LMS/PIN/N02160

Pinellas County, Florida, Site Environmental Restoration Project

Semiannual Progress Report for the 4.5 Acre Site

December 2016 Through May 2017

June 2017

U.S. DEPARTMENT OF ENERGY | Legacy Management

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Abbreviations

amsl	above mean sea level (feet)
cDCE	*cis*-1,2-dichloroethene
COPC	contaminant of potential concern
CTL	cleanup target level
DOE	U.S. Department of Energy
µg/L	micrograms per liter
RPD	relative percent difference
STAR Center	Young - Rainey Science, Technology, and Research Center
TCE	trichloroethene
TCOPCs	total contaminants of potential concern
tDCE	*trans*-1,2-dichloroethene
VC	vinyl chloride
VOC	volatile organic compound

1.0 Introduction

This *Pinellas County, Florida, Site Environmental Restoration Project Semiannual Progress Report for the 4.5 Acre Site* describes environmental restoration activities for the 4.5 Acre Site in Pinellas County, Largo, Florida (Figure 1). The former U.S. Department of Energy (DOE) Pinellas Plant facility consisted of the 4.5 Acre Site and what is now the STAR Center (Young - Rainey Science, Technology, and Research Center). Both the 4.5 Acre Site and the STAR Center are part of the overall Pinellas County, Florida, Site (Figure 2).

The 4.5 Acre Site is located immediately northwest of the STAR Center, in the northeast quarter of Section 13, Township 30 South, Range 15 East. DOE owned this parcel from 1957 to 1972, at which time it was sold to a private landowner. During the period of DOE ownership, the property was used for the disposal of drums of waste resins and solvents. As a result of this practice, the surficial aquifer was impacted by volatile organic compounds (VOCs)—trichloroethene (TCE), *cis*-1,2-dichloroethene (cDCE), *trans*-1,2-dichloroethene (tDCE), vinyl chloride (VC), and benzene.

Detailed background information for the site is contained in the *Long-Term Surveillance and Maintenance Plan for the Pinellas Site* (DOE 2016). That document and other site-related documents can be accessed at this website: https://www.lm.doe.gov/Pinellas/Sites.aspx.

Recent remediation activities consist of the injection of emulsified vegetable oil and the microorganism *Dehalococcoides mccartyi* into the subsurface to enhance contaminant biodegradation (also called bioinjection). Bioinjection events were conducted in February 2010, July 2013, and October through December 2016. The 2016 injection point layout is shown in Figure 3. Evaluating the performance of these actions, in the form of monitoring well sampling, is ongoing.

1.1 Site Activities

The following work took place during the December 2016 through May 2017 period:

- Bioinjection, which began in late October, was completed in December. The injection locations are shown in Figure 3.
- Semiannual sampling was conducted; it consisted of collecting groundwater samples for VOC analysis from six monitoring wells on March 1 and 2 and measuring water levels in all accessible wells on March 8. Five monitoring wells were not sampled because they were impacted by bioinjection activities.
- Results of the semiannual monitoring were reported (this document).

2.0 Monitoring Data

2.1 Groundwater Elevations and Flow

During this reporting period, depth-to-water measurements were taken in all accessible monitoring wells at the 4.5 Acre Site on March 8. The depth to water in each well was measured

with an electronic water-level indicator. The groundwater elevation data are listed in Table 1. Surface water elevations for the West Pond (to the east) and Pond 5 (to the southeast) are listed in Table 2. The water elevation data were used to construct contours of water levels in the shallow and deep portions of the surficial aquifer (Figures 4 and 5).

In March 2017, the flow patterns in both the shallow and deep surficial aquifers (Figures 4 and 5) generally indicate radial flow from the center of the site, with flow to the northwest in the northern part of the site, to the west-southwest on the west side of the site, and also a component of flow toward the south or southeast in the southern part of the site. The average hydraulic gradient was approximately 0.001 to 0.003 foot per foot across most of the site. Calculations using Darcy's law, along with approximations of 1 foot per day for hydraulic conductivity and 0.3 for effective porosity, indicate that groundwater at the site is estimated to move about 1.2 to 3.6 feet per year. Groundwater velocities at the site have historically ranged from 2 to 10 feet per year.

2.2 Groundwater Sampling

During the semiannual monitoring event in March 2017, groundwater samples for VOC analysis were collected from 6 of the 11 routine monitoring wells. Results are discussed in Section 3.0. Wells PIN20-M001, PIN20-M053, PIN20-M056, PIN20-M057, and PIN20-M059 were not sampled in March because these wells appeared to contain some of the injected emulsified vegetable oil and, therefore, the water samples would not be representative. The oil may appear as a milky fluid when fresh, or as a cloudy dark fluid when weathered.

All samples were collected in accordance with the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites* (LMS/PRO/S04351), using Florida Department of Environmental Protection procedures. All monitoring wells were micropurged using high-density polyethylene tubing or dedicated Teflon tubing in the well and a peristaltic pump at the surface, and sampling was performed when the field measurements stabilized.

Table 3 lists the March 2017 field measurements of temperature, specific conductance, turbidity, pH, oxidation–reduction potential, and dissolved oxygen recorded at the time the samples were collected. Measurements were made using a calibrated multiparameter meter with a flow cell, and turbidity was measured using a nephelometer. Some field parameters could not be measured in some wells due to interference from the injected emulsified vegetable oil. Although some field parameters may not be complete for all wells, analytical results are considered valid for VOCs.

All samples were submitted to TestAmerica Laboratories in Denver, Colorado, for analysis. TestAmerica Denver is accredited by the Florida Department of Health in accordance with the National Environmental Laboratory Accreditation Conference (certification number E87667). VOCs were analyzed using U.S. Environmental Protection Agency SW-846 method 8260B.

2.3 Groundwater Analytical Results

Table 4 presents individual contaminant of potential concern (COPC) concentrations in samples collected from the 11 routine monitoring wells since March 2014. Figure 6 shows the total COPCs (TCOPCs) concentrations (the sum of the individual COPCs concentrations) for

March 2017. The COPCs for the 4.5 Acre Site are TCE, cDCE, tDCE, VC, and benzene. Only VC exceeded its cleanup target level (CTL); a VC concentration map is included as Figure 7. The laboratory report for samples collected in March 2017 is provided in Appendix A.

2.4 Quality Assurance/Quality Control

The results from TestAmerica were checked for quality assurance/quality control through duplicate samples, trip blanks, and equipment blanks. Detected analytes for the duplicate samples collected from the 4.5 Acre Site in March 2017 are listed in Table 5. The duplicate sample results were compared, and the relative percent differences (RPDs) between the results were calculated. All analytes met the EPA-recommended laboratory duplicate criterion of less than 20 RPD for results that are greater than 5 times the method detection limit.

As specified in the *Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites*, duplicate samples should be collected at a frequency of 1 duplicate for every 20 or fewer samples. During the March 2017 event, 6 samples were collected and 1 duplicate sample was collected, so this criterion was met.

A data-validation software module for identifying and tracking anomalous groundwater data was used to generate a report of analytical results that fall outside of historical minimum or maximum values. There were no anomalies associated with these results, and the data are acceptable as qualified.

3.0 Data Interpretation

Trend plots for the 11 routine monitoring wells are shown as Figures 8–18. Since March 2014, TCE has not been detected and benzene has been detected only below its CTL, so only cDCE, tDCE, and VC are shown on these plots. The goal of bioinjection at the 4.5 Acre Site is to decrease contaminant concentrations to maximum contaminant levels along the west and southwest property boundaries (to meet risk-based corrective action requirements) and to minimize the extent of the plume in the interior of the site.

Contaminant concentrations decreased in some wells (e.g., VC was not detected in well PIN20-M015) and increased slightly in other wells following the October–December 2016 bioinjection event. The increases could be due to biodegradation (e.g., VC produced from cDCE degradation) or from local groundwater movement due to the injected fluids.

4.0 Upcoming Tasks

The following task is planned for the June through November 2017 period:

- The semiannual sampling event will be conducted in September.

5.0 References

DOE (U.S. Department of Energy), 2016. *Long-Term Surveillance and Maintenance Plan for the Pinellas Site*, LMS/PIN/N01058, Office of Legacy Management, September.

Sampling and Analysis Plan for U.S. Department of Energy Office of Legacy Management Sites, LMS/PRO/S04351, continually updated, prepared by Navarro Research and Engineering, Inc., for the U.S. Department of Energy Office of Legacy Management.

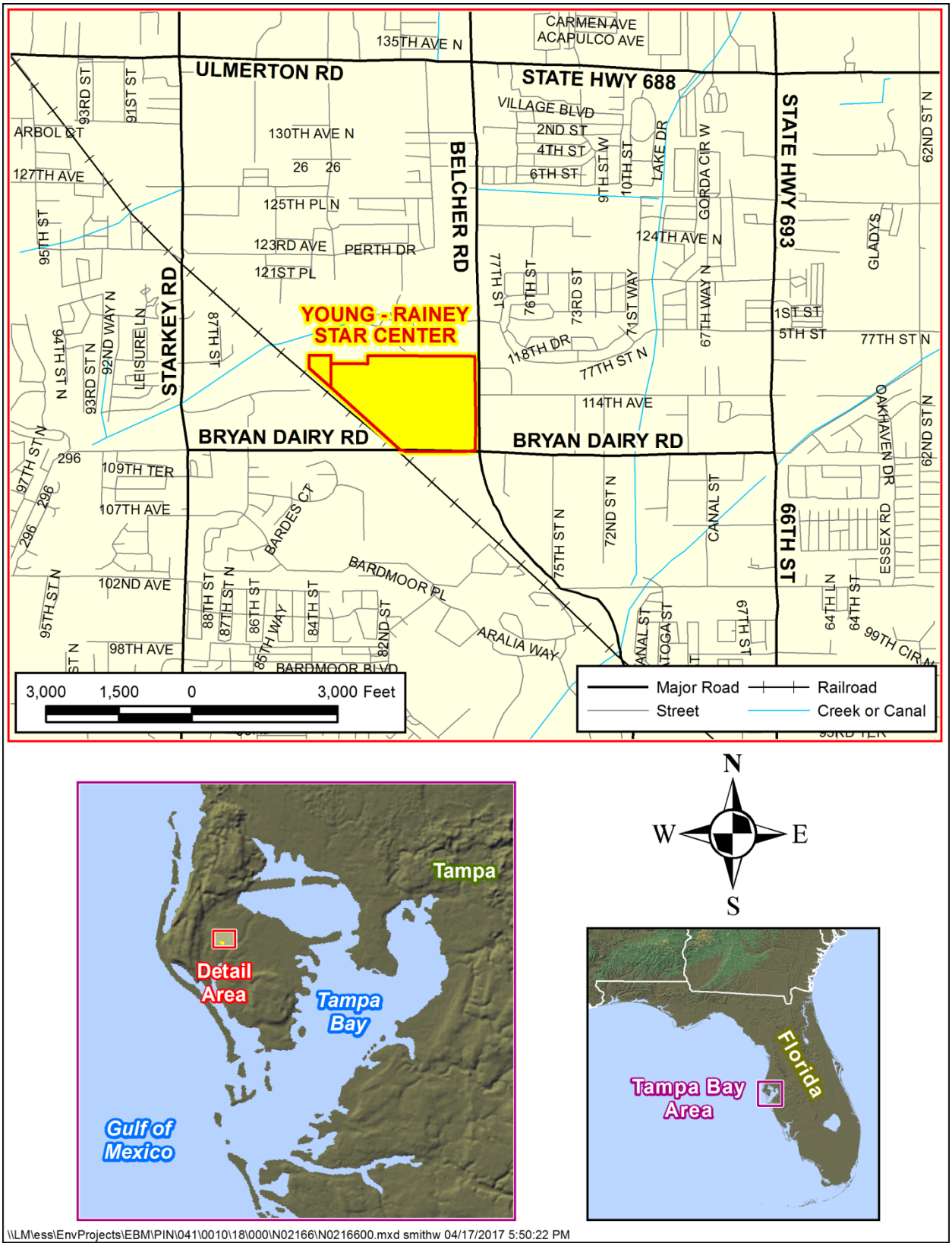

Figure 1. Young - Rainey STAR Center Location

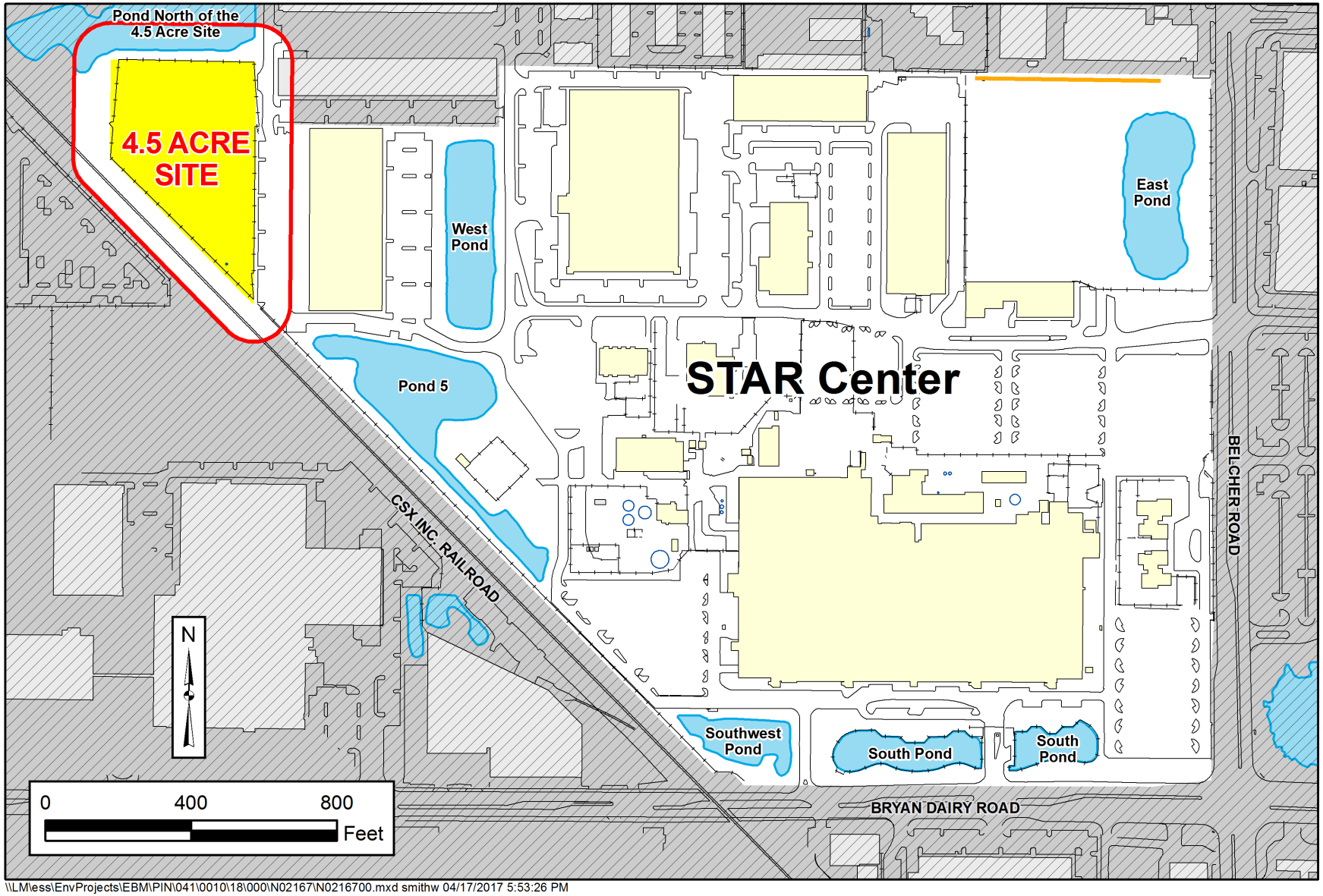

Figure 2. 4.5 Acre Site Location

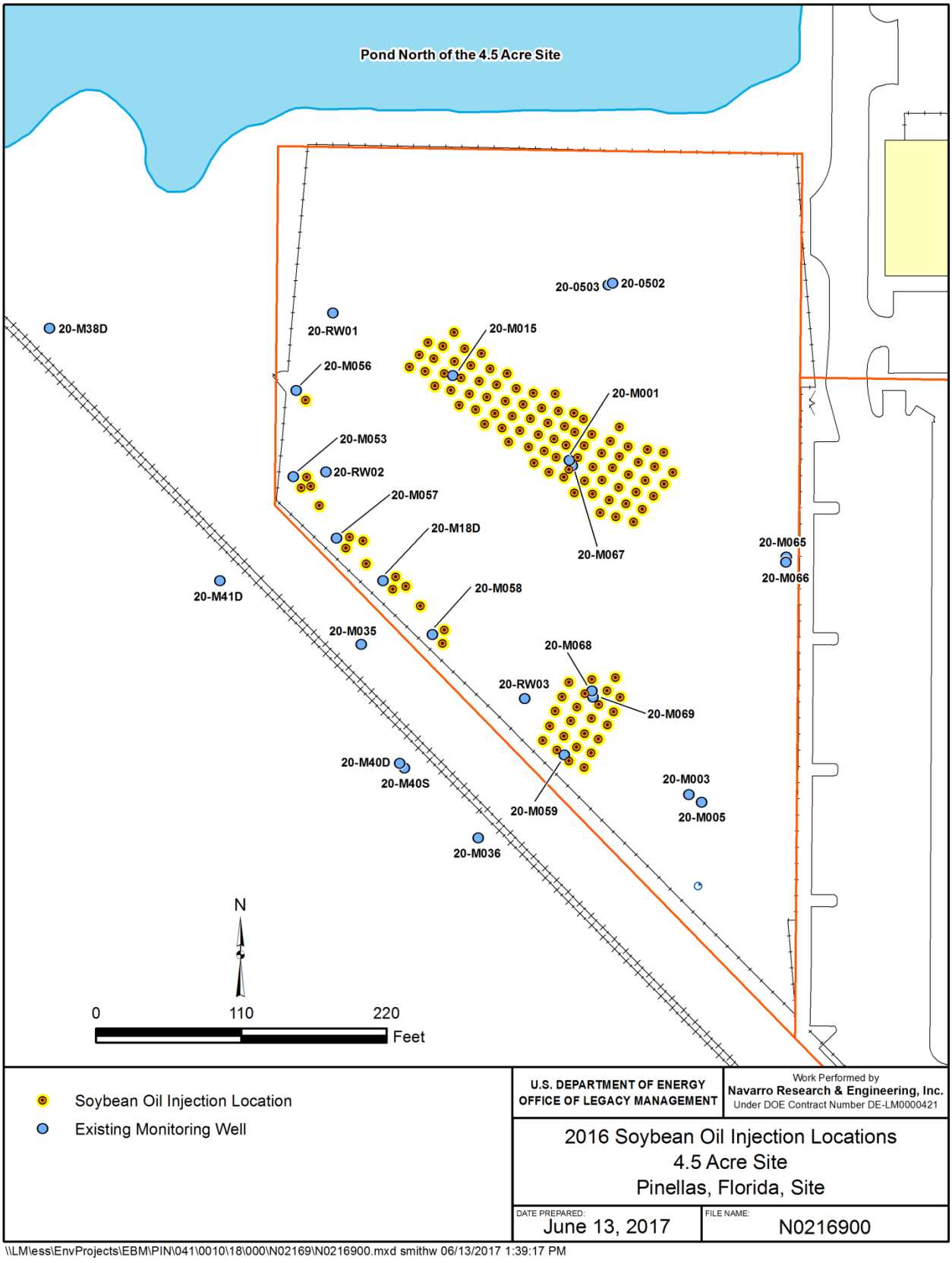

Figure 3. 2016 Bioinjection Locations

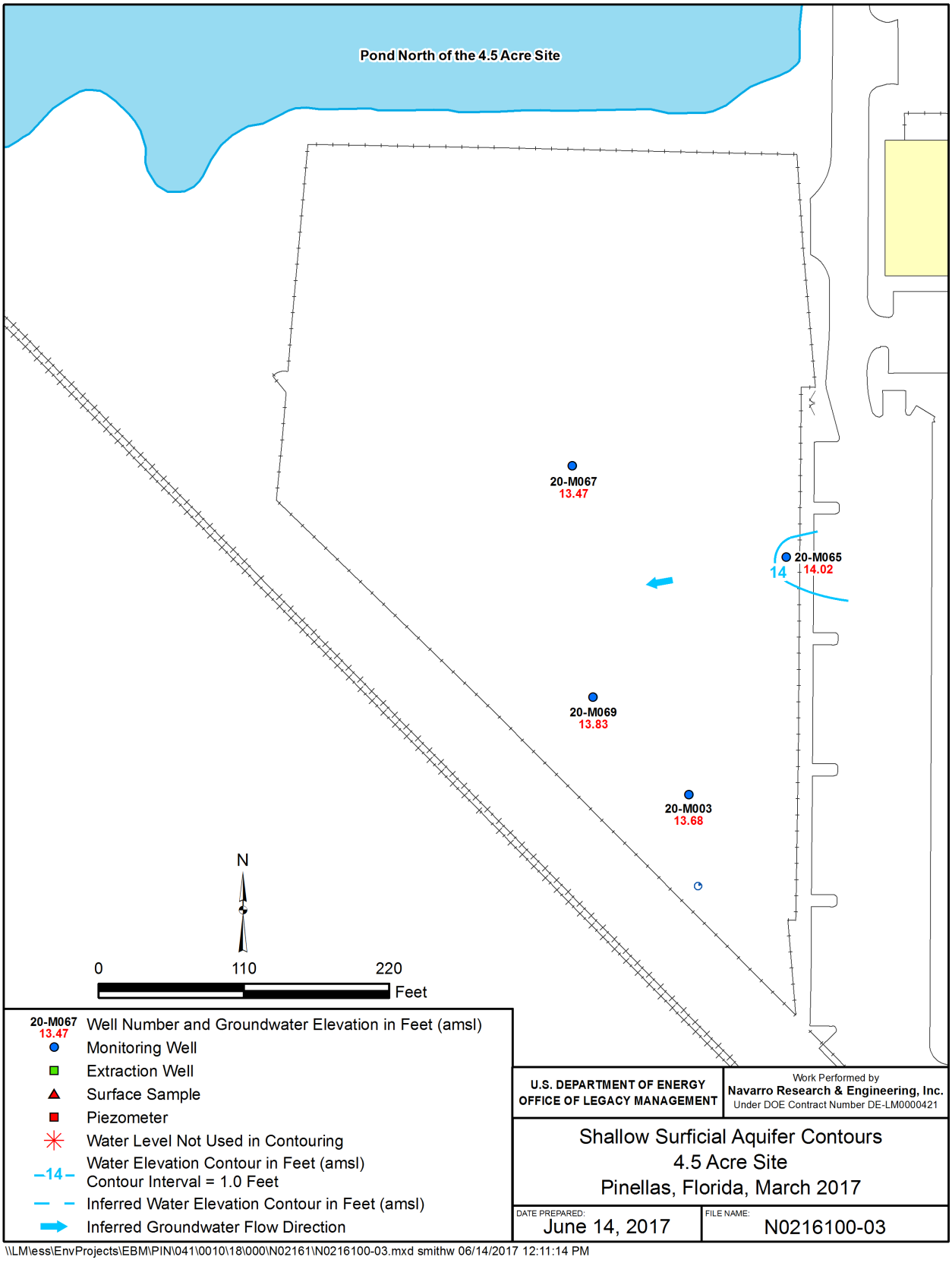

Figure 4. Shallow Surficial Aquifer Flow, March 2017

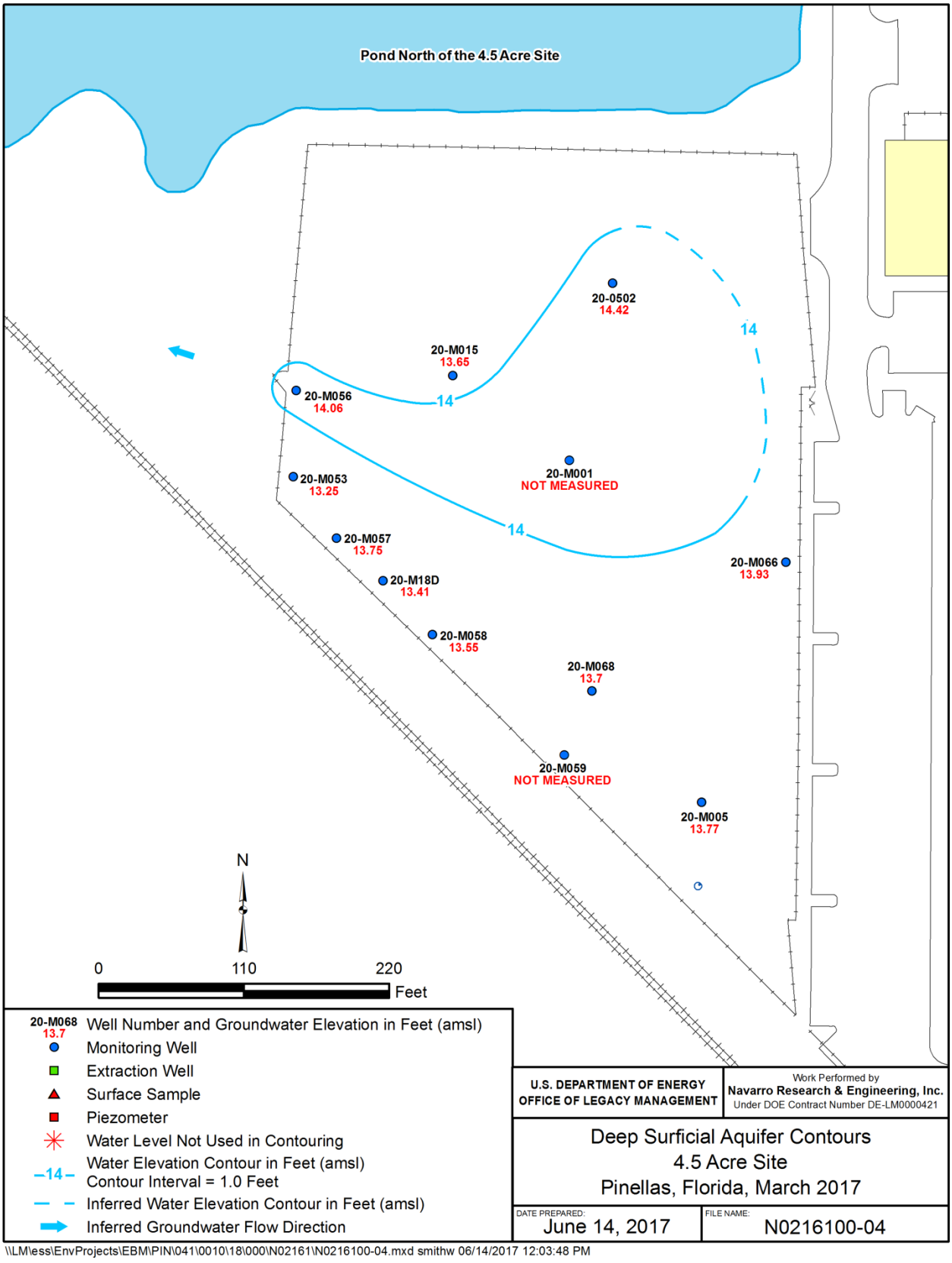

Figure 5. Deep Surficial Aquifer Flow, March 2017

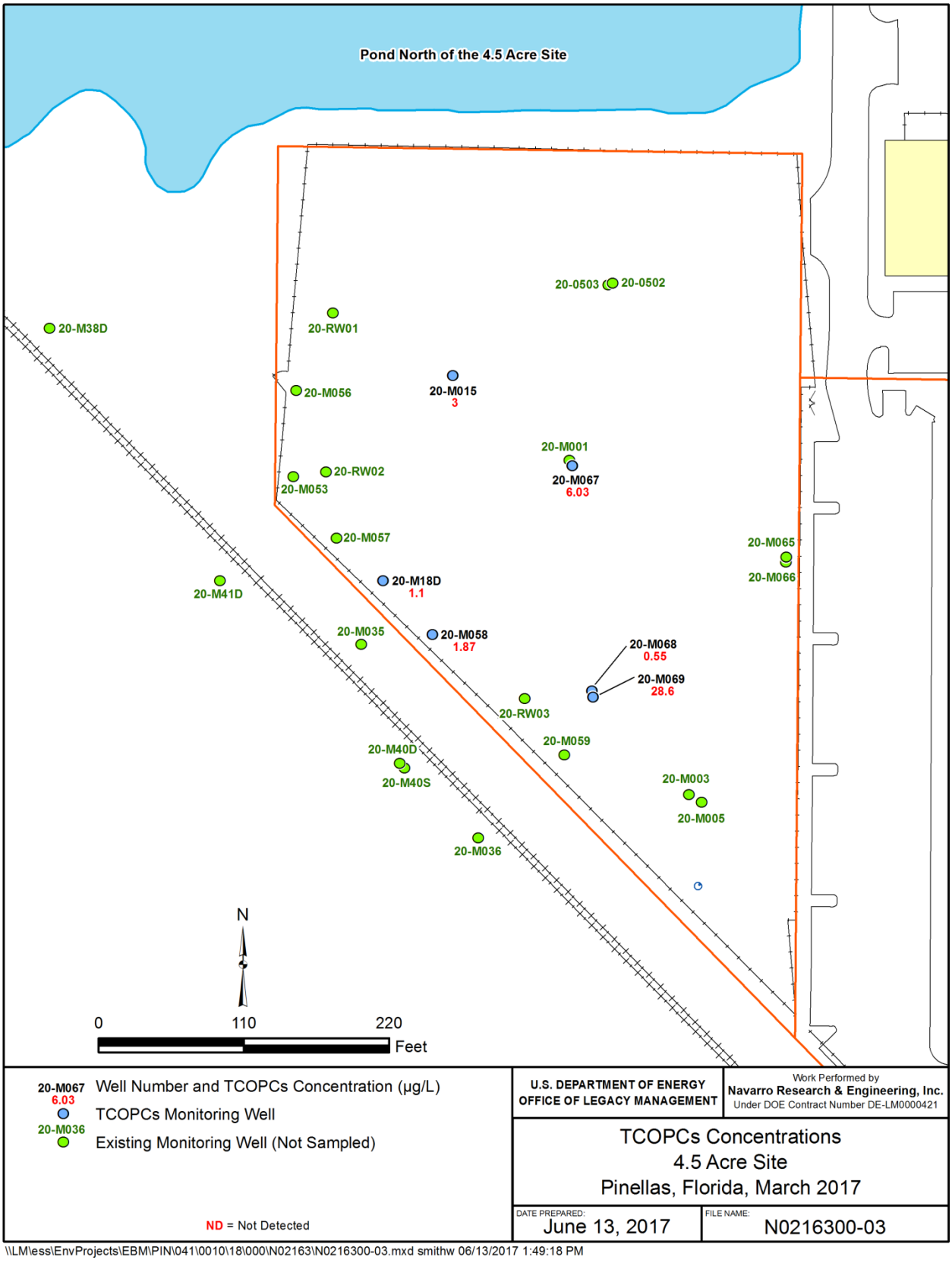

Figure 6. Total COPCs Concentrations, March 2017

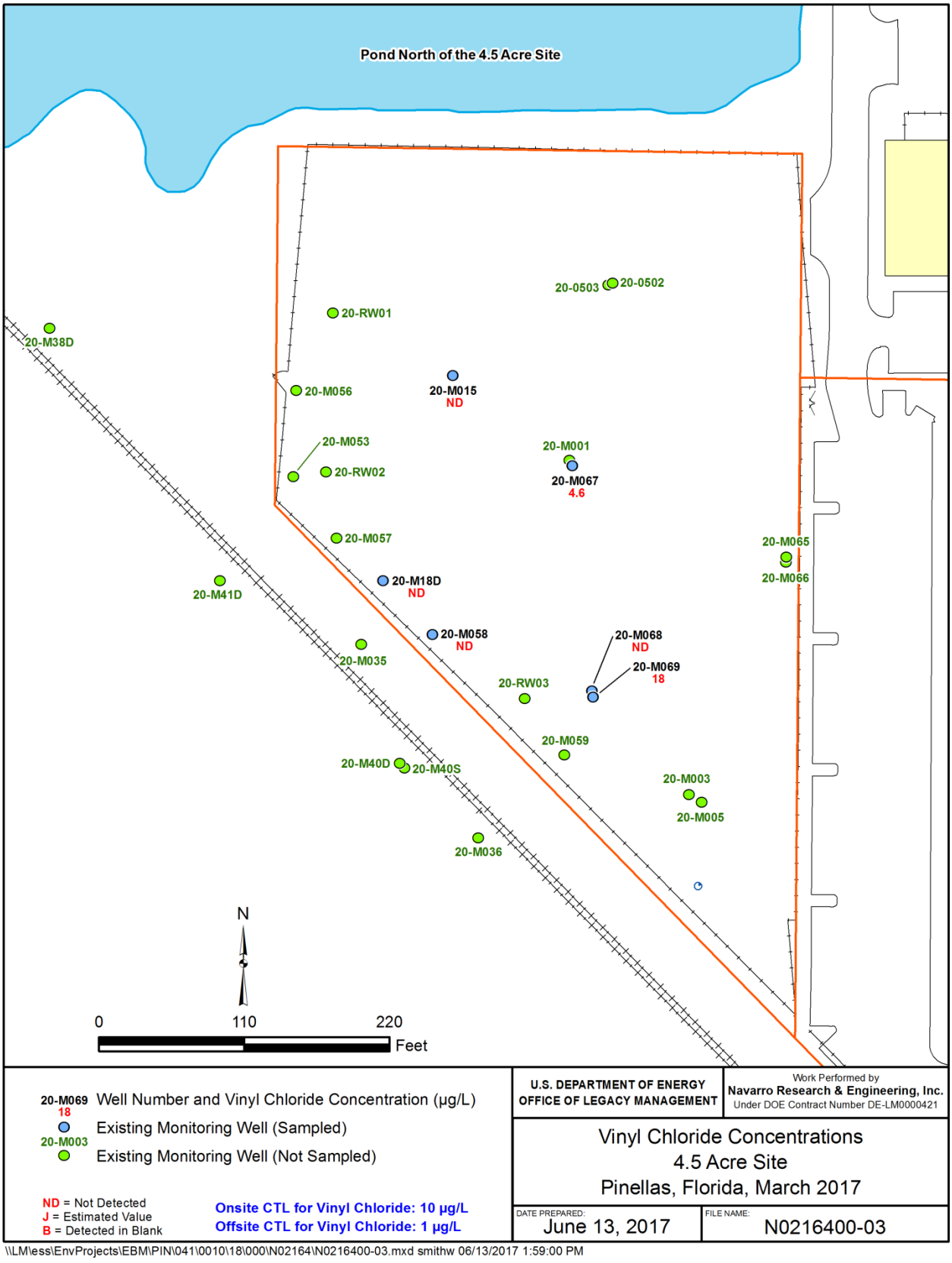

Figure 7. Vinyl Chloride Concentrations, March 2017

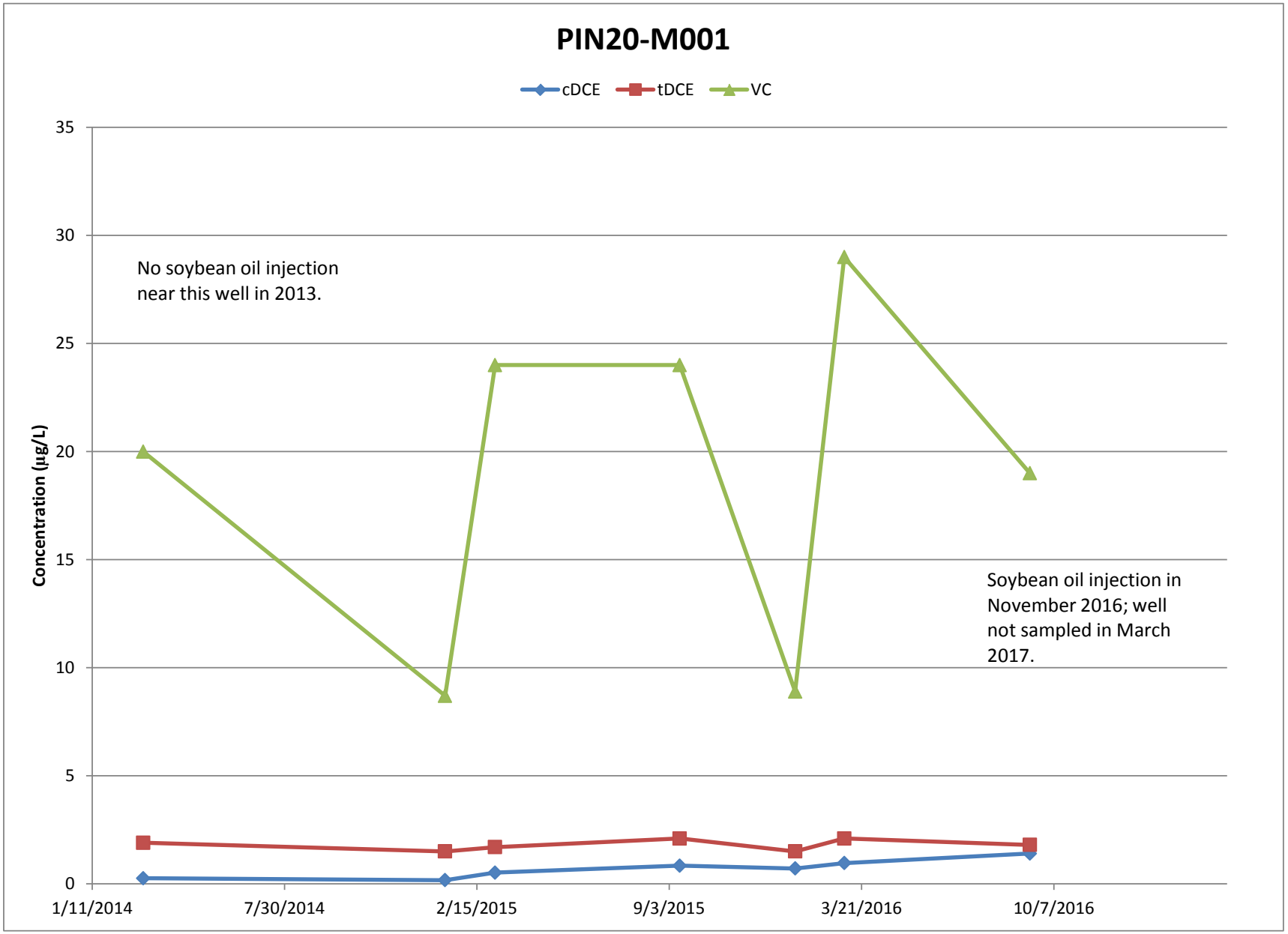

Figure 8. cDCE, tDCE, and VC in Well PIN20-M001

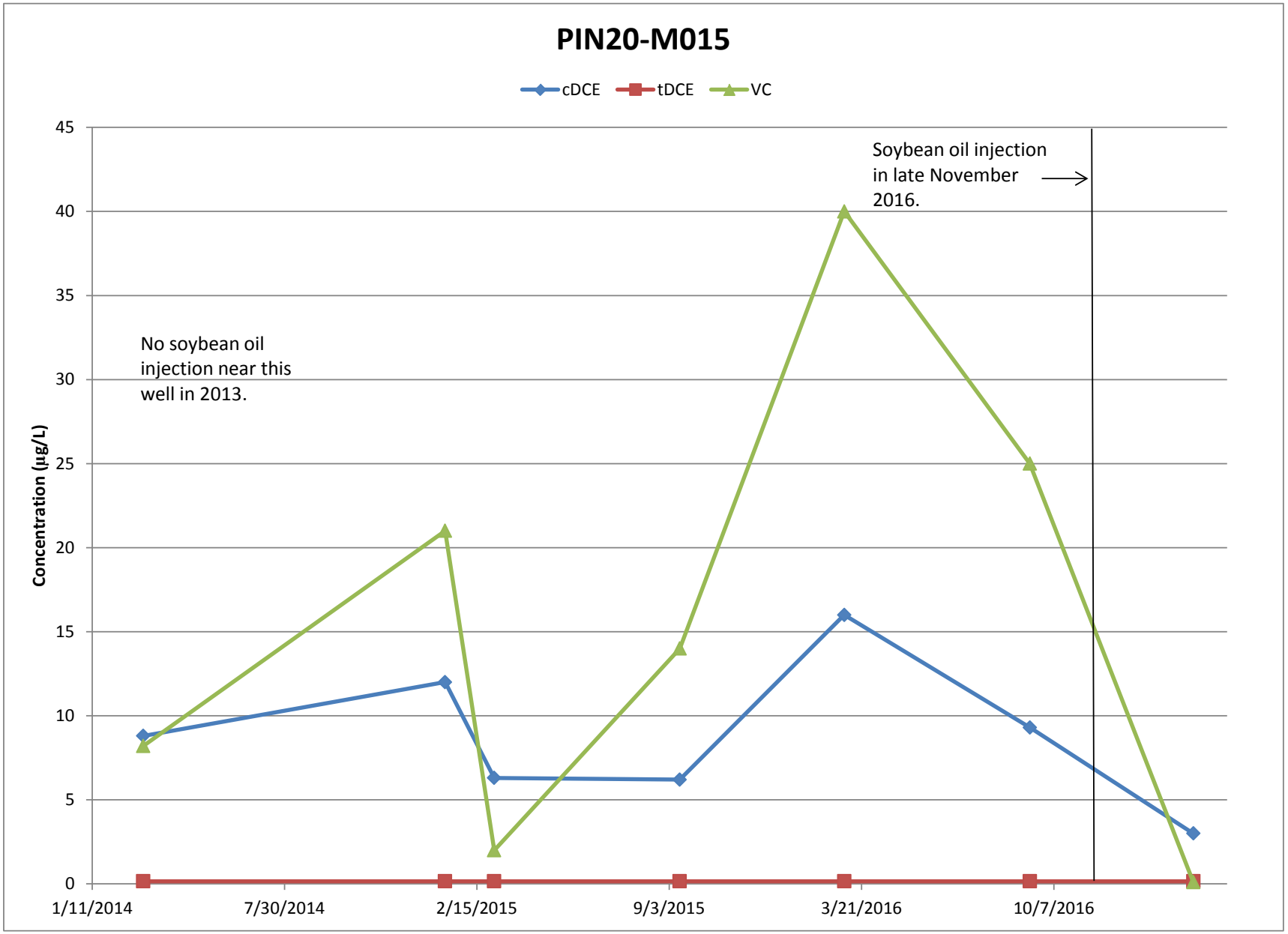

Figure 9. cDCE, tDCE, and VC in Well PIN20-M015

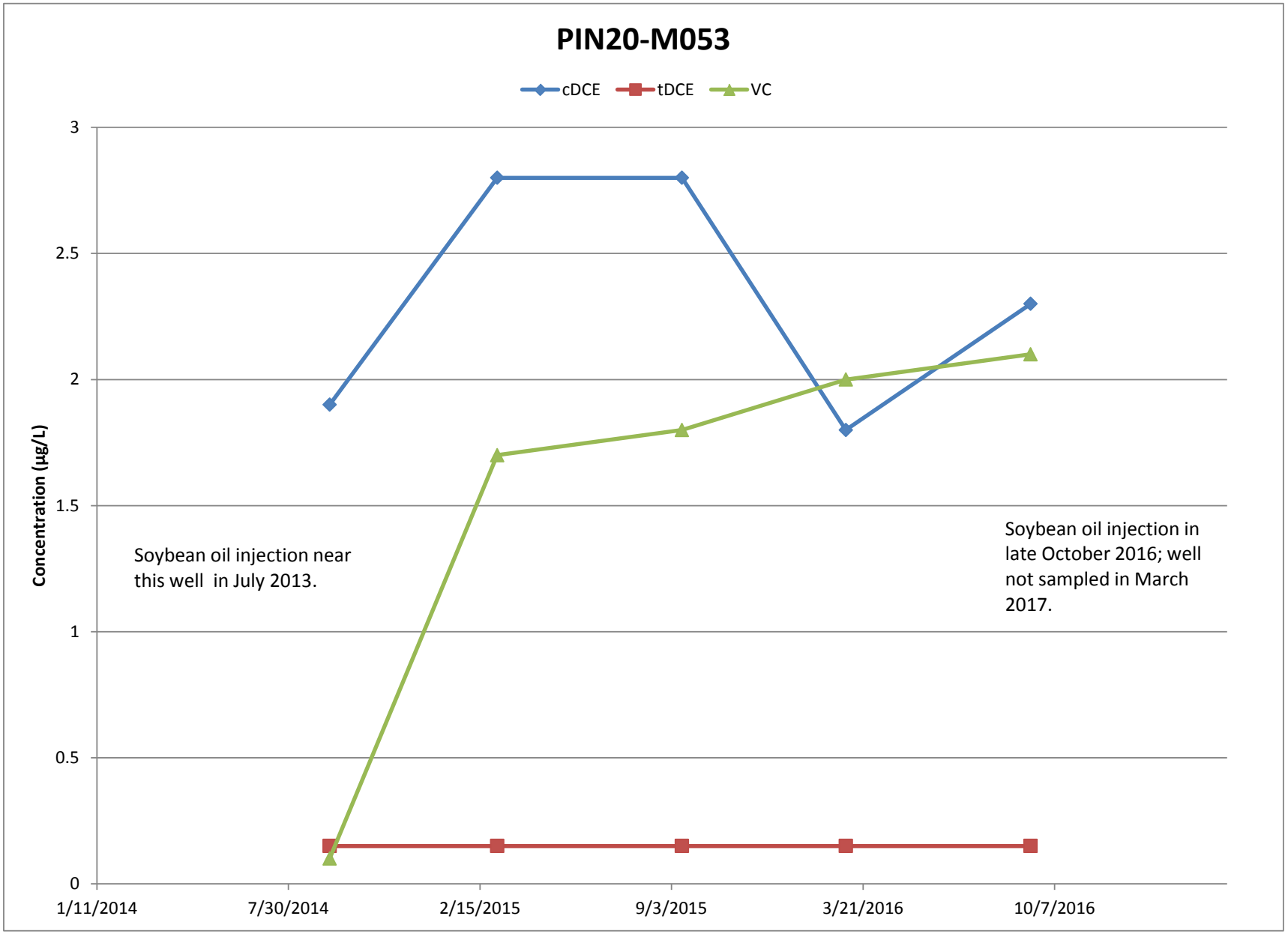

Figure 10. cDCE, tDCE, and VC in Well PIN20-M053

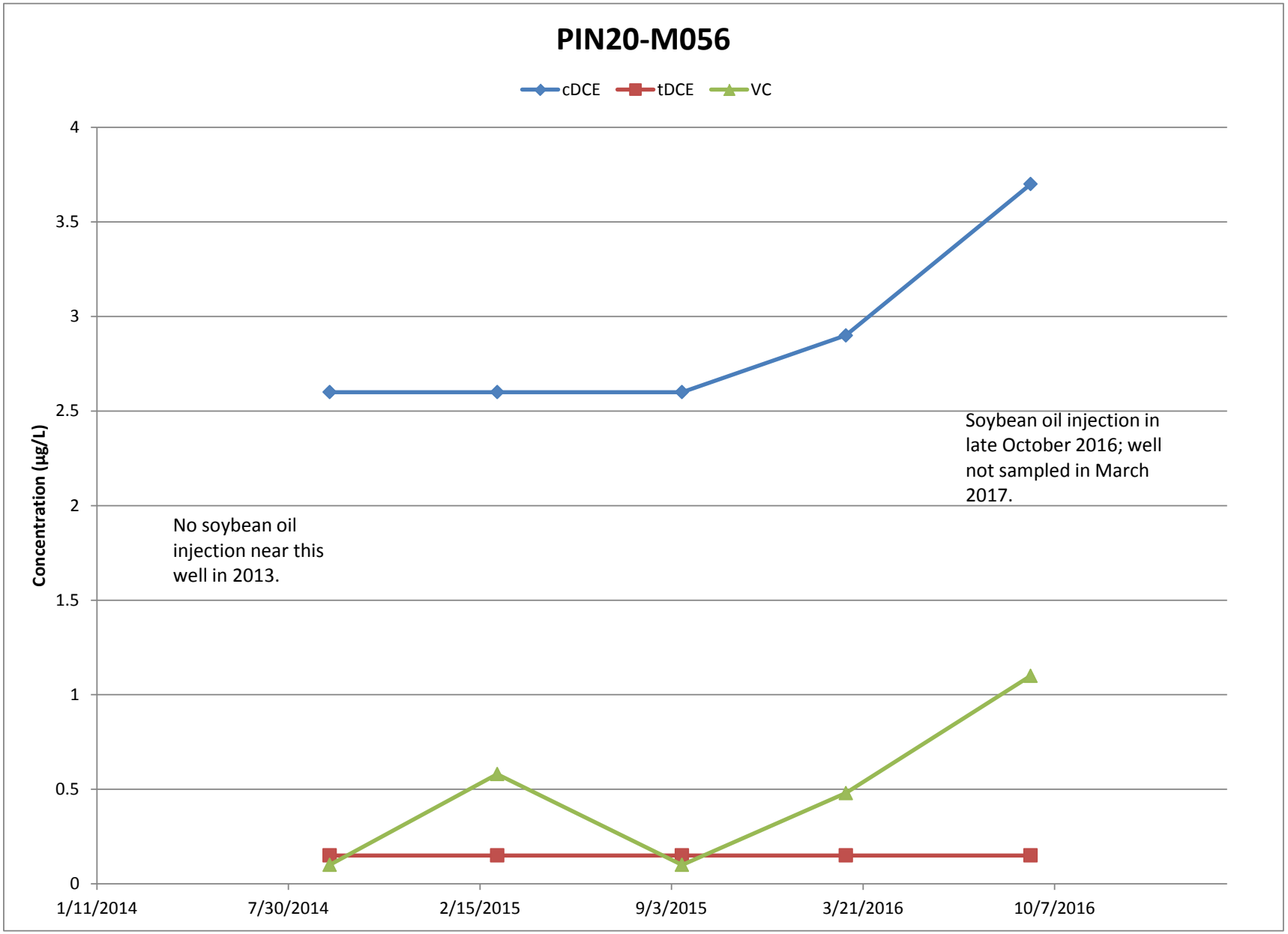

Figure 11. cDCE, tDCE, and VC in Well PIN20-M056

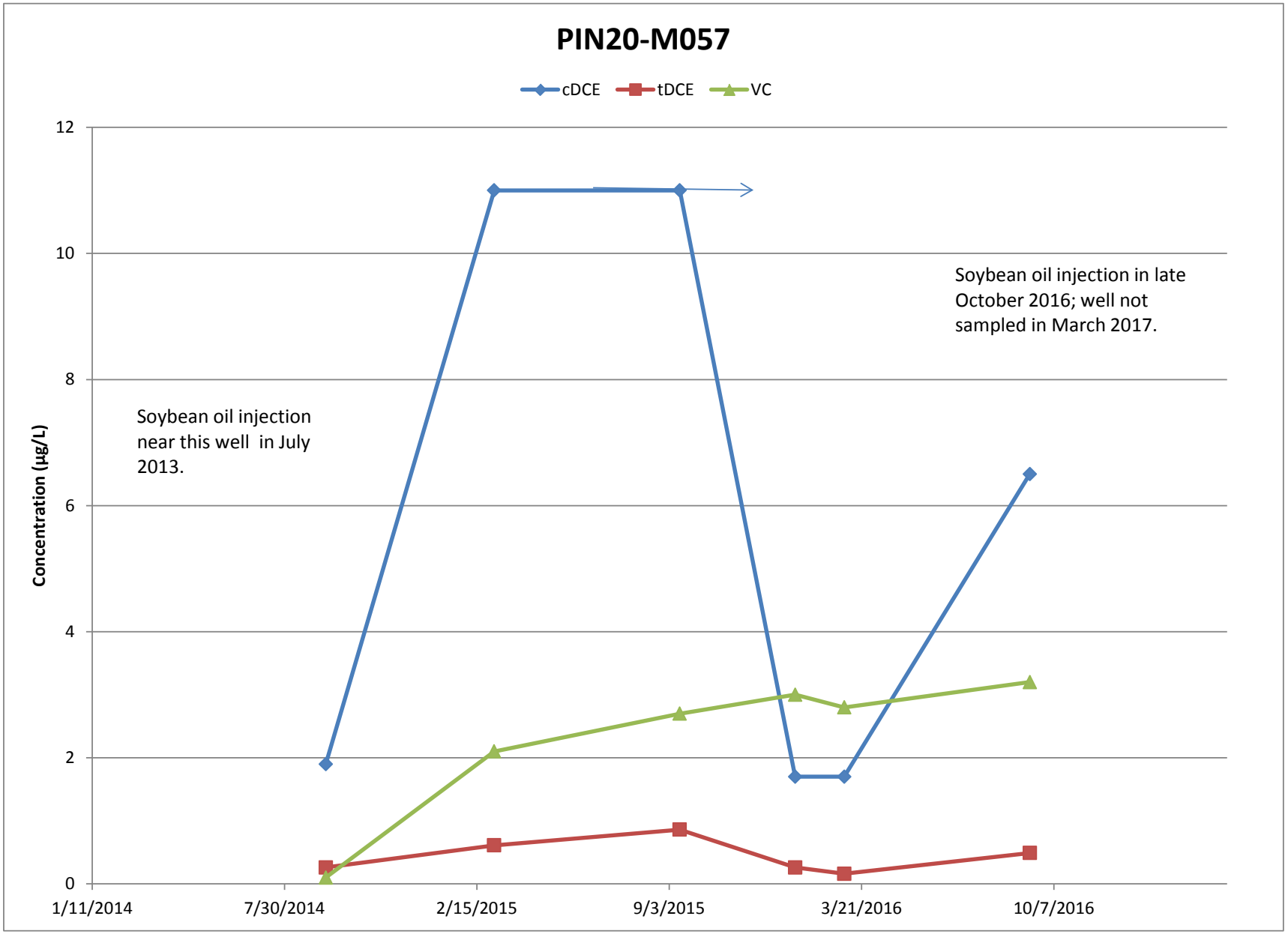

Figure 12. cDCE, tDCE, and VC in Well PIN20-M057

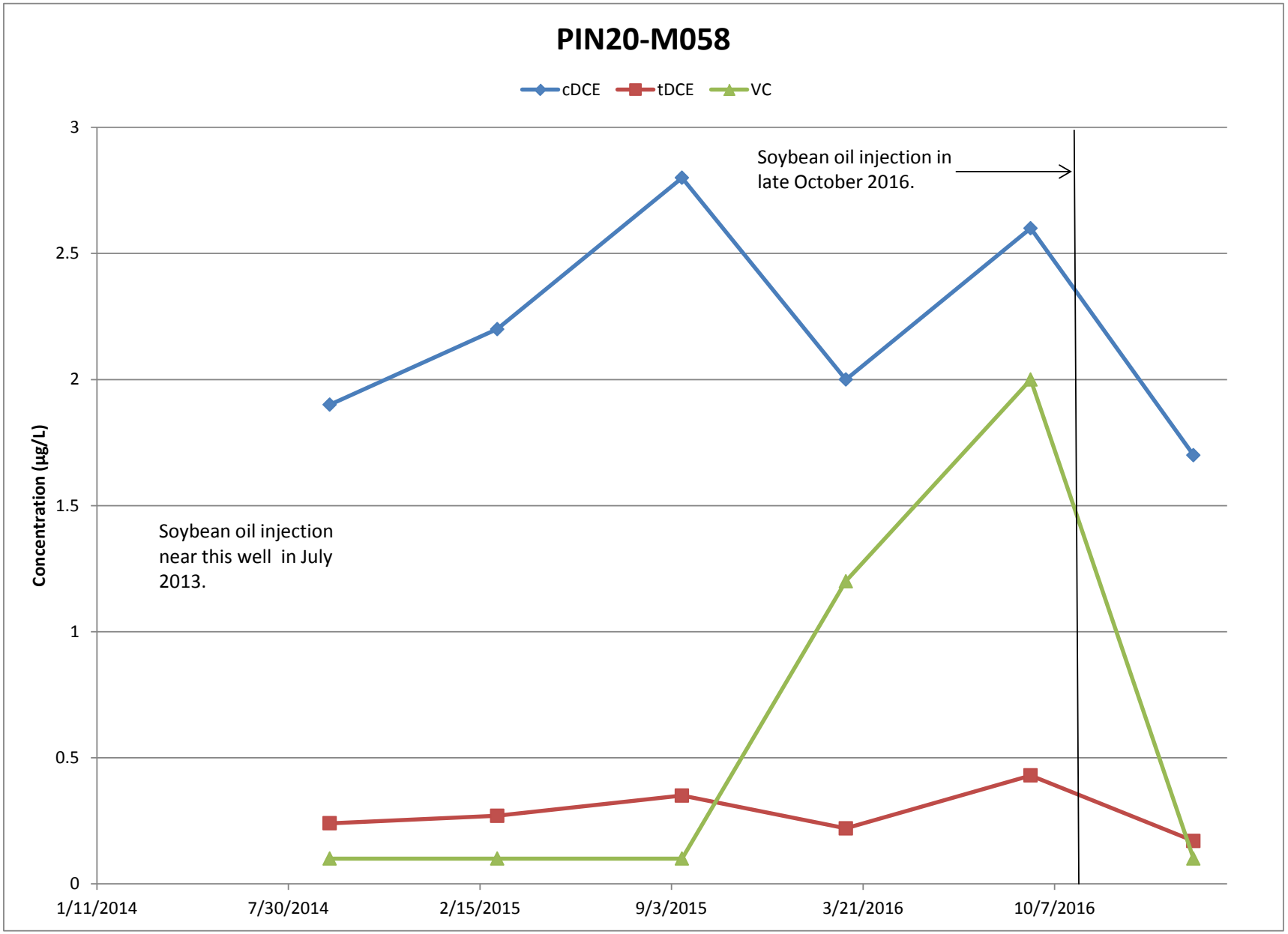

Figure 13. cDCE, tDCE, and VC in Well PIN20-M058

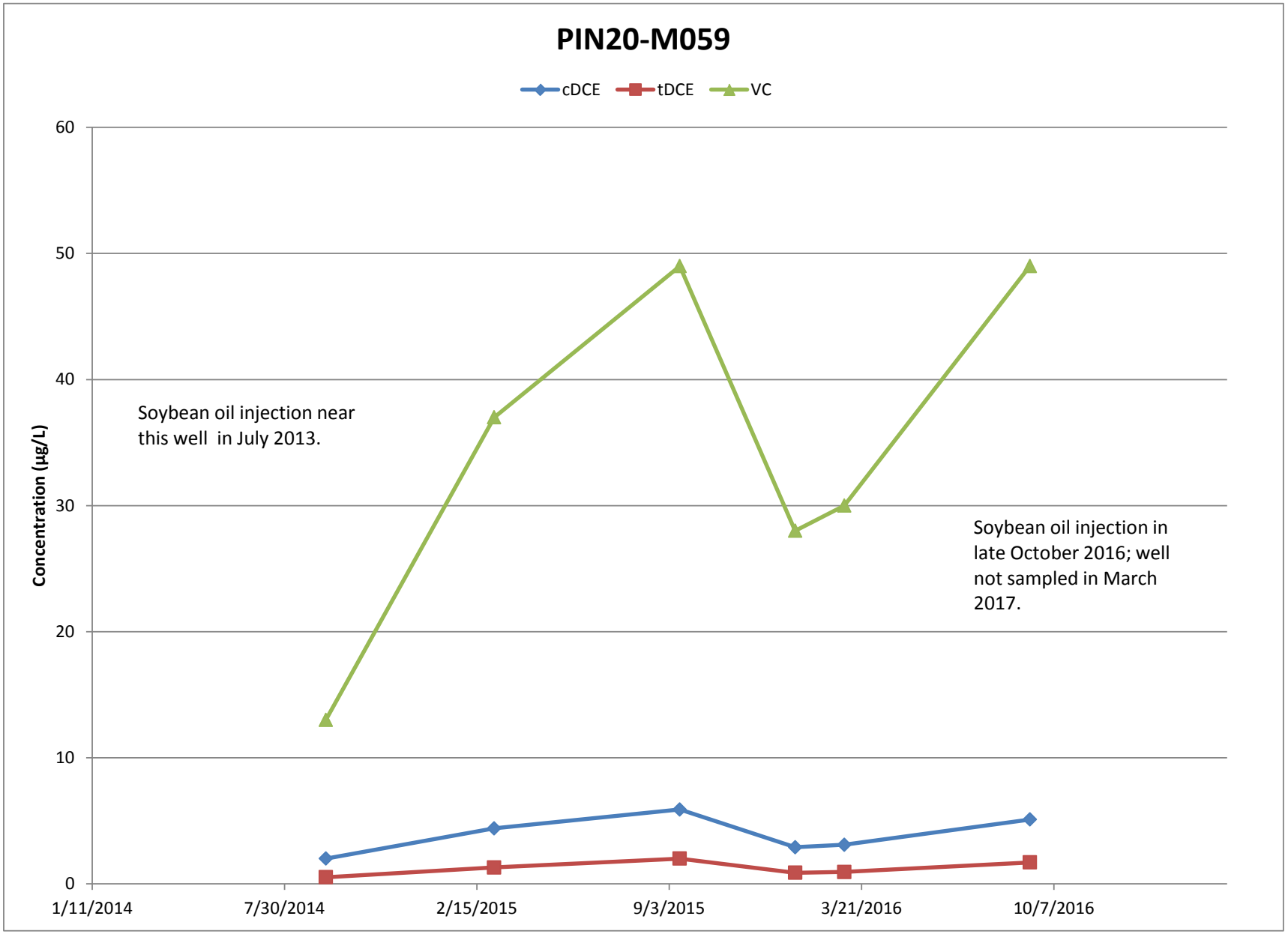

Figure 14. cDCE, tDCE, and VC in Well PIN20-M059

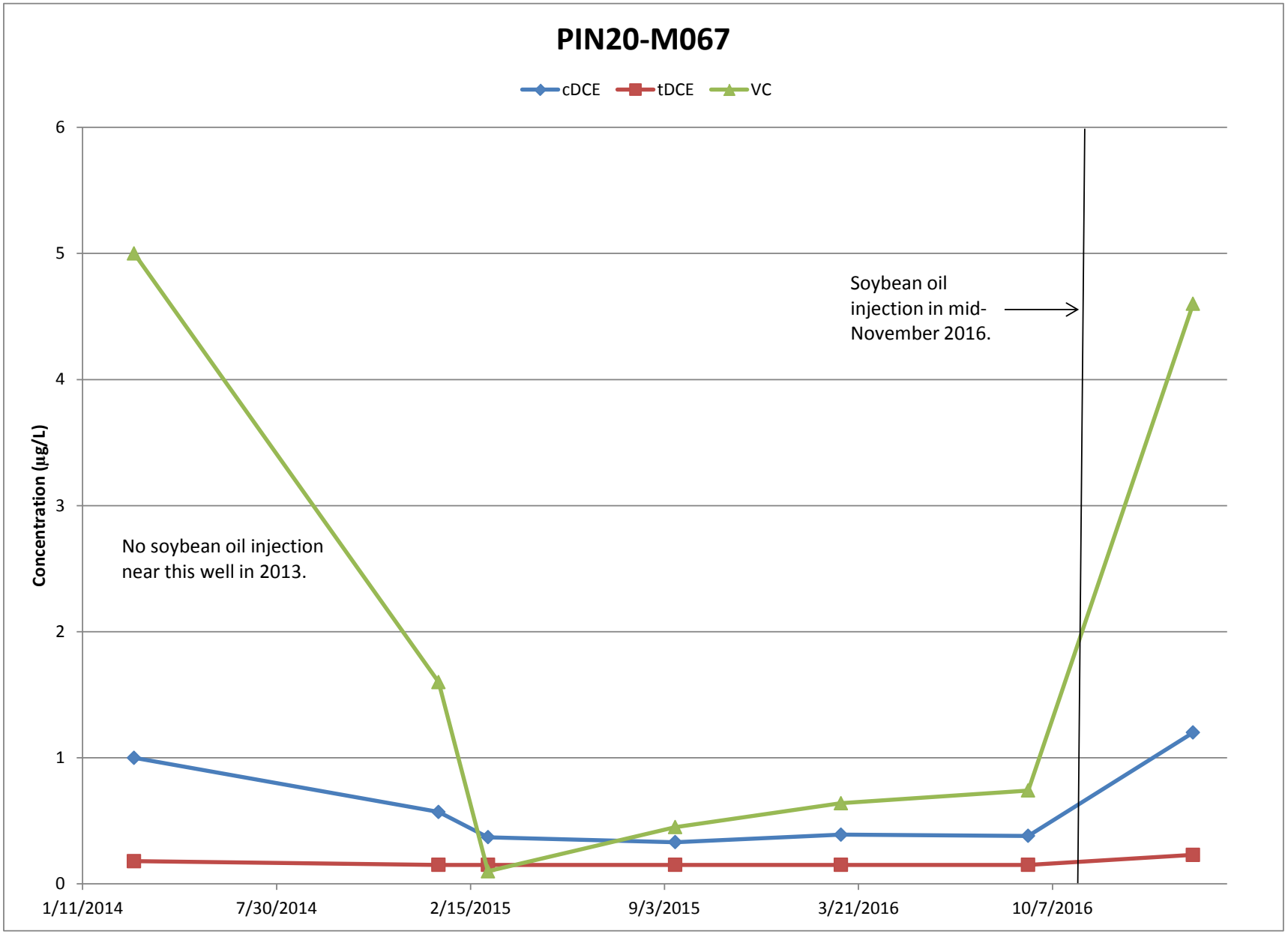

Figure 15. cDCE, tDCE, and VC in Well PIN20-M067

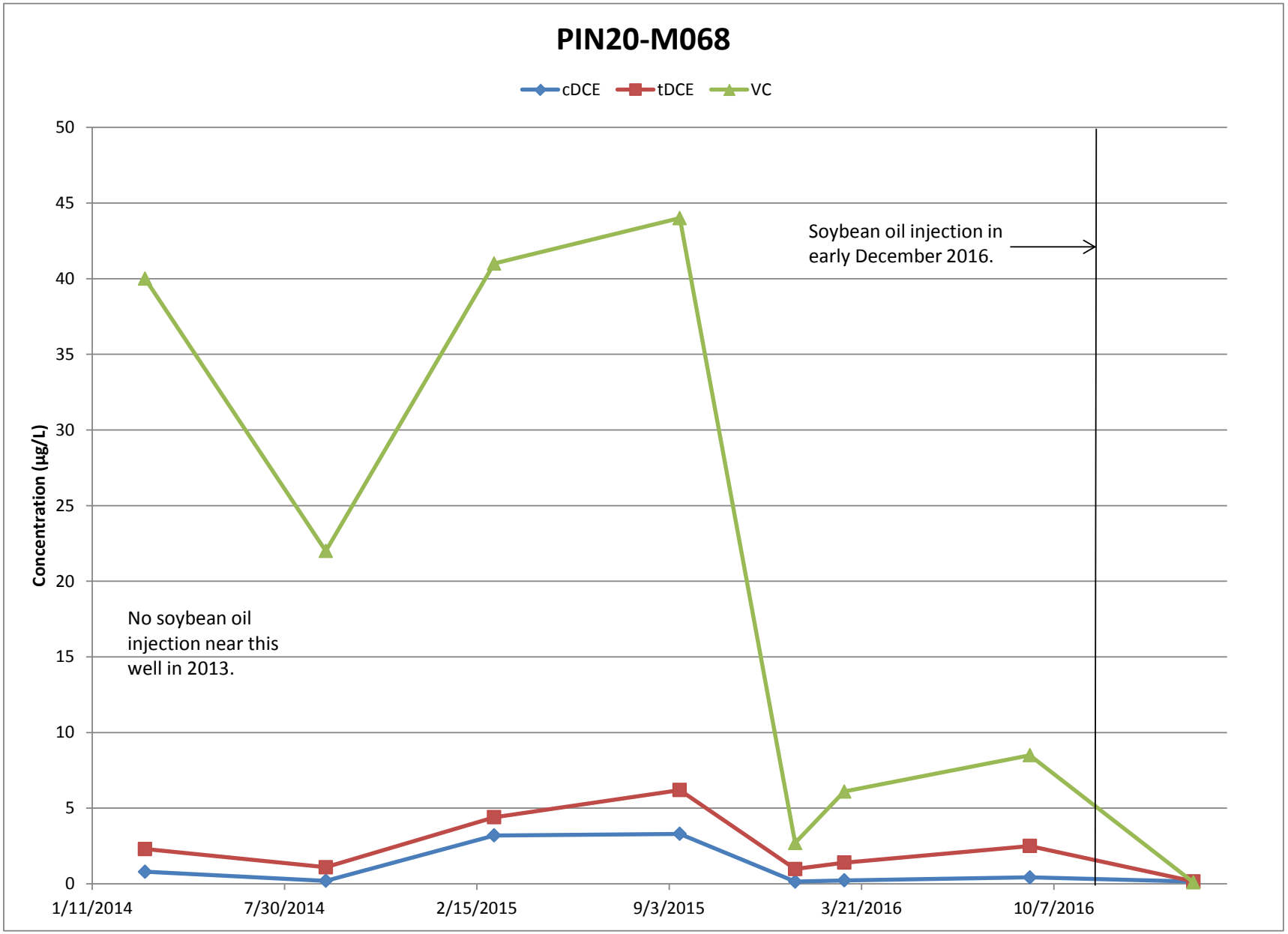

Figure 16. cDCE, tDCE, and VC in Well PIN20-M068

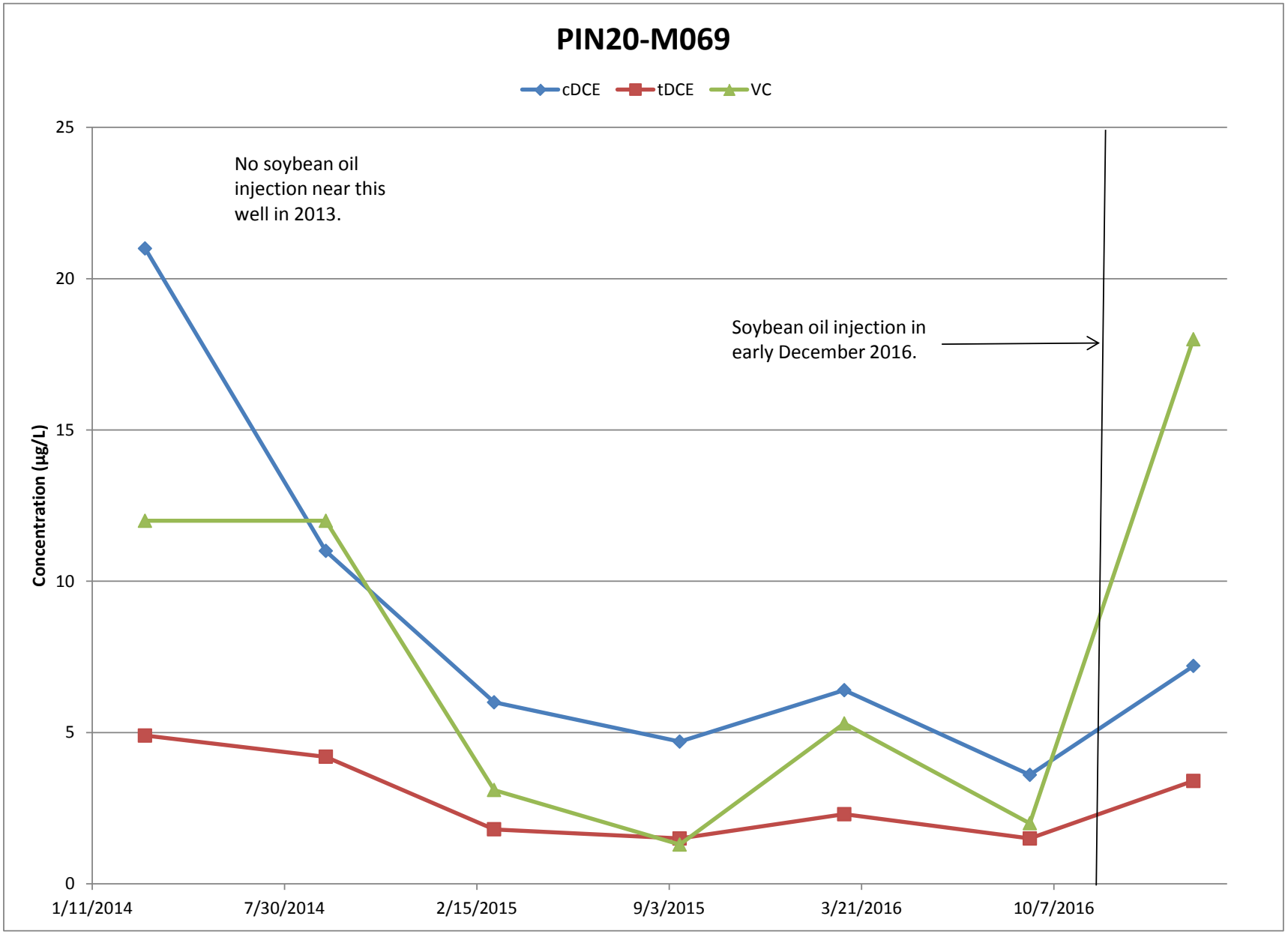

Figure 17. cDCE, tDCE, and VC in Well PIN20-M069

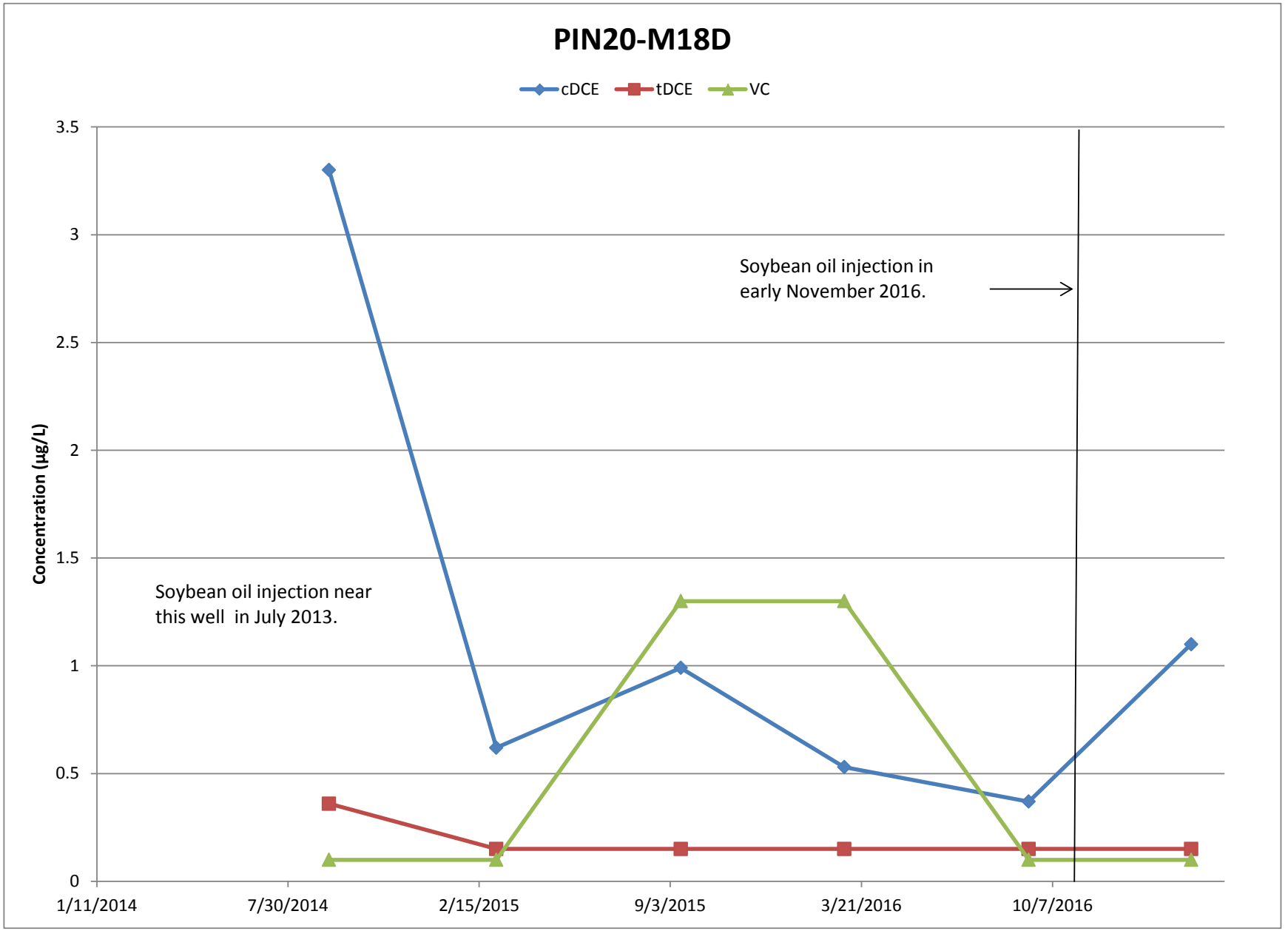

Figure 18. cDCE, tDCE, and VC in Well PIN20-M18D

Table 1. Groundwater Elevation Data at the 4.5 Acre Site, March 2017

Location	Measurement		Water Depth (ft bls)	Groundwater Elevation (ft amsl)
	Date	Time		
PIN20				
0502	3/8/2017	08:05	2.98	14.42
0503	3/8/2017	08:27	4.00	13.40
M003	3/8/2017	08:54	4.22	13.68
M005	3/8/2017	08:56	4.53	13.77
M015	3/8/2017	08:29	4.74	13.65
M053	3/8/2017	08:34	3.95	13.25
M056	3/8/2017	08:32	3.04	14.06
M057	3/8/2017	08:39	4.15	13.75
M058	3/8/2017	08:45	4.15	13.55
M065	3/8/2017	09:15	4.38	14.02
M066	3/8/2017	09:18	4.27	13.93
M067	3/8/2017	09:26	5.23	13.47
M068	3/8/2017	14:09	4.45	13.70
M069	3/8/2017	14:08	4.17	13.83
M18D	3/8/2017	08:42	4.29	13.41

Abbreviations:
ft amsl = feet above mean sea level
ft bls = feet below land surface

Table 2. Surface Water Elevations at the 4.5 Acre Site, March 2017

Location	Measurement		Surface Water Elevation (ft amsl)
	Date	Time	
PIN01	**Pond 5**		
P501	3/8/2017	07:43	13.44
PIN02	**West Pond**		
W005	3/8/2017	07:38	13.68

Abbreviation:
ft amsl = feet above mean sea level

Table 3. Field Measurements of Samples Collected at the 4.5 Acre Site, March 2017

Location	Screen Depth (ft bls)	Temperature (°C)	Specific Conductance (µmhos/cm)[a]	Turbidity (NTU)	pH	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)
PIN20							
M015	20.8–25.8	–	–	58	–	–	–
M058	18–28	–	–	33	–	–	–
M067	10–20	24.6	2700	294	6.45	–76	0.8
M068	20–30	23.5	1433	27	6.17	–79	1.0
M069	10–20	23.5	2714	32	6.66	–99	0.8
M18D	20–30	–	–	42	–	–	–

Note:
[a] Temperature corrected to 25 °C.

Abbreviations:
– = not measured
ft bls = feet below land surface
µmho/cm = micromho per centimeter
mg/L = milligrams/liter
mV = millivolts
NTU = nephelometric turbidity units

Table 4. COPC Concentrations Since March 2014 (µg/L)[a,b]

Location (all IDs start with PIN20-)	Screen Depth (ft bls)	Date Sampled	TCE	cDCE	tDCE	VC	Benzene	TCOPCs
Cleanup Target Level[c]			**30**	**700**	**1000**	**10**	**10**	
M001	20–25	3/5/2014	<0.16	0.26J	1.9	20	0.73J	22.89
		1/13/2015	<0.16	0.17J	1.5	8.7	0.45J	10.82
		3/6/2015	<0.16	0.52J	1.7	24	0.61J	26.83
		9/14/2015	<0.16	0.84J	2.1	24	0.72J	27.66
		1/12/2016	<0.16	0.71J	1.5	8.9	0.72J	11.83
		3/3/2016	<0.16	0.96J	2.1	29	0.89J	32.95
		9/12/2016	<0.16	1.4	1.8	19	0.81J	23.01
M015	20.8–25.8	3/5/2014	<0.16	8.8	<0.15	8.2	<0.16	17
		1/13/2015	<0.16	12	<0.15	21	<0.16	33
		3/5/2015	<0.16	6.3	<0.15	2	<0.16	8.3
		9/14/2015	<0.16	6.2	<0.15	14	<0.16	20.2
		1/12/2016	<0.16	18	<0.15	37	<0.16	55
		3/3/2016	<0.16	16	<0.15	40	<0.16	56
		9/12/2016	<0.16	9.3	<0.15	25	<0.16	34.3
		3/1/2017	<0.16	3	<0.15	<0.1	<0.16	3
M053	20–30	9/11/2014	<0.16	1.9	<0.15	<0.1	<0.16	1.9
		3/5/2015	<0.16	2.8	<0.15	1.7	<0.16	4.5
		9/14/2015	<0.16	2.8	<0.15	1.8	<0.16	4.6
		3/3/2016	<0.16	1.8	<0.15	2	<0.16	3.8
		9/12/2016	<0.16	2.3	<0.15	2.1	<0.16	4.4
M056	19–29	9/11/2014	<0.16	2.6	<0.15	<0.1	<0.16	2.6
		3/5/2015	<0.16	2.6	<0.15	0.58J	<0.16	3.18
		9/14/2015	<0.16	2.6	<0.15	<0.1	<0.16	2.6
		3/3/2016	<0.16	2.9	<0.15	0.48J	<0.16	3.38
		9/12/2016	<0.16	3.7	<0.15	1.1	<0.16	4.8
M057	20–30	9/11/2014	<0.16	1.9	0.26J	<0.1	<0.16	2.16
		3/5/2015	<0.16	11	0.61J	2.1	<0.16	13.71
		9/14/2015	<0.16	11J	0.86J	2.7J	<0.16	14.56
		1/12/2016	<0.16	1.7	0.26J	3	<0.16	4.96
		3/3/2016	<0.16	1.7	0.16J	2.8	<0.16	4.66
		9/12/2016	<0.16	6.5	0.49J	3.2	<0.16	10.19
M058	18–28	9/11/2014	<0.16	1.9	0.24J	<0.1	<0.16	2.14
		3/5/2015	<0.16	2.2	0.27J	<0.1	<0.16	2.47
		9/14/2015	<0.16	2.8	0.35J	<0.1	<0.16	3.15
		3/3/2016	<0.16	2	0.22J	1.2	<0.16	3.42
		9/12/2016	<0.16	2.6	0.43J	2	<0.16	5.03
		3/1/2017	<0.16	1.7	0.17J	<0.1	<0.16	1.87

Table 4 (continued). COPC Concentrations Since March 2014 (µg/L)[a,b]

Location (all IDs start with PIN20-)	Screen Depth (ft bls)	Date Sampled	TCE	cDCE	tDCE	VC	Benzene	TCOPCs
Cleanup Target Level[c]			**30**	**700**	**1000**	**10**	**10**	
M059	19–29	9/11/2014	<0.16	2	0.52J	13	0.22J	15.74
		3/5/2015	<0.16	4.4	1.3	37	0.26J	42.96
		9/14/2015	<0.16	5.9	2	49	0.29J	57.19
		1/12/2016	<0.16	2.9	0.88J	28	0.28J	32.06
		3/3/2016	<0.16	3.1	0.94J	30	0.3J	34.34
		9/12/2016	<0.16	5.1	1.7	49	0.32J	56.12
M067	10–20	3/5/2014	<0.16	1	0.18J	5	<0.16	6.18
		1/13/2015	<0.16	0.57J	<0.15	1.6	<0.16	2.17
		3/5/2015	<0.16	0.37J	<0.15	<0.1	<0.16	0.37
		9/14/2015	<0.16	0.33J	<0.15	0.45J	<0.16	0.78
		3/3/2016	<0.16	0.39J	<0.15	0.64J	<0.16	1.03
		9/12/2016	<0.16	0.38J	<0.15	0.74J	<0.16	1.12
		3/2/2017	<0.16	1.2	0.23J	4.6	<0.16	6.03
M068	20–30	3/7/2014	<0.16	0.8J	2.3	40	0.37J	43.47
		9/11/2014	<0.16	0.2J	1.1	22	0.36J	23.66
		3/5/2015	<0.16	3.2	4.4	41	0.25J	48.85
		9/14/2015	<0.16	3.3	6.2	44	0.26J	53.76
		1/12/2016	<0.16	<0.15	0.98J	2.7	0.29J	3.97
		3/3/2016	<0.16	0.23J	1.4	6.1	0.28J	8.01
		9/12/2016	<0.16	0.43J	2.5	8.5	0.28J	11.71
		3/2/2017	<0.16	<0.15	0.16J	<0.1	0.39J	0.55
M069	10–20	3/7/2014	<0.16	21	4.9	12	<0.16	37.9
		9/11/2014	<0.16	11	4.2	12	<0.16	27.2
		3/5/2015	<0.16	6	1.8	3.1	<0.16	10.9
		9/14/2015	<0.16	4.7	1.5	1.3	<0.16	7.5
		3/3/2016	<0.16	6.4	2.3	5.3	<0.16	14
		9/12/2016	<0.16	3.6	1.5	2	<0.16	7.1
		3/2/2017	<0.16	7.2	3.4	18	<0.16	28.6
M18D	20–30	9/11/2014	<0.16	3.3	0.36J	<0.1	<0.16	3.66
		3/5/2015	<0.16	0.62J	<0.15	<0.1	<0.16	0.62
		9/14/2015	<0.16	0.99J	<0.15	1.3J	<0.16	2.29
		3/3/2016	<0.16	0.53J	<0.15	1.3	<0.16	1.83
		9/12/2016	<0.16	0.37J	<0.15	<0.1	<0.16	0.37
		3/1/2017	<0.16	1.1	<0.15	<0.1	<0.16	1.1

Notes:
[a] The "<" values are method detection limits.
[b] Not all wells were sampled during every sampling event.
[c] The offsite CTL is a factor of 10 lower than the listed onsite (poor water quality) CTL.

Abbreviations:
ft bls = feet below land surface J = estimated value µg/L = micrograms per liter

Table 5. Relative Percent Difference for Duplicate Samples, March 2017 (reported in µg/L)

Sample ID	Duplicate ID	Analyte	Result	Dup Result	MDL	RPD
PIN20-M058	PIN20-2860	*cis*-1,2-Dichloroethene	1.7	1.7	0.15	0

Abbreviations:
MDL = method detection limit
RPD = relative percent difference
µg/L = micrograms per liter

Appendix A

Laboratory Reports

March 2017 Semiannual Monitoring

ANALYTICAL REPORT

Job Number: 280-94471-1

SDG Number: 17028292

Job Description: PINELLAS MONITORING

For:
Navarro Research and Engineering, Inc
2597 Legacy Way
Grand Junction, CO 81503

Attention: Mr. Steve Donivan

Approved for release.
DiLea R Bindel
Project Manager I
3/9/2017 12:59 PM

DiLea R Bindel, Project Manager I
4955 Yarrow Street, Arvada, CO, 80002
(303)736-0173
dilea.bindel@testamericainc.com
03/09/2017

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

Pages have been deleted from this laboratory report file to reduce file size. The deleted pages contain raw data and instrument calibrations. If the full laboratory report is needed, contact Scott.Surovchak@lm.doe.gov

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CASE NARRATIVE

Client: Navarro Research and Engineering, Inc

Project: PINELLAS MONITORING - 17028292

Report Number: 280-94471-1

With exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. All laboratory quality control samples analyzed in conjunction with the samples in this project were within established control limits, with any exceptions noted. Calculations are performed before rounding to avoid round-off errors in calculated results.

This report includes reporting limits (RLs) less than TestAmerica Denver's practical quantitation limits. These reporting limits are being used specifically at the client's request to meet the needs of this project. Please note that data are not normally reported to these levels without qualification, since they are inherently less reliable and potentially less defensible than required by the current NELAC standards.

Results between the method detection limit (MDL) and reporting limit (RL) are flagged with a "J" qualifier to indicate an estimated value. These results are statistically less reliable than results greater than or equal to the RL and should be considered a qualitative value.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 3/4/2017 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.4º C and 0.6º C.

GC/MS VOLATILES - SW846 8260B

Acetone and Methylene Chloride, common laboratory contaminants, were detected in the method blank MB 280-364649/6 at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Due to matrix interference, the matrix spike / matrix spike duplicate (MS/MSD) recovery for Vinyl chloride was outside control limits at 0% recovery in sample PIN20-2860 (PDZ 579). This analyte is not a spike analyte of interest for this project. Therefore, data was not affected.

The project specific reporting limit of 5 ug/L for 1,2-Dibromo-3-Chloropropane falls below the laboratory's lowest calibration standard. Results reported below the lowest calibration standard have less certainty (i.e., are estimated).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DATA REPORTING QUALIFIERS

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Lab Section	Qualifier	Description
GC/MS VOA		
	B	Compound was found in the blank and sample.
	U	Indicates the analyte was analyzed for but not detected.
	F1	MS and/or MSD Recovery is outside acceptance limits.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

SAMPLE SUMMARY

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
280-94471-1	PIN20-2860	Water	03/01/2017 1300	03/04/2017 0910
280-94471-1MS	PIN20-2860	Water	03/01/2017 1300	03/04/2017 0910
280-94471-1MSD	PIN20-2860	Water	03/01/2017 1300	03/04/2017 0910
280-94471-2	PIN20-M015	Water	03/01/2017 1015	03/04/2017 0910
280-94471-3	PIN20-M058	Water	03/01/2017 1325	03/04/2017 0910
280-94471-4	PIN20-M067	Water	03/02/2017 1040	03/04/2017 0910
280-94471-5	PIN20-M068	Water	03/02/2017 0850	03/04/2017 0910
280-94471-6	PIN20-M069	Water	03/02/2017 0945	03/04/2017 0910
280-94471-7	PIN20-M18D	Water	03/01/2017 1415	03/04/2017 0910
280-94471-8	PIN20-2861	Water	03/01/2017 0800	03/04/2017 0910

EXECUTIVE SUMMARY - Detections

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-94471-1	**PIN20-2860**					
Carbon disulfide		0.67	J	1.0	ug/L	8260B
cis-1,2-Dichloroethene		1.7		1.0	ug/L	8260B
trans-1,2-Dichloroethene		0.20	J	1.0	ug/L	8260B
280-94471-2	**PIN20-M015**					
Acetone		97	B	10	ug/L	8260B
2-Butanone (MEK)		23		5.0	ug/L	8260B
Carbon disulfide		0.64	J	1.0	ug/L	8260B
cis-1,2-Dichloroethene		3.0		1.0	ug/L	8260B
280-94471-3	**PIN20-M058**					
Acetone		9.4	J B	10	ug/L	8260B
Carbon disulfide		1.2		1.0	ug/L	8260B
cis-1,2-Dichloroethene		1.7		1.0	ug/L	8260B
trans-1,2-Dichloroethene		0.17	J	1.0	ug/L	8260B
280-94471-4	**PIN20-M067**					
Carbon disulfide		0.70	J	1.0	ug/L	8260B
cis-1,2-Dichloroethene		1.2		1.0	ug/L	8260B
trans-1,2-Dichloroethene		0.23	J	1.0	ug/L	8260B
Vinyl chloride		4.6		1.0	ug/L	8260B
280-94471-5	**PIN20-M068**					
Acetone		44	B	10	ug/L	8260B
Benzene		0.39	J	1.0	ug/L	8260B
2-Butanone (MEK)		110		5.0	ug/L	8260B
Carbon disulfide		0.51	J	1.0	ug/L	8260B
trans-1,2-Dichloroethene		0.16	J	1.0	ug/L	8260B
280-94471-6	**PIN20-M069**					
cis-1,2-Dichloroethene		7.2		1.0	ug/L	8260B
trans-1,2-Dichloroethene		3.4		1.0	ug/L	8260B
Vinyl chloride		18		1.0	ug/L	8260B
280-94471-7	**PIN20-M18D**					
Acetone		11	B	10	ug/L	8260B
Carbon disulfide		0.61	J	1.0	ug/L	8260B
cis-1,2-Dichloroethene		1.1		1.0	ug/L	8260B

EXECUTIVE SUMMARY - Detections

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Lab Sample ID Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-94471-8	**PIN20-2861**					
Carbon disulfide		0.56	J	1.0	ug/L	8260B

METHOD SUMMARY

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Volatile Organic Compounds (GC/MS)	TAL DEN	SW846 8260B	
Purge and Trap	TAL DEN		SW846 5030B

Lab References:

TAL DEN = TestAmerica Denver

Method References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Method	Analyst	Analyst ID
SW846 8260B	Lines, Jeremy N	JNL

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-2860**

Lab Sample ID: 280-94471-1
Client Matrix: Water

Date Sampled: 03/01/2017 1300
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3040.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2201			Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2201				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	1.9	U F1	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	2.0	U	2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.67	J	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U F1	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U F1	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	1.7		0.15	1.0
trans-1,2-Dichloroethene	0.20	J	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: PIN20-2860

Lab Sample ID: 280-94471-1
Client Matrix: Water

Date Sampled: 03/01/2017 1300
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3040.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2201			Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2201				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U F1	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	0.10	U F1	0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	86		70 - 127
Toluene-d8 (Surr)	103		80 - 125
4-Bromofluorobenzene (Surr)	103		78 - 120
Dibromofluoromethane (Surr)	83		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M015**

Lab Sample ID: 280-94471-2
Client Matrix: Water

Date Sampled: 03/01/2017 1015
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3062.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0521			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0521				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	97	B	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	23		2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.64	J	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	3.0		0.15	1.0
trans-1,2-Dichloroethene	0.15	U	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: PIN20-M015

Lab Sample ID: 280-94471-2
Client Matrix: Water

Date Sampled: 03/01/2017 1015
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3062.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0521			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0521				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	0.10	U	0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	111		70 - 127
Toluene-d8 (Surr)	97		80 - 125
4-Bromofluorobenzene (Surr)	102		78 - 120
Dibromofluoromethane (Surr)	93		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M058**

Lab Sample ID: 280-94471-3
Client Matrix: Water

Date Sampled: 03/01/2017 1325
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3045.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2342			Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2342				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	9.4	J B	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	2.0	U	2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	1.2		0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	1.7		0.15	1.0
trans-1,2-Dichloroethene	0.17	J	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: PIN20-M058

Lab Sample ID: 280-94471-3
Client Matrix: Water

Date Sampled: 03/01/2017 1325
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3045.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2342			Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2342				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	0.10	U	0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	98		70 - 127
Toluene-d8 (Surr)	98		80 - 125
4-Bromofluorobenzene (Surr)	102		78 - 120
Dibromofluoromethane (Surr)	90		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M067**

Lab Sample ID: 280-94471-4
Client Matrix: Water

Date Sampled: 03/02/2017 1040
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3046.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0002			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0002				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	1.9	U	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	2.0	U	2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.70	J	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	1.2		0.15	1.0
trans-1,2-Dichloroethene	0.23	J	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M067**

Lab Sample ID: 280-94471-4
Client Matrix: Water

Date Sampled: 03/02/2017 1040
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3046.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0002			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0002				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	4.6		0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	100		70 - 127
Toluene-d8 (Surr)	98		80 - 125
4-Bromofluorobenzene (Surr)	101		78 - 120
Dibromofluoromethane (Surr)	90		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M068**

Lab Sample ID: 280-94471-5
Client Matrix: Water

Date Sampled: 03/02/2017 0850
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3047.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0022			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0022				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	44	B	1.9	10
Benzene	0.39	J	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	110		2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.51	J	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
trans-1,2-Dichloroethene	0.16	J	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M068**

Lab Sample ID: 280-94471-5
Client Matrix: Water

Date Sampled: 03/02/2017 0850
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3047.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0022			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0022				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	0.10	U	0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	104		70 - 127
Toluene-d8 (Surr)	101		80 - 125
4-Bromofluorobenzene (Surr)	100		78 - 120
Dibromofluoromethane (Surr)	91		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M069**

Lab Sample ID: 280-94471-6
Client Matrix: Water

Date Sampled: 03/02/2017 0945
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3048.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0042			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0042				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	1.9	U	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	2.0	U	2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.45	U	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	7.2		0.15	1.0
trans-1,2-Dichloroethene	3.4		0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: PIN20-M069

Lab Sample ID: 280-94471-6
Client Matrix: Water

Date Sampled: 03/02/2017 0945
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3048.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0042			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0042				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	18		0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	103		70 - 127
Toluene-d8 (Surr)	100		80 - 125
4-Bromofluorobenzene (Surr)	101		78 - 120
Dibromofluoromethane (Surr)	91		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-M18D**

Lab Sample ID: 280-94471-7
Client Matrix: Water

Date Sampled: 03/01/2017 1415
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3049.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0102			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0102				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	11	B	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	2.0	U	2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.61	J	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	1.1		0.15	1.0
trans-1,2-Dichloroethene	0.15	U	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: PIN20-M18D

Lab Sample ID: 280-94471-7
Client Matrix: Water

Date Sampled: 03/01/2017 1415
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3049.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0102			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0102				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	0.10	U	0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	103		70 - 127
Toluene-d8 (Surr)	100		80 - 125
4-Bromofluorobenzene (Surr)	102		78 - 120
Dibromofluoromethane (Surr)	92		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: **PIN20-2861**

Lab Sample ID: 280-94471-8
Client Matrix: Water

Date Sampled: 03/01/2017 0800
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3050.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0122			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0122				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Acetone	1.9	U	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	2.0	U	2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.56	J	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
trans-1,2-Dichloroethene	0.15	U	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.32	U	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0
n-Propylbenzene	0.16	U	0.16	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Client Sample ID: PIN20-2861

Lab Sample ID: 280-94471-8
Client Matrix: Water

Date Sampled: 03/01/2017 0800
Date Received: 03/04/2017 0910

8260B Volatile Organic Compounds (GC/MS)

Analysis Method:	8260B	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Prep Method:	5030B	Prep Batch:	N/A	Lab File ID:	R3050.D
Dilution:	1.0			Initial Weight/Volume:	20 mL
Analysis Date:	03/08/2017 0122			Final Weight/Volume:	20 mL
Prep Date:	03/08/2017 0122				

Analyte	Result (ug/L)	Qualifier	MDL	RL
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	0.10	U	0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	%Rec	Qualifier	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	106		70 - 127
Toluene-d8 (Surr)	101		80 - 125
4-Bromofluorobenzene (Surr)	105		78 - 120
Dibromofluoromethane (Surr)	94		77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Surrogate Recovery Report

8260B Volatile Organic Compounds (GC/MS)

Client Matrix: Water

Lab Sample ID	Client Sample ID	DBFM %Rec	DCA %Rec	TOL %Rec	BFB %Rec
280-94471-1	PIN20-2860	83	86	103	103
280-94471-2	PIN20-M015	93	111	97	102
280-94471-3	PIN20-M058	90	98	98	102
280-94471-4	PIN20-M067	90	100	98	101
280-94471-5	PIN20-M068	91	104	101	100
280-94471-6	PIN20-M069	91	103	100	101
280-94471-7	PIN20-M18D	92	103	100	102
280-94471-8	PIN20-2861	94	106	101	105
MB 280-364649/6		87	96	99	102
LCS 280-364649/4		87	95	101	96
280-94471-1 MS	PIN20-2860 MS	90	104	101	97
280-94471-1 MSD	PIN20-2860 MSD	90	100	101	97

Surrogate	Acceptance Limits
DBFM = Dibromofluoromethane (Surr)	77-120
DCA = 1,2-Dichloroethane-d4 (Surr)	70-127
TOL = Toluene-d8 (Surr)	80-125
BFB = 4-Bromofluorobenzene (Surr)	78-120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Method Blank - Batch: 280-364649

Method: 8260B
Preparation: 5030B

Lab Sample ID:	MB 280-364649/6	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	R3038.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2105	Units:	ug/L	Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2105				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
Acetone	3.28	J	1.9	10
Benzene	0.16	U	0.16	1.0
Bromobenzene	0.17	U	0.17	1.0
Bromochloromethane	0.10	U	0.10	1.0
Bromodichloromethane	0.17	U	0.17	1.0
Bromoform	0.19	U	0.19	1.0
Bromomethane	0.21	U	0.21	1.0
2-Butanone (MEK)	2.0	U	2.0	5.0
n-Butylbenzene	0.32	U	0.32	1.0
sec-Butylbenzene	0.17	U	0.17	1.0
tert-Butylbenzene	0.16	U	0.16	1.0
Carbon disulfide	0.45	U	0.45	1.0
Carbon tetrachloride	0.19	U	0.19	1.0
Chlorobenzene	0.17	U	0.17	1.0
Dibromochloromethane	0.17	U	0.17	1.0
Chloroethane	0.41	U	0.41	1.0
Chloroform	0.16	U	0.16	1.0
Chloromethane	0.30	U	0.30	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.47	U	0.47	1.0
Dibromomethane	0.17	U	0.17	1.0
1,2-Dichlorobenzene	0.15	U	0.15	1.0
1,3-Dichlorobenzene	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.16	U	0.16	1.0
Dichlorodifluoromethane	0.31	U	0.31	1.0
1,1-Dichloroethane	0.22	U	0.22	1.0
1,2-Dichloroethane	0.13	U	0.13	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
trans-1,2-Dichloroethene	0.15	U	0.15	1.0
1,1-Dichloroethene	0.23	U	0.23	1.0
1,2-Dichloropropane	0.18	U	0.18	1.0
1,3-Dichloropropane	0.22	U	0.22	1.0
2,2-Dichloropropane	0.18	U	0.18	1.0
cis-1,3-Dichloropropene	0.16	U	0.16	1.0
trans-1,3-Dichloropropene	0.19	U	0.19	1.0
1,1-Dichloropropene	0.19	U	0.19	1.0
Ethylbenzene	0.16	U	0.16	1.0
Hexachlorobutadiene	0.36	U	0.36	1.0
2-Hexanone	1.7	U	1.7	5.0
Isopropylbenzene	0.19	U	0.19	1.0
4-Isopropyltoluene	0.20	U	0.20	1.0
Methylene Chloride	0.647	J	0.32	1.0
4-Methyl-2-pentanone	0.98	U	0.98	5.0
Naphthalene	0.22	U	0.22	1.0

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Method Blank - Batch: 280-364649

Method: 8260B
Preparation: 5030B

Lab Sample ID:	MB 280-364649/6	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	R3038.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2105	Units:	ug/L	Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2105				
Leach Date:	N/A				

Analyte	Result	Qual	MDL	RL
n-Propylbenzene	0.16	U	0.16	1.0
Styrene	0.17	U	0.17	1.0
1,1,1,2-Tetrachloroethane	0.21	U	0.21	1.0
1,1,2,2-Tetrachloroethane	0.21	U	0.21	1.0
Tetrachloroethene	0.20	U	0.20	1.0
Toluene	0.17	U	0.17	1.0
1,2,3-Trichlorobenzene	0.21	U	0.21	1.0
1,2,4-Trichlorobenzene	0.21	U	0.21	1.0
1,1,1-Trichloroethane	0.16	U	0.16	1.0
1,1,2-Trichloroethane	0.27	U	0.27	1.0
Trichloroethene	0.16	U	0.16	1.0
Trichlorofluoromethane	0.29	U	0.29	1.0
1,2,3-Trichloropropane	0.33	U	0.33	1.0
1,2,4-Trimethylbenzene	0.15	U	0.15	1.0
1,3,5-Trimethylbenzene	0.16	U	0.16	1.0
Vinyl chloride	0.10	U	0.10	1.0
Xylenes, Total	0.19	U	0.19	1.0
1,2-Dibromoethane	0.18	U	0.18	1.0

Surrogate	% Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	96	70 - 127
Toluene-d8 (Surr)	99	80 - 125
4-Bromofluorobenzene (Surr)	102	78 - 120
Dibromofluoromethane (Surr)	87	77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Lab Control Sample - Batch: 280-364649

Method: 8260B
Preparation: 5030B

Lab Sample ID:	LCS 280-364649/4	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	R3037.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2045	Units:	ug/L	Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2045				
Leach Date:	N/A				

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Benzene	5.00	5.01	100	65 - 135	
Bromodichloromethane	5.00	5.02	100	65 - 135	
Carbon tetrachloride	5.00	5.48	110	65 - 135	
Chlorobenzene	5.00	5.26	105	65 - 135	
Chloroform	5.00	5.46	109	65 - 135	
1,3-Dichlorobenzene	5.00	5.02	100	65 - 135	
1,1-Dichloroethane	5.00	5.26	105	65 - 135	
trans-1,2-Dichloroethene	5.00	5.06	101	65 - 135	
1,1-Dichloroethene	5.00	4.82	96	65 - 136	
1,2-Dichloropropane	5.00	5.27	105	64 - 135	
Ethylbenzene	5.00	5.21	104	65 - 135	
Methylene Chloride	5.00	5.51	110	54 - 141	
Tetrachloroethene	5.00	5.21	104	65 - 135	
Toluene	5.00	5.12	102	65 - 135	
1,1,1-Trichloroethane	5.00	5.55	111	65 - 135	
Trichloroethene	5.00	5.11	102	65 - 135	

Surrogate	% Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	95	70 - 127
Toluene-d8 (Surr)	101	80 - 125
4-Bromofluorobenzene (Surr)	96	78 - 120
Dibromofluoromethane (Surr)	87	77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 280-364649

Method: 8260B
Preparation: 5030B

MS Lab Sample ID:	280-94471-1	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	R3043.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2302			Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2302				20 mL
Leach Date:	N/A				

MSD Lab Sample ID:	280-94471-1	Analysis Batch:	280-364649	Instrument ID:	VMS_R1
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	R3044.D
Dilution:	1.0	Leach Batch:	N/A	Initial Weight/Volume:	20 mL
Analysis Date:	03/07/2017 2322			Final Weight/Volume:	20 mL
Prep Date:	03/07/2017 2322				20 mL
Leach Date:	N/A				

Analyte	% Rec. MS	% Rec. MSD	Limit	RPD	RPD Limit	MS Qual	MSD Qual
Benzene	101	101	65 - 135	0	20		
Bromodichloromethane	109	109	65 - 135	0	20		
Carbon tetrachloride	128	125	65 - 135	2	21		
Chlorobenzene	106	104	65 - 135	1	20		
Chloroform	118	116	65 - 135	2	20		
1,3-Dichlorobenzene	102	103	65 - 135	1	20		
1,1-Dichloroethane	109	109	65 - 135	0	21		
trans-1,2-Dichloroethene	100	102	65 - 135	1	24		
1,1-Dichloroethene	96	96	65 - 136	0	20		
1,2-Dichloropropane	106	105	64 - 135	1	20		
Ethylbenzene	106	107	65 - 135	0	20		
Methylene Chloride	87	92	54 - 141	5	26		
Tetrachloroethene	108	107	65 - 135	1	20		
Toluene	106	107	65 - 135	1	20		
1,1,1-Trichloroethane	129	126	65 - 135	3	20		
Trichloroethene	105	104	65 - 135	1	20		

Surrogate	MS % Rec	MSD % Rec	Acceptance Limits
1,2-Dichloroethane-d4 (Surr)	104	100	70 - 127
Toluene-d8 (Surr)	101	101	80 - 125
4-Bromofluorobenzene (Surr)	97	97	78 - 120
Dibromofluoromethane (Surr)	90	90	77 - 120

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 280-364649

Method: 8260B
Preparation: 5030B

MS Lab Sample ID:	280-94471-1	Units:	ug/L	MSD Lab Sample ID:	280-94471-1
Client Matrix:	Water			Client Matrix:	Water
Dilution:	1.0			Dilution:	1.0
Analysis Date:	03/07/2017 2302			Analysis Date:	03/07/2017 2322
Prep Date:	03/07/2017 2302			Prep Date:	03/07/2017 2322
Leach Date:	N/A			Leach Date:	N/A

Analyte	Sample Result/Qual		MS Spike Amount	MSD Spike Amount	MS Result/Qual	MSD Result/Qual
Benzene	0.16	U	5.00	5.00	5.04	5.05
Bromodichloromethane	0.17	U	5.00	5.00	5.45	5.46
Carbon tetrachloride	0.19	U	5.00	5.00	6.38	6.27
Chlorobenzene	0.17	U	5.00	5.00	5.28	5.22
Chloroform	0.16	U	5.00	5.00	5.88	5.78
1,3-Dichlorobenzene	0.13	U	5.00	5.00	5.09	5.15
1,1-Dichloroethane	0.22	U	5.00	5.00	5.44	5.45
trans-1,2-Dichloroethene	0.20	J	5.00	5.00	5.22	5.28
1,1-Dichloroethene	0.23	U	5.00	5.00	4.81	4.79
1,2-Dichloropropane	0.18	U	5.00	5.00	5.30	5.27
Ethylbenzene	0.16	U	5.00	5.00	5.32	5.33
Methylene Chloride	0.32	U	5.00	5.00	4.36	4.58
Tetrachloroethene	0.20	U	5.00	5.00	5.41	5.34
Toluene	0.17	U	5.00	5.00	5.30	5.33
1,1,1-Trichloroethane	0.16	U	5.00	5.00	6.45	6.28
Trichloroethene	0.16	U	5.00	5.00	5.27	5.22

Client: Navarro Research and Engineering, Inc

Job Number: 280-94471-1
Sdg Number: 17028292

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
GC/MS VOA					
Analysis Batch:280-364649					
LCS 280-364649/4	Lab Control Sample	T	Water	8260B	
MB 280-364649/6	Method Blank	T	Water	8260B	
280-94471-1	PIN20-2860	T	Water	8260B	
280-94471-1MS	Matrix Spike	T	Water	8260B	
280-94471-1MSD	Matrix Spike Duplicate	T	Water	8260B	
280-94471-2	PIN20-M015	T	Water	8260B	
280-94471-3	PIN20-M058	T	Water	8260B	
280-94471-4	PIN20-M067	T	Water	8260B	
280-94471-5	PIN20-M068	T	Water	8260B	
280-94471-6	PIN20-M069	T	Water	8260B	
280-94471-7	PIN20-M18D	T	Water	8260B	
280-94471-8	PIN20-2861	T	Water	8260B	

Report Basis
T = Total