonol

Customer Reference: 448538.01000

SiREM Reference: S-3145

Report Date: 1-Apr-14

Data Files: MyiQ-VC-QPCR-0642
MyiQ-DB-VC-QPCR-0363
VC-QPCR-Check-gel-0649

Table 1a: Test Results

Customer Sample ID	SiREM Sample ID	Sample Collection Date	Sample Matrix	Percent <i>vcrA</i> *	Vinyl Chloride Reductase (<i>vcrA</i>) Gene Copies/Liter
EKO-14D-ANAC-3/4	VCR-4664	24-Mar-14	Microcosm	0.01 - 0.03 %	3×10^6
EKO-14D-Fe/Nut/7.0-11/12	VCR-4665	24-Mar-14	Microcosm	0.4 - 1 %	1×10^8
EKO-2D-ANAC-13/14	VCR-4666	24-Mar-14	Microcosm	0.004 - 0.01 %	1×10^6
EKO-2D-Fe/Nut/7.0-19/20	VCR-4667	24-Mar-14	Microcosm	0.0005 - 0.002 %	3×10^5

Notes:

* Percent *vcrA* in microbial population. This value is calculated by dividing the number of vinyl chloride reductase A (*vcrA*) gene copies quantified by the total number of bacteria estimated to be in the sample based on the mass of DNA extracted from the sample. Range represents normal variation in enumeration of *vcrA*.

J The associated value is an estimated quantity between the method detection limit and quantitation limit.

U Not detected, associated value is the quantification limit.

B Analyte was detected in the method blank within an order of magnitude of the test sample.

NA Not applicable as *vcrA* not detected and/or quantifiable DNA not extracted from the sample.

I Sample inhibited the test reaction based on inability to PCR amplify extracted DNA with universal primers.

C Correction factor applied to correct for non-specific PCR amplification products, value is an estimated quantity.

Analyst:



Jennifer Wilkinson
Senior Laboratory Technician

Approved:



Ximena Druar, B.Sc.
Genetic Testing Coordinator

Certificate of Analysis: Gene-Trac® *Dehalobacter* Assay

Customer: Glenn Ulrich, Parsons

Project: Ekonol

Customer Reference: 448538.01000

SiREM Reference: S-3145

Report Date: 1-Apr-14

Data Files: iQ5-DHB-QPCR-0284
iQ5-DB-DHB-QPCR-0100

Table 1b: Test Results

Customer Sample ID	SiREM Sample ID	Sample Collection Date	Sample Matrix	Percent Dhb *	<i>Dehalobacter</i> 16S rRNA Gene Copies/Liter
EKO-14D-ANAC-3/4	DHB-1009	24-Mar-14	Microcosm	0.001 - 0.003 %	3×10^5
EKO-14D-Fe/Nut/7.0-11/12	DHB-1010	24-Mar-14	Microcosm	0.002 - 0.005 %	5×10^5
EKO-2D-ANAC-13/14	DHB-1011	24-Mar-14	Microcosm	0.03 - 0.09 %	1×10^7
EKO-2D-Fe/Nut/7.0-19/20	DHB-1012	24-Mar-14	Microcosm	0.000007 - 0.00002 %	4×10^3 J

Notes:

* Percent *Dehalobacter* (Dhb) in microbial population. This value is calculated by dividing the number of Dhb 16S ribosomal ribonucleic acid (rRNA) gene copies by the total number of bacteria as estimated by the mass of DNA extracted from the sample. Range represents normal variation in Dhb enumeration.

J The associated value is an estimated quantity between the method detection limit and quantitation limit.

U Not detected, associated value is the quantification limit.

B Analyte was detected in the method blank within an order of magnitude of the test sample.

NA Not applicable as *Dehalobacter* not detected and/or quantifiable DNA not extracted from the sample.

I Sample inhibited the test reaction based on inability to PCR amplify extracted DNA with universal primers.

E Extracted genomic DNA was not detected in the sample.

Analyst:



Jennifer Wilkinson
Senior Laboratory Technician

Approved:



Ximena Druar, B.Sc.
Genetic Testing Coordinator

Table 2: Detailed Test Parameters, Gene-Trac Test Reference S-3145

Customer Sample ID	EKO-14D-ANAC-3/4	EKO-14D-Fe/Nut/7.0-11/12	EKO-2D-ANAC-13/14	EKO-2D-Fe/Nut/7.0-19/20
SiREM <i>vcrA</i> Sample ID	VCR-4664	VCR-4665	VCR-4666	VCR-4667
SiREM Dhb Sample ID	DHB-1009	DHB-1010	DHB-1011	DHB-1012
Date Received	24-Mar-14	24-Mar-14	24-Mar-14	24-Mar-14
Sample Temperature	NA	NA	NA	NA
Filtration Date	26-Mar-14	26-Mar-14	26-Mar-14	26-Mar-14
Volume Used for DNA Extraction	10 mL	10 mL	10 mL	10 mL
DNA Extraction Date	27-Mar-14	27-Mar-14	27-Mar-14	27-Mar-14
DNA Concentration in Sample (extractable)	49650 ng/L	62850 ng/L	63525 ng/L	113400 ng/L
PCR Amplifiable DNA	Detected	Detected	Detected	Detected
<i>vcrA</i> qPCR Date Analyzed	28-Mar-14	28-Mar-14	28-Mar-14	28-Mar-14
Dhb qPCR Date Analyzed	31-Mar-14	31-Mar-14	31-Mar-14	31-Mar-14
Laboratory Controls (see Tables 3 & 4)	Passed	Passed	Passed	Passed
Comments	--	--	--	--

Notes:

Refer to Tables 3 & 4 for detailed results of controls.

°C = degrees Celsius

DNA = Deoxyribonucleic acid

NA = not applicable

PCR = polymerase chain reaction

qPCR = quantitative PCR

vcrA = vinyl chloride reductase

ng/L = nanograms per liter

mL = milliliters

Dhb = *Dehalobacter*

Table 3: Gene-Trac VC Control Results, Test Reference S-3145

Laboratory Control	Analysis Date	Control Description	Spiked <i>vcrA</i> reductase Gene Copies per Liter	Recovered <i>vcrA</i> reductase Gene Copies per Liter	Comments
Positive Control Low Concentration	28-Mar-14	qPCR with KB1 genomic DNA (CSLV-0510)	7.5×10^4	3.3×10^4	See Note 1
Positive Control High Concentration	28-Mar-14	qPCR with KB1 genomic DNA (CSHV-0510)	1.2×10^7	6.1×10^6	--
DNA Extraction Blank	28-Mar-14	DNA extraction sterile water (FB-2147)	0	7.8×10^3	See Note 2
Negative Control	28-Mar-14	Tris Reagent Blank (TBV-0481)	0	1.1×10^3 J	See Note 2

Notes:

DNA = Deoxyribonucleic acid

qPCR = quantitative PCR

16S rRNA = 16S ribosomal ribonucleic acid

U Not detected, associated value is the quantification limit.

vcrA = vinyl chloride reductase

¹Outside recovery limit guideline of +/- 50%.

²Acceptable as test results for relevant samples are greater than 1 order of magnitude above DNA Extraction Blank and Tris Reagent Blank test results.

Table 4: Gene-Trac Dhb Control Results, Test Reference S-3145

Laboratory Control	Analysis Date	Control Description	Spiked Dhb 16S rRNA Gene Copies per Liter	Spiked Dhb 16S rRNA Gene Copies per Liter	Comments
Positive Control Low Concentration	31-Mar-14	qPCR with ACT-3 genomic DNA (CSLDB-0244)	1.3×10^6	7.5×10^5	--
Positive Control High Concentration	31-Mar-14	qPCR with ACT-3 genomic DNA (CSHDB-0244)	1.3×10^7	1.0×10^7	--
DNA Extraction Blank	31-Mar-14	DNA extraction sterile water (FB-2147)	0	2.6×10^3 U	--
Negative Control	31-Mar-14	Tris Reagent Blank (TBDB-0244)	0	2.6×10^3 U	--

Notes:

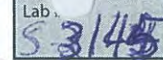
DNA = Deoxyribonucleic acid

qPCR = quantitative PCR

16S rRNA = 16S ribosomal ribonucleic acid

U Not detected, associated value is the quantification limit.

Dhb = *Dehalobacter*



In the absence of an executed agreement, submission of samples to SIREM implies consent for performance of analyses specified on this Chain-of-Custody form and agreement with the terms and conditions of the SIREM Laboratory Services Agreement. The entity submitting samples shall be responsible for payment in full for said analyses.

SiREM Technical Note 1.5:

Guidelines for Interpretation of Gene-Trac® Test Results

This document provides technical background information and guidelines for interpreting the results for the following Gene-Trac® assays:

- (1) Gene-Trac® Dhc
- (2) Gene-Trac® VC
- (3) Gene-Trac® Dhb

SiREM Technical Note 1.4 - *Quantitative Gene-Trac® Assay Test Procedure and Reporting Overview* provides detailed information on Gene-Trac® test procedures and reporting. Explanation of data qualifiers and commonly used notes is provided as Appendix A. Table 1 provides a brief interpretation for some common scenarios, more detailed interpretation information is provided in the following sections.

Table 1: Common Gene-Trac® Test Result Scenarios and Interpretation

Gene-Trac® Dhc (<i>Dehalococcoides</i>)	Gene-Trac® VC (<i>vcrA</i>)	Gene-Trac® Dhb (<i>Dehalobacter</i>)	Interpretation
>1 x10 ⁷ /L	>1 x10 ⁷ /L	Not Analyzed	Complete dechlorination to ethene likely as Dhc high and <i>vcrA</i> high
1 x10 ⁷ /L	Not Detected	Not Analyzed	VC accumulation possible as <i>vcrA</i> negative
Not Detected	Not Detected	Not Analyzed	Dhc negative/ lack of dechlorination or <i>cis</i> -DCE accumulation likely
Not Analyzed	Not Analyzed	1 x10 ⁶ /L	Dhb positive, potential for biodegradation of 1,1,1-TCA, 1,2-DCA, carbon tetrachloride and chloroform, PCE and TCE to <i>cis</i> -DCE
Not Analyzed	Not Analyzed	Not Detected	Biodegradation of 1,1,1-TCA, carbon tetrachloride and chloroform not expected as Dhb negative

Gene-Trac[®] Dhc -Total *Dehalococcoides* Test

Background:

Gene-Trac[®] Dhc is a quantitative PCR (qPCR) test for total *Dehalococcoides* (Dhc) microbes that targets Dhc specific sequences of the 16S ribosomal ribonucleic acid (rRNA) gene, a gene commonly used to identify microbes. Dhc are the only known microorganisms capable of complete dechlorination of chloroethenes (i.e., tetrachloroethene, trichloroethene, cis-1,2-dichloroethene [cis-DCE] and vinyl chloride) to non-toxic ethene. Gene-Trac[®] Dhc may also be used to assess the in situ growth of Dhc containing bioaugmentation cultures such as KB-1[®].

Negative Gene-Trac[®] Dhc Test Results (U qualified)

A non-detect in the Gene-Trac[®] Dhc assay (e.g., 4,000U) indicates that Dhc were not detected in the sample. The absence of Dhc is frequently associated with a lack of complete dechlorination or incomplete dechlorination of chlorinated ethenes. Where Dhc are absent the accumulation of cis-DCE is commonly observed, particularly after addition of electron donors. Bioaugmentation with Dhc containing cultures, such as KB-1[®], is commonly used to improve bioremediation performance at sites that lack an indigenous Dhc population.

Positive Gene-Trac[®] Dhc Test Results

The detection of Dhc has been correlated with the complete biological dechlorination of chlorinated ethenes to ethene at contaminated sites (Hendrickson et al., 2002). A positive Gene-Trac[®] Dhc test indicates that Dhc DNA was detected in the sample and is encouraging for dechlorination of chlorinated ethenes to ethene. Note not all Dhc are capable of conversion of vinyl chloride to ethene; this capability can be determined by the Gene-Trac[®] VC test (see Section 2) which is commonly performed as a follow-on analysis after positive Gene-Trac[®] Dhc tests. In most cases Dhc must be present at sufficient concentrations in order for significant dechlorination to be observed, guidelines for expected impacts at various Dhc concentrations are indicated below.

Values of 10^4 Dhc gene copies per liter (or lower): indicates that the sample contains low concentrations of Dhc which may indicate that site conditions are suboptimal for high rates of dechlorination. Increases in Dhc concentrations at the site may be possible if conditions are optimized (e.g., electron donor addition).

Values of 10^5 - 10^6 Dhc gene copies per liter: indicates the sample contains moderate concentrations of Dhc which may, or may not, be associated with observable dechlorination activity (i.e., detectable ethene).

Values at or above 10^7 Dhc gene copies per liter: indicates that the sample contains high concentrations of Dhc that are often associated with high rates of dechlorination (Lu et al., 2006) and the production of ethene.

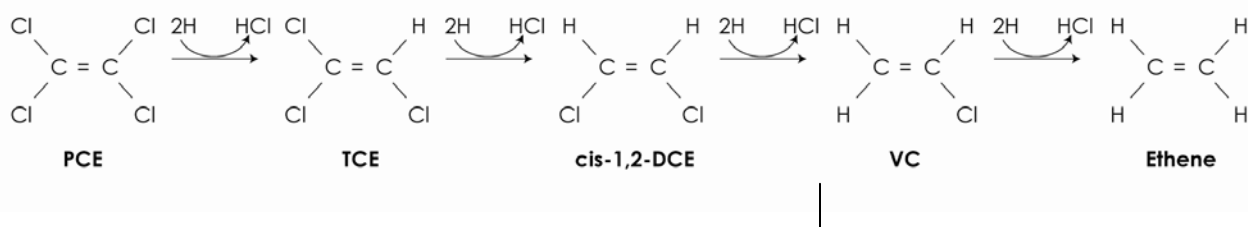
Values of 10^9 Dhc gene copies per liter are generally the highest observed for groundwater samples with rare exceptions.

Gene-Trac® VC- Vinyl Chloride Reductase (*vcrA*) Test

Background

Gene-Trac® VC is a qPCR test for the vinyl chloride reductase (*vcrA*) gene that codes for a Dhc enzyme that converts (VC) to ethene, a critical step in reductive dechlorination of chlorinated ethenes. Gene-Trac® VC is commonly used where Gene-Trac® Dhc test results are positive to confirm that the Dhc detected are capable of complete dechlorination to ethene. #

The vinyl chloride reductase gene (*vcrA*) (Müller et al., 2004) produces an enzyme that is found in many (but not all) Dhc and is reported to be the most common identified VC reductase in the environment (van der Zaan et al., 2010).



Key activity of vinyl chloride reductase *vcrA* gene/enzyme

Interpretation of Gene-Trac® VC Results

Detect in Gene-Trac® VC Test

A detect in the Gene-Trac® VC test indicates that a Dhc population has the *vcrA* gene and the prospects for complete dechlorination to ethene are good. As a minimal requirement, *vcrA* copies exceeding 10⁵/L combined with observed increases over time (i.e., cell growth) are required for robust VC dechlorination (van der Zaan et al., 2010). Also the guidelines for detection of ethene provided under Gene-Trac® Dhc are conservative for interpretation of Gene-Trac® VC (i.e., > 1 x10⁷ gene copies/L indicate a high likelihood of detection of ethene). In one study, more than 90% of samples where *vcrA* enumeration exceeded 1 x10⁷ gene copies/L had detectable ethene (Dennis, 2009). In cases where *vcrA* gene copies are lower the likelihood of detectable ethene decreases.

Non-Detect in Gene-Trac® VC Test (*U* qualified)

A non-detect in the Gene-Trac® VC test indicates that *vcrA* gene sequences in the sample are below the detection limit of the assay (typically 4 x 10³ *vcrA* gene copies/L). This indicates VC accumulation (VC stall) is possible. Note negative Gene-Trac® VC test results do not indicate with 100% certainty that a VC-stall will occur as there are other vinyl chloride reductase genes, such as *bvcA* (van der Zaan et al., 2010) that also convert VC to ethene.

Comparing Gene-Trac® VC and Gene-Trac® Dhc Test Results

Sites may contain different types of Dhc populations. At some sites the Dhc population is homogenous while other sites have Dhc populations that are mixtures of different types of Dhc. This can lead to differing results for Gene-Trac® Dhc and Gene-Trac® VC.

In many cases, the numerical results of Gene-Trac® VC test are identical to those obtained in the Gene-Trac® Dhc test, indicating that the entire Dhc population contains the *vcrA* gene. In other cases, Gene-Trac® VC results may differ significantly (i.e., more than an order or magnitude) from the total Dhc for a number of reasons.

Table 3 provides some common scenarios for Gene-Trac® VC and Gene-Trac® Dhc test results. In general, where Gene-Trac® VC results are non-detect, or significantly lower than Gene-Trac® Dhc, accumulation of VC is more likely.

Table 2: Interpretation of Gene-Trac® VC in Relation to Gene-Trac® Dhc

Gene-Trac® Dhc (16S rRNA gene copies/ L)	Gene-Trac® VC (<i>vcrA</i> gene copies/L)	Results Summary	Interpretation	Potential Site Implications
2×10^8 /L	3×10^8 /L	Total Dhc and <i>vcrA</i> are ~the same (within 3-fold)	Entire Dhc population has <i>vcrA</i> gene	Potential for complete dechlorination high. VC stall unlikely-sites with <i>vcrA</i> above 1×10^7 /L typically have detectable ethene
1×10^8 /L	Non-detect	Total Dhc high; <i>vcrA</i> non-detect	High concentration of Dhc and entire population lacks the <i>vcrA</i> gene	Likelihood for VC accumulation high as <i>vcrA</i> non-detect
1×10^8 /L	1×10^6 /L	Total Dhc is significantly higher (100 fold) than <i>vcrA</i>	Dhc population consists of different types, some with the <i>vcrA</i> gene (~1%) and some without (~99%)	VC-accumulation possible; Dhc/ <i>vcrA</i> proportions may change over course of remediation
1×10^6 /L	1×10^8 /L	<i>vcrA</i> orders of magnitude higher than Dhc	Significantly higher <i>vcrA</i> may indicate the presence of populations of non-Dhc microorganisms with <i>vcrA</i> like genes	Potential for VC-stall likely low

Gene-Trac[®] Dhb-Total *Dehalobacter* Test

Gene-Trac[®] Dhb is a qPCR test targeting the 16S rRNA gene sequences unique to *Dehalobacter* (Dhb). Dhb are implicated in the biodegradation of 1,1,1-trichloroethane (to chloroethane), 1,1,2-trichloroethane and 1,2-dichloroethane to ethene (Grostern and Edwards, 2006) and chloroform (to dichloromethane) (Grostern et al., 2010) as well as incomplete dechlorination of PCE and TCE to cis-DCE (Holliger et al., 1998). Gene-Trac[®] Dhb may also be used as a tool to assess the impact of bioaugmentation with the KB-1[®] Plus cultures which contain high concentrations of Dhb.

Positive Gene-Trac[®] Dhb Test Results (Detects)

A positive Gene-Trac[®] Dhb indicates that a member of the *Dehalobacter* (Dhb) genus was detected in the sample. The detection of Dhb indicates that some or all of the dechlorination activities attributed to Dhb may be present at the subject site. Increasing concentrations of Dhb are indicative of increased potential to degrade some or all of these compounds.

Note: the Gene-Trac[®] Dhb test will not differentiate the type of Dhb; therefore, observations of the specific biodegradation pathways and end products based on chemical analytical methods in conjunction with Gene-Trac[®] Dhb will increase the interpretability of Gene-Trac[®] Dhb results.

Note: Dhb have been reported to contain multiple copies (up to 4 per cell) of the 16S rRNA gene (Grostern and Edwards, 2008). This means that, unlike Dhc, there is not a 1:1 ratio between the 16S rRNA gene copy and the number of Dhb cells in a sample. Calculating the number of Dhb cells requires dividing the Gene-Trac[®] Dhb test result by the 16S rRNA gene copy number (often 3-4 copies/cell).

Non-detect Gene-Trac[®] Dhb Results (U qualified)

In cases where Gene-Trac[®] Dhb is not detected (e.g., 4,000U) this indicates that *Dehalobacter* species were not identified in the sample and that anaerobic reductive dechlorination of 1,1,1-TCA, 1,1,2-TCA, 1,2-DCA or chloroform, which are dechlorinated by *Dehalobacter*, may not be observed. This activity can be introduced at sites through the addition of bioaugmentation cultures containing *Dehalobacter* such as KB-1[®] Plus.

Key Elements of Gene-Trac® Data

Gene-Trac® test results include two key values (a) Target Gene Enumeration, an enumeration of target gene sequence by quantitative PCR (e.g. “Dhc Enumeration” “Dhb 16S Gene Copies” or “*vcrA* gene copies”) and (b) Target gene percent (e.g. “Percent Dhc”), an estimated percentage of the microbial population comprised by microbes harboring the target gene and other microbes present in sample. Further explanation of these values is provided below.

a) Target Gene Enumeration

This value is the concentration of Dhc or Dhb 16S rRNA or *vcrA* gene copies detected in the sample. Results may be reported as either gene copies per liter (for groundwater) or per gram (for soil). In general, the greater the number of gene copies in a sample the greater the likelihood of related dechlorination activity. Dhc 16S gene copies are typically equivalent to the number of Dhc as they have 1 gene copy per cell this is not necessarily true for Dhb or *vcrA* which have the potential be present in multiple gene copies per cell. Guidelines for relating target gene presence and concentration to observable dechlorination activity for groundwater samples are provided below in previous sections.

b) Target Gene Percent (%Dhc, %Dhb, %*vcrA*)

This value estimates the percentage of the target gene (e.g., %Dhc) relative to other microorganisms in the sample based on the formulas/assumptions presented below. For example, %Dhc is a measure of the predominance of Dhc and, in general, the higher this percentage the better.

$$\%Dhc = \frac{\text{Number Dhc}}{\text{Number Dhc} + \text{Number other Bacteria}}$$

Where:

$$\text{Number other Bacteria} = \frac{\text{Total DNA in sample (ng)} - \text{DNA attributed to Dhc (ng)}}{4.0 \times 10^{-6} \text{ ng DNA per bacterial cell}}$$

*Paul and Clark, (1996).

Percent Dhc (and % *vcrA*) values can range from very low fractions of percentages, in samples with low numbers of Dhc and a high number of other bacteria (incompletely colonized by Dhc), to greater than 50% in Dhc enriched locations (highly colonized by Dhc).

In addition to determining the predominance of the target gene target gene percent is also useful for interpretation of Dhc counts from different sampling locations, or the same location over time. For example, the %Dhc value can be used to correct Dhc counts where samples are biased due to non-representative sampling. Example 1 illustrates a hypothetical scenario where the %Dhc value improved data interpretation.

Example 1, use of %Dhc to interpret enumeration data

Table 2 presents results from MW-1 sampled in April, May and June. Based on the Dhc enumeration alone one would conclude that the concentration of Dhc held steady between April and May; however, the %Dhc indicates the proportion of Dhc actually increased from April to May and the unchanged count in May could be a case of low biomass recovery during sampling or other losses such as sample degradation in transit. The higher raw count and the higher percentage of Dhc in June confirm the trend of increasing Dhc concentrations over time.

Table 3: Use of % Dhc* Value to Diagnose Sampling Bias

Sample	Dhc Enumeration	%Dhc	Interpretation Based on %Dhc
MW-1, April	$1.0 \times 10^5/\text{Liter}$	0.1%	Dhc is a low proportion of total microbial population
MW-1, May	$1.0 \times 10^5/\text{Liter}$	1%	Dhc proportion increased 10-fold from April. Dhc enumeration was unchanged possibly due to low biomass recovery from monitoring well, non-biased sample would be $[(1.0/0.1) \times 1.0 \times 10^5] = 1.0 \times 10^6/\text{Liter}$
MW-1, June	$1.0 \times 10^7/\text{Liter}$	10%	Dhc has increased 100-fold from April and confirms May sample was likely low biased

**Note: the above approach is also applicable to the “%vcrA” and “%Dhb” values provided on their respective test certificates*

References

- Dennis, P., X.M. Druar, A. Waller and E. Edwards, 2006. Advantages of Vinyl Chloride Reductase Gene Testing in Bioremediation. Abstract and platform presentation, Presented at Fifth International Conference on Remediation of Chlorinated & Recalcitrant Compounds, Monterey, California May 22-25, 2006.
- Dennis, P., 2009. Lessons Learned from Interpreting the Quantification of *Dehalococcoides* - Platform Presentation-Clemson Hydrogeology Symposium, Clemson University, Clemson, South Carolina, April 2, 2009.
- Groster, A. and E.A. Edwards, 2006. Growth of *Dehalobacter* and *Dehalococcoides* spp. during Degradation of Chlorinated Ethanes. *Appl. Environ. Microbiol.* 72: 428–436.
- Groster, A. and E.A. Edwards, 2008. Characterization of a *Dehalobacter* Coculture that Dechlorinates 1,2-Dichloroethane to Ethene and Identification of the Putative Reductive Dehalogenase Gene. *Appl. Environ. Microbiol.* 75: 2684–2693.
- Groster, A., M. Duhamel, S. Dworatzek and E.A. Edwards, 2010. Chloroform respiration to dichloromethane by a *Dehalobacter* population. *Environmental Microbiology* 12(4) 1053-1060.
- Holliger, C., D. Hahn, H. Harmsen, W. Ludwig, W. Schumacher, B. Tindall, F. Vazquez, N. Weiss, and A.J.B. Zehnder, 1998. *Dehalobacter restrictus* gen. nov. and sp. nov., a strictly anaerobic bacterium that reductively dechlorinates tetraandtrichloroethene in an anaerobic respiration *Arch Microbiol* (1998) 169 : 313–321.
- Krajmalnik-Brown, R., T. Hölscher, I.N. Thomson, F.M. Saunders, K.M. Ritalahti, and F.E. Löffler, 2004. Genetic Identification of a Putative Vinyl Chloride Reductase in *Dehalococcoides* sp. Strain BAV1. *Appl. Environ. Microbiol.* 70: 6347–6351.
- Lu, X., J.T. Wilson, D.H. Kampbell, 2006. Relationship between *Dehalococcoides* DNA in ground water and rates of reductive dechlorination at field scale. *Water Res.* 40: 3131- 3140.
- Paul, E.A. and F.E. Clark, 1996. *Soil Microbiology and Biochemistry* Academic Press, Inc., San Diego, CA.
- Müller, J.A., B.M. Rosner, G. von Abendroth, G. Meshulam-Simon, P.L. McCarty, and A.M. Spormann, 2004. Molecular Identification of the Catabolic Vinyl Chloride Reductase from *Dehalococcoides* sp. Strain VS and Its Environmental Distribution. *Applied and Environmental Microbiology* 2004 August; 70(8): 4880–4888.
- van der Zaan, B. , F. Hannes, N. Hoekstra, H. Rijnaarts, W.M. de Vos, H. Smidt, and J. Gerritse, 2010. Correlation of *Dehalococcoides* 16S rRNA and Chloroethene-Reductive Dehalogenase Genes with Geochemical Conditions in Chloroethene-Contaminated Groundwater. *Appl. Environ. Microbiol.* 76(3) 843–850.

Appendix A: Data Qualifiers

Data Qualification

Data qualifiers and notes are used to clarify Gene-Trac® test results. Additional explanation beyond that provided on the test certificate is provided below.

“U” Not detected, associated value is the quantitation limit. Indicates that the target gene (microbe) was not detected in the sample above the quantitation limit of the assay. Note the quantitation limit value can change between samples as the volume filtered can vary; thus, a sample in which 100 ml was tested would have a 5-fold higher quantification limit compared with a sample in which 500 ml was tested.

“J” The associated value is an estimated quantity between the method detection limit and quantitation limit. Indicates that the target gene was conclusively detected but the concentration is below the quantitation limit where it cannot be accurately quantified.

“I” Sample inhibited the test reaction. This means universal primers were incapable of amplifying DNA from this sample. The inability to amplify with universal primers suggests that the sample may be imparting matrix interference. Matrix interference is commonly attributed to humic compounds, polyphenols and metals. Non-detects with an “I” qualifier are more likely to be false negative.

“B” Analyte was also detected in the method blank. Indicates that DNA was detected in a method blank or negative control; detectable contamination of the blanks with microbes or DNA containing the gene of interest is not uncommon as the test reaction is extremely sensitive. In most cases, blank contamination is at a very low level relative to test results (often orders of magnitude lower). In these cases, blank contamination is not relevant to interpretation of test results. The potential of test samples being contaminated (i.e. false positives) should be considered in cases where blank results are within 1 order of magnitude of test results.



10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Client: Sandra Dworatzek
SIREM Lab
130 Research Lane
Suite 2
Guelph, ON N1G 5G3
Canada

Phone: (519)515-0839

Fax: (519) 822-3151

Identifier: 007LD

Date Rec: 04/02/2014

Report Date: 04/08/2014

Client Project #: TL0311.13

Client Project Name: Ekonol

Purchase Order #:

Analysis Requested: CENSUS

Reviewed By:

A handwritten signature in black ink, appearing to be 'R. H. H.' or similar, written over a light blue background.

NOTICE: This report is intended only for the addressee shown above and may contain confidential or privileged information. If the recipient of this material is not the intended recipient or if you have received this in error, please notify Microbial Insights, Inc. immediately. The data and other information in this report represent only the sample(s) analyzed and are rendered upon condition that it is not to be reproduced without approval from Microbial Insights, Inc. Thank you for your cooperation.

MICROBIAL INSIGHTS, INC.

10515 Research Dr., Knoxville, TN 37932
Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: SIREM Lab
Project: Ekonol

MI Project Number: 007LD
Date Received: 04/02/2014

Sample Information

Client Sample ID:	GDNA 14351	GDNA 14352	GDNA 14353	GDNA 14354
Sample Date:	03/24/2014	03/24/2014	03/24/2014	03/24/2014
Units:	cells/ul	cells/ul	cells/ul	cells/ul
Analyst:	RW	RW	RW	RW

Dechlorinating Bacteria

<i>Dehalococcoides</i>	DHC	8.26E+04	1.00E+08	1.83E+04	5.70E+04
tceA Reductase	TCE	2.14E+03	5.95E+06	3.16E+03	2.72E+02(J)
BAV1 Vinyl Chloride Reductase	BVC	2.11E+04	5.41E+07	1.26E+04	5.50E+04
Vinyl Chloride Reductase	VCR	8.31E+03	7.21E+05	1.05E+03	3.71E+02(J)

Legend:

NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL I = Inhibited
< = Result not detected



10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

Identifier: 007LD

Date Rec: 04/02/2014

Report Date: 04/08/2014

Client Project #: TL0311.13

Client Project Name: Ekonol

Purchase Order #:

Comments: The results reported were multiplied by the provided elution volume of 150ul. However since extraction sample volume was not provided 1 was used as the submitted sample volume.

Name: Sandra Duoratzek / Kola Ashworth
Company: SIREM
Address: 130 Research Lane, Suite 2
Guelph, Ontario
N1G 5G3
email: kashworth@siremlab.com
Phone: 519-822-2265
Fax:

Name: Karen Broersma
Company: SIPEM
Address:

email: kbroersma@geosyntec.com
Phone: 519-515-0846
Fax:



10515 Research Dr
Knoxville, TN 37932
865-573-8188
www.microbe.com

Project Manager:	<u>Sandra Dworatzek, sdworatzek@sirema.com</u>	Purchase Order No.
Project Name:	<u>Ekono1</u>	Subcontract No.
Project No.:	<u>TL0311-13</u>	MI Quote No.

Purchase Order No. ab.com
Subcontract No.
MI Quote No.

Please Check One:

- ☐ More samples to follow
- ☐ No Additional Samples

Report Type: ☒ Standard (default) ☐ Microbial Insights Level III raw data(15% surcharge) ☐ Microbial Insights Level IV (25% surcharge) ☐ Comprehensive Interpretive(15%) ☐ Historical Interpretive (30%)

EDD type: ☒ Microbial Insights Standard (default) ☐ All other available EDDs (5% surcharge) Specify EDD Type:

Please contact us with any questions about the analyses or filling out the COC at (865) 573-8188 (9:00 am to 5:00 pm EST, M-F). After hours email: customerservice@microbe.com

Sample Information					Analyses					CENSUS: Please select the target organism/gene																									
MI ID (Laboratory Use Only)	Sample Name	Date Sampled	Time Sampled	Matrix	PLFA	DGGE+3ID	DGGE+5ID	QuantArray Chlor	QuantArray Petro	DHC (Dehalococcoides)	DHC Functional genes (bvc, bsa, vsc) <i>NO VCC</i>	DHBt (Dehalobacter)	DSM (Desulfuromonas)	DSB (Desulfobacterium)	EBAC (Total)	SFB (Sulfate Reducing Bacteria-APS)	MGN (Methanogens)	MOB (Methanotrophs)	SMMO	DNF (Denitrifiers-nirS and nirK)	AOB (ammonia oxidizing bacteria)	PM1 (MTBE aerobic)	RMO (Toluene Monooxygenase)	RDEG (Toluene Monooxygenase)	PHE (Phenol Hydroxylase)	NAH (Naphthalene-aerobic)	BSSA (Toluene/Xylene-Anaerobic)	add. qPCR:	add. qPCR:	RNA (Expression Option)*	Other:	Other:	Other:		
007401	GDNA 14351	24 May 2014		DNA						X	X																								
2	GDNA 14352	↓		↓						X	X																								
3	GDNA 14353	↓		↓						X	X																								
4	GDNA 14354	↓		↓						X	X																								
Relinquished by: Kela Ghimire		1 Apr 2014	Received by:										Date										Niraj M. Desai 4/2/14												

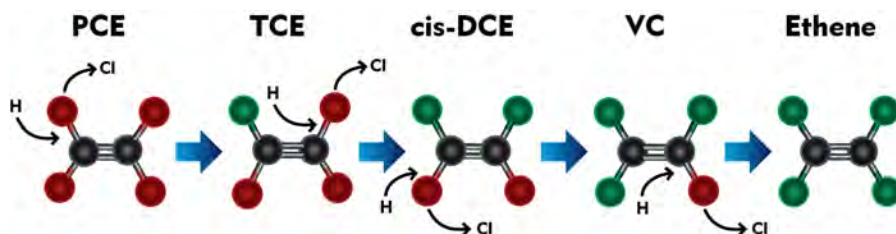
It is vital that chain of custody is filled out correctly & that all relative information is provided.

Failure to provide sufficient and/or correct information regarding reporting, invoicing & analyses requested information may result in delays for which MI will not be liable.

DHC Interpretation

Dehalococcoides 16S rRNA gene (qDHC)

Under anaerobic conditions, tetrachloroethene (PCE) and trichloroethene (TCE) can undergo sequential reductive dechlorination through the daughter products *cis*-dichloroethene (*cis*-DCE) and vinyl chloride to nontoxic ethene (1,2).



While a number of bacterial cultures capable of utilizing PCE and TCE as growth supporting electron acceptors have been isolated (3-7), *Dehalococcoides* spp. may be the most important because they are the only bacterial group that has been isolated to date which is capable of complete reductive dechlorination of PCE to ethene (8). In fact, the presence of *Dehalococcoides* spp. has been associated with complete dechlorination to ethene at sites across North America and Europe (9).

Status	<i>Dehalococcoides</i> spp.	Observation
	$\geq 10^4$ (cells/mL)	Lu et al. proposed that a concentration of 1×10^4 DHC cells/mL could be used as a screening criterion to identify sites where reductive dechlorination will yield a generally useful biodegradation rate (10). Similarly, in an internal study conducted with nearly 1000 groundwater samples obtained from sites across the US, ethene production was observed in approximately 80% of samples in which CENSUS® qDHC results were greater than or equal to 10^4 DHC cells/mL.
	10^1 to $< 10^4$ (cells/mL)	When vinyl chloride reductase genes (See DHC functional genes discussion below) are also detected, complete reductive dechlorination of PCE and TCE to ethene may still occur even with moderate DHC concentrations. When the DHC population is below the 10^4 cells/mL criterion proposed by Lu et al. (10), project managers should carefully consider other site-specific data to determine whether subsurface conditions may be limiting reductive dechlorination. For example, the addition of an electron donor may be able to stimulate DHC growth and enhance anaerobic bioremediation.
	$< 10^1$ (cells/mL)	DHC concentrations are low suggesting that complete reductive dechlorination of PCE and TCE to ethene is unlikely to occur under existing conditions. Enhanced anaerobic bioremediation options (biostimulation or bioaugmentation) may need to be considered.

DHC Functional Genes (*tceA*, *bvcA*, *vcrA*)

A “stall” where daughter products *cis*-DCE and vinyl chloride accumulate can occur at PCE- and TCE-impacted sites especially under MNA conditions. The accumulation of vinyl chloride, generally considered more carcinogenic than the parent compounds, is particularly problematic. Although elevated *Dehalococcoides* concentrations correspond to ethene production in numerous studies, the range of chlorinated ethenes metabolized and cometabolized varies among species and strains within the *Dehalococcoides* genus. For example, *Dehalococcoides ethenogenes* str. 195 metabolizes PCE, TCE, and *cis*-DCE and cometabolizes vinyl chloride (8) to produce ethene. Conversely, *Dehalococcoides* sp. CBDB1 utilizes PCE and TCE but does not cometabolize additional chloroethenes (11). Other *Dehalococcoides* strains, such as BAV1, GT and VS, are known to fully dechlorinate *cis*-DCE and VC to ethene (14,16,19). Quantification of reductive dehalogenase genes is used to more definitively confirm the potential for reductive dechlorination of TCE, *cis*-DCE, and vinyl chloride (12-15).

Functional Gene

Observation

TCE Reductase

<i>tceA</i> gene	The <i>tceA</i> gene encodes the enzyme responsible for reductive dechlorination of TCE to <i>cis</i>-DCE in some strains of <i>Dehalococcoides</i>. Absence of <i>tceA</i> does not preclude the potential for reductive dechlorination of TCE in the field since the <i>tceA</i> gene is not universally distributed among all DHC and is not present in other microorganisms capable of reductive dechlorination of TCE (e.g. <i>Dehalobacter</i>). Detection of the <i>tceA</i> gene provides an additional line of evidence indicating the potential for dechlorination of TCE.

Vinyl Chloride Reductase

<i>bvcA</i> gene	The <i>bvcA</i> gene encodes the vinyl chloride reductase enzyme responsible for reductive dechlorination of vinyl chloride to ethene by <i>Dehalococcoides</i> sp. str. BAV1 (16). Presence of <i>bvcA</i> gene indicates the potential for reductive dechlorination of VC to ethene. Absence of both <i>bvcA</i> and <i>vcrA</i> genes suggests VC may accumulate. An internal study with ~1,000 samples showed ethene production was observed in 80% of the samples that the DHC population was greater than or equal to 10⁴ cells/mL. The <i>bvcA</i> gene was detected in over 50% of these samples. Van Der Zaan et al (17) noted that the <i>bvcA</i> gene was the only VC reductase gene detected at three of their sites. Alfred Spormann’s laboratory at Stanford University (18) reported that the <i>bvcA</i> gene was the most abundant and active at the outflow of a PCE fed column study. This section of the column was in the DCE to VC stages of reductive dechlorination thus confirming the importance of the <i>bvcA</i> gene for complete reductive dechlorination.
<i>vcrA</i> gene	The <i>vcrA</i> gene encodes the vinyl chloride reductase enzyme responsible for reductive dechlorination of <i>cis</i>-DCE and vinyl chloride by <i>Dehalococcoides</i> sp. strain VS (14). Presence of <i>vcrA</i> gene indicates the potential for reductive dechlorination of DCE and/or VC to ethene. Absence of both <i>bvcA</i> and <i>vcrA</i> genes suggest VC may accumulate. As with the <i>bvcA</i> gene, detection of the <i>vcrA</i> gene is associated with ethene production in internal studies (67%) and vinyl chloride reduction in independent studies (14, 17).

Reporting

Microbial Insights can provide a variety of data packages and reporting levels to suit the needs of any project. Data packages range from simple analytical reports with results only to more complex data packages that include a report narrative, analytical results, QC data, and supporting materials including all raw data and chain-of-custody documentation. The figure below shows our standard report and explains the way values are reported.

Microbial Insights, Inc.

2340 Stock Creek Blvd. Rockford, TN 37853-3044
Tel. (865) 573-8188 Fax. (865) 573-8133

CENSUS

Client: Company Name
Project: Your Project Name

MI Project Number: Unique Laboratory Identifier
Date Received: Date Samples Arrived

Sample Information

Client Sample ID:	Sample A	Sample B	Sample C
Sample Date:	00/00/0000	00/00/0000	00/00/0000
Units:	cells/mL	cells/mL	cells/mL
Analyst:	Intials	Intials	Intials
Dechlorinating Bacteria			
<i>Dehalococcoides spp.</i>	DHC	1.84E+05	2.76E+02
			2.28E+01 (J)
Functional Genes			
tceA Reductase	TCE	6.00E+01	3.23E+01
bvcA Reductase	BVC	1.17E+04	1.81E+01
vcrA Reductase	VCR	8.42E+04	1.74E+02
			<4.00E-01
			<4.00E-01
			<4.00E-01

Legend:

NA = Not Analyzed NS = Not Sampled J = Estimated gene copies below PQL but above LQL
< = Result not detected

"J" value
Result is an estimated value. This data qualifier (flag) is used when the target gene is detected but at a concentration or abundance below the practical quantification limit (PQL).

< value
The target gene was not detected at the limit of quantitation (LOQ) reported for that sample.

I = Inhibited

"I" value
QA Procedure indicated that the sample may have exhibited PCR inhibition. Although relatively rare, PCR inhibition can occur due to the presence of metals or humic acids at high concentrations in the sample.

Quality Assurance

Microbial Insights' comprehensive Quality Assurance (QA) Program is the foundation of all laboratory analyses, ensuring that our clients receive high-quality analytical services that are timely, reliable, and meet their intended purpose in a cost effective manner. MI is committed to providing quality data that surpasses regulatory and industry standards, thus enabling the client to make well-informed decisions. MI maintains strict standard operating procedures and QA/QC measures throughout all of the analyses offered. The following Table details specific QA/QC procedures that are used for CENSUS.

QA/QC	Description
Date of Extraction	DNA and RNA extractions are performed the day the samples are received by MI to minimize the possibility of any changes to the microbial community prior to analysis.
Laboratory Method Blanks	An extraction blank (no sample added) is processed alongside each set of field samples from DNA extraction through CENSUS® analysis to ensure that cross contamination has not occurred. Although MI has never experienced this issue, the detection of the CENSUS® target (e.g. <i>Dehalococcoides</i>) in an extraction blank is direct evidence of cross contamination with a sample or contamination of a reagent and would invalidate the results. If this were to occur, MI would re-extract the sample. If not possible to re-extract, MI would contact the client immediately and notate it on the laboratory report.
Laboratory Control Samples (LCS)	A laboratory control sample (LCS) or positive control (target DNA) is included with each CENSUS® plate to confirm amplification and as a continuing calibration check.
Negative Controls	A negative control (no DNA) is included with each CENSUS plate to ensure that cross contamination has not occurred during amplification. As with the extraction blank, detection of CENSUS target (e.g. DHC) in a negative control is direct evidence of contamination and would invalidate the results. If this were to occur, MI would rerun the analysis.

References

1. Freedman, D. L. and J. M. Gossett. 1989. Biological reductive dechlorination of tetrachloroethylene and trichloroethylene to ethylene under methanogenic conditions. *Applied and Environmental Microbiology* 55(9): 2144-2151.
2. DiStefano, T. D., J.M. Gossett, and S.H. Zinder. 1991. Reductive dechlorination of high concentrations of tetrachlorethene to ethene by an anaerobic enrichment culture in the absence of methanogenesis. *Applied and Environmental Microbiology* 57(8): 2287-2292.
3. Gerritse, J., V. Renard, T. M. Pedro Gomes, P. A. Lawson, M. D. Collins, and J. C. Gottschal. 1996. *Desulfitobacterium* sp. Strain PCE1, an anaerobic bacterium that can grow by reductive dechlorination of tetrachloroethene or ortho-chlorinated phenols. *Archives of Microbiology* 165(2): 132-140.
4. Gerritse, J., O. Drzyzga, G. Kloetstra, M. Keijmel, L. P. Wiersum, R. Hutson, M. D. Collins, and J. C. Gottschal. 1999. Influence of different electron donors and acceptors on dehalorespiration of tetrachloroethene by *Desulfitobacterium frappieri* TCE1. *Applied and Environmental Microbiology* 65(12): 5212-5221.
5. Holliger, C., G. Schraa, A.J.M. Stams, and A.J.B. Zehnder. 1993. A highly purified enrichment culture couples the reductive dechlorination of tetrachloroethene to growth. *Applied and Environmental Microbiology* 59 (9): 2991-2997.
6. Krumholz, L. R., R. Sharp, and S. S. Fishbain. 1996. A freshwater anaerobe coupling acetate oxidation to tetrachloroethylene dehalogenation. *Applied and Environmental Microbiology* 62(11): 4108-4113.
7. Löffler, F.E., R.A. Sanford, and J.M. Tiedje. 1996. Initial characterization of a reductive dehalogenase from *Desulfitobacterium chlororespirans* Co23. *Applied and Environmental Microbiology* 62(10): 3809-3813.

8. Maymó-Gatell, X., T. Anguish, and S.H. Zinder. 1999. Reductive dechlorination of chlorinated ethenes and 1,2-dichloroethane by *Dehalococcoides ethenogenes* 195. *Applied and Environmental Microbiology* 65(7): 3108–3113.
9. Hendrickson, E.R., J. Payne, R.M. Young, M.G. Starr, M.P. Perry, S. Fahnestock, D.E. Ellis, and R.C. Eversole. 2002. Molecular analysis of *Dehalococcoides* 16S ribosomal DNA from chloroethene-contaminated sites throughout North America and Europe. *Applied and Environmental Microbiology* 68(2): 485-495.
10. Lu, X., J.T. Wilson, and D.H. Kampbell. 2006. Relationship between *Dehalococcoides* DNA in ground water and rates of reductive dechlorination at field scale. *Water Research* 40:3131-3140.
11. Adrian, L, U. Szewzyk, J. Wecke, and H. Görsch. 2000. Bacterial dehalorespiration with chlorinated benzenes. *Nature* 408(6812): 580-583.
12. Holmes, V.F., J. He, P.K.H. Lee, and L. Alvarez-Cohen. 2006. Discrimination of multiple *Dehalococcoides* strains in a trichloroethene enrichment by quantification of their reductive dehalogenase genes. *Applied and Environmental Microbiology* 72(9): 5877-5883.
13. Lee, P.K.H., D.R. Johnson, V.F. Holmes, J. He, and L. Alvarez-Cohen. 2006. Reductive dehalogenase gene expression as a biomarker for physiological activity of *Dehalococcoides* spp. *Applied and Environmental Microbiology* 72(9): 6161-6168.
14. Müller, J.A., B.M. Rosner, G. von Avendroth, G. Meshulam-Simon, P.L. McCarty, and A.M. Spormann. 2004. Molecular identification of the catabolic vinyl chloride reductase from *Dehalococcoides* sp. strain VS and its environmental distribution. *Applied and Environmental Microbiology* 70(8): 4880-4888.
15. Ritalahti, K.M., B.K. Amos, Y. Sung, Q. Wu, S.S. Koenigsberg, and F.E. Löffler. 2006. Quantitative PCR targeting 16S rRNA and reductive dehalogenase genes simultaneously monitors multiple *Dehalococcoides* strains. *Applied and Environmental Microbiology* 72(4): 2765-2774.
16. Krajmalnik-Brown, R., T. Hölscher, I. N. Thomson, F. M. Saunders, K. M. Ritalahti, and F. E. Löffler. 2004. Genetic identification of a putative vinyl chloride reductase in *Dehalococcoides* sp. strain BAV1. *Applied and Environmental Microbiology* 70:6347–6351.
17. van der Zaan, B., F. Hannes, N. Hoekstra, H. Rijnaarts, W.M. de Vos, H. Smidt, and J. Gerritse. 2010. Correlation of *Dehalococcoides* 16S rRNA and chloroethene-reductive dehalogenase genes with geochemical conditions in chloroethene-contaminated groundwater. *Applied and Environmental Microbiology* 76(3):843-850.
18. Behrens, S., M.F., Azizian, P.J. McMurdie, A. Sabalowsky, M.E. Dolan, L. Semprini, and A.M. Spormann. 2008. Monitoring abundance and expression of *Dehalococcoides* species chloroethene-reductive dehalogenases in a tetrachloroethene-dechlorinating flow column. *Applied and Environmental Microbiology* 74(18):5695-5703.
19. Sung, Y., K. M. Ritalahti, R. P. Apkarian, and F. E. Löffler. 2006. Quantitative PCR confirms purity of strain GT, a novel trichloroethene (TCE)-to-ethene respiring *Dehalococcoides* isolate. *Appl. Environ. Microbiol.* 72:1980-1987