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GROUNDWATER MONITORING REPORT
EVENT 42 – March 2021

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List of Acronyms

amsl	above mean sea level
bgs	below ground surface
cis-1,2-DCE	cis-1,2-dichloroethene
DEQ	Department of Environmental Quality
DO	dissolved oxygen
DOE	United States Department of Energy
EPA	U.S. Environmental Protection Agency
GWMP	Groundwater Monitoring Plan
ICF	ICF International
MCL	maximum contaminant level
MML	maximum measurable level
mS/cm	milliSiemens per centimeter
mV	millivolts
NETL	National Energy Technology Laboratory
NGVD	National Geodetic Vertical Datum
NTU	nephelometric turbidity units
ORP	oxidation-reduction potential
PCE	tetrachloroethene
PRG	preliminary remediation goal
PVC	polyvinyl chloride
RBC	risk-based concentration
RSL	regional screening level
TCE	trichloroethene
trans-1,2-DCE	trans-1,2-dichloroethene
URS	URS Corporation
VOC	volatile organic compounds
µg/L	micrograms per liter
° C	degrees Celsius

Executive Summary

This report describes the March 2021 (Periodic Event 42) groundwater sampling and analysis activities performed by WE2 at the United States Department of Energy (DOE) National Energy Technology Laboratory (NETL) in Albany, Oregon (the Site). The March 2021 sampling event is the 42nd round of groundwater samples collected from the NETL-Albany site since the initiation of the NETL-Albany groundwater monitoring program in 2002.

Groundwater levels were measured in thirty-five of the thirty-five monitoring wells and piezometers. The gauging data was used to create groundwater elevation contour maps for the two identified aquifers on site. Wells installed in the Perched Aquifer and deeper Gravel Aquifer zones provided spatial coverage to map the potentiometric surfaces of both aquifers as separate hydrogeologic units. Groundwater elevations from wells in the Perched Aquifer measured during the March 2021 event show a flow to the north in the northern portion of the site (from MW-10 to MW-11), and to the south/southwest and to the east away from a potentiometric high near MW-9. In the Gravel Aquifer, groundwater elevation data shows a potentiometric high near monitoring well MW-25 from which flow is radially away in all directions,

Groundwater samples were collected from thirty-one of the thirty-three two-inch diameter monitoring wells between March 2 and March 5, 2021. Two wells (MW-1 and MW-21) were not sampled because they are not optimally screened based on the current understanding of the Conceptual Site Model (USSE2, July 2019). Low-flow sampling protocols were followed at each well in accordance with the NETL-Albany Groundwater Monitoring Plan (GWMP, USSE2, January 2020). All groundwater samples were submitted for analysis of volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260C and metals by EPA Methods 200.7 Rev 4.4 and 200.8.

Six VOCs were detected during the March 2021 sampling event and are discussed in Section 4.1: carbon tetrachloride, chloroform, chloromethane, cis-1,2-dichloroethene (cis-1,2-DCE), tetrachloroethene (PCE), and trichloroethene (TCE). Four these VOCs were detected at concentrations that exceed Oregon Groundwater Maximum Measurement Levels (MMLs), Oregon Hot Spot tables, Oregon Risk-Based Concentrations (RBCs), EPA Regional Screening Levels (RSLs), or EPA Primary Maximum Contaminant Levels (MCLs).

1.0 Introduction

This report describes the March 2021 (Periodic Event 42) groundwater sampling and analysis performed by WE2 at the DOE NETL site in Albany, Oregon (Figure 1). The sampling was conducted in accordance with the Groundwater Monitoring Plan Revision 14, for National Energy Technology Laboratory, Albany, Oregon (USSE2, January 2020) and the National Energy Technology Laboratory, Albany Groundwater Sampling Event 42 Work Plan Memo (July 2020).

The NETL-Albany groundwater monitoring program was initiated in 2001, as was then required by DOE Order 5400.1, *General Environmental Protection Program*. The sampling has not been mandated by any other regulatory requirement or consent order. These monitoring requirements have since been incorporated into DOE Order 436.1, *Departmental Sustainability*.

1.1 Project Scope and Objectives

The objective of the NETL-Albany groundwater monitoring program is to perform a site-wide and a limited off-site evaluation of groundwater conditions to determine the presence and extent of groundwater contamination. The NETL-Albany groundwater monitoring program is designed to:

- Obtain data for the purpose of determining baseline conditions of groundwater quality and quantity;
- Demonstrate compliance with and implementation of all applicable regulations and DOE Orders;
- Provide data to permit the early detection of groundwater pollution or contamination;
- Provide a reporting mechanism for detected groundwater pollution or contamination;
- Identify existing and potential groundwater contamination sources and maintain surveillance of these sources;
- Provide data upon which decisions can be made concerning facility operations (including land, buildings and equipment), management and protection of groundwater resources and future remedial activities.

The March 2021 sampling event is the forty-second round of groundwater sampling conducted at the Site under the general program that was developed 2001. The following table lists previous sampling events:

Event 1	July 2002	Event 22	August 2010
Event 2	November/December 2002	Event 23	March 2011
Event 3	February/March 2003	Event 24	August/September 2011
Event 4	May 2003	Event 25	March 2012
Event 5	August 2003	Event 26	August 2012
Event 6	November 2003	Event 27	March 2013
Event 7	February 2004	Event 28	August 2013
Event 8	May 2004	Event 29	February 2014
Event 9	October 2004	Event 30	August 2014
Event 10	February 2005	Event 31	March 2015
Event 11	September 2005	Event 32	August 2015
Event 12	February 2006	Event 33	April 2016
Event 13	October 2006	Event 34	September 2016
Event 14	March 2007	Event 35	April 2017
Event 15	June 2007	Event 36	August 2017
Event 16	October 2007	Event 37	March 2018
Event 17	March 2008	Event 38	August 2018
Event 18	October 2008	Event 39	March 2019
Event 19	March 2009	Event 40	August 2019
Event 20	September 2009	Event 41	March 2020
Event 21	March 2010		

The groundwater data generated during these previous sampling events are discussed in detail in their respective periodic groundwater monitoring reports produced by ICF International (ICF, through Event 22), URS (a legacy AECOM company, Event 23 through Event 32), and AECOM/Amentum (with USSE2/WE2, Event 33 through Event 41). Historical data are also summarized in the latest version of the GWMP (USSE2, January 2020). Historical data are incorporated into this report in the form of contaminant concentration trend graphs (Figure 6).

A detailed description of the Site, including the site location, physical structures, and site history, is provided in the GWMP.

2.0 Field and Analytical Procedures

This section summarizes the field and analytical procedures conducted by WE2 during the March 2021 groundwater sampling event. Activities included the sampling and analysis of groundwater and the measurement of depth to groundwater. Field and analytical procedures were conducted in accordance with the GWMP. The monitoring well locations are shown in Figure 2.

2.1 Water Level Measurements

Groundwater depths were recorded at the thirty-five of thirty-five monitoring wells and piezometers on site (thirty-three two-inch diameter wells and two one-inch piezometers). Depth to water was measured to the nearest one-hundredth of a foot from the surveyed reference point on the polyvinyl chloride (PVC) well riser using an electronic hand-held water-level meter. These water-level data were used to calculate groundwater elevations and flow gradients that are discussed in Section 3.2 and to develop the contour maps presented in Figures 3 and 4. Table 1 shows the well construction details, and Table 2 and Table 3 show the depth to groundwater and groundwater elevations from Event 42.

2.2 Groundwater Sampling

Groundwater samples were collected between March 2 and March 5, 2021 from thirty-one of thirty-three monitoring wells located at NETL-Albany and Liberty Elementary School. Two wells (MW-1 and MW-21) are not sampled because they are screened in the upper part of the Gravel Aquifer, where they do not monitor maximum concentrations of contaminants, and other adjacent wells (i.e., MW-22 and MW-23) are better suited to indicate concentrations at those depths and locations.

Samples were collected using low-flow sampling methods in accordance with the GWMP. Water quality measurements including temperature, pH, specific conductivity, dissolved oxygen (DO), turbidity, and oxidation-reduction potential (ORP) were recorded every 3-5 minutes during purging of monitoring wells using a multi-parameter water quality meter with flow-through cell. Groundwater samples were collected following the stabilization of water-quality parameters. Final water quality readings were recorded and are shown in Table 2. Sampling field logs are provided in Appendix A.

2.3 Laboratory Analysis

The thirty-one primary groundwater samples were analyzed for VOCs by EPA Method 8260C.

Two field duplicates and two matrix spike/matrix spike duplicate quality control samples were collected during the event, one set from MW-10 and MW-25. Laboratory analysis procedures and methods were performed as described in the GWMP.

The complete laboratory analytical reports are presented in Appendix B and the analytical results for groundwater are tabulated in Appendix C. In addition, the groundwater purge water was analyzed and determined to be non-hazardous. The purge water laboratory report is also contained in Appendix C. The purge water was disposed through the industrial waste water system in accordance with the site's industrial waste water permit.

2.4 Data Review and Validation

A data validation was performed on groundwater analytical results in accordance with the updated GWMP. The data validation included review of sample documentation, preservation and holding times, blank data, recovery data for laboratory control samples, and precision of duplicate results.

All data is valid as reported. and usable for project decision-making purposes. The data validation memorandum is included in Appendix D.

3.0 Hydrogeological Assessment

The following sections summarize the hydrostratigraphy as first described by ICF and refined by AECOM. Section 3.2 describes groundwater flow directions for Event 41.

3.1 Geology and Hydrology

Several distinct geologic units have been identified at the site. The geologic and hydrogeologic characteristics of each unit are summarized below.

3.1.1 Upper Silt Unit

The Upper Silt Unit is present from the ground surface to a depth of approximately 15 feet below ground surface (bgs) and is predominantly silt and silty sand with laterally discontinuous clay lenses and thin water-bearing sands. It contacts the underlying Gravel Aquifer across much of the site. The Upper Silt Unit is subject to non-uniform surface water infiltration that can become locally perched on discontinuous clay lenses and saturate discontinuous sand lenses. These conditions contribute to a non-uniform saturation and heterogeneous groundwater elevations and groundwater flow throughout the unit.

3.1.2 Upper Clay Unit

The Upper Clay Unit is a laterally discontinuous, dense, dry clay with a maximum thickness of approximately 10 feet. The Upper Clay Unit, when encountered, is located between the Upper Silt Unit and the underlying Gravel Aquifer at a depth of approximately 12 to 18 feet bgs. The current understanding of the lateral extent of the clay shows it as an inverted “T” shaped structure; however, it is important to note that the southern and western extent of the clay has not been evaluated. In some areas, the clay grades into soft, brown, moist, silty clay for about 10 feet from the mapped edge of the dense, hard, dry clay. The soft brown clay may represent some relatively narrow transitional facies at the edge of the Upper Clay Unit.

The Upper Clay Unit is a localized aquitard and groundwater perches on it in some portions of the Site. The approximate extents of the Perched Aquifer were determined by ICF, refined by AECOM/USSE2, and are shown in Figure 3. Some borings that have penetrated the Upper Clay Unit have encountered an approximately 5-foot-thick zone of dry sediments composed of the underlying Gravel Aquifer, suggesting the Upper Clay Unit (where present) prevents vertical movement of water through the clay and into the Gravel Aquifer. Flow of the perched groundwater (where present) appears to be controlled in part by the surface topography of the clay. With water infiltration being significantly less during the dry season, there are variable flow patterns in the Perched Aquifer, with flow generally somewhat radial due to local mounding around MW-10. Groundwater flow in the southern part of the Site appears to consistently be to the south/southwest regardless of season.

3.1.3 Gravel Aquifer

The Gravel Aquifer is present from a depth of approximately 15 feet bgs to approximately 35 feet bgs and consists of gravelly sands and clayey/silty gravels which are saturated in most portions of the Site. Investigations indicate a change in lithology of the Gravel Aquifer in the northeast portion of the Site. The typical lithology of the Gravel Aquifer transitions to a predominant dark gray, poorly-graded sand with little or no gravel or fines in the northeast portion of the Site. This same unit was observed in several borings in the northwestern part of Liberty Elementary School near the ball fields. Groundwater elevation data and geologic data obtained during site assessments suggest that stratigraphic variations in the overlying Upper Silt Unit may cause local confining conditions in the Gravel Aquifer; therefore, the Gravel Aquifer is considered to be semi-confined. Where the Upper Clay is absent, the Upper Silt Unit directly overlies the Gravel Aquifer and forms a continuous semi-confined aquifer. Locally, the upper portion of the Gravel Aquifer immediately below the Upper Clay has been found to be only partially saturated.

Groundwater flow in the Gravel Aquifer is variable across the Site. The gradient in the central portion of the Site is very flat, and groundwater elevations decrease to the north and south, indicating a flow direction away from the

center portion of the Site with a slight east-southeast trend below Liberty Elementary School. In the southern part of the Site the groundwater gradient is generally to the southwest, and in the northern part of the Site the gradient is toward the northwest or northeast depending on the season. Water levels in wells screened across both the Upper Silt Unit and Gravel Aquifer (MW-1, MW-3, MW-5, MW-6, and MW-14) are consistent with water levels in the Gravel Aquifer. The majority of the seventeen wells installed on site since February 2005, and the four off-site wells installed in September 2006 were constructed such that the screened interval only penetrates the deep Gravel Aquifer and does not intercept the Upper Silt Unit. This was later confirmed based on contaminants of potential concern identified in the earlier sampling events of the site's original wells.

3.1.4 Lower Silt/Clay Unit

The Lower Silt/Clay Unit includes two stratigraphic units (Siltstone and Blue Clay) that underlie the Gravel Aquifer. In general, the Blue Clay underlies the Siltstone Unit; however, in portions of the Site, the Siltstone Unit is not present, and the Gravel Aquifer directly overlies the Blue Clay. The Lower Silt/Clay Unit is an aquitard that restricts the vertical movement of water. The surface of the Lower Silt/Clay Unit in the southwestern portion of the Site dips steeply to the southwest. The surface of the Lower Silt/Clay Unit in the eastern portion of the Site and at Liberty Elementary School dips to the east/northeast. In the northwest part of the Site the Lower Silt Clay dips to the northwest.

3.2 March 2021 Groundwater Elevations and Flow Direction

Groundwater levels were measured in the thirty-five existing wells and piezometers in March 2021. Groundwater depths ranged from 1.09 feet bgs at MW-7 to 18.46 feet bgs at MW-1. Groundwater elevations ranged from 207.36 feet above mean sea level (amsl) at MW-6 to 223.43 feet amsl at MW-10. Event 42 and historical groundwater elevation data are provided in Table 3. Note that all groundwater elevations are referenced to National Geodetic Vertical Datum (NGVD), 1947.

The wet winters and dry summers result in seasonal variability in groundwater elevations at the Site. The groundwater elevations reflect the low precipitation during the dry season (between July and September) as compared to much higher amounts during the wet season (between November and May).

The average March 2021 groundwater elevation (212.58 feet) was 4.89 feet higher than the average elevation during the previous dry season (August 2019, 207.69 feet) and 0.98 feet higher than the previous wet season (March 2020, 211.60).

Figures 3 and 4 show the groundwater elevation contours for the Perched Aquifer and Gravel Aquifer, respectively, for the March 2021 groundwater level measurements. Groundwater elevations from wells screened in the Gravel Aquifer were used to construct a potentiometric map of the Gravel Aquifer. Selected wells screened across both the Upper Silt and Gravel Aquifer zones are included in groundwater contouring because screens in these wells penetrate well into the Gravel Aquifer and appear to be representative of the Gravel Aquifer. These wells are generally located at the perimeter of the site.

Groundwater elevations from wells in the Perched Aquifer (Figure 3) measured during the March 2021 event show a flow to the north in the northern portion of the site (from MW-10 to MW-11), and to the south/southwest and to the east away from a potentiometric high near MW-9. The gradient during March 2021 was 4.47 E-03 (between MW-10 to MW-11) in the northern part of the site, and between 1.37 E-02 (between MW-10 to MW-8) and 5.71 E-03 (between MW-10 to MW-4) in the southern part of the site.

In the Gravel Aquifer, groundwater elevation data shows a potentiometric high near monitoring well MW-25 from which flow is radially away in all directions (Figure 4). The gradient in the gravel aquifer is relatively flat across the site and under the Liberty Elementary School property; -2.18 E-04 (between MW-23 and MW-24); and 2.01 E-03 (between MW-25 and MW-23). The gradient steepens to the south; 8.87 E-03 (between MW-16 and MW-6) and 5.44 E-03 (between MW-16 and MW-31). Table 4 shows hydraulic gradient calculations.

4.0 Groundwater Quality Assessment

This section summarizes the results of the chemical analyses performed on groundwater samples collected during the March 2021 sampling event. Groundwater samples from thirty-one monitoring wells were analyzed for VOCs and fourteen wells for metals. Table 5 summarizes the March 2021 groundwater analytical results for detected constituents including the minimum applicable screening criteria, the frequency of detection, the frequency of detections exceeding screening criteria, the minimum and maximum concentrations, and the location of the maximum concentration. Table 6 lists groundwater analytical results for any detected volatile organic chemicals. Appendix B includes the Test America Laboratories Analytical Reports and Appendix C summarizes all reported groundwater lab data of volatile organics.

Table 7 lists federal and state groundwater quality standards and criteria for VOCs and metals. The table includes Oregon Groundwater MMLs as defined in Oregon Administrative Rule 340-040-0020 (Groundwater Quality Protection). The MMLs are the maximum allowable concentrations of the chemicals in groundwater established by the State of Oregon. The Oregon Department of Environmental Quality (DEQ) uses the MMLs in the process of designating groundwater management areas in Oregon where necessary to preserve groundwater quality. MMLs are not *de facto* cleanup levels but are generally consistent with the EPA Primary MCLs. The MCLs are the levels established by the EPA that cannot be exceeded by a public water supply system. Oregon and EPA have also established risk-based criteria for screening purposes. The Oregon Hotspot values are screening values that are a combination of promulgated criteria and guidance values used by the state to prioritize groundwater cleanups. The EPA RSL values were calculated using the latest toxicity values, default exposure assumptions, and physical and chemical properties. The EPA RSL values incorporate the EPA Region III RBC Table, Region VI human health medium-specific screening levels table, and the Region IX Preliminary Remediation Goal (PRG) Table, and was last updated in November 2017. The Oregon DEQ RBC values are similar to the EPA RSLs but use Oregon-specific parameters to calculate risk. Oregon DEQ Petroleum RBCs were updated November 2015. Minimum criteria values used in this report reflect up to date EPA RSLs and Oregon DEQ RBCs.

The March 2021 groundwater data are compared to the lowest screening criteria for each analyte and are discussed in the following sections. Any result annotated with a “U” qualifier (in either the tables or appendices) or reported “ND” in the lab report signifies that the chemical was not detected above the method detection limit. Any result annotated with a “J” qualifier is an estimate, since the value is below the method reporting limit but above the method detection limit.

Laboratory method detection limits for VOCs and metals may be greater than the minimum applicable screening criteria. Therefore, while these compounds were not detected above the method detection limits, they may still be present above screening criteria.

4.1 Volatile Organic Compounds

Six VOCs - carbon tetrachloride, chloroform, chloromethane, cis-1,2-DCE, PCE, and TCE - were detected during the March 2021 sampling event. The current and historical concentrations of five common VOCs (carbon tetrachloride, chloroform, cis-1,2-DCE, PCE, and TCE) are presented graphically in Figure 6.

Carbon Tetrachloride. Carbon tetrachloride was detected in seven of the thirty-one wells sampled during the March 2021 sampling event at concentrations ranging from 1.40 J µg/L at MW-23 to 2,200 µg/L at MW-20. Seven of the detections of carbon tetrachloride exceeded the minimum groundwater criteria, which is the Oregon DEQ RBC of 0.41 µg/L. In addition, seven of the detections exceed the EPA RSL of 0.43 µg/L. Six of the detections exceed the EPA Primary Drinking Water Standard, the Oregon Hot Spot Value and the Oregon Groundwater MMLs of 5 µg/L. Carbon tetrachloride is an industrial solvent that was historically used in degreasing and other industrial applications.

Chloroform. Chloroform was detected in eleven of the thirty-one wells sampled during the March 2021 sampling event at concentrations ranging from 0.28 J µg/L at MW-17 to 190 µg/L at MW-20. All the detections of chloroform exceeded the minimum groundwater criteria for the site which is the Oregon DEQ RBC of 0.19 µg/L. In addition, all of the concentrations exceeded the EPA RSL of 0.22 µg/L, one of the detections exceeded the EPA Primary Drinking Water Standard and the Oregon Hot Spot Value of 80 µg/L and the Oregon Groundwater MMLs of 100 µg/L.

Chloroform is formed as a byproduct when chlorine is added to the water supply system and is also a breakdown product of the anaerobic degradation of carbon tetrachloride.

Cis-1,2-Dichloroethene (cis-1,2-DCE). Cis-1,2-DCE was detected in three of the thirty-one wells sampled during the March 2021 sampling event at concentrations ranging from 0.71 J µg/L at MW-20 to 3.4 µg/L at MW-30. None of the detections exceed the minimum screening criteria, which is the EPA RSL of 3.6 µg/L. Cis-1,2-DCE is an anaerobic breakdown product of TCE.

Chloromethane. Chloromethane was detected in one of the thirty-one wells sampled during the March 2021 sampling event at a concentration of 0.36 J µg/L at MW-24. The detection did not exceed the minimum screening criteria, which is the EPA RSL of 19 µg/L. Chloromethane is a critical reagent in industrial chemistry, although it is rarely in consumer products.

Tetrachloroethene (PCE). PCE was detected in four of the thirty-one wells sampled during the March 2021 sampling event at concentrations ranging from 0.61 J µg/L at MW-24 to 16 µg/L at MW-18. Two of the detections exceeded the minimum groundwater criteria, which is the EPA RSL of 4.1 µg/L. In addition, two of the concentrations exceed the EPA Primary Drinking Water Standard and Oregon Hot Spot Value of 5 µg/L.

Trichloroethene (TCE). TCE was detected in ten of the thirty-one wells sampled during the March 2021 sampling event at concentrations ranging from 0.87 J µg/L at MW-23 to 240 µg/L at MW-20. All of the TCE detections exceeded the minimum groundwater criteria, which is the EPA RSL of 0.28 µg/L. In addition, all of the detections exceed the Oregon DEQ RBC of 0.43 µg/L and six of the detections exceed the Oregon MML, the Oregon Hot Spot Value and EPA Primary Drinking Water Standard of 5 µg/L. TCE is an industrial solvent used in degreasing and other industrial applications.

4.2 Metals

Twenty metals — aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, vanadium, and zinc were detected during the March 2021 sampling event.

Aluminum. Aluminum was detected in 10 of the 14 wells sampled during the March 2021 sampling event. All detections exceeded the EPA Secondary Drinking Water Standard of 0.05 mg/L. The highest detection was at a concentration of 5.7 mg/L at MW-24.

Antimony. Antimony was detected in 11 of the 14 wells sampled during the March 2021 sampling event. The highest was detected at a concentration of 0.00034 mg/L at MW-24. None of the detections exceeded the minimum groundwater criteria, which is the EPA RSL of 0.001 mg/L.

Arsenic. Arsenic was detected in all 14 wells sampled during the March 2021 event, at concentrations ranging from 0.00057 J mg/L at MW-3 to 0.024 mg/L at MW-16. All detections exceed the minimum groundwater criteria, which is the Oregon DEQ RBC of 0.000038 mg/L. In addition, the detected concentrations exceed the EPA RSL of 0.000052 mg/L and one detected concentration exceeds the EPA Primary Drinking Water Standard and Oregon Hot Spot Value of 0.010 mg/L.

Barium. Barium was detected in all 14 wells sampled during the March 2021 sampling event at concentrations ranging from 0.0046 mg/L at MW-23 to 0.038 mg/L at MW-4. None of the detected concentrations exceed the minimum screening criteria, which is the EPA RSL of 0.38 mg/L.

Beryllium. Beryllium was detected in 3 of the 14 wells sampled during the March 2021 sampling event. The highest concentration was 0.00035 J mg/L at MW-24. None of the detections exceed the minimum screening criteria, which is the EPA RSL of 0.003 mg/L.

Cadmium. Cadmium was detected in 4 of 14 wells sampled during the March 2021 event. The highest concentration was 0.0001 mg/L at MW-20. None of the detections exceed the minimum screening criteria, which is the EPA RSL of 0.0009 mg/L.

Calcium. Calcium was detected in all 14 wells sampled during the March 2021 sampling event at concentrations ranging from 9.1 mg/L at MW-6 to 37 mg/L at MW-4 and MW-20. Screening criteria does not exist for calcium.

Chromium. Chromium was detected in all 14 wells sampled during the March 2021 sampling event at a concentration of 0.00040 J mg/L at MW-22 to 0.0074 mg/L at MW-24. The detected concentrations exceed the minimum groundwater criteria, which is the EPA RSL of 0.000035 mg/L.

Cobalt. Cobalt was detected in all 14 wells sampled during the March 2021 sampling event at concentrations ranging from 0.000081 J mg/L at MW-4 to 0.01 mg/L at MW-24. Eight of these detections exceed the minimum groundwater criteria, which is the EPA RSL of 0.0006 mg/L.

Copper. Copper was detected in 10 of the 14 wells sampled during the March 2021 sampling event. concentrations ranged from 0.00070 J mg/L at MW-4 to 0.011 J mg/L at MW-24. None of the detections exceed the minimum groundwater criteria, which is the EPA RSL of 0.08 mg/L.

Iron. Iron was detected in 13 of the 14 wells sampled during the March 2021 sampling event at concentrations ranging from0.068 J mg/L at MW--13 to 15 mg/L at MW-24. Seven of the detected concentrations exceed the minimum groundwater criteria, which is the Oregon MML, the Oregon Hot Spot Value and the EPA Secondary Drinking Water Standard of 0.3 mg/L. In addition, 4 of the detections exceeds the EPA RSL of 1.4 mg/L.

Lead. Lead was detected in 12 of the 14 wells sampled during the March 2021 sampling event ranging from 0.000043 J mg/L at MW-20 to 0.0028 mg/L at MW-24. None of the detections exceeded the minimum groundwater criteria of 0.015 mg/L, the EPA Primary Drinking Water MCL.

Magnesium. Magnesium was detected in all 14 wells sampled during the March 2021 sampling event at concentrations ranging from 4.7 mg/L at MW-6 to 19 mg/L at MW-4. Screening criteria does not exist for magnesium.

Manganese. Manganese was detected in all of the 14 wells sampled during the March 2021 sampling event at concentrations ranging from 0.0066 mg/L at MW-23 to 0.70 mg/L at MW-20. Eleven of the detected concentrations exceed the minimum groundwater criteria, which is the EPA RSL of 0.043 mg/L. In addition, 10 of the detections exceed the EPA Secondary Drinking Water Standard, the Oregon Hot Spot Value and Oregon MML of 0.05 mg/L.

Nickel. Nickel was detected in all of the 14 wells sampled during the March 2021 sampling event at concentrations of 0.00038 J mg/L at MW-23 and 0.056 mg/L at MW-20. Only 1 (MW-20) exceeded the minimum groundwater criteria, which is the EPA RSL of 0.22 mg/L.

Potassium. Potassium was detected in all 14 wells sampled during the March 2021 sampling event at concentrations ranging from 0.36 J mg/L at MW-6 to 1.6 J mg/L at MW-3. Screening criteria does not exist for potassium.

Silver. Silver was detected in 2 of 14 wells sampled during the March 2011 event at concentrations from 0.00003 at MW- 20 to 0.000057 mg/L at MW-18. Neither exceeded the minimum groundwater criteria, which is the EPA RSL of 0.0094 mg/L.

Sodium. Sodium was detected in all 14 wells sampled during the March 2021 sampling event at concentrations ranging from 6.7 mg/L at MW-6 to 26 mg/L at MW-20. Screening criteria does not exist for sodium.

Vanadium. Vanadium was detected in all of the 14 wells sampled during the March 2021 event at concentrations ranging from 0.0022 J mg/L at MW-16 to 0.053 mg/L at MW-24. Six of the detected concentrations exceed the minimum groundwater criteria, which is the EPA RSL of 0.0086 mg/L.

Zinc. Zinc was detected in all of the 14 wells sampled during the March 2021 sampling event ranging from 0.0014 J mg/L at MW-16 to 0.018 mg/L at MW-24. None exceeded the minimum groundwater criteria, which is the EPA RSL of 0.6 mg/L.

4.3 Water Quality Parameters

Table 2 summarizes field parameters recorded at each of the thirty-one wells, including pH, conductivity, turbidity, DO, temperature, and ORP.

In March 2021:

- Temperatures ranged from 11.39 degrees Celsius (°C) at MW-20 to 16.59 °C at MW-18.
- DO was detected in all of the thirty-one wells.
- pH ranged from 6.15 s.u. at MW-11 to 7.59 s.u. at MW-18.
- Conductivity ranged from 0.099 milli Siemens per centimeter (mS/cm) at MW-28 to 0.600 mS/cm at MW-101.
- ORP ranged from -116 millivolts (mV) at MW-30 to 216 mV at MW-8.
- All of the wells sampled had measurable turbidity once readings stabilized. The measurable turbidity ranged from 4.2 nephelometric turbidity units (NTUs) at MW-18, to 20.3 NTUs at MW-11.

4.4 Contaminant Trends

Several important trends in the VOC concentrations were noted at 19 locations: MW-3, MW-4, MW-5, MW-6, MW-14, MW-15, MW-17, MW-18, MW-20, MW-22, MW-23, MW-24, MW-27, MW-29, MW-30, MW-100, MW-101, MW-102 and MW-103. Trend plots (Figure 6) support the discussion below.

- *MW-3.* Concentrations of chloroform, cis-1,2-DCE, and TCE remain non-detected since August 2017.
- *MW*-4. Carbon tetrachloride was last detected in March 2020, the only other detection was in April 2016.
- *MW*-5. Concentrations of chloroform continue to fluctuate with higher concentrations reported during the dry season; 1.9 µg/l was reported for August 2019, below the previous high recorded in August 2017 of 4.8 µg/l. The March 2021 concentration was 0.79 µg/l, slightly lower than the value of 0.89 µg/l in March 2020. Concentrations of carbon tetrachloride were elevated at 15.0 µg/l during the March 2009 sampling event but decreased to non-detect in August 2009.
- *MW*-6. Concentrations of cis-1,2-DCE continue to fluctuate, with higher concentrations reported during the dry season. Cis-1,2-DCE was non-detect in March 2021. Carbon tetrachloride, chloroform, TCE, and PCE continued to be non-detect during the March 2021 sampling event.
- *MW-14.* Concentrations of chloroform continue to fluctuate with higher concentrations reported during the wet season, but with an overall downward trend since the most recent high of 12 µg/l in April 2016. The chloroform concentration was 1.5 µg/l in March 2021, slightly lower than 2.0 µg/l in March 2020. The carbon tetrachloride concentration was non-detected in March 2021 and was 0.40 J µg/l in March 2020. Concentrations of cis-1,2-DCE, TCE, and PCE remain non-detected during the March 2020 sampling event.
- *MW-15.* Concentrations of TCE continued to decrease after an all-time high of 3,100 µg/l in March 2019. The TCE concentration was 70 µg/l in March 2021, significantly lower than 1,200 µg/l in March 2020. This will continue to be evaluated. Concentrations of chloroform decreased slightly in March 2021 from March 2020. Cis-1,2.-DCE was non-detected in March 2021 after being detected in March 2020. Concentrations of PCE remain non-detected.
- *MW-17.* TCE was reported at a slightly increased level 1.5 µg/l in March 2021 compared with 1.2 µg/l in March 2020. Concentrations of carbon tetrachloride were non-detect like the previous wet season sampling event (March 2020). Chloroform was 0.28 µg/l in March 2021, first detection since August 2017. Both TCE and carbon tetrachloride concentrations have shown a downward trend since August 2014. Concentrations of cis-1,2-DCE and PCE remain non-detected during the March 2021 sampling event.
- *MW-18.* The five primary VOCs (carbon tetrachloride, chloroform, cis-1,2-DCE, TCE, and PCE) show seasonal trends, returning to typical higher concentrations during the wet season. However, the March 2021

results resemble dry season results. Record low concentrations of carbon tetrachloride, TCE, chloroform, and PCE were detected in March 2021.

- *MW-20.* Concentrations of carbon tetrachloride, chloroform, PCE, and TCE fluctuate seasonally and increased in March 2021 as compared to the previous dry season sampling event (August 2019). Concentration of cis-1,2-DCE was detected for the first time March 2019. PCE concentrations reached a record high in March 2021. Carbon tetrachloride concentrations were the same as March 2020, and the highest since the record high in March 2018.
- *MW-22.* Concentrations of carbon tetrachloride and chloroform increased slightly from prior sampling event (March 2020). PCE, cis-1,2-DCE, and TCE decreased slightly from prior sampling event (March 2020).
- *MW-23.* Concentrations of carbon tetrachloride, chloroform, and TCE are consistent with previous events. Cis-1,2-DCE and PCE remain at non-detected concentrations.
- *MW-24.* Concentrations of carbon tetrachloride, chloroform, PCE, and TCE are at record levels since monitoring began in this well in 2007.Cis-1,2-DCE remained at non-detected concentrations.
- *MW*-27. Carbon tetrachloride and chloroform in March 2021 are consistent with past events. Concentrations of cis-1,2-DCE, PCE, and TCE remain at non-detected concentrations.
- *MW-29.* Carbon tetrachloride was detected for the first time in September 2016 but has since returned to non-detect.
- *MW*-30. Concentration of cis-1,2-DCE of 3.4 µg/l in March 2021 was slightly lower than 6.2 g/l in March 2020, and reached a minimum since it was first sampled in 2011. Carbon tetrachloride, chloroform, PCE, and TCE remain non-detected.
- *MW-100.* Concentrations of TCE continue to fluctuate seasonally, with concentrations consistent with the previous wet season sampling event. Concentrations of carbon tetrachloride, chloroform, cis-1,2-DCE, and PCE remain non-detected.
- *MW*-101. TCE was detected at 0.94 J µg/L for March 2021, slightly lower than the six previous sampling events. Concentrations of carbon tetrachloride, chloroform, cis-1,2-DCE, and PCE remain non-detected.
- *MW-102*. Concentrations of TCE of 10 µg/l in March 2021 was lower than 26 µg/l in March 2020 and matches the lowest historic concentration of August 2019. Carbon tetrachloride, cis-1,2-DCE , chloroform, and PCE were non-detected.
- *MW*-103. Carbon tetrachloride was non-detected in March 2021, after being detected for the first time in March 2020. Chloroform, cis-1,2-DCE, PCE, and TCE remain non-detect.

Results from Event 42 groundwater sampling were used to evaluate the extent and stability of the primary constituents of concern. Primary constituents of concern are VOCs, including carbon tetrachloride, chloroform, TCE, cis-1,2-DCE and PCE. Concentration data are presented in isopleth maps for carbon tetrachloride, chloroform, TCE, and PCE in the Gravel Aquifer (Figure 7 through Figure 10). The concentrations of carbon tetrachloride in the perched aquifer is presented in Figure 11 for this sampling event. The concentrations of cis 1,2-DCE in the gravel aquifer is presented in Figure 12.

Contour maps of chemical concentrations were contoured by hand, scanned, and digitized into ArcGIS. A discussion of the maps is presented below.

Carbon Tetrachloride. Carbon tetrachloride was detected in six of the twenty-one wells in the Gravel Aquifer and one of the nine wells sampled in the Perched Aquifer. Figure 7 shows the distribution of carbon tetrachloride in the Gravel Aquifer. The pattern of contamination depicts a carbon tetrachloride plume extending off-site to the northwest.

The highest detected carbon tetrachloride concentration (2,200 µg/L) was in well MW-20, located north of the suspected primary source area near MW-18. The concentrations at MW-20 are typically the location of the highest concentrations in the wet seasons and, as shown by concentration trends in Figure 6, these concentrations have been steadily increasing. Concentrations in MW-24 at the northern property boundary have been steadily increasing, while concentrations at MW-20 have been increasing steadily since approximately March 2006. These trends continued in March 2021. The concentrations at MW-18 fluctuate seasonally, but have been steadily decreasing since 2006. The value of 170 µg/L is an historic low value.

Well MW-103, downgradient of the eastern limit of carbon tetrachloride contamination, never had a detectable concentration until March 2020, but was not detected in March 2021. To the southwest, MW-22 had a concentration

of 17 µg/L during Event 42. This well shows an overall decreasing trend in carbon tetrachloride concentrations The data indicate that the extent of contamination may have migrated offsite to the southwest.

As shown in Figure 11, The only detection of carbon tetrachloride in the Perched aquifer was in MW-27 at 73 µg/L. This is consistent with recent values, although it is part of an overall decreasing trend since 2011.

Chloroform. Chloroform is an early breakdown product of carbon tetrachloride in the reductive dechlorination and denitrification biological breakdown processes. Chloroform was detected in ten of the twenty-two wells in the Gravel Aquifer and one of the wells in the Perched Aquifer. The extent of chloroform in the Gravel Aquifer (Figure 8) follows the same general trend as carbon tetrachloride, but at much lower concentrations. The highest chloroform concentration is at MW-20 (190 µg/L). Concentrations at MW-20 have shown a general increase in concentrations over time. At MW-18, which is located near the primary source area, chloroform concentrations have decreased considerably since August 2019. Trends in chloroform concentration (Figure 6) show that it tracks closely with carbon tetrachloride. Chloroform concentrations in the east-central part of the Site, specifically MW-14, have fluctuated greatly since March 2009, but show a decreasing trend since 2017. Concentrations to the north of the release area, specifically MW-24 show a consistent increase in concentrations over time. Concentrations to the southwest (MW-22), have shown a decrease in concentrations over time. Delineation of concentrations is not complete further to the southwest beyond MW-22.

Trichloroethene. Figure 9 shows contours of TCE concentrations in the Gravel Aquifer. TCE was detected in ten of the twenty-two wells in the Gravel Aquifer and no wells in the Perched Aquifer. Concentrations of TCE are highest in MW-20 at 240 µg/L. This is consistent with results since approximately 2012. Concentrations have been typically highest in MW-18 and MW-15. Concentrations in MW-15 spiked during March 2019 at 3100 µg/L, but have markedly decreased to a new historic low of 70 µg/L in March 2021. . Concentrations in MW-18 continue to fluctuate with higher concentrations reported during the wet season, but reached a new historic low of 44 µg/L. TCE concentrations continue to increase in the northern part of the site at MW-24 over time and reached a new maximum of 82 µg/L. Concentrations are consistently decreasing in the southwest part of the site at MW-22. TCE concentrations in MW-100, MW-101 and MW-102, in the eastern area of contamination, have consistently been above detection limits, but concentrations are low, decreasing, and currently not detected in MW-103. Concentrations at MW-102 are generally decreasing since approximately2006.

Tetrachloroethene. PCE concentration contours are shown on Figure 10. During Event 42, PCE was detected in four of the twenty-two wells in the Gravel Aquifer and none in the Perched Aquifer. The highest concentration (16 µg/L) was at MW-18, which is an historic low. It appears likely that PCE sources near MW-18 are being transported offsite to the northwest near MW-20 along with other VOCs. PCE reached an historic high concentration of 14 µg/L in MW-20.

PCE concentrations to the southwest, at MW-22, are generally stable and consistent with previous sampling events. Concentrations to the northwest at MW-20 have fluctuated seasonally since 2010, and reached an historic high of 14 µg/L in March 2021. Concentrations along the northern site boundary by MW-24 have fluctuated greatly since 2012 and are reported at their highest concentration since sampling began, whereas concentrations at MW-23 have remained non-detect since August 2012. PCE has not been detected at the eastern perimeter of the Site, nor has PCE been detected in the monitoring wells east of the Site.

Cis 1,2-DCE. Cis 1,2-DCE concentration contours in the Gravel Aquifer are shown on Figure 12. During Event 42, cis 1,2-DCE was detected in three of the twenty-two wells in the Gravel Aquifer. The highest concentration (3.4 µg/L) was at MW-30, which is approximately one-half of previous events. Unusually, cis 1,2-DCE was not detected in either source area well, MW-15 or MW-18. The MW-22 concentration was consistent with previous sampling events. MW-20 (0.71 µg/L) has had periodic low but increasing cis 1,2-DCE detections.

5.0 Summary

This section summarizes WE2's observations on the results of the 42nd periodic sampling event conducted in March 2021.

5.1 Groundwater Flow

- Groundwater levels were measured in thirty-five of the thirty-five existing wells and piezometers in March 2021. Groundwater depths ranged from 1.09 feet bgs at MW-7 to 18.46 feet bgs at MW-1. Groundwater elevations ranged from 207.36 feet above mean sea level (amsl) at MW-6 to 223.43 feet amsl at MW-10.
- The average March 2021 groundwater elevation (212.58 feet) was 4.89 feet higher than the average elevation during the previous dry season (August 2019, 207.69 feet) and 0.98 feet higher than the previous wet season (March 2020, 211.60).
- Groundwater elevations from wells in the Perched Aquifer (Figure 3) measured during the March 2021 event show a flow to the north in the northern portion of the site (from MW-10 to MW-11), and to the south/southwest and to the east away from a potentiometric high near MW-9.
- In the Gravel Aquifer, groundwater elevation data shows a potentiometric high near monitoring well MW-25 from which flow is radially away in all directions (Figure 4).

5.2 Groundwater Quality

- Carbon tetrachloride, chloroform, chloromethane, cis-1,2-DCE, PCE, and TCE - were detected during the March 2021 sampling event,
- Detections of carbon tetrachloride (7), chloroform (11), PCE (2), and TCE (10) in groundwater exceeded minimum screening criteria.

5.3 Contaminant Trends

There are detections of VOCs at concentrations greater than screening criteria near the site boundary and notable increases in VOC concentrations in some wells. In particular, VOC concentrations have increased substantially in the Gravel Aquifer in the northwest corner of the site.

- Carbon tetrachloride concentrations continue to climb in wells MW-20 and MW-24 at the northwest and north boundaries of the Site. A new historic high of 180 µg/l was detected in MW-24 and a high but stable value of 2,200 µg/l in MW-20. Chloroform concentrations in these wells mirror those of carbon tetrachloride and indicate some natural biological dechlorination. TCE trends in both wells are similar, with well MW-20 showing strong seasonal variations.

Concentrations in several wells are stable or decreasing.

- In well MW-22, located at the edge of the Site southwest of the Building 17 leach field source area, concentrations of chloroform and carbon tetrachloride have stabilized since approximately August 2016 after declining sharply from high values in 2007, when sampling began. Concentrations of TCE and PCE continue to decrease.
- MW-15 TCE concentrations have sharply decreased from a record high spike of 3,100 µg/l in March 2019 to a record low of 70 µg/l in March 2021. The reason for these departures from a long-term decrease since 2004 in the 1992 drum spill source area are unknown and will continue to be evaluated. Concentrations of carbon tetrachloride and chloroform have steadily decreased since 2006.
- MW-18 is located near the solvent disposal sump source area and has historically been the well with the highest contaminant concentrations on the Site. Carbon tetrachloride, chloroform, TCE, and PCE have been

declining and strongly seasonal in MW-18 since it was first sampled in 2006. The March 2021 concentrations were record lows for all of these contaminants in this well.

- In wells to the east of the 1992 drum spill source area near MW-15, TCE concentrations at wells MW-17, MW-100, MW-102 are low and stable after declines since 2007.

6.0 References

Oregon Department of Environmental Quality, *Numerical Groundwater Quality Reference Levels, Interim Standards for Maximum Measurable Levels of Contaminants in Groundwater, and Permanent Standards for Maximum Measurable Levels of Contaminants in Groundwater*, as delineated by Oregon Administrative Rules 340-40-020 and 090: November 14, 1997.

Oregon Department of Environmental Quality, *Pre-Calculated Hot Spot Look-Up Tables*, as delineated by Oregon Administrative Rules 340-122-010 through 115: October 20, 1998. Tables updated June 7, 2012. Latest version can be found at http://www.deq.state.or.us/lq/pubs/docs/RBDMHotSpotTable.pdf

Oregon Department of Environmental Quality, *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*, as delineated by Oregon Administrative Rules 340-122-0205 through 0360: Electronic spreadsheets updated June 7, 2012. Latest version available at http://www.deq.state.or.us/lq/rbdm.htm

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USSE2, *Groundwater Monitoring Plan for the National Energy Technology Laboratory-Albany, Revision 14, Albany, Oregon.* January 2020.

USSE2, *Technical Memorandum: Conceptual Site Model Report for the National Energy Technology Laboratory (Formerly Albany Research Center), U.S. Department of Energy- Albany, Oregon.* July 2019.

USSE2, *National Energy Technology Laboratory, Albany Groundwater Sampling Event 42 Work Plan Memo. July 2020*.

Tables

Table 1
Monitoring Well Construction

Groundwater Sampling Event 42
Albany NETL, Albany, OR

Well Number	Total Depth	Screen Depth	Blank Casing	Filter Pack Depth
MW-1	30	15-30	0-15	12.1-30
MW-3	24	9-24	0-9	7-24
MW-4	20	10-20	0-10	8-20
MW-5	30	14.5-29.5	0-14.5	11-30
MW-6	30	14-29	0-14	12-30
MW-7	20	10-20	0-10	7-20
MW-8	20	10-20	0-10	7-20
MW-9	25	10-25	0-10	7.2-25
MW-10	25	10-25	0-10	6.5-25
MW-11	20	9.5-19.5	0-9.5	6.5-20
MW-13	25	10-25	0-10	7.3-25
MW-14	28	8-28	0-8	6.7-28
MW-15	35	25-35	0-25	23.1-36
MW-16	33	23-33	0-23	20.8-35.5
MW-17	30	20-30	0-20	18.1-38
MW-18	32	22-32	0-22	20-33
MW-19	31.5	21.5-31.5	0-21.5	19.5-32
MW-20	35	25-35	0-25	23-36
MW-21	31	20-30	0-20	18-31
MW-22	53	40-50	0-40	38-50.5
MW-23	41	27-37	0-27	25-37.5
MW-24	46	35.5-43.5	0-33.5	31.5-44
MW-25	36	19-29	0-19	17-29.5
MW-26	30	20-30	0-20	18-30
MW-27	15	10-15	0-10	8-15
MW-28	14	9-14	0-9	7-14
MW-29	29	24-29	0-24	22-29
MW-30	38	28-38	0-28	26-38
MW-31	38	28-38	0-28	26-38
MW-100	27	17-27	0-17	14.5-27.5
MW-101	27	17-27	0-17	17-30
MW-102	37	27-37	0-27	24.5-37.5
MW-103	45	35-45	0-35	34.5-47.5
PZ-1A	13	13-18	0-13	12-18.2
PZ-1B	26	21-26	0-21	20-26.2

Notes:

All measurements in feet below ground surface

All wells are completed with flush mount monuments

Table 2
Groundwater Depth, Elevation, and Water Quality Measurements

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Well Number	Sample Date	Measuring Point Elevation	Depth to Water (ft)	Groundwater Elevation (ft AMSL)	Water Quality Measurements					
					pH	Specific Conductivity (mS/cm)	Turbidity (NTUs)	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)
MW-1	3/05/21	228.10	18.46	209.64	-	-	-	-	-	-
MW-3	3/02/21	219.61	8.02	211.59	7.14	0.243	15.4	3.57	143	15.85
MW-4	3/03/21	218.28	1.74	216.54	6.96	0.387	5.9	0.97	122	12.73
MW-5	3/04/21	217.08	9.46	207.62	6.88	0.377	6.0	2.12	36	13.11
MW-6	3/04/21	219.48	12.12	207.36	6.78	0.163	8.8	2.85	120	12.30
MW-7	3/04/21	216.85	1.09	215.76	7.11	0.288	5.3	3.44	112	13.10
MW-8	3/03/21	220.23	6.98	213.25	7.24	0.178	9.1	1.91	216	14.43
MW-9	3/04/21	224.00	1.68	222.32	6.72	0.150	6.1	2.39	201	12.29
MW-10	3/05/21	225.41	1.98	223.43	6.79	0.303	6.5	1.07	178	12.12
MW-11	3/05/21	227.73	6.54	221.19	6.15	0.144	20.3	1.32	133	12.58
MW-13	3/03/21	223.31	9.32	213.99	7.01	0.215	10.6	2.09	165	12.85
MW-14	3/04/21	224.77	12.71	212.06	6.97	0.199	9.1	3.64	133	12.41
MW-15	3/02/21	222.96	11.38	211.58	7.02	0.292	8.8	2.51	173	15.06
MW-16	3/04/21	217.57	6.10	211.47	7.44	0.377	6.1	2.80	110	13.08
MW-17	3/03/21	218.84	7.34	211.50	7.20	0.270	4.3	2.48	191	13.66
MW-18	3/02/21	224.00	12.42	211.58	7.59	0.358	4.2	4.41	166	16.59
MW-19	3/04/21	224.20	13.06	211.14	6.76	0.175	11.1	1.48	189	14.32
MW-20	3/05/21	225.62	15.24	210.38	7.20	0.387	5.5	1.60	148	11.39
MW-21	3/03/21	216.60	5.42	211.18	-	-	-	-	-	-
MW-22	3/03/21	216.57	5.38	211.19	7.41	0.312	5.8	0.82	166	12.84
MW-23	3/05/21	227.87	18.23	209.64	7.58	0.298	7.2	6.53	191	13.31
MW-24	3/05/21	227.49	17.78	209.71	7.13	0.333	7.0	2.33	-20	12.07
MW-25	3/03/21	220.38	8.08	212.30	7.14	0.192	7.6	5.98	184	15.08
MW-26	3/04/21	220.63	8.91	211.72	7.17	0.175	6.1	2.64	113	12.38
MW-27	3/02/21	222.80	8.31	214.49	7.43	0.262	6.2	6.32	171	13.45
MW-28	3/02/21	223.52	3.66	219.86	6.58	0.099	8.7	5.38	181	13.75
MW-29	3/03/21	217.93	6.69	211.24	7.29	0.536	14.6	0.86	142	11.70
MW-30	3/04/21	219.26	11.07	208.19	7.50	0.325	5.9	0.48	-116	12.59
MW-31	3/04/21	216.78	8.91	207.87	7.53	0.357	5.2	0.92	-93	12.87
MW-100	3/03/21	218.37	6.86	211.51	7.15	0.426	5.9	0.86	101	13.15
MW-101	3/03/21	218.54	7.06	211.48	7.21	0.600	6.7	1.31	81	13.19
MW-102	3/03/21	217.64	6.06	211.58	7.50	0.421	6.1	1.10	78	13.08
MW-103	3/03/21	216.51	-	-	7.39	0.324	6.8	3.31	101	13.08
PZ-1A	3/02/21	220.10	8.48	211.62	-	-	-	-	-	-
PZ-1B	3/02/21	220.05	8.36	211.69	-	-	-	-	-	-

Notes:
ft = feet
AMSL = Above Mean Sea Level
- = Not sampled
mS/cm = MilliSiemens per centimeter
NTUs = Nephelometric Turbidity Units
mg/L = Milligrams per liter
ORP = Oxidation-Reduction Potential
°C = Degrees Celsius
mV = Millivolts

Table 3
Current and Historical Groundwater Elevations

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Well Number	Measuring Point Elevation	Depth to Water (ft)	Groundwater Elevation (ft AMSL)																
		3/2/2021		3/2/2020	8/26/2019	3/25/2019	8/20/2018	3/19/2018	9/1/2017	4/10/2017	9/16/2016	4/3/2016	8/20/2015	3/19/2015	8/21/2014	2/15/2014	8/19/2013	3/25/2013	8/13/2012
MW-1	228.10	18.46	209.64	208.82	207.36	208.90	207.20	209.64	207.38	210.45	207.18	209.98	207.37	209.05	207.70	208.02	207.34	208.62	207.88
MW-3	219.61	8.02	211.59	210.50	207.96	210.44	207.01	211.59	206.98	211.56	207.44	211.03	207.76	210.24	208.27	209.78	207.77	210.16	208.38
MW-4	218.28	1.74	216.54	216.25	210.84	215.55	210.10	216.54	210.63	216.46	209.85	215.86	210.28	216.57	212.27	216.55	210.78	216.00	212.73
MW-5	217.08	9.46	207.62	206.53	201.28	206.63	201.26	207.62	200.71	207.75	200.41	206.59	200.08	205.95	200.93	207.27	200.88	206.53	202.23
MW-6	219.48	12.12	207.36	205.89	200.18	205.97	200.03	207.36	199.93	207.05	199.48	205.96	199.40	205.64	200.17	206.37	200.13	205.93	200.93
MW-7	216.85	1.09	215.76	215.40	208.10	214.85	207.75	215.76	208.02	215.68	206.90	215.61	206.39	215.25	209.84	215.41	208.50	215.05	210.95
MW-8	220.23	6.98	213.25	212.51	208.71	212.45	207.25	213.25	207.98	213.73	207.61	213.34	207.78	213.13	209.28	213.01	208.25	212.81	209.75
MW-9	224.00	1.68	222.32	221.63	211.98	221.53	210.78	222.32	213.00	222.45	209.63	221.88	210.39	222.19	211.92	224.00	212.73	221.58	212.47
MW-10	225.41	1.98	223.43	223.21	213.57	222.68	213.60	223.43	214.15	223.56	212.28	223.18	213.76	223.71	215.79	224.91	214.95	223.09	217.36
MW-11	227.73	6.54	221.19	220.19	213.08	220.63	212.58	221.19	213.42	221.30	212.42	220.57	212.82	221.13	214.43	222.86	214.08	220.62	215.99
MW-13	223.31	9.32	213.99	213.03	209.66	212.90	207.96	213.99	208.01	214.51	208.58	214.19	209.26	213.23	209.65	210.99	209.44	213.23	210.19
MW-14	224.77	12.71	212.06	210.00	207.92	209.99	207.44	212.06	207.52	211.52	207.54	211.14	207.90	209.89	208.26	Repeat	207.77	209.61	208.42
MW-15	222.96	11.38	211.58	210.63	207.94	210.37	206.24	211.58	206.51	211.65	207.41	211.08	207.71	210.53	208.31	210.01	207.93	210.41	208.58
MW-16	217.57	6.10	211.47	211.07	205.41	210.81	205.17	211.47	205.12	211.82	204.87	211.37	204.21	211.12	205.89	211.33	205.34	210.99	206.47
MW-17	218.84	7.34	211.50	210.57	207.91	210.49	206.42	211.50	206.74	211.66	207.41	211.39	207.64	213.46	208.28	210.10	207.76	210.34	208.48
MW-18	224.00	12.42	211.58	210.51	207.88	210.28	206.42	211.58	206.51	211.77	207.25	211.11	207.70	210.33	208.30	209.65	207.77	210.30	208.51
MW-19	224.20	13.06	211.14	210.30	207.53	210.20	206.22	211.14	206.65	212.00	206.93	210.63	207.18	210.30	208.09	209.96	207.87	210.00	208.23
MW-20	225.62	15.24	210.38	209.54	207.34	209.57	206.75	210.38	207.09	211.21	206.94	210.52	207.20	209.64	207.69	208.67	207.21	209.31	207.83
MW-21	216.60	5.42	211.18	210.53	204.78	210.45	204.43	211.18	204.26	211.25	203.82	210.60	203.67	210.35	204.69	210.46	204.41	210.15	205.51
MW-22	216.57	5.38	211.19	210.12	204.50	210.17	204.25	211.19	204.02	210.98	203.50	210.31	203.31	210.08	204.65	210.37	204.09	209.92	205.15
MW-23	227.87	18.23	209.64	208.87	207.32	208.87	207.17	209.64	207.37	210.45	207.19	209.98	207.39	209.01	207.71	208.02	207.34	208.61	207.90
MW-24	227.49	17.78	209.71	208.94	207.29	208.89	207.13	209.71	207.34	210.70	207.17	209.87	207.28	209.21	207.54	208.28	207.22	208.79	207.83
MW-25	220.38	8.08	212.30	210.98	207.50	210.68	206.05	212.30	206.48	212.28	206.53	211.44	206.86	211.41	207.86	211.43	207.16	211.40	208.40
MW-26	220.63	8.91	211.72	209.08	208.09	209.16	207.58	211.72	207.51	210.85	206.88	210.46	207.73	209.72	208.36	208.60	207.63	209.47	208.26
MW-27	222.80	8.31	214.49	213.62	209.95	213.78	208.57	214.49	209.02	214.55	208.48	214.05	208.94	213.75	210.35	214.17	208.85	213.67	211.62
MW-28	223.52	3.66	219.86	219.47	218.06	219.45	217.40	219.86	217.55	220.32	216.91	219.92	217.37	220.82	218.06	222.92	212.92	220.00	217.72
MW-29	217.93	6.69	211.24	210.43	207.60	210.31	206.03	211.24	205.38	211.63	206.93	210.98	207.75	210.91	208.46	209.95	207.74	210.35	208.49
MW-30	219.26	11.07	208.19	206.84	201.48	206.75	202.16	208.19	201.68	207.76	200.55	206.88	200.34	206.29	201.19	206.95	201.07	206.42	202.22
MW-31	216.78	8.91	207.87	206.76	201.09	206.78	201.34	207.87	200.66	207.80	200.51	206.81	200.42	206.38	201.24	206.97	201.31	206.83	202.47
MW-100	218.37	6.86	211.51	210.62	207.82	210.49	206.47	211.51	207.02	211.69	207.06	210.95	207.62	210.51	208.13	210.56	207.67	210.28	208.39
MW-101	218.54	7.06	211.48	210.64	207.72	210.46	206.14	211.48	206.84	211.72	206.58	210.92	207.53	210.54	208.07	210.67	207.61	210.35	208.29
MW-102	217.64	6.06	211.58	210.62	207.79	210.47	206.76	211.58	207.16	211.66	207.29	210.92	207.56	210.48	208.04	210.68	207.63	210.33	208.32
MW-103	216.51	NM	NM	210.36	207.73	210.16	NM	NM	207.33	211.21	207.28	210.86	207.51	210.24	207.96	210.61	207.50	210.05	208.09
PZ-1A	220.10	8.48	211.62	210.68	207.95	210.37	206.30	211.62	207.00	211.78	207.48	207.09	207.64	197.05	208.29	210.55	207.44	210.30	211.43
PZ-1B	220.05	8.36	211.69	210.78	207.86	210.40	206.41	211.69	207.13	211.87	207.68	207.13	207.68	197.00	207.99	210.60	207.71	210.37	211.46

Notes:
ft = feet
AMSL = Above Mean Sea Level
NM = Not Measured
NA = Not Applicable, before well installation

Table 3
Current and Historical Groundwater Elevations

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Well Number	Measuring Point Elevation		Groundwater Elevation (ft. AMSL)																
		3/26/2012	8/30/2011	3/21/2011	8/23/2010	03/22/10	09/01/09	03/16/09	10/10/08	03/10/08	10/15/07	06/25/07	03/05/07	10/02/06	02/27/06	09/26/05	02/21/05	10/04/04	05/10/04
MW-1	228.10	207.92	207.92	209.49	207.93	208.91	207.06	206.99	206.85	208.73	206.95	208.16	209.06	207.03	208.92	207.00	207.72	206.75	208.10
MW-3	219.61	211.30	208.58	211.28	208.51	213.42	207.57	209.70	207.21	210.07	207.84	209.10	211.06	207.72	210.42	207.49	208.98	207.32	209.04
MW-4	218.28	217.08	212.69	216.72	211.76	215.95	210.90	216.14	211.58	216.23	210.66	213.47	215.83	210.18	215.68	210.78	215.54	212.63	214.85
MW-5	217.08	208.66	202.51	207.62	201.54	205.87	200.50	205.47	200.29	205.18	201.48	202.73	206.94	199.66	206.22	200.77	204.59	201.35	204.23
MW-6	219.48	208.40	202.03	206.82	199.52	203.97	198.63	204.40	198.50	203.26	199.43	200.27	205.56	197.28	204.17	197.77	202.38	198.12	202.07
MW-7	216.85	NM	210.44	215.53	209.66	214.81	207.16	214.88	206.53	214.44	208.38	209.98	214.99	205.90	214.90	207.60	213.52	209.17	213.13
MW-8	220.23	213.78	209.87	213.83	209.27	212.96	208.51	213.07	210.40	213.23	214.17	210.70	219.18	216.35	218.53	216.38	218.38	217.42	218.22
MW-9	224.00	223.05	212.00	222.57	211.85	218.74	207.74	220.89	207.55	216.65	210.89	209.01	214.77	207.14	211.33	207.04	210.34	207.80	210.12
MW-10	225.41	224.16	217.52	223.86	216.80	222.96	214.96	223.76	214.65	222.40	222.11	218.80	223.28	211.89	221.36	212.45	220.93	214.05	220.39
MW-11	227.73	220.86	215.79	221.28	216.64	219.99	215.41	219.97	217.58	219.73	219.48	221.01	221.55	217.68	220.43	215.46	218.89	213.83	219.37
MW-13	223.31	213.28	210.14	214.39	209.94	210.11	209.00	212.85	208.16	209.96	207.44	210.59	214.00	208.71	212.67	208.61	211.51	209.34	211.01
MW-14	224.77	NM	208.50	210.86	208.59	210.15	207.62	209.09	207.30	209.77	207.65	209.06	210.47	207.72	210.09	207.48	208.58	207.24	208.89
MW-15	222.96	211.41	208.55	211.41	208.48	210.49	207.55	209.83	207.26	210.15	207.93	209.09	211.15	207.65	210.50	207.47	209.08	NA	NA
MW-16	217.57	212.46	206.65	212.07	205.98	210.52	204.90	210.56	204.68	210.18	206.15	207.21	211.47	204.42	210.52	204.90	209.21	NA	NA
MW-17	218.84	211.41	208.53	211.31	208.40	210.44	207.46	209.72	207.07	210.03	207.76	209.02	211.10	207.64	210.49	207.41	209.07	NA	NA
MW-18	224.00	211.28	208.53	211.34	208.50	210.45	207.56	209.80	207.30	210.19	207.96	209.09	211.06	207.64	210.15	NA	NA	NA	NA
MW-19	224.20	211.06	208.10	211.34	208.08	210.45	207.06	210.79	207.07	211.14	208.85	208.75	212.02	207.17	210.45	NA	NA	NA	NA
MW-20	225.62	210.25	208.08	210.47	207.87	209.59	206.92	208.85	206.90	209.41	207.31	208.38	210.01	206.99	209.47	NA	NA	NA	NA
MW-21	216.60	NM	205.95	211.72	205.46	210.14	204.33	210.17	204.45	209.78	205.79	206.69	210.89	203.92	209.86	NA	NA	NA	NA
MW-22	216.57	211.69	205.64	211.55	205.16	209.87	204.04	209.98	204.19	209.53	205.52	206.41	NA	NA	NA	NA	NA	NA	NA
MW-23	227.87	209.47	207.92	209.53	207.96	208.92	207.09	207.98	206.85	208.73	206.96	208.17	NA	NA	NA	NA	NA	NA	NA
MW-24	227.49	214.64	208.04	209.87	207.87	209.04	206.99	208.18	206.88	208.88	207.11	208.22	NA	NA	NA	NA	NA	NA	NA
MW-25	220.38	212.52	208.45	212.32	207.93	211.45	207.03	214.23	207.80	211.51	209.10	209.33	NA	NA	NA	NA	NA	NA	NA
MW-26	220.63	210.51	208.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-27	222.80	211.29	209.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-28	223.52	220.65	217.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-29	217.93	210.80	206.71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-30	219.26	208.70	203.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-31	216.78	208.89	202.59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-100	218.37	211.22	208.48	211.50	208.31	210.36	207.37	209.65	207.15	209.93	207.71	208.89	211.07	208.14	NA	NA	NA	NA	NA
MW-101	218.54	211.29	208.41	211.50	208.20	210.35	207.25	209.48	207.05	209.93	207.64	208.82	211.10	207.72	NA	NA	NA	NA	NA
MW-102	217.64	211.25	208.34	211.42	208.14	210.24	207.18	209.64	206.77	209.78	207.50	208.71	211.60	206.54	NA	NA	NA	NA	NA
MW-103	216.51	210.95	208.06	210.99	207.92	209.80	207.01	209.32	206.61	209.31	207.15	208.40	210.77	207.21	NA	NA	NA	NA	NA
PZ-1A	220.10	211.43	208.58	211.39	NM	213.86	208.64	209.90	208.20	210.29	208.00	209.17	211.05	207.74	218.70	NA	NA	NA	NA
PZ-1B	220.05	211.46	208.66	211.17	NM	210.93	207.40	209.55	207.81	210.19	207.95	209.65	211.10	198.49	210.64	NA	NA	NA	NA

Notes:
ft = feet
AMSL = Above Mean Sea Leve
NM = Not Measured
NA = Not Applicable, before we

Table 3
Current and Historical Groundwater Elevations

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Well Number	Measuring Point Elevation	Groundwater Elevation (ft. AMSL)							
		02/23/04	11/17/03	08/25/03	05/27/03	02/10/03	11/07/02	07/16/02	02/26/02
MW-1	228.10	208.34	206.21	206.99	208.75	207.64	206.17	207.40	206.55
MW-3	219.61	209.96	206.34	207.00	209.57	209.20	206.04	207.67	207.49
MW-4	218.28	216.04	211.68	209.86	214.41	214.52	209.65	211.38	213.88
MW-5	217.08	206.58	200.48	199.92	204.78	205.51	199.87	201.17	203.34
MW-6	219.48	205.00	197.44	197.46	202.79	204.22	197.44	199.17	200.96
MW-7	216.85	214.84	206.67	206.88	212.73	213.52	205.46	207.00	212.29
MW-8	220.23	218.99	218.52	216.93	218.19	218.82	217.05	217.26	219.53
MW-9	224.00	210.83	207.20	207.37	209.57	209.16	206.36	207.80	208.07
MW-10	225.41	222.30	214.16	214.44	220.34	220.23	209.61	215.77	221.83
MW-11	227.73	221.25	215.53	216.84	220.23	221.03	211.85	216.85	219.85
MW-13	223.31	212.22	205.31	208.43	211.82	211.30	207.84	209.08	210.50
MW-14	224.77	209.51	206.53	207.35	209.62	208.66	206.43	207.87	207.12
MW-15	222.96	NA	NA	NA	NA	NA	NA	NA	NA
MW-16	217.57	NA	NA	NA	NA	NA	NA	NA	NA
MW-17	218.84	NA	NA	NA	NA	NA	NA	NA	NA
MW-18	224.00	NA	NA	NA	NA	NA	NA	NA	NA
MW-19	224.20	NA	NA	NA	NA	NA	NA	NA	NA
MW-20	225.62	NA	NA	NA	NA	NA	NA	NA	NA
MW-21	216.60	NA	NA	NA	NA	NA	NA	NA	NA
MW-22	216.57	NA	NA	NA	NA	NA	NA	NA	NA
MW-23	227.87	NA	NA	NA	NA	NA	NA	NA	NA
MW-24	227.49	NA	NA	NA	NA	NA	NA	NA	NA
MW-25	220.38	NA	NA	NA	NA	NA	NA	NA	NA
MW-26	220.63	NA	NA	NA	NA	NA	NA	NA	NA
MW-27	222.80	NA	NA	NA	NA	NA	NA	NA	NA
MW-28	223.52	NA	NA	NA	NA	NA	NA	NA	NA
MW-29	217.93	NA	NA	NA	NA	NA	NA	NA	NA
MW-30	219.26	NA	NA	NA	NA	NA	NA	NA	NA
MW-31	216.78	NA	NA	NA	NA	NA	NA	NA	NA
MW-100	218.37	NA	NA	NA	NA	NA	NA	NA	NA
MW-101	218.54	NA	NA	NA	NA	NA	NA	NA	NA
MW-102	217.64	NA	NA	NA	NA	NA	NA	NA	NA
MW-103	216.51	NA	NA	NA	NA	NA	NA	NA	NA
PZ-1A	220.10	NA	NA	NA	NA	NA	NA	NA	NA
PZ-1B	220.05	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
ft = feet
AMSL = Above Mean Sea Leve
NM = Not Measured
NA = Not Applicable, before we

Table 4
Hydraulic Gradient Calculations
Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Horizontal Gradient Locations	Aquifer Zone Screened	Elevation (ft. AMSL)	Elevation Difference feet	Horizontal Distance feet	Gradient
MW-10 to MW-11					
MW-10	Perched	223.43	2.24	500.9	4.47 E-03
MW-11		221.19			
MW-10 to MW-8					
MW-10	Perched	223.43	10.18	744.9	1.37 E-02
MW-8		213.25			
MW-10 to MW-4					
MW-10	Perched	223.43	6.89	1205.8	5.71 E-03
MW-4		216.54			
MW-28 to MW-8					
MW-28	Perched	219.86	6.61	289.4	2.28 E-02
MW-8		213.25			
MW-16 to MW-6					
MW-16	Gravel	211.47	4.11	463.6	8.87 E-03
MW-6		207.36			
MW-16 to MW-31					
MW-16	Gravel	211.47	3.60	661.4	5.44 E-03
MW-31		207.87			
MW-23 to MW-24					
MW-23	Gravel	209.64	-0.07	321.5	-2.18 E-04
MW-24		209.71			
MW-25 to MW-23					
MW-25	Gravel	212.30	2.66	1320.8	2.01 E-03
MW-23		209.64			

Notes:
ft. AMSL = Feet Above Mean Sea Level

Table 5
Detection Summary

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Analyte	Minimum Applicable Criteria*	Detection Frequency	Minimum Criteria Exceedance Frequency	Maximum Detected Concentration	Location of Maximum Detection	Minimum Detected Concentration
Volatile Organics (µg/L)						
Carbon tetrachloride	0.41	7/31	7/31	2200	MW-20	1.4 J
Chloroform	0.19	11/31	11/31	190	MW-20	0.28 J
Chloromethane	--	1 / 14	--	0.36 J	MW-24	0.36 J
cis-1,2-Dichloroethene	3.6	3/31	0/31	3.4	MW-30	0.71 J
Tetrachloroethene (PCE)	4.1	4/31	2/31	16	MW-18	0.61 J
Trichloroethene (TCE)	0.28	10/31	10/31	240	MW-20	0.87 J

Notes:

µg/L = micrograms per Liter

mg/L = milligrams per Liter

J = Analyte concentration is an estimate. Analyte was detected below Method Reporting Limit, but above the Method Detection Limit

* = Minimum Applicable Criteria are the minimium criteria presented in Table 7

** = Method Detection Limits are above the minimum applicable screening criteria. Additional concentrations may exceed minimum applicable screening criteria

Table 5
Detection Summary

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Analyte	Minimum Applicable Criteria*	Detection Frequency	Minimum Criteria Exceedance Frequency	Maximum Detected Concentration	Location of Maximum Detection	Minimum Detected Concentration
Metals (mg/L)						
Aluminum	0.05	10/ 14	10 / 14	5.7	MW-24	0.053 J
Antimony	0.001	11 / 14	0 / 14	0.00034	MW-24	0.00013 J
Arsenic	0.000038	14 / 14	14 / 14	0.024	MW-16	0.00057 J
Barium	0.38	14 / 14	0 / 14	0.038	MW-4	0.0046
Beryllium	0.003	3 / 14	0 / 14	0.00035	MW-24	0.00011 J
Cadmium	0.0009	4 / 14	0 / 14	0.0001	MW-20	0.00004 J
Calcium	--	14 / 14	--	37	MW-4, MW-20	9.1
Chromium	0.00035	14 / 14	14 / 14	0.0074	MW-24	0.00040 J
Cobalt	0.0006	14/ 14	8 / 14	0.01	MW-24	0.000081 J
Copper	0.08	10 / 14	0 / 14	0.011	MW-24	0.00070 J
Iron	0.3	13 / 14	8 / 14	15	MW-24	0.070 J
Lead	0.015	12 / 14	0 / 14	0.0028	MW-24	0.000043 J
Magnesium	--	14 / 14	--	19	MW-4	4.7
Manganese	0.043	14 / 14	11 / 14	0.70	MW-20	0.0066
Nickel	0.022	14 / 14	1 / 14	0.056	MW-20	0.00038 J
Potassium	--	14 / 14	--	1.6 J	MW-3	0.36 J
Silver	0.0094	2 / 14	0 / 14	0.000057 J	MW-18	0.000030 J
Sodium	--	14 / 14	--	26	MW-20	6.7
Vanadium	0.0086	14 / 14	6 / 14	0.019	MW-14	0.0022 J
Zinc	0.6	14 / 14	0 / 14	0.018	MW-24	0.0014 J

Table 6
Analytical Results for Detected Constituents - Volatile Organics

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Sample Location	Sample ID	Sample Date	Volatile Organic Concentrations							
			Benzene	Carbon tetrachloride	Chloroform	cis-1,2-Dichloroethene	Naphthalene	Tetrachloroethene (PCE)	trans-1,2-Dichloroethene	Trichloroethene (TCE)
MW-3	MW3	03/02/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-4	MW4	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-5	MW5	03/04/2021	0.24 U	0.30 U	**0.79 J**	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-6	MW6	03/04/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-7	MW7	03/04/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-8	MW8	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-9	MW9	03/04/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-10	MW10	03/05/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
	DUP2	03/05/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-11	MW11	03/05/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-13	MW13	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-14	MW14	03/04/2021	0.24 U	0.30 U	**1.5 J**	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-15	MW15	03/02/2021	0.24 U	**14**	**2.2 J**	0.69 U	0.93 U	0.41 U	0.39 U	**70**
MW-16	MW16	03/04/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-17	MW17	03/03/2021	0.24 U	0.30 U	0.28 J	0.69 U	0.93 U	0.41 U	0.39 U	**1.5 J**
MW-18	MW18	03/02/2021	0.24 U	**170**	**24**	0.69 U	0.93 U	**16**	0.39 U	**44**
MW-19	MW19	03/04/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-20	MW20	03/05/2021	0.24 U	**2200**	**190**	**0.71 J**	0.93 U	**14**	0.39 U	**240**
MW-22	MW22	03/03/2021	0.24 U	**17**	**3.2 J**	**1.9 J**	0.93 U	**0.93 J**	0.39 U	**6.5**
MW-23	MW23	03/05/2021	0.24 U	**1.4 J**	**4.3 J**	0.69 U	0.93 U	0.41 U	0.39 U	**0.87 J**
MW-24	MW24	03/05/2021	0.24 U	**180**	**23**	0.69 U	0.93 U	**0.61 J**	0.39 U	**82**
MW-25	MW25	03/04/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
	DUP1	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-26	MW26	03/04/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-27	MW27	03/02/2021	0.24 U	**73**	**17**	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-28	MW28	03/02/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-29	MW29	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-30	MW30	03/04/2021	0.24 U	0.30 U	0.26 U	**3.4**	0.93 U	0.41 U	0.39 U	0.26 U
MW-31	MW31	03/04/2021	0.24 U	0.30 U	**0.47 J**	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
MW-100	MW100	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	**2.9 J**
MW-101	MW101	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	**0.94 J**
MW-102	MW102	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	**10**
MW-103	MW103	03/03/2021	0.24 U	0.30 U	0.26 U	0.69 U	0.93 U	0.41 U	0.39 U	0.26 U
Minimum Applicable Screening Criteria			0.39	0.41	0.19	3.6	0.14	4.1	36	0.28

Notes:
µg/L = Micrograms per liter
U = Analyte was not detected above indicated value
J = Analyte concentration is an estimate. Analyte was detected below Method Reporting Limit, but above the Method Detection Limit
Bold indicates analyte was detected above the method detection limit
Shading indicates result exceeds the minimum applicable screening criteria (See Table 7).

Table 7
Applicable Screening Criteria

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Analyte	Minimum Criteria	Oregon - Groundwater MMLs[1]	Oregon - Hot Spot Tables[2]	Oregon - DEQ RBCs [3]	EPA - Primary Drinking Water MCLs[4]	EPA - Secondary Drinking Water MCLs[4]	EPA - Regional Screening Levels[5]
Volatile Organics (µg/L)							
1,1,1,2-Tetrachloroethane	0.57	---	---	---	---	---	0.57
1,1,1-Trichloroethane	200	200	200	9,100	200	---	800
1,1,2,2-Tetrachloroethane	0.076	---	---	---	---	---	0.076
1,1,2-Trichloroethane	0.041	---	5	0.23	5	---	0.041
1,1-Dichloroethane	2.3	---	---	2.3	---	---	2.7
1,1-Dichloroethene	7	7	7	340	7	---	28
1,1-Dichloropropene	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	0.70	---	---	---	---	---	0.70
1,2,3-Trichloropropane	0.00075	---	---	---	---	---	0.00075
1,2,4-Trichlorobenzene	0.40	---	70	---	70	---	0.40
1,2,4-Trimethylbenzene	1.5	---	---	54	---	---	1.5
1,2-Dibromo-3-chloropropane	0.00033	---	0.2	---	0.2	---	0.00033
1,2-Dichlorobenzene	30	---	600	370	600	---	30
1,2-Dichloroethane (EDC)	0.14	5	5	0.14	5	---	0.17
1,2-Dichloropropane	0.44	---	5	---	5	---	0.44
1,3,5-Trimethylbenzene	12	---	---	50	---	---	12
1,3-Dichlorobenzene	---	---	---	---	---	---	---
1,3-Dichloropropane	37	---	---	---	---	---	37
1,4-Dichlorobenzene	0.42	75	75	0.42	75	---	0.48
2,2-Dichloropropane	---	---	---	---	---	---	---
2-Chlorotoluene	25	---	---	---	---	---	25
4-Chlorotoluene	24	---	---	---	---	---	24
4-Isopropyltoluene	---	---	---	---	---	---	---
Benzene	0.39	5	5	0.39	5	---	0.45
Bromobenzene	6.2	---	---	---	---	---	6.2
Bromoform (THM)	2.7	100 (total THM)	80 (total THM)	2.7	80 (total THM)	---	9.2
Bromomethane	0.75	---	---	8.7	---	---	0.75
Carbon Tetrachloride	0.41	5	5	0.41	5	---	0.45
Chlorobenzene	7.8	---	100	91	100	---	7.8
Chlorobromomethane	---	---	---	---	---	---	---
Chlorodibromomethane (THM)	100	100 (total THM)	---	0.14	---	---	---
Chloroethane	21,000	---	---	21,000	---	---	--
Chloroform (THM)	0.19	100 (total THM)	80 (total THM)	0.19	80 (total THM)	---	0.22
Chloromethane	19	---	---	190	---	---	19
cis-1,2-Dichloroethene	3.6	---	70	73	70	---	3.6
cis-1,3-Dichloropropene	--	---	---	---	---	---	--
Dibromomethane	0.80	---	---	---	---	---	0.80
Dichlorobromomethane (THM)	100	100 (total THM)	---	---	---	---	---
Dichlorodifluoromethane	20	---	---	---	---	---	20
Ethylbenzene	1.5	---	700	1.4	700	---	1.5
Ethylene Dibromide	0.00005	---	0.00005	---	0.00005	---	---
Hexachlorobutadiene	0.30	---	---	---	---	---	0.30
Isopropylbenzene (cumene)	45	---	---	680	---	---	45
Methylene chloride	5	---	5	---	5	---	11
m,p-Xylene	19	---	---	---	---	---	19
Methyl tert-butyl ether (MTBE)	12	---	---	12	---	---	14
Naphthalene	0.14	---	---	0.14	---	---	0.17
n-Butylbenzene	100	---	---	---	---	---	100
n-Propylbenzene	--	---	---	---	---	---	--
o-Xylene	19	---	---	---	---	---	19
sec-Butylbenzene	200	---	---	---	---	---	200
Styrene	100	---	100	1,600	100	---	120
tert-Butylbenzene	69	---	---	---	---	---	69
Tetrachloroethene (PCE)	4.1	---	5	11	5	---	4.1
Toluene	110	---	1,000	2,300	1,000	---	110
trans-1,2-Dichloroethene	36	---	100	110	100	---	36
trans-1,3-Dichloropropene	--	---	---	---	---	---	--
Trichloroethene (TCE)	0.28	5	5	0.43	5	---	0.28
Trichlorofluoromethane	110	---	---	1,300	---	---	110
Vinyl chloride	0.019	2	2	0.025	2	---	0.019

Notes:

--- = No criteria available

µg/L = micrograms per liter

THM = Trihalomethanes, including a group of disinfection byproducts (chloroform, bromodichloromethane, dibromochloromethane, & bromoform).

[1] The Oregon Groundwater Maximum Measurement Levels (MMLs) are provided in Oregon Administrative Rules (OAR) 340-40-020, last updated on November 14, 1997.

2 The Oregon Hot Spot Tables are provided by the Oregon DEQ under Environmental Cleanup Guidance, [see http://www.deq.state.or.us/pubs/reports.htm]. Values used are revised to reflect Oregon DEQ hierarchy (MCL/MML, RBC, then EPA Regional Screening Levels for Regions 3, 6 and 9). Hot Spot values were modified in 2015 to reflect updates to EPA Regional Screening Levels and subsequently revised Oregon RBDM values.

3 The Oregon Petroleum Risk-Based Concentrations are provided by the Oregon DEQ under Environmental Cleanup Guidance, [see http://www.deq.state.or.us/pubs/reports.htm]. Values used are from Appendix A using Residential Groundwater - Ingestion & Inhalation from Tapwater last updated on November, 2015.

4 The EPA Primary and Secondary Maximum Contaminant Levels (MCLs) are provided by the U.S. Environmental Protection Agency, last updated on June 2013
[see http://www.epa.gov/safewater/contaminants/index.html].

5 The EPA Regional Risk-Based Screening Values for Region 3, 6 and 9, provided by the U.S. Environmental Protection Agency, last updated on November 2017 [see http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm]. Screening levels used are via the pathway of exposure to tapwater.

Table 7
Applicable Screening Criteria

Groundwater Monitoring Event 42
NETL Albany, Albany, OR

Analyte	Oregon Groundwater MMLs[1]	Oregon Hot Spot Tables[2]	Oregon DEQ RBCs [3]	EPA Primary Drinking Water MCLs[4]	EPA Secondary Drinking Water MCLs[4]	EPA Regional Screening Levels[5]
Aluminum (Al)	---	---	---	---	0.05	2
Antimony (Sb)	---	0.006	---	0.006	---	0.001
Arsenic (As)	0.05	0.010	0.000038	0.010	---	0.000052
Barium (Ba)	1.0	2	4	2	---	0.38
Beryllium (Be)	---	0.004	0.040	0.004	---	0.003
Cadmium (Cd)	0.010	0.005	0.020	0.005	---	0.0009
Calcium (Ca)	---	---	---	---	---	---
Chromium (Cr)	0.05	0.1	---	0.1	---	0.000035
Cobalt (Co)	---	---	---	---	---	0.0006
Copper (Cu)	1.0	1.0	1.5	1.3	1.0	0.08
Iron (Fe)	0.3	0.3	---	---	0.3	1.4
Lead (Pb)	0.05	0.015	0.015	0.015	---	---
Magnesium (Mg)	---	---	---	---	---	---
Manganese (Mn)	0.05	0.05	0.48	---	0.05	0.043
Mercury (Hg)	0.002	0.002	0.006	0.002	---	0.000063
Nickel (Ni)	---	---	0.4	---	---	0.022
Potassium (K)	---	---	---	---	---	---
Selenium (Se)	0.01	0.05	---	0.05	---	0.010
Silver (Ag)	0.05	0.10	0.1	---	0.10	0.0094
Sodium (Na)	---	---	---	---	---	---
Thallium (Tl)	---	0.002	---	0.002	---	0.00002
Vanadium (V)	---	---	---	---	---	0.0086
Zinc (Zn)	5.0	5	---	---	5	0.6

Notes:
--- = No criteria available

Value presented in milligrams per liter (mg/L)

1 The Oregon Groundwater Maximum Measurement Levels (MMLs) are provided in Oregon Administrative Rules (OAR) 340-40-020, last updated on November 14, 1997.

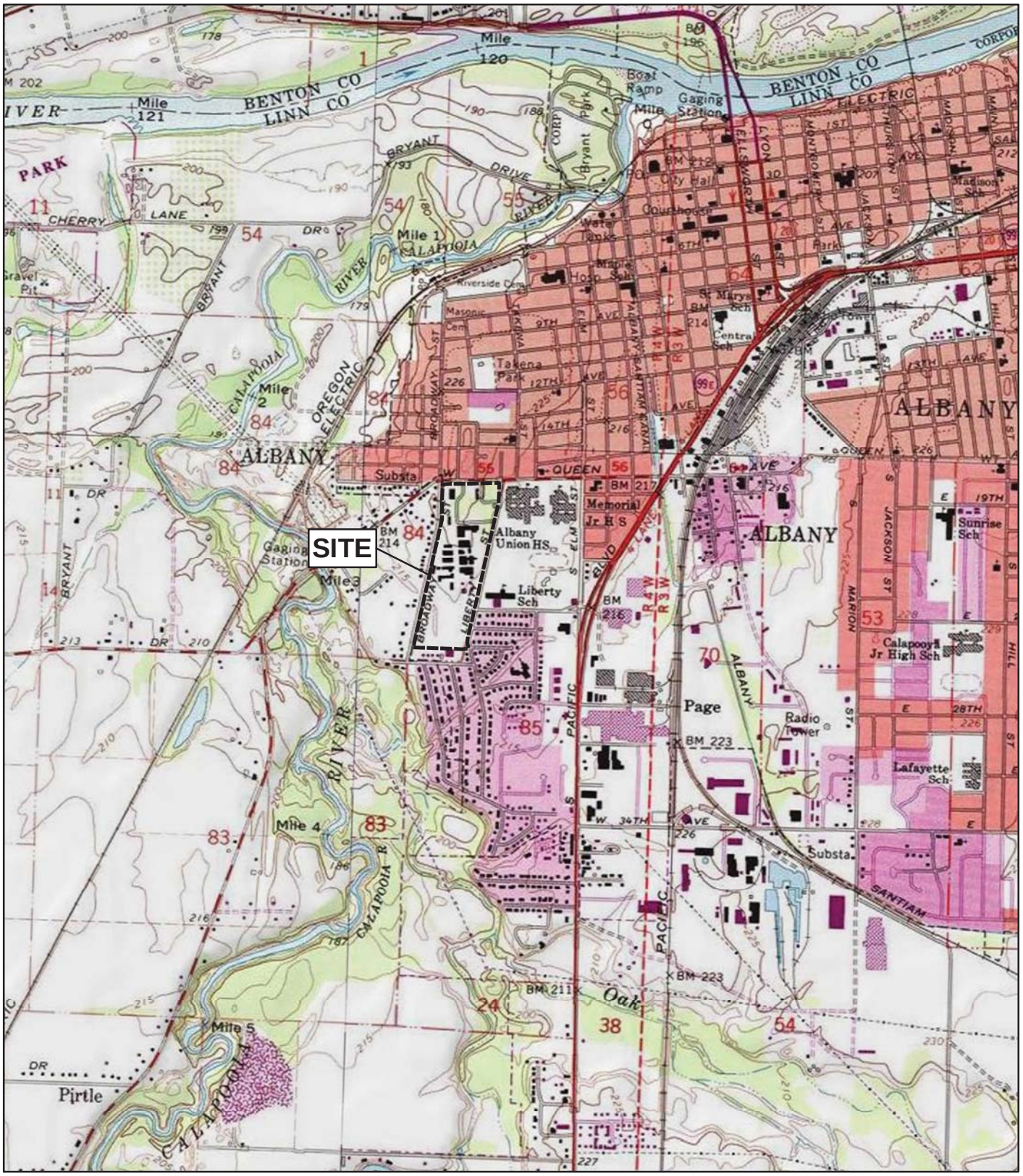
2 The Oregon Hot Spot Tables are provided by the Oregon DEQ under Environmental Cleanup Guidance, [see http://www.deq.state.or.us/pubs/reports.htm]. Values used are revised to reflect Oregon DEQ hierarchy (MCL/MML, RBC, then EPA Regional Screening Levels for Regions 3, 6 and 9). Hot Spot values were modified in 2012 to reflect updates to EPA Regional Screening Levels and subsequently revised Oregon RBDM values.

3 The Oregon Petroleum Risk-Based Concentrations are provided by the Oregon DEQ under Environmental Cleanup Guidance, [see http://www.deq.state.or.us/pubs/reports.htm]. Values used are from Appendix A using Residential Groundwater - Ingestion & Inhalation from Tap water last updated on November 2015.

4 The EPA Primary and Secondary Maximum Contaminant Levels (MCLs) are provided by the U.S. Environmental Protection Agency, last updated on June 2013 [see http://www.epa.gov/safewater/contaminants/index.html].

5 The EPA Regional Risk-Based Screening Values for Region 3, 6 and 9, provided by the U.S. Environmental Protection Agency, last updated on May 2014 [see http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm]. Screening levels used are via the pathway of exposure to tap water.

Figures



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1,000 0 1,000 2,000

SCALE IN FEET

SITE VICINITY

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

MARCH 2021

FIGURE 1

K:\25697357 NETL Albany\MXD\2Q15\Fig 1 Site Vicinity.mxd



Sources: NAIP, 2012.
Albany GIS, 2007.

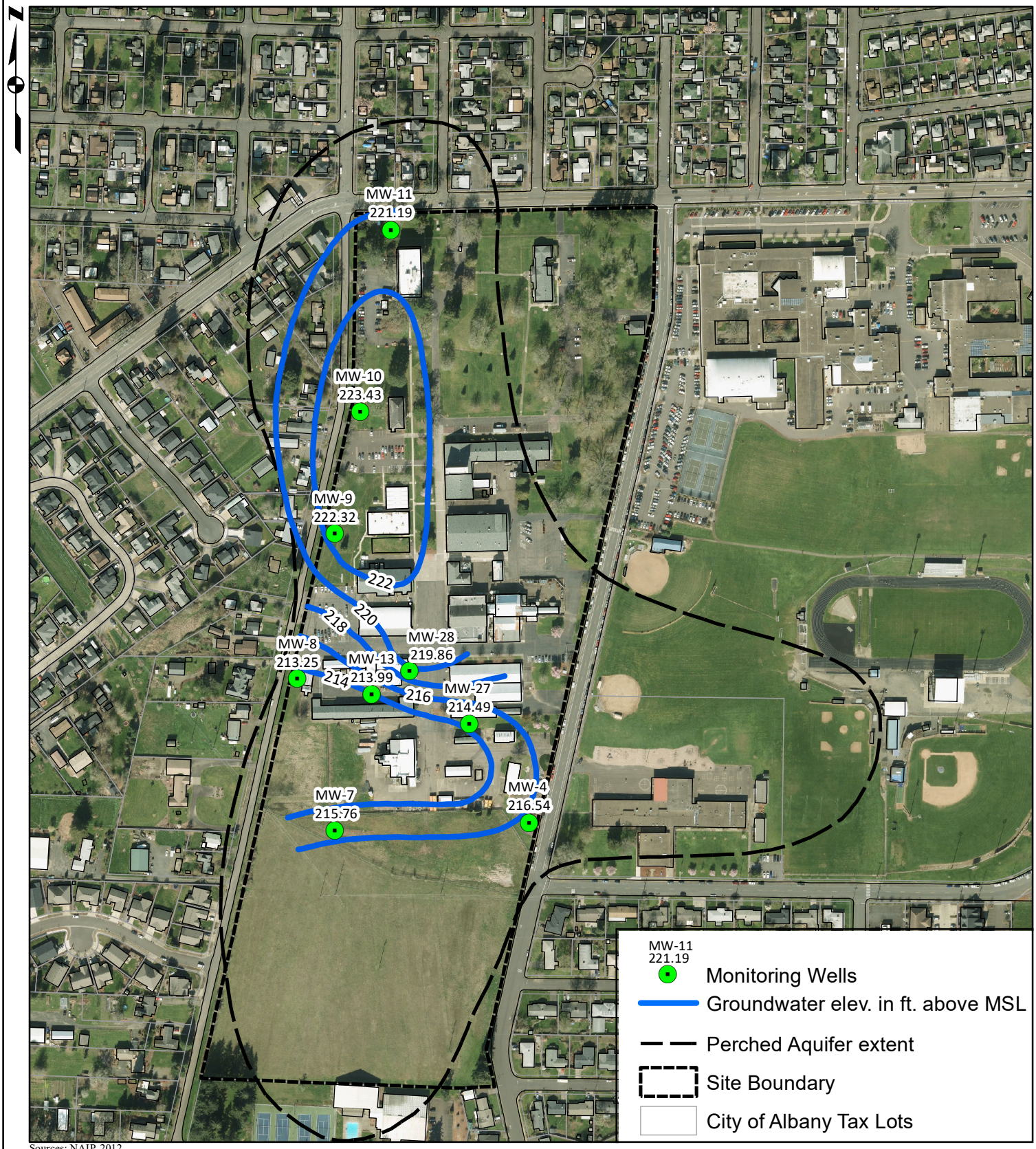
150 75 0 150 300
Feet

SITE MAP

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

MARCH 2021

FIGURE 2



Sources: NAIP, 2012.
Albany GIS, 2007.

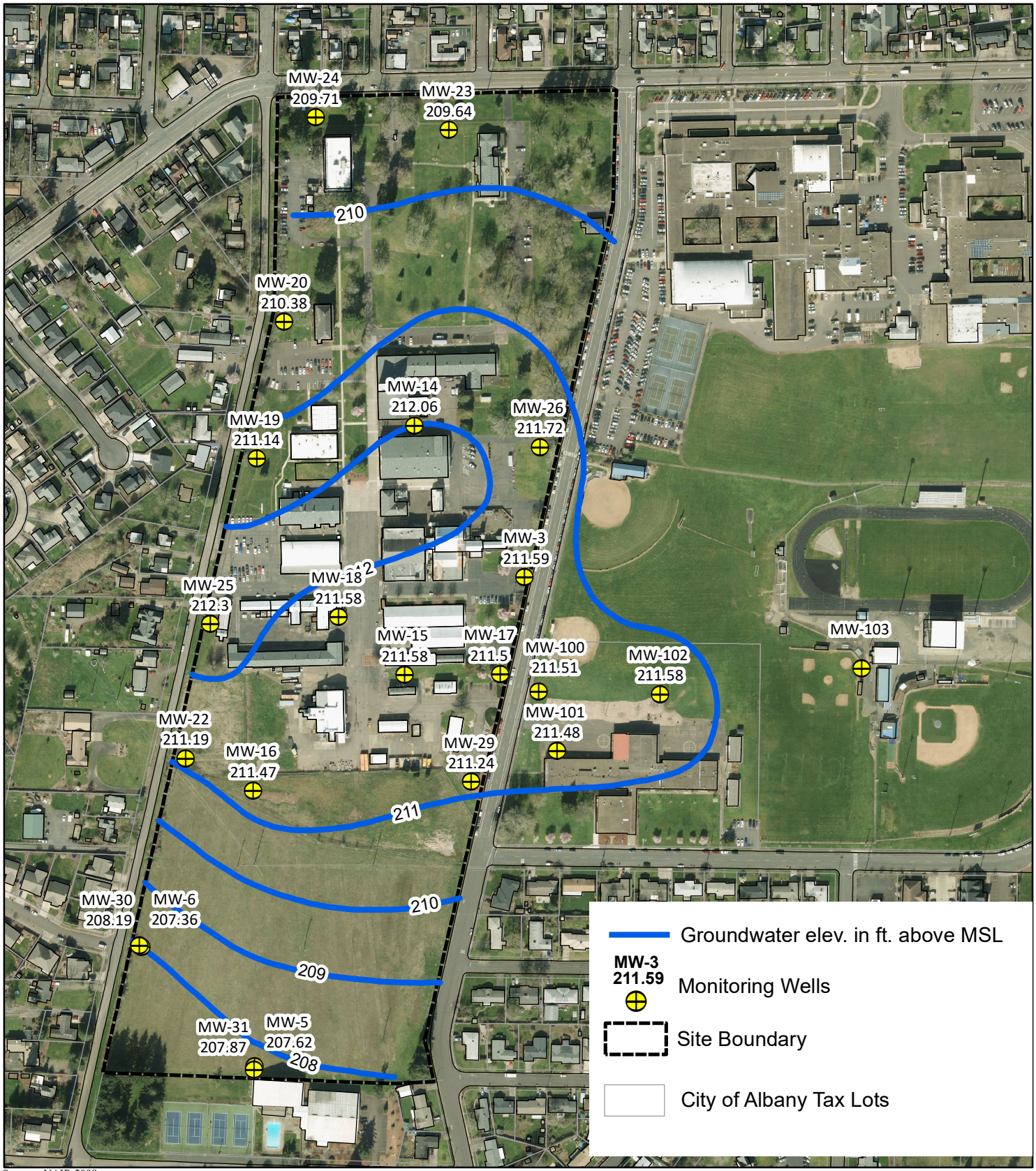
150 75 0 150 300
Feet

GROUNDWATER ELEVATION CONTOURS IN THE PERCHED AQUIFER, MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 3



Sources: NAIP, 2009.
Albany GIS, 2007.

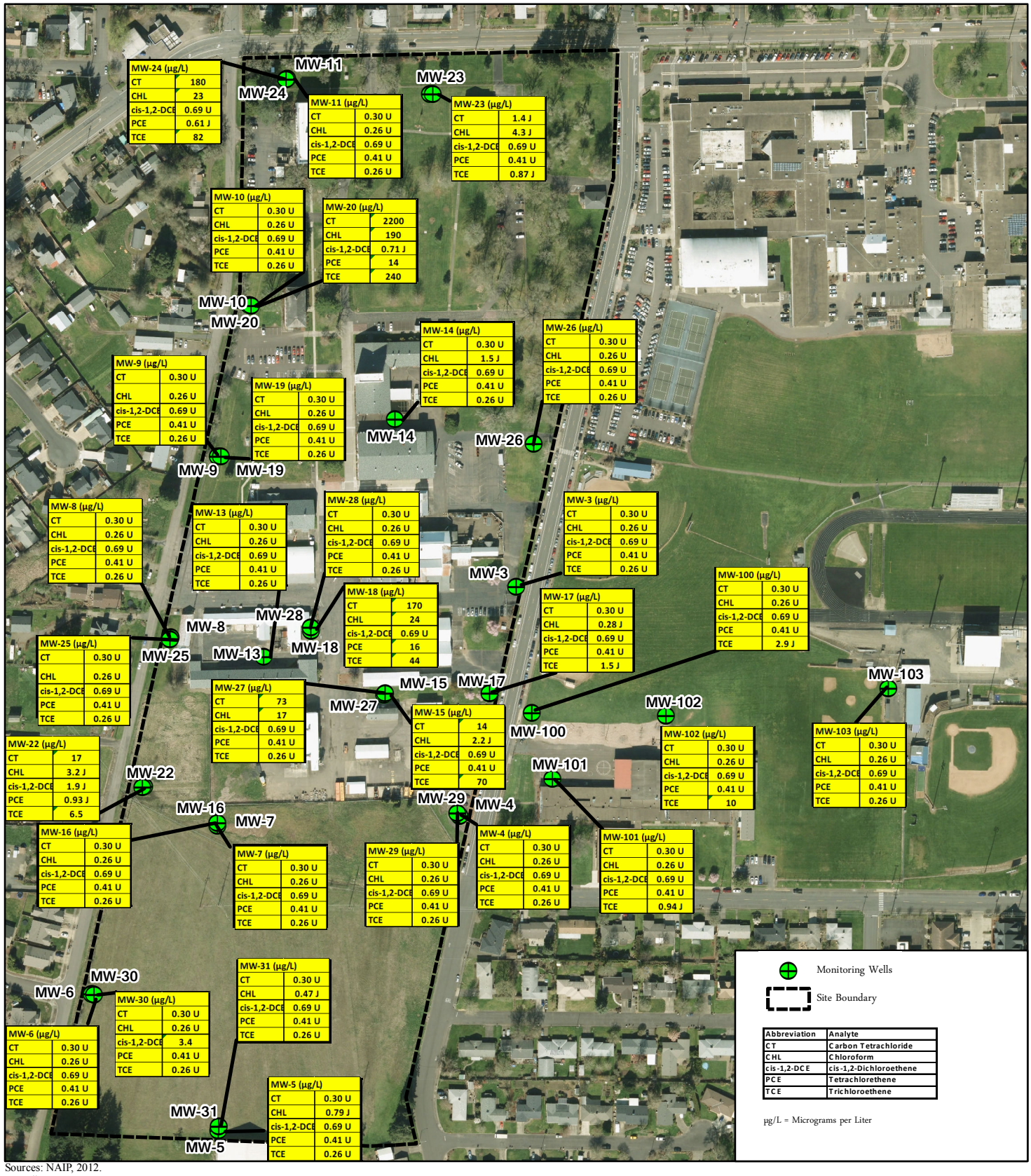
200 100 0 200 400
Feet

GROUNDWATER ELEVATION CONTOURS IN THE GRAVEL AQUIFER, MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 4



Sources: NAIP, 2012.
Albany GIS, 2007.

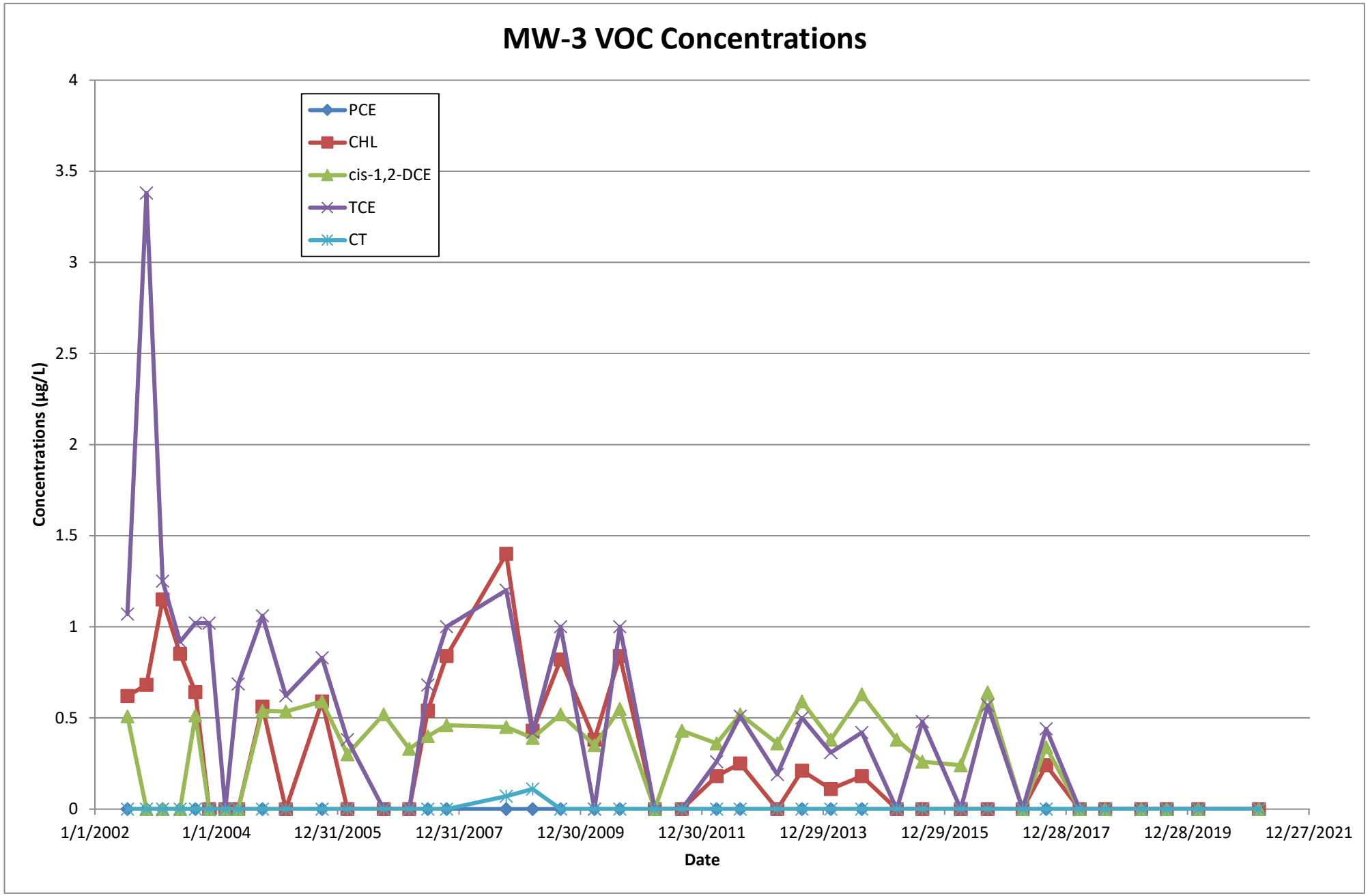
150 75 0 150 300
Feet

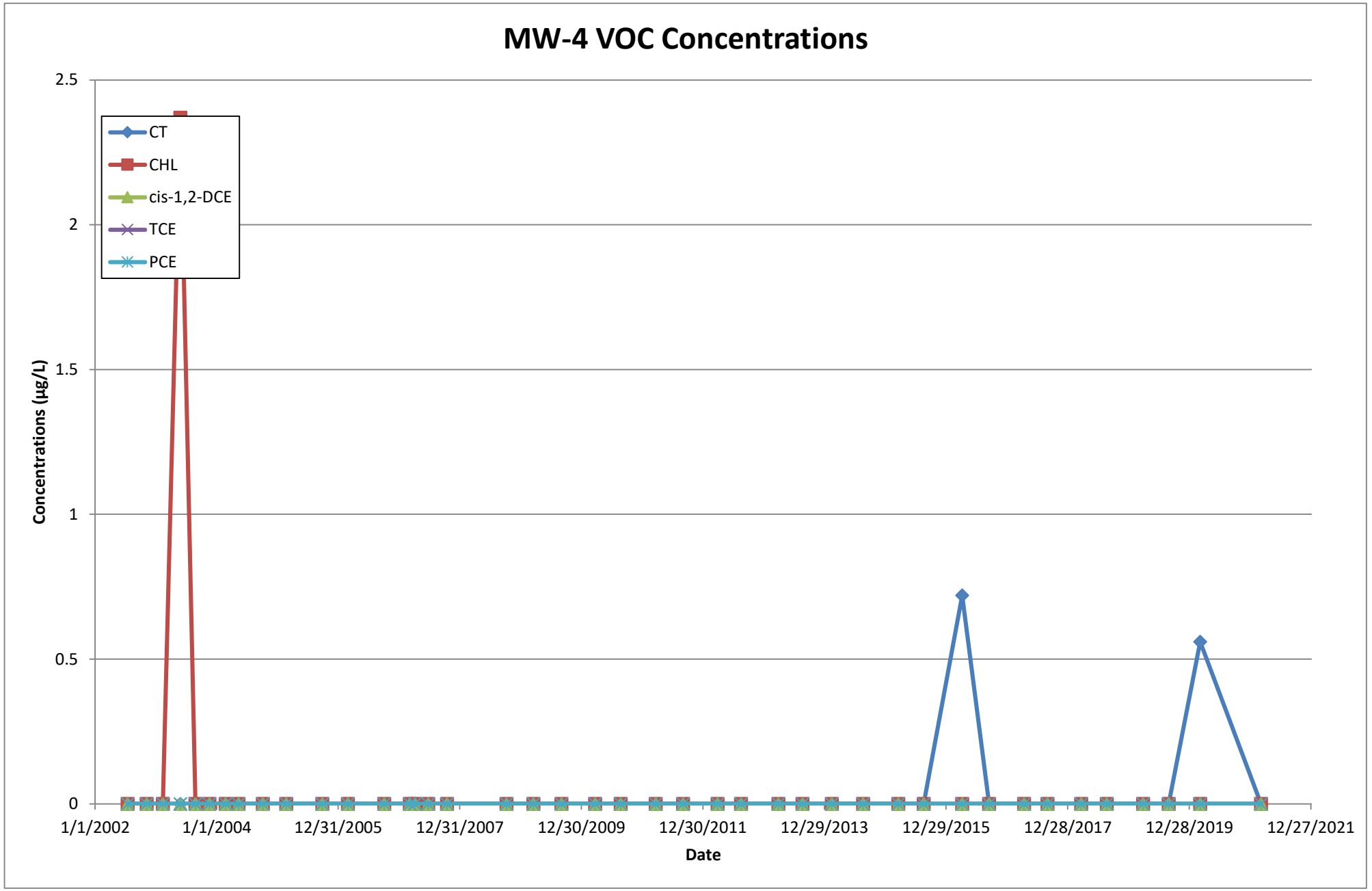
GROUNDWATER ANALYTICAL RESULTS MARCH 2021

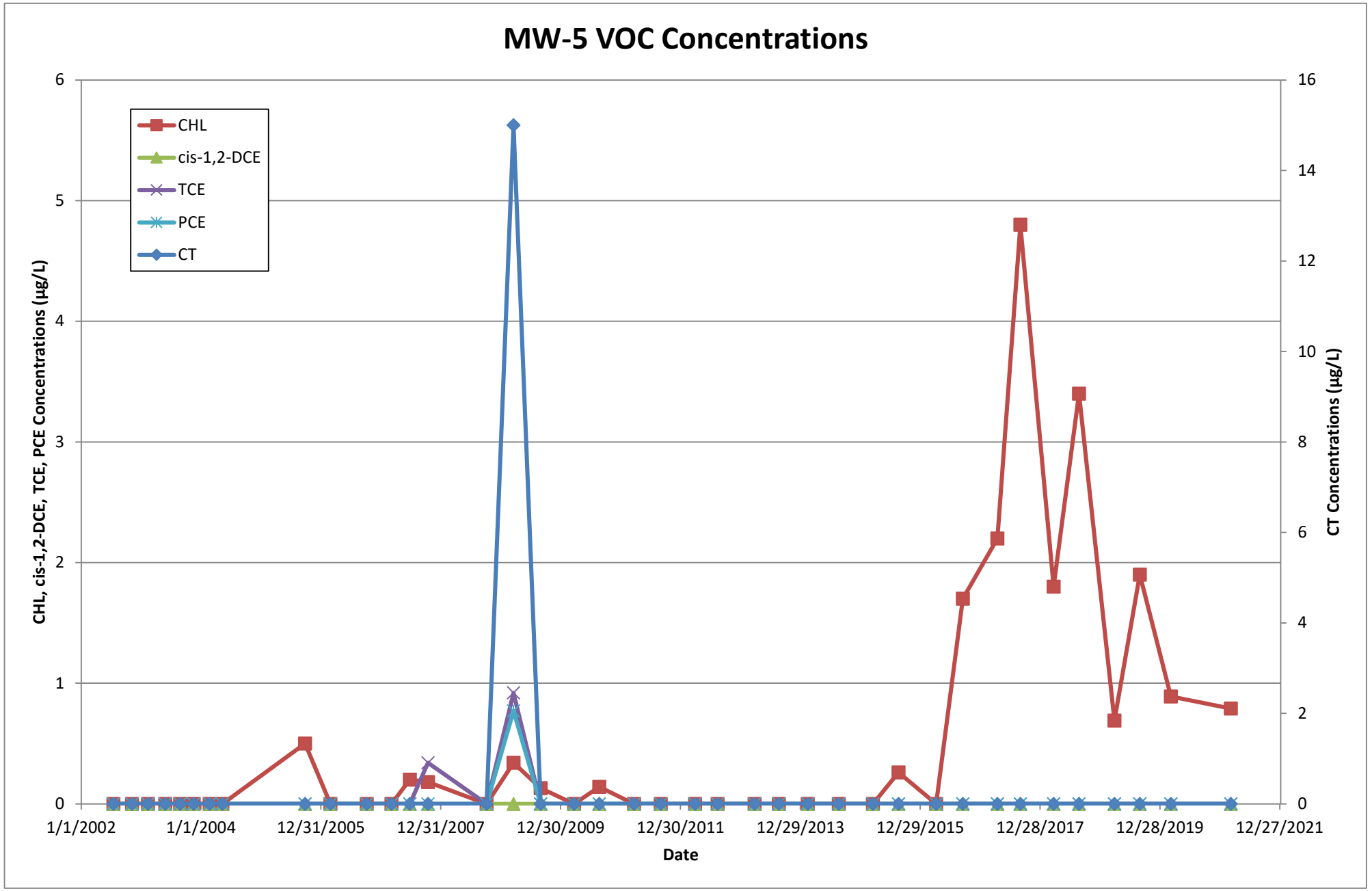
NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

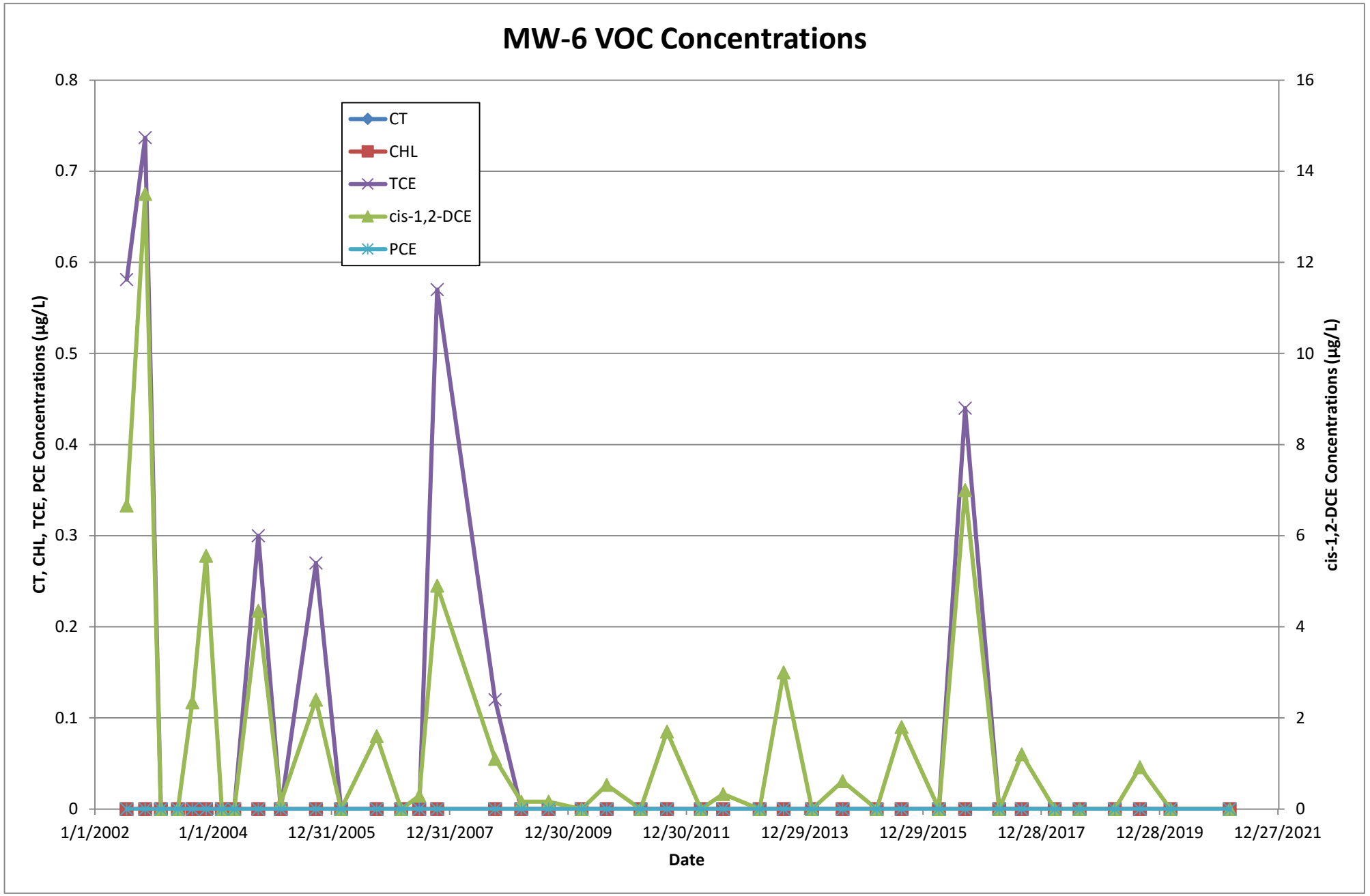
FIGURE 5

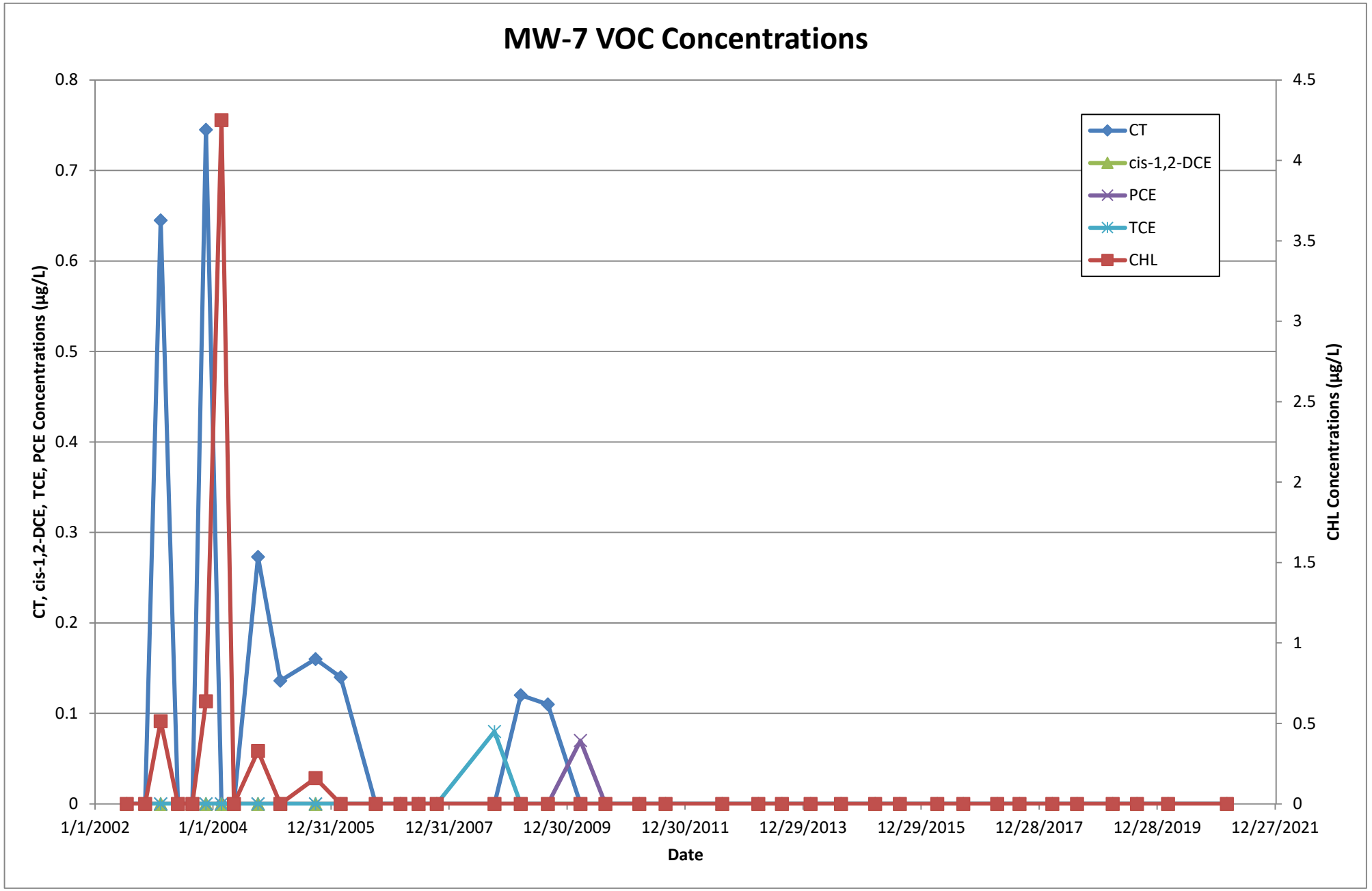
Figure 6 VOC Trend Charts

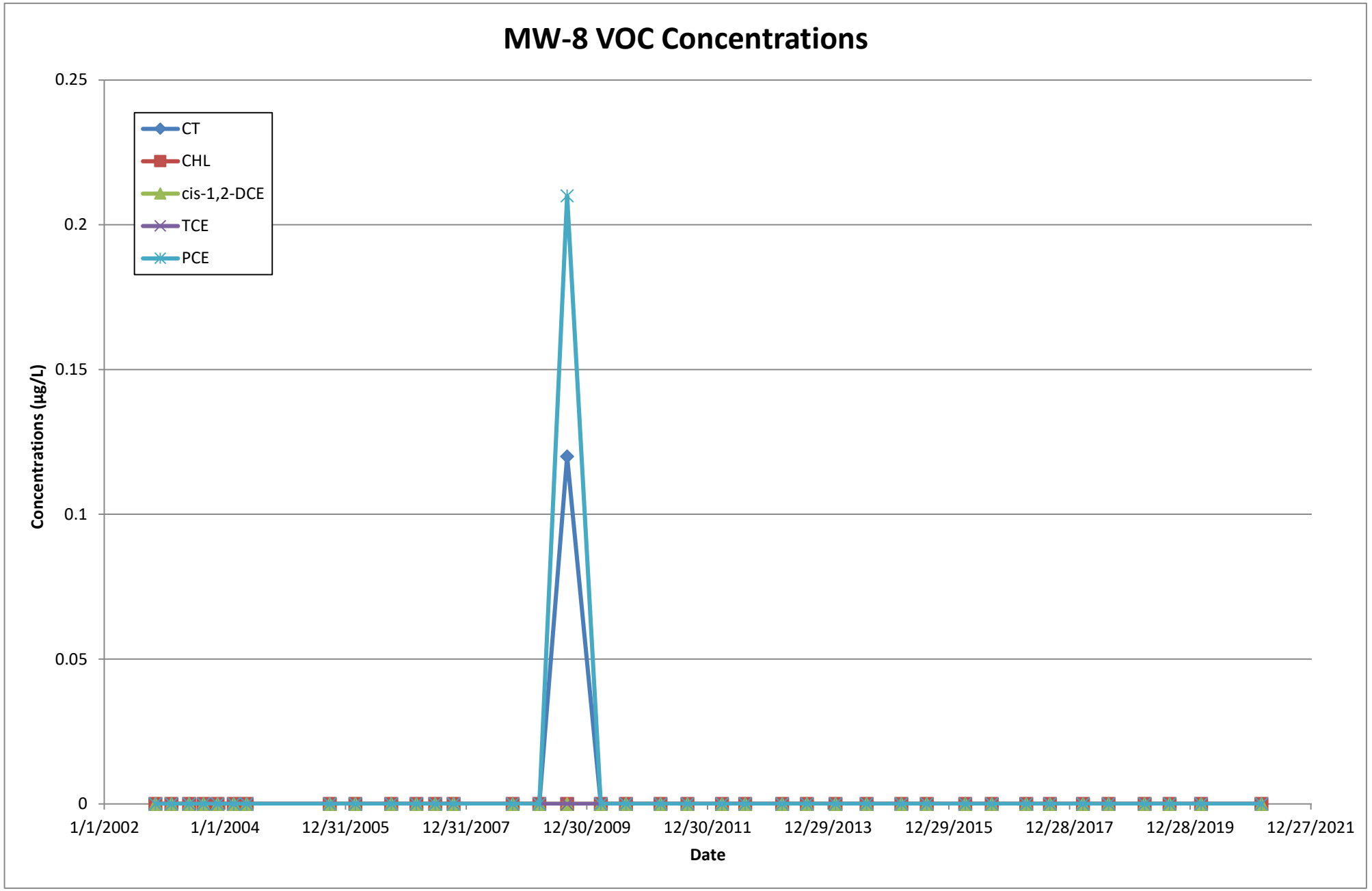

MW-3 VOC Concentrations
PCE
CHL
cis-1,2-DCE
TCE
CT
Concentrations (µg/L)
4
3.5
3
2.5
2
1.5
1
0.5
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

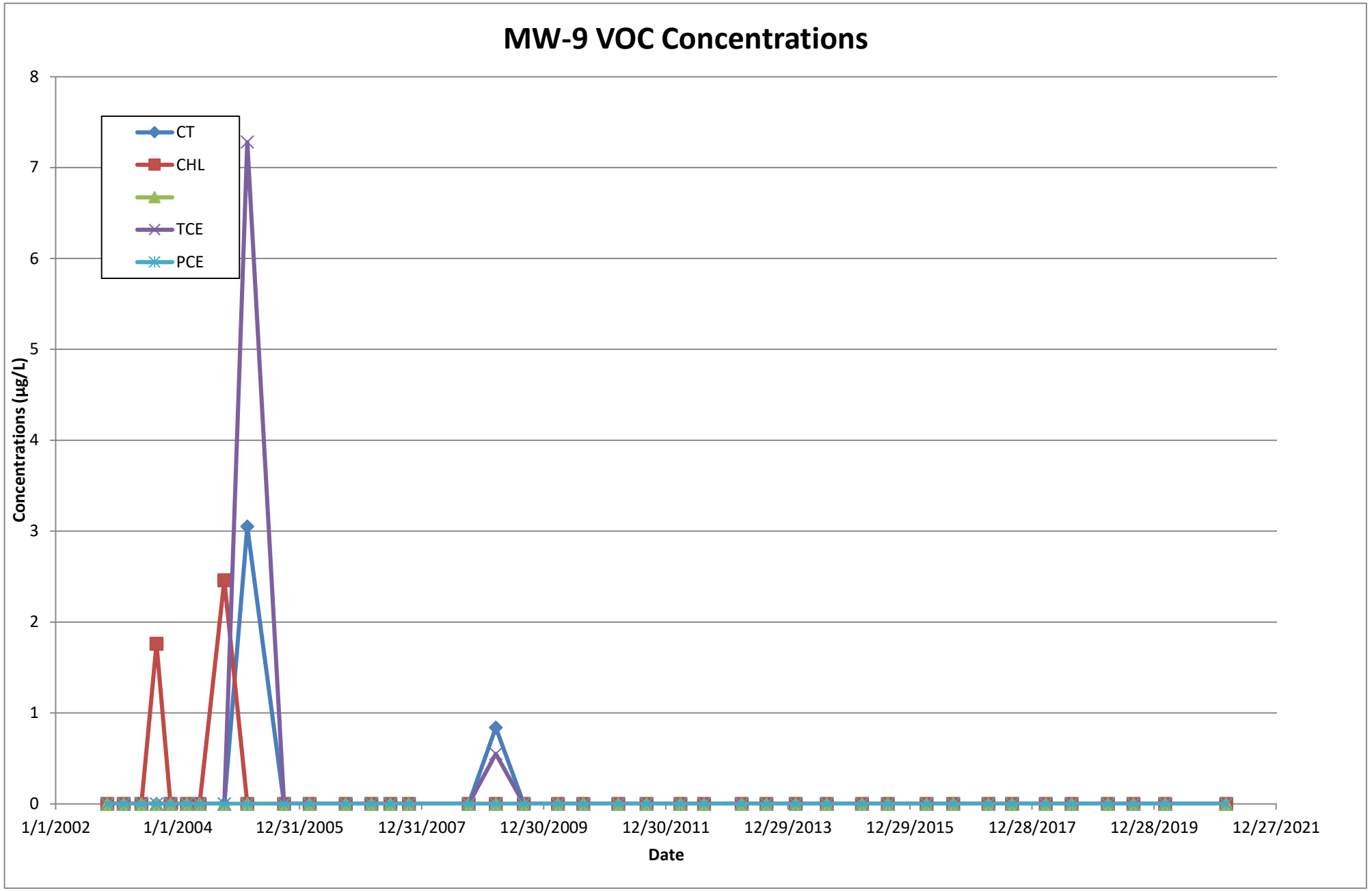

MW-4 VOC Concentrations
2.5
2
1.5
1
0.5
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

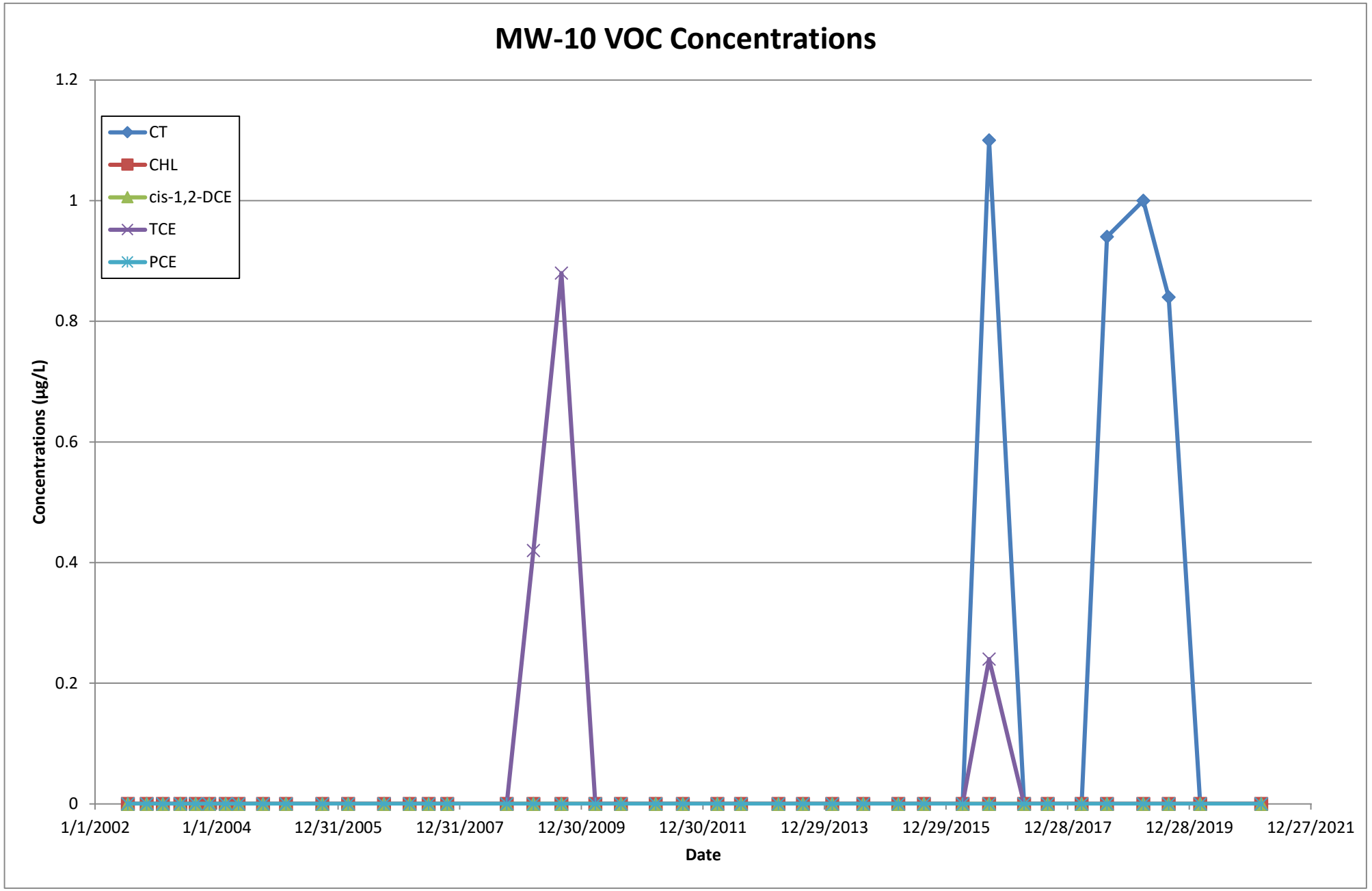

MW-5 VOC Concentrations
CHL
cis-1,2-DCE
TCE
PCE
CT
CHL, cis-1,2-DCE, TCE, PCE Concentrations (µg/L)
CT Concentrations (µg/L)
Date
0
1
2
3
4
5
6
0
2
4
6
8
10
12
14
16
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
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12/28/2019
12/27/2021

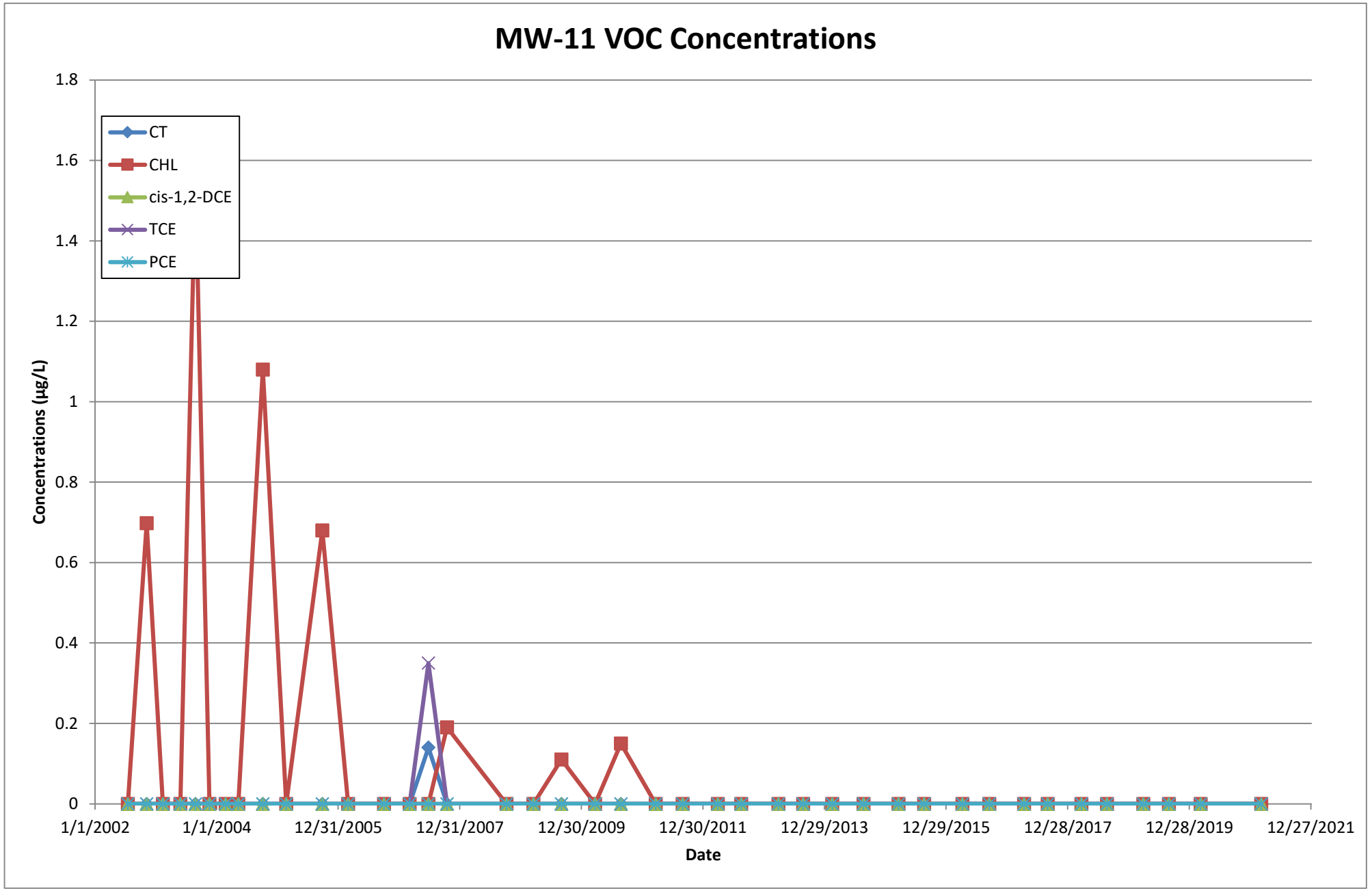

MW-6 VOC Concentrations
CT
CHL
TCE
cis-1,2-DCE
PCE
CT, CHL, TCE, PCE Concentrations (µg/L)
cis-1,2-DCE Concentrations (µg/L)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
16
14
12
10
8
6
4
2
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

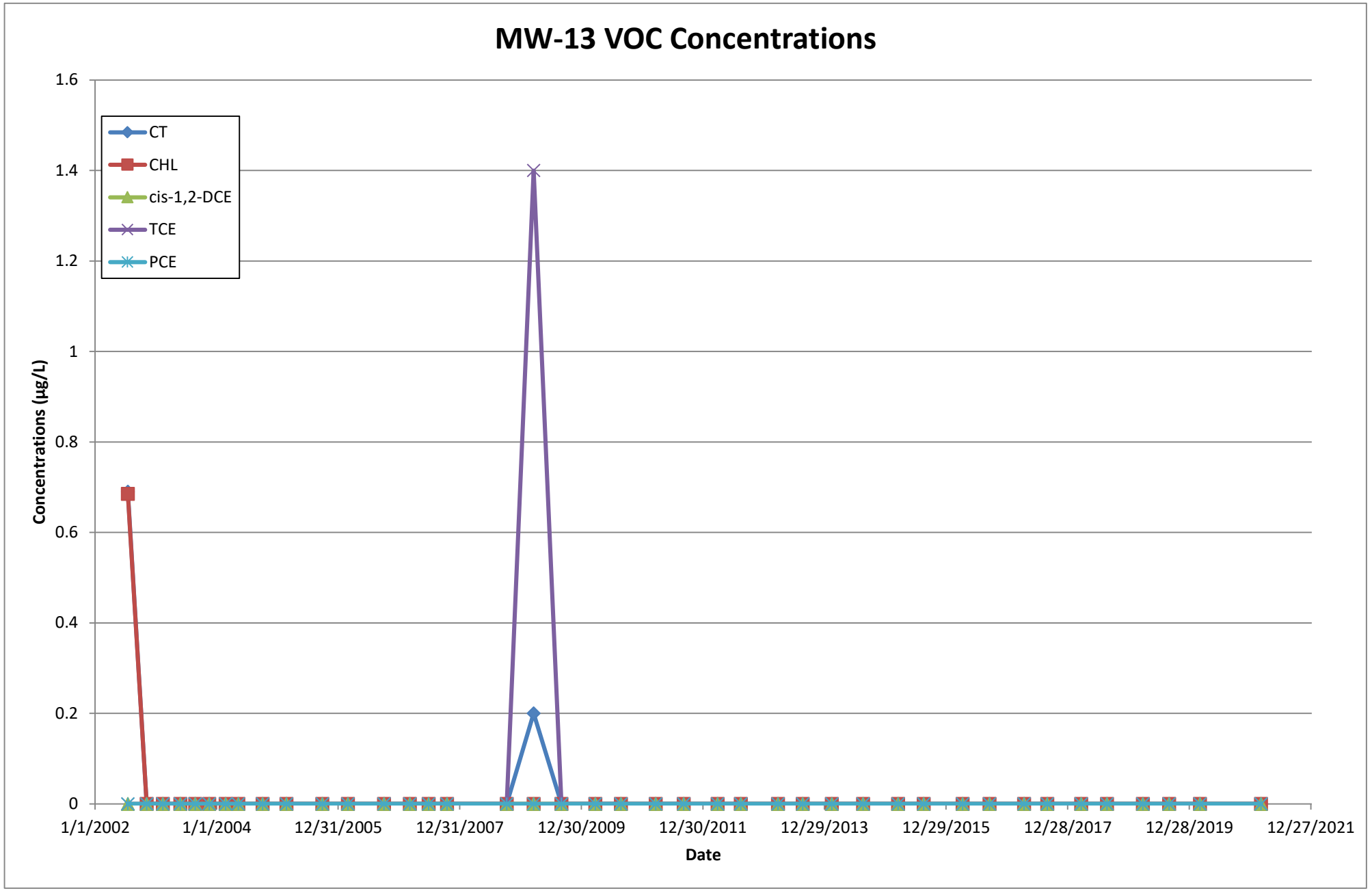

MW-7 VOC Concentrations
CT, cis-1,2-DCE, TCE, PCE Concentrations (µg/L)
CHL Concentrations (µg/L)
Date
CT
cis-1,2-DCE
PCE
TCE
CHL
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021

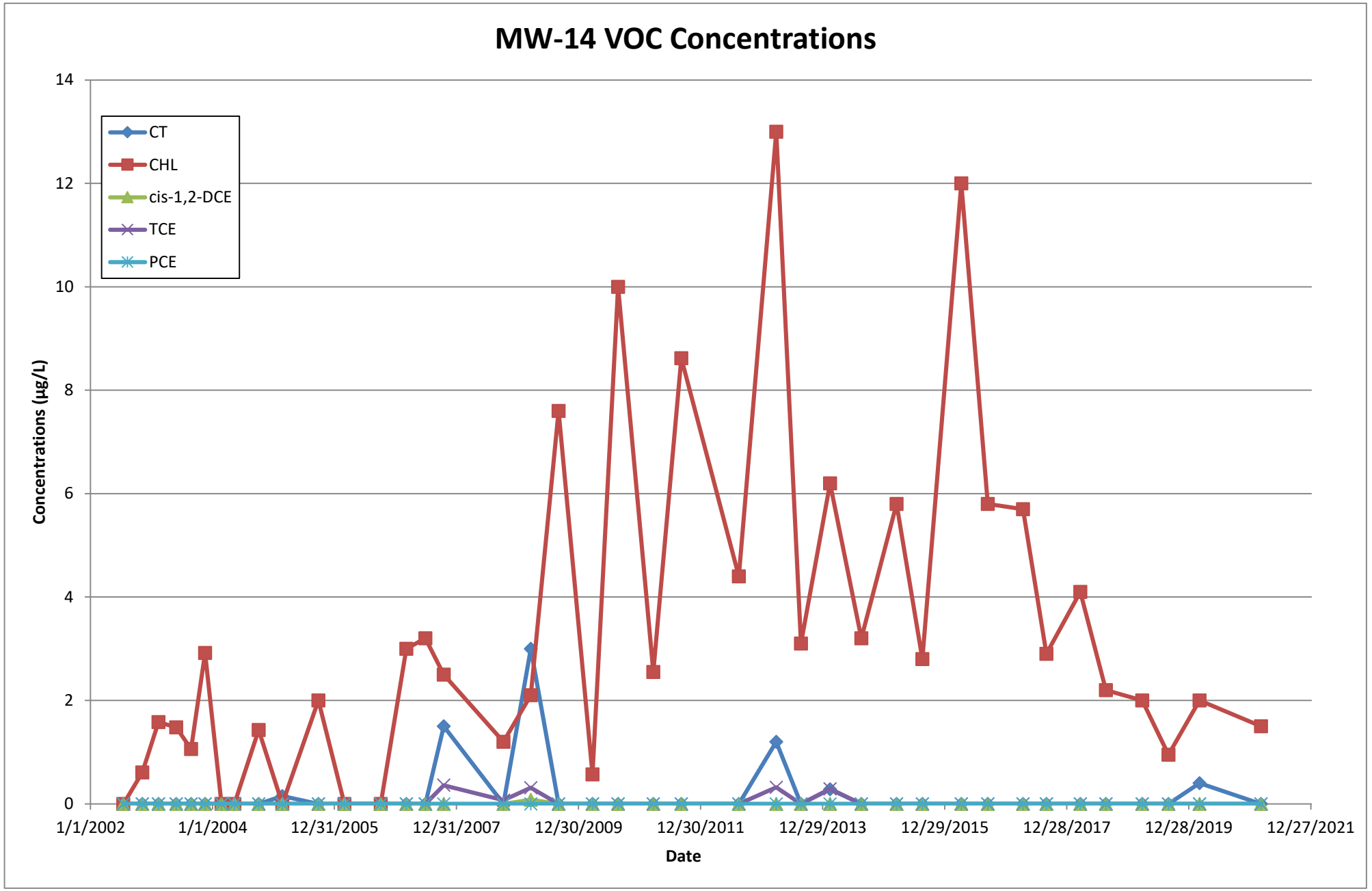

MW-8 VOC Concentrations
0.25
0.2
0.15
0.1
0.05
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

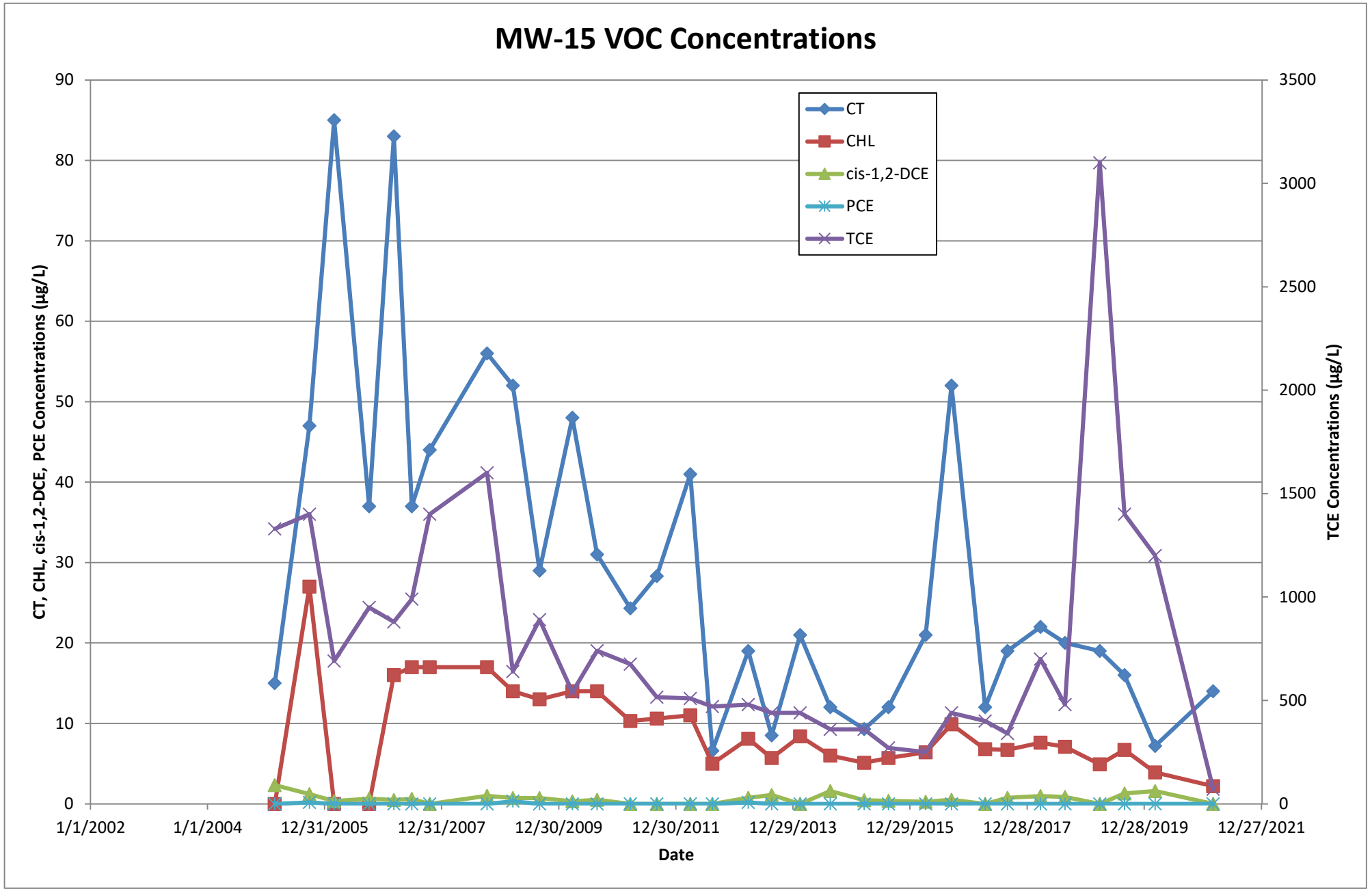

MW-9 VOC Concentrations
CT
CHL
TCE
PCE
Concentrations (µg/L)
0
1
2
3
4
5
6
7
8
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

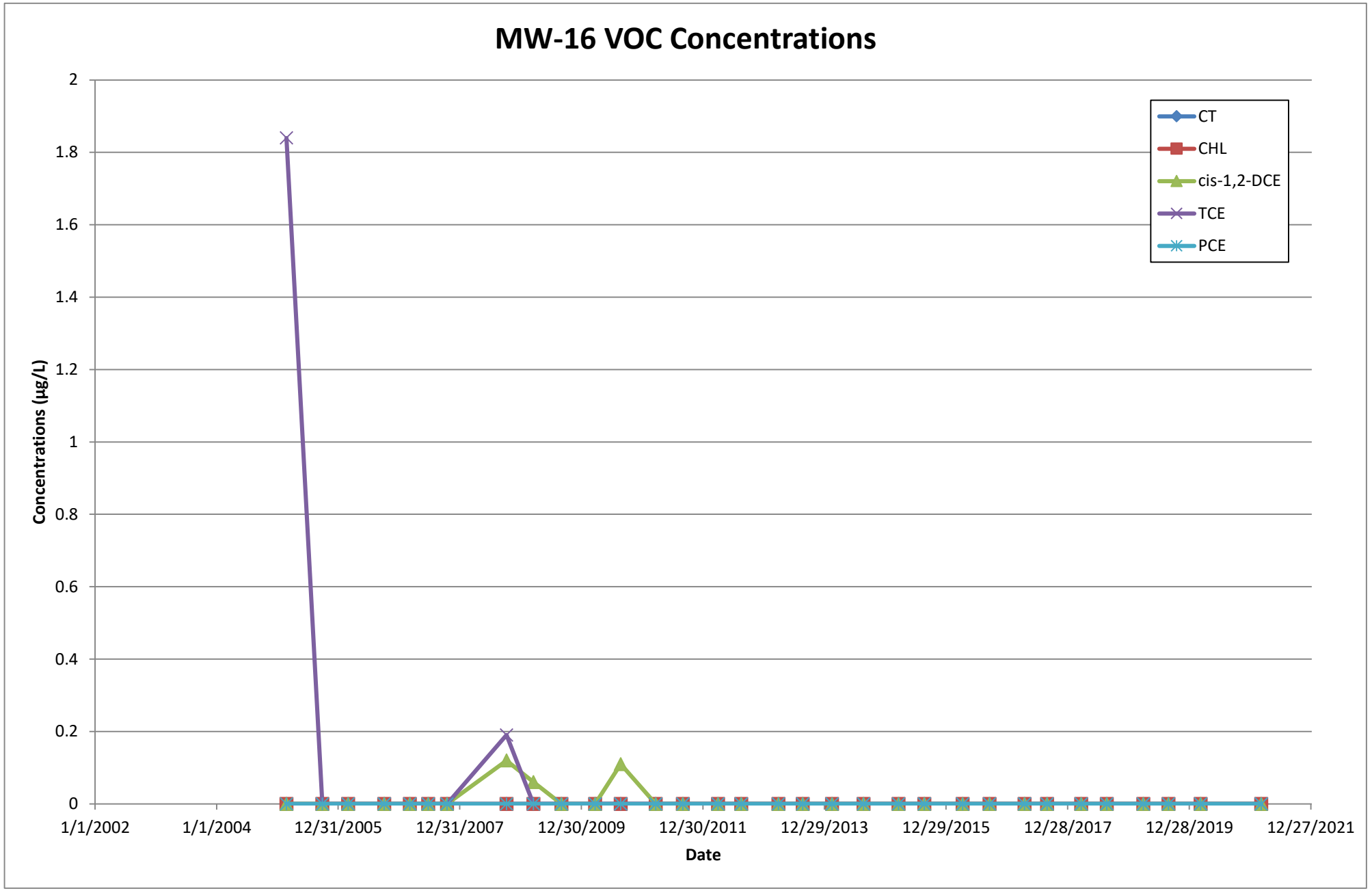

MW-10 VOC Concentrations
1.2
1
0.8
0.6
0.4
0.2
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

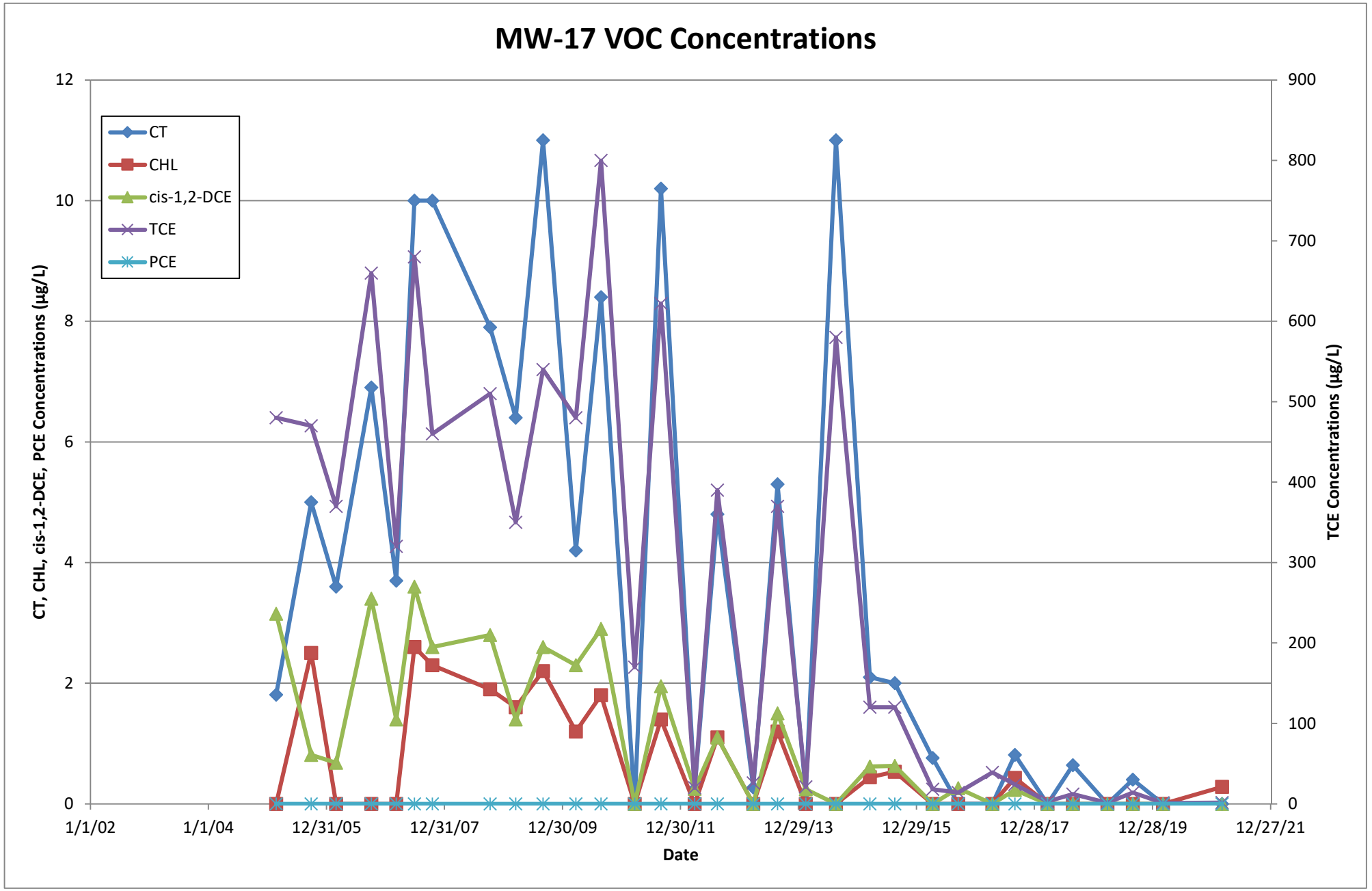

MW-11 VOC Concentrations
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

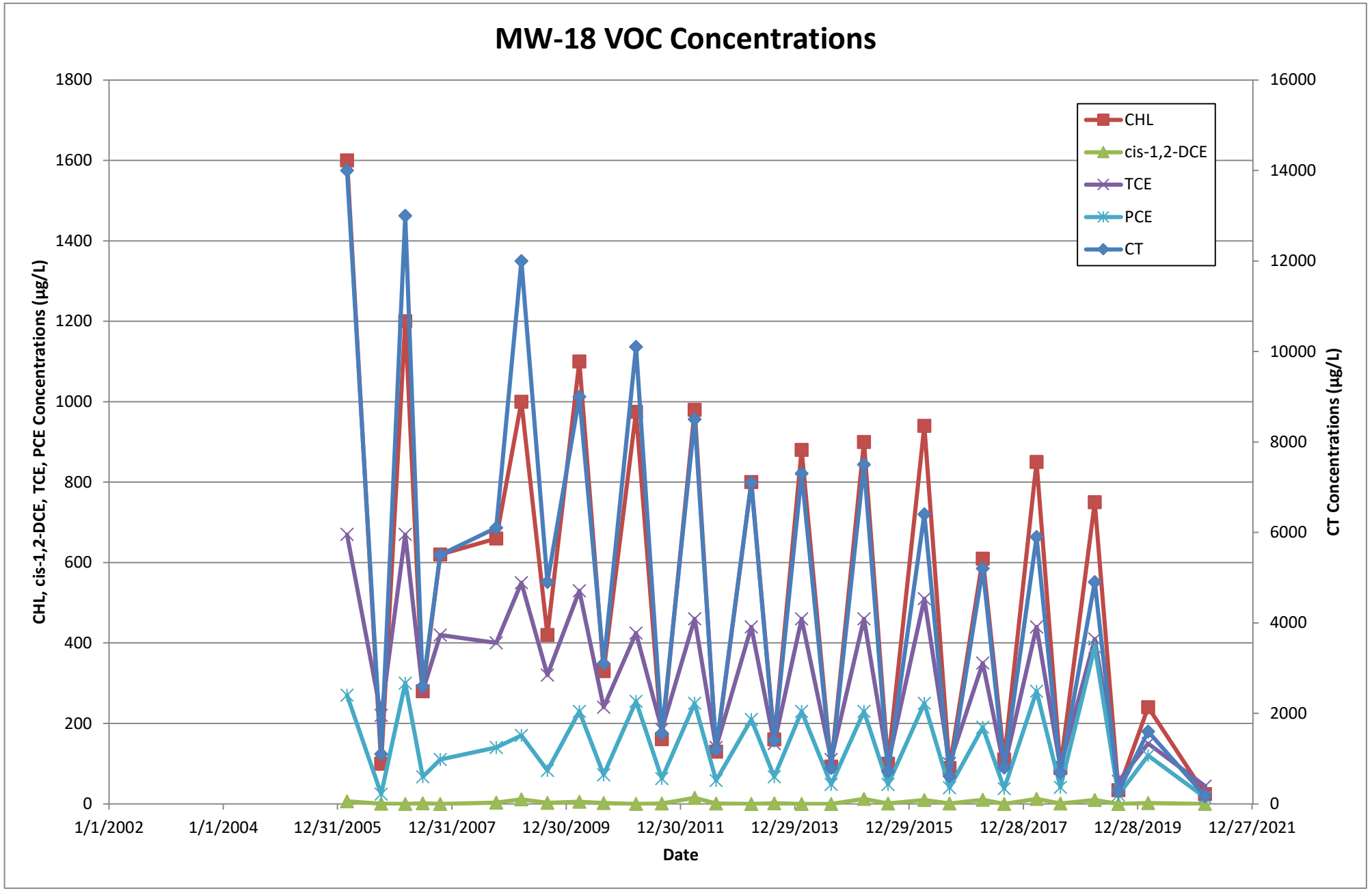

MW-13 VOC Concentrations
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

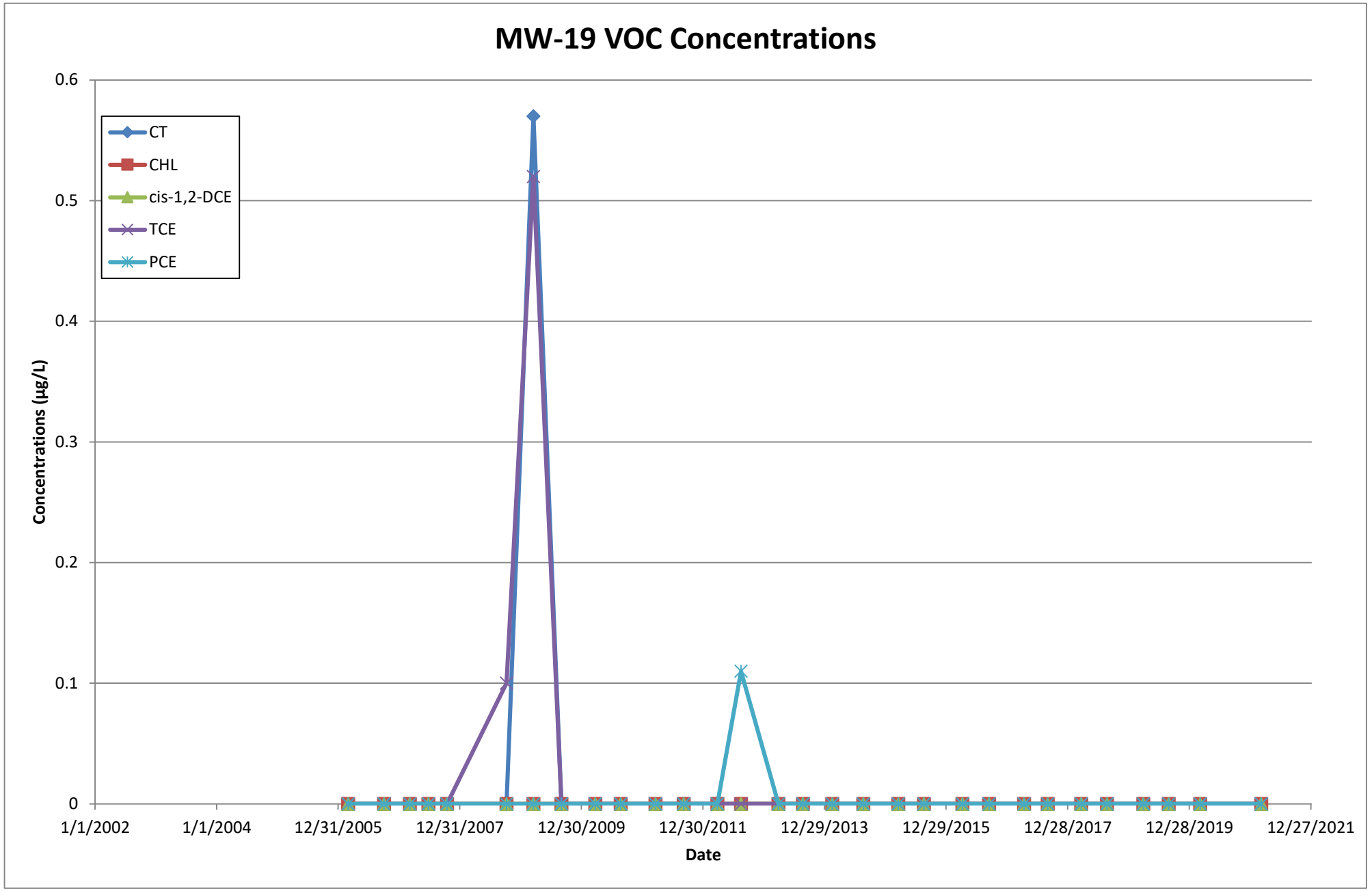

MW-14 VOC Concentrations
CT
CHL
cis-1,2-DCE
TCE
PCE
Concentrations (µg/L)
0
2
4
6
8
10
12
14
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

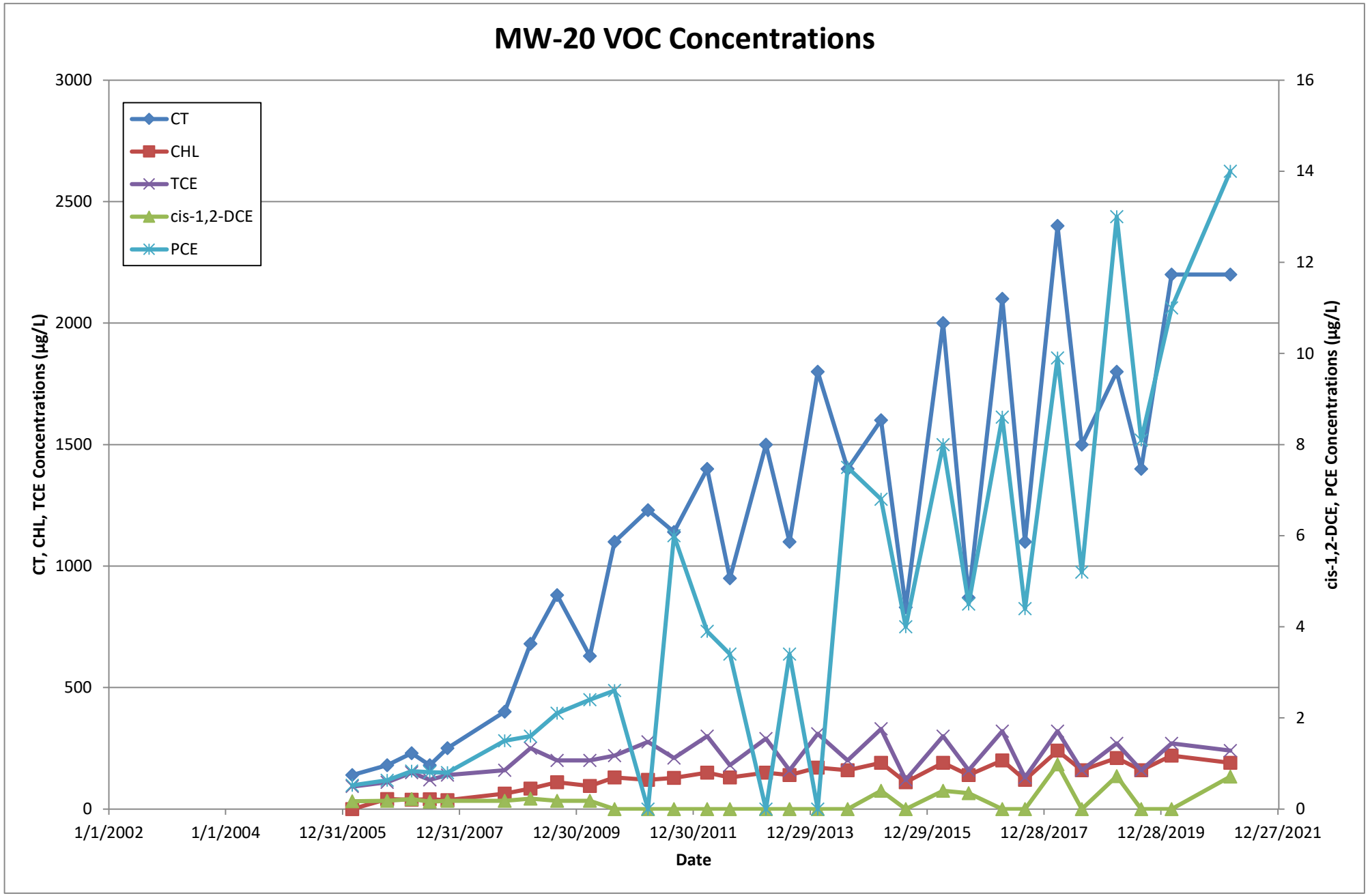

MW-15 VOC Concentrations
CT
CHL
cis-1,2-DCE
PCE
TCE
CT, CHL, cis-1,2-DCE, PCE Concentrations (µg/L)
TCE Concentrations (µg/L)
Date
0
10
20
30
40
50
60
70
80
90
0
500
1000
1500
2000
2500
3000
3500
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021

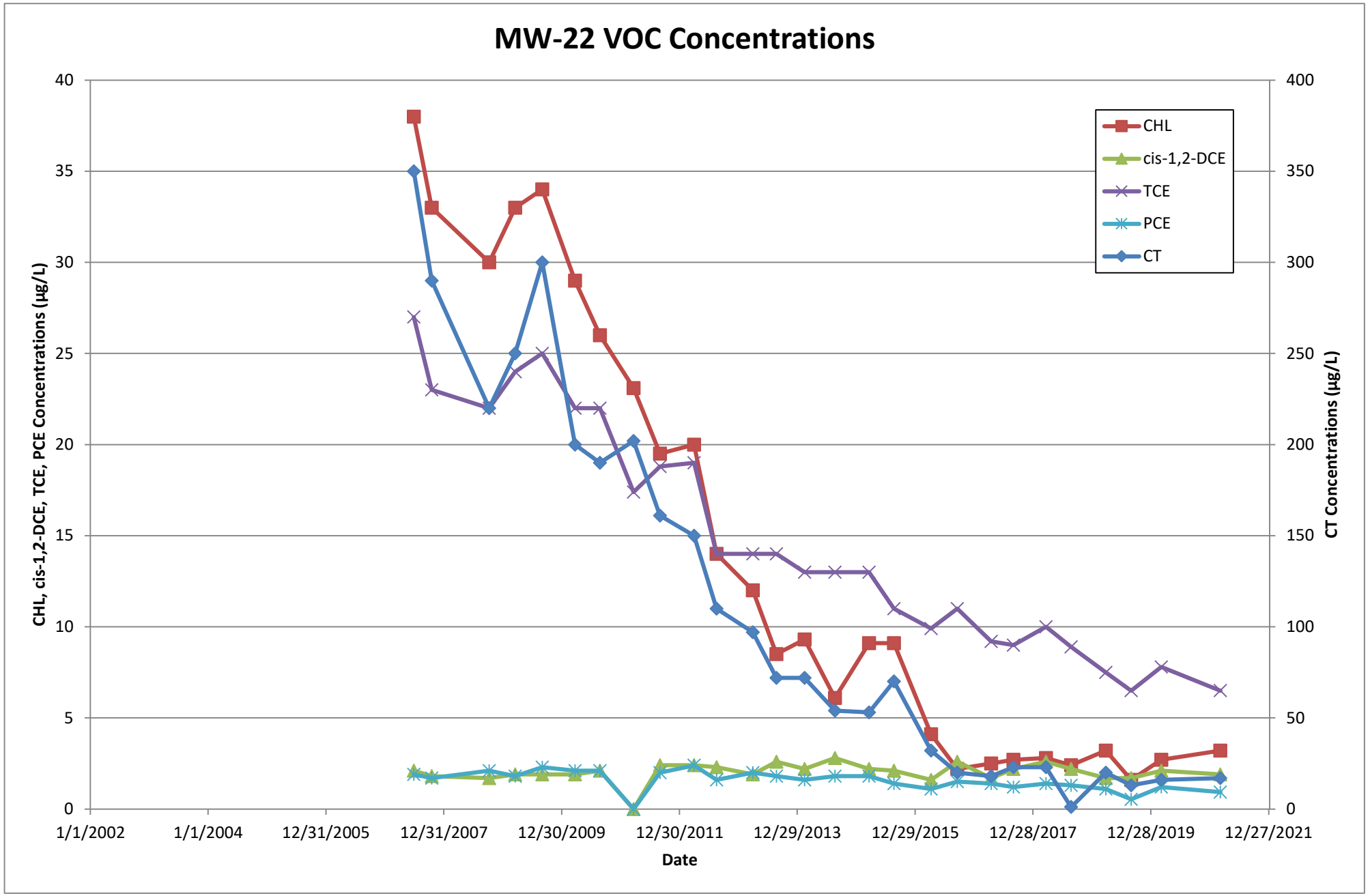

MW-16 VOC Concentrations
Concentrations (µg/L)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date
CT
CHL
cis-1,2-DCE
TCE
PCE

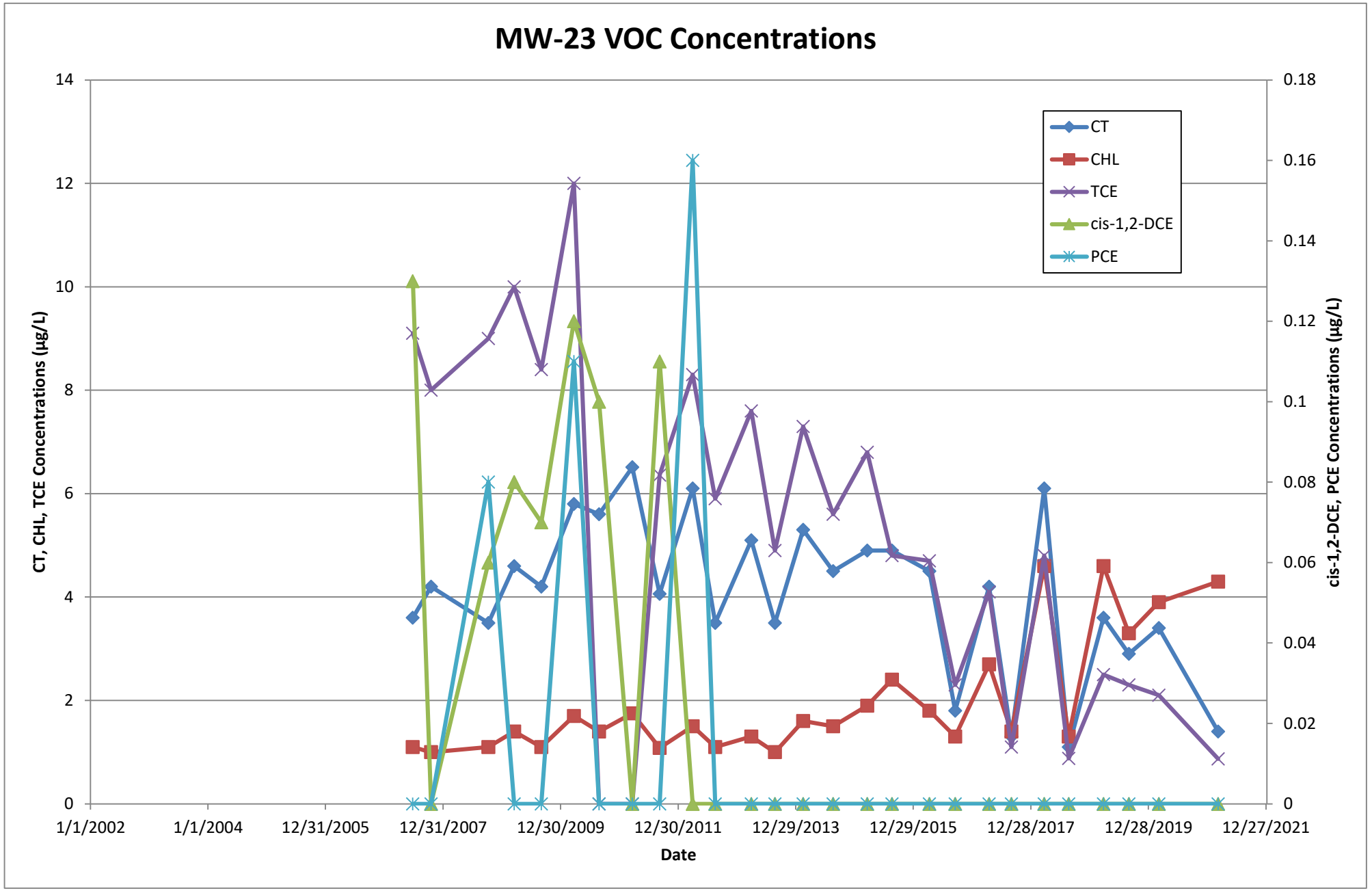

MW-17 VOC Concentrations
CT
CHL
cis-1,2-DCE
TCE
PCE
CT, CHL, cis-1,2-DCE, PCE Concentrations (µg/L)
TCE Concentrations (µg/L)
Date
0
2
4
6
8
10
12
0
100
200
300
400
500
600
700
800
900
1/1/02
1/1/04
12/31/05
12/31/07
12/30/09
12/30/11
12/29/13
12/29/15
12/28/17
12/28/19
12/27/21

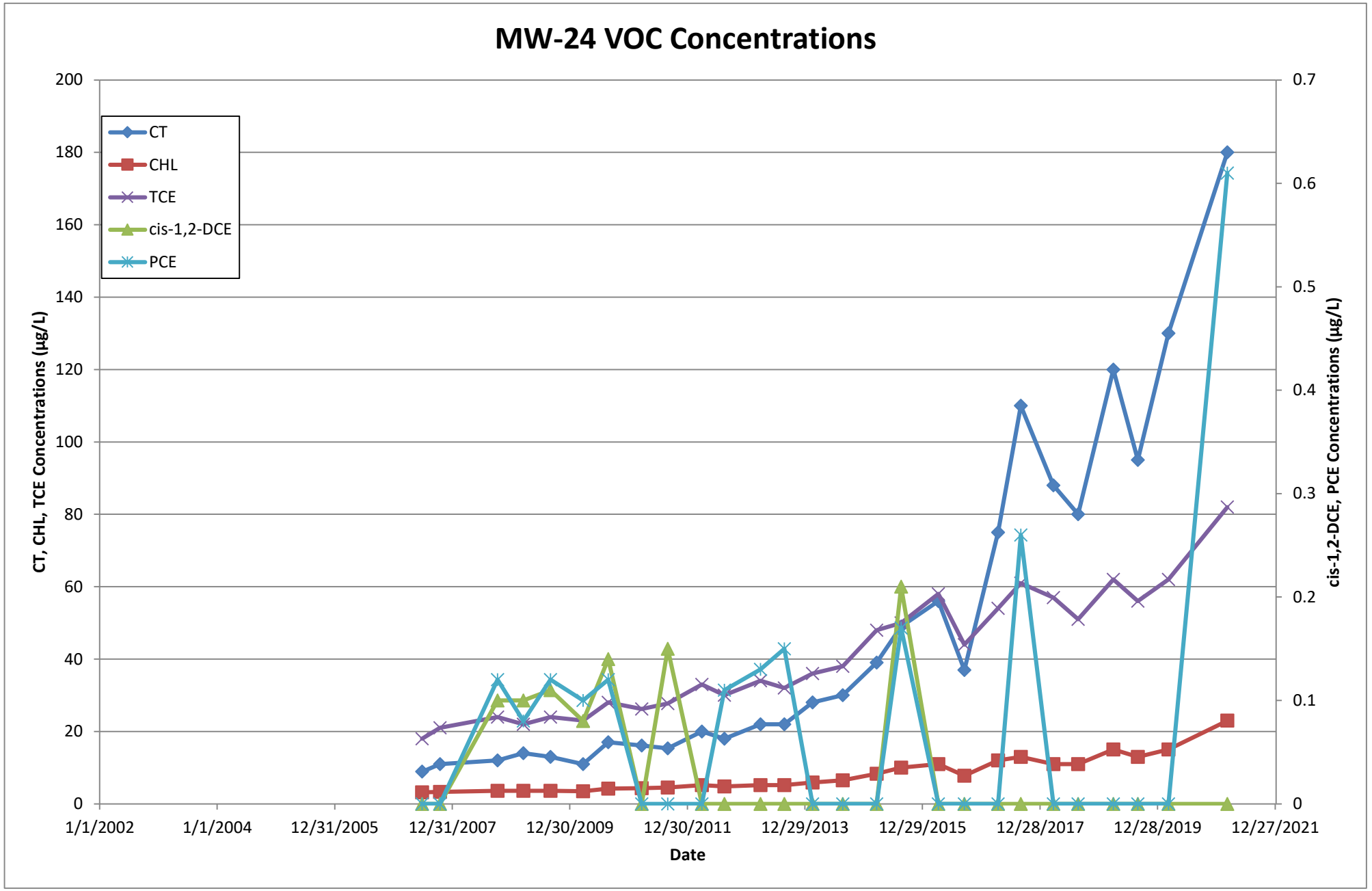

MW-18 VOC Concentrations
CHL, cis-1,2-DCE, TCE, PCE Concentrations (µg/L)
CT Concentrations (µg/L)
Date
CHL
cis-1,2-DCE
TCE
PCE
CT
0
200
400
600
800
1000
1200
1400
1600
1800
0
2000
4000
6000
8000
10000
12000
14000
16000
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021

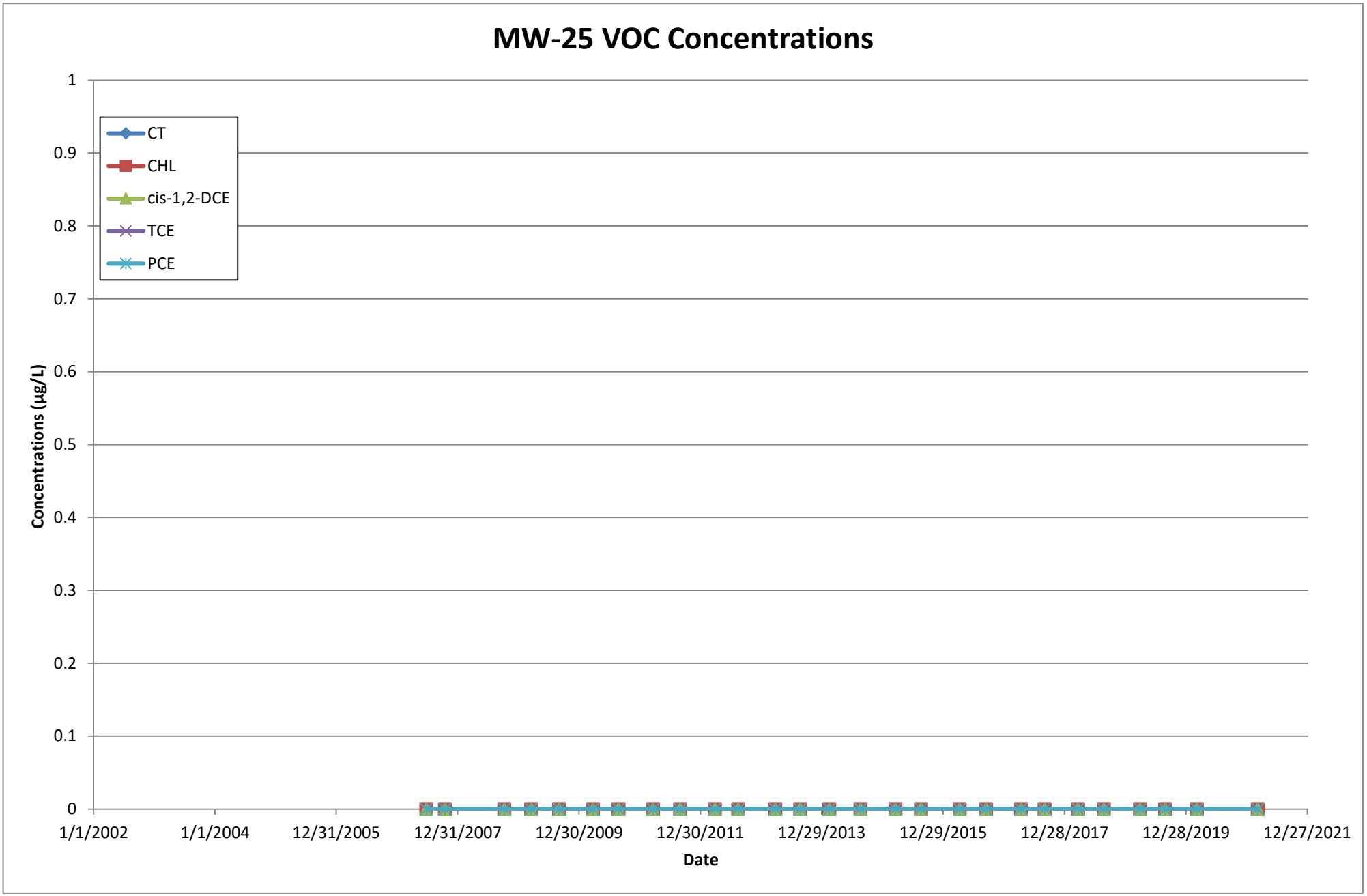

MW-19 VOC Concentrations
0.6
0.5
0.4
0.3
0.2
0.1
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

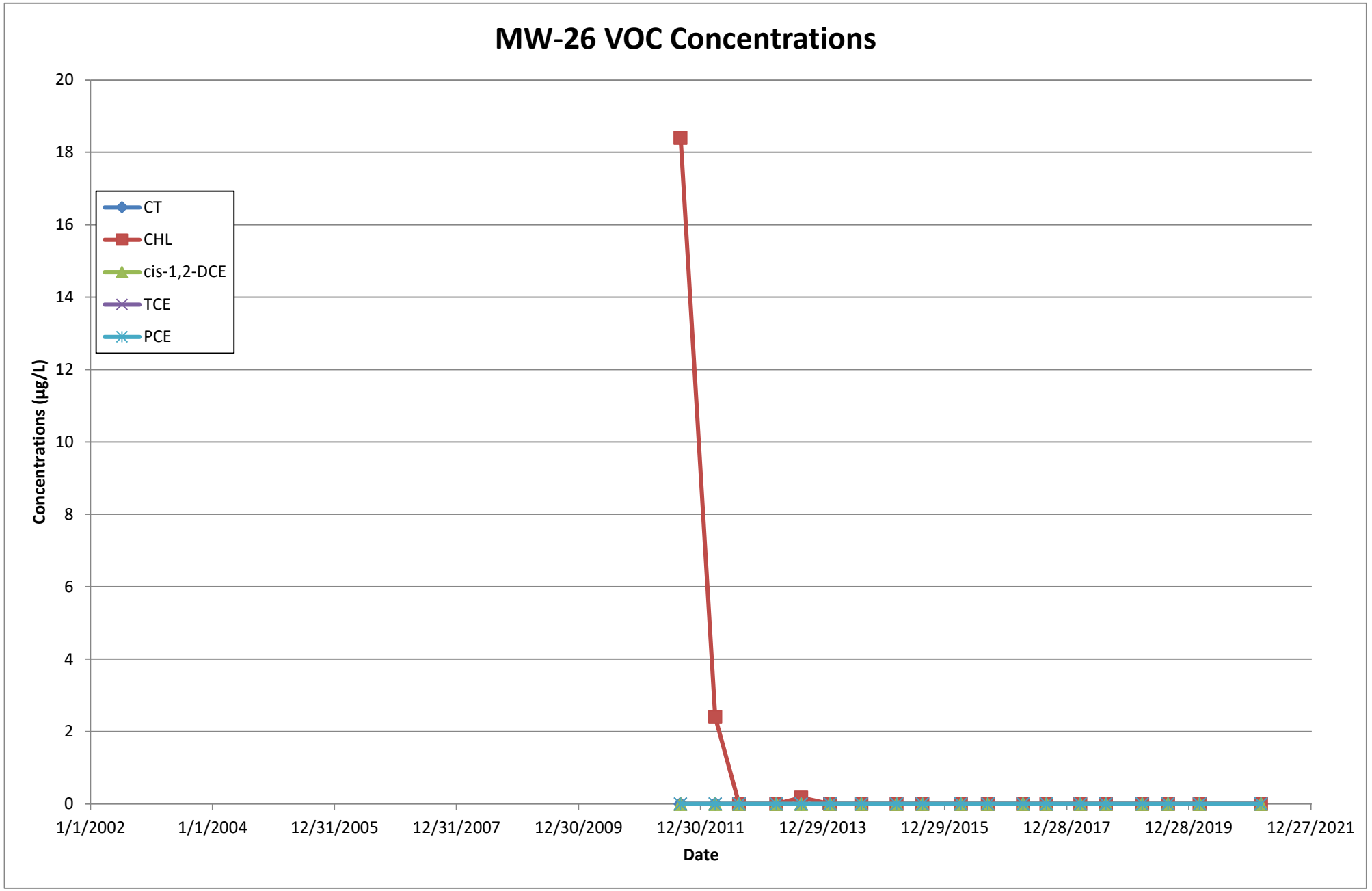

MW-20 VOC Concentrations
CT
CHL
TCE
cis-1,2-DCE
PCE
CT, CHL, TCE Concentrations (µg/L)
cis-1,2-DCE, PCE Concentrations (µg/L)
Date
3000
2500
2000
1500
1000
500
0
16
14
12
10
8
6
4
2
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021

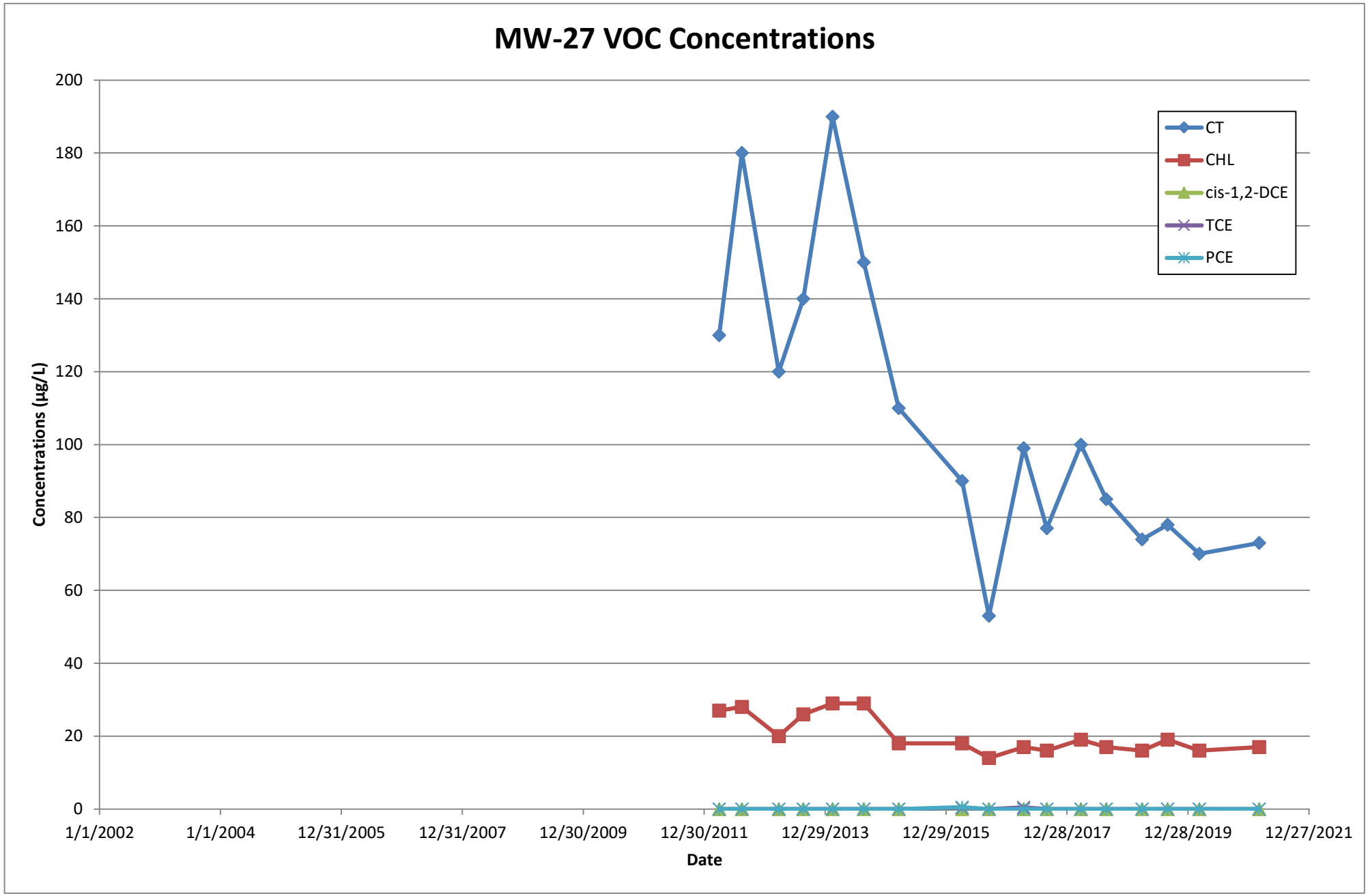

MW-22 VOC Concentrations
CHL
cis-1,2-DCE
TCE
PCE
CT
CHL, cis-1,2-DCE, TCE, PCE Concentrations (µg/L)
CT Concentrations (µg/L)
Date
0
5
10
15
20
25
30
35
40
0
50
100
150
200
250
300
350
400
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021

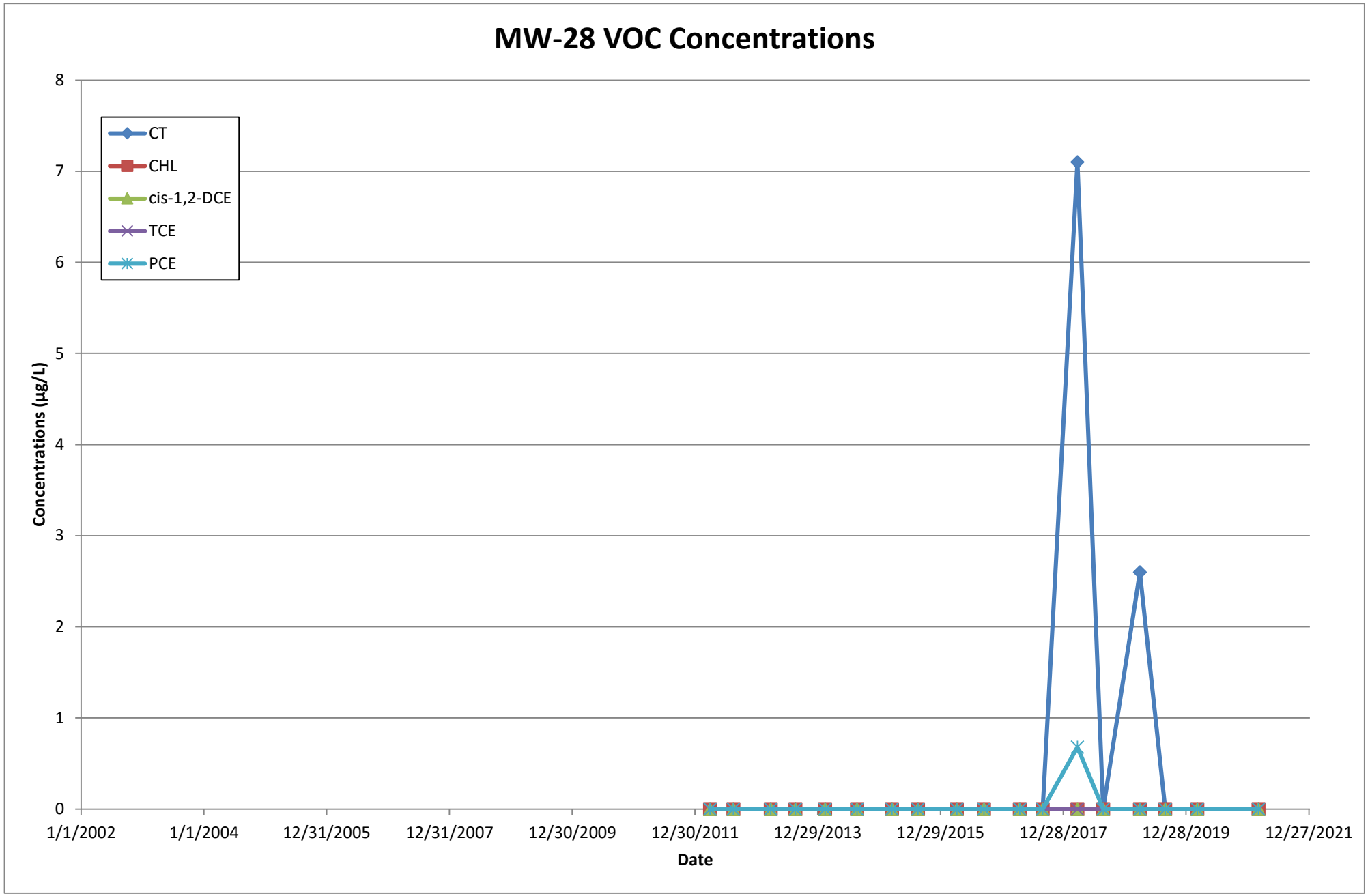

MW-23 VOC Concentrations
CT, CHL, TCE Concentrations (µg/L)
cis-1,2-DCE, PCE Concentrations (µg/L)
Date
CT
CHL
TCE
cis-1,2-DCE
PCE
0
2
4
6
8
10
12
14
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021

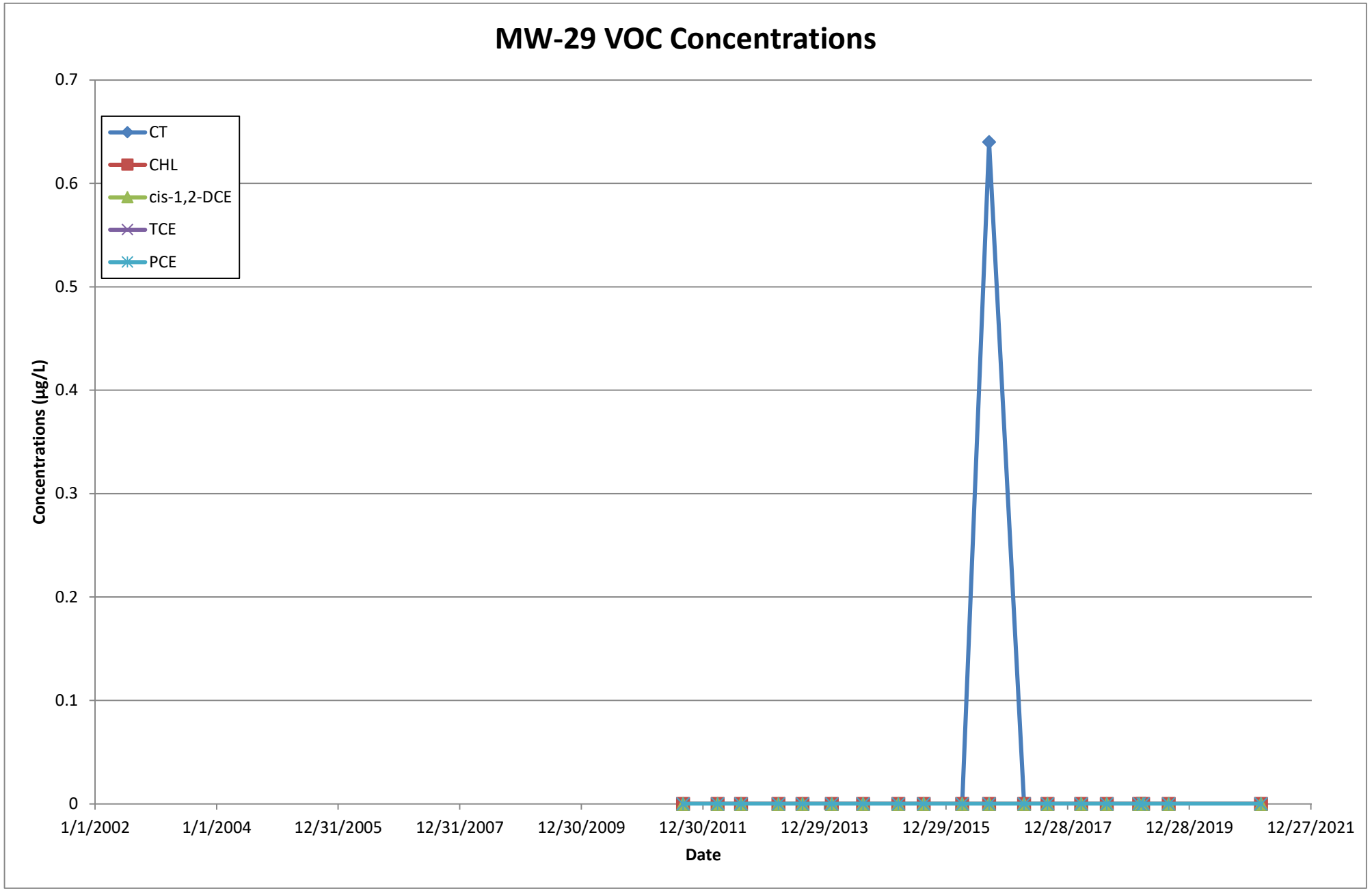

MW-24 VOC Concentrations
CT
CHL
TCE
cis-1,2-DCE
PCE
CT, CHL, TCE Concentrations (µg/L)
cis-1,2-DCE, PCE Concentrations (µg/L)
Date
0
20
40
60
80
100
120
140
160
180
200
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021

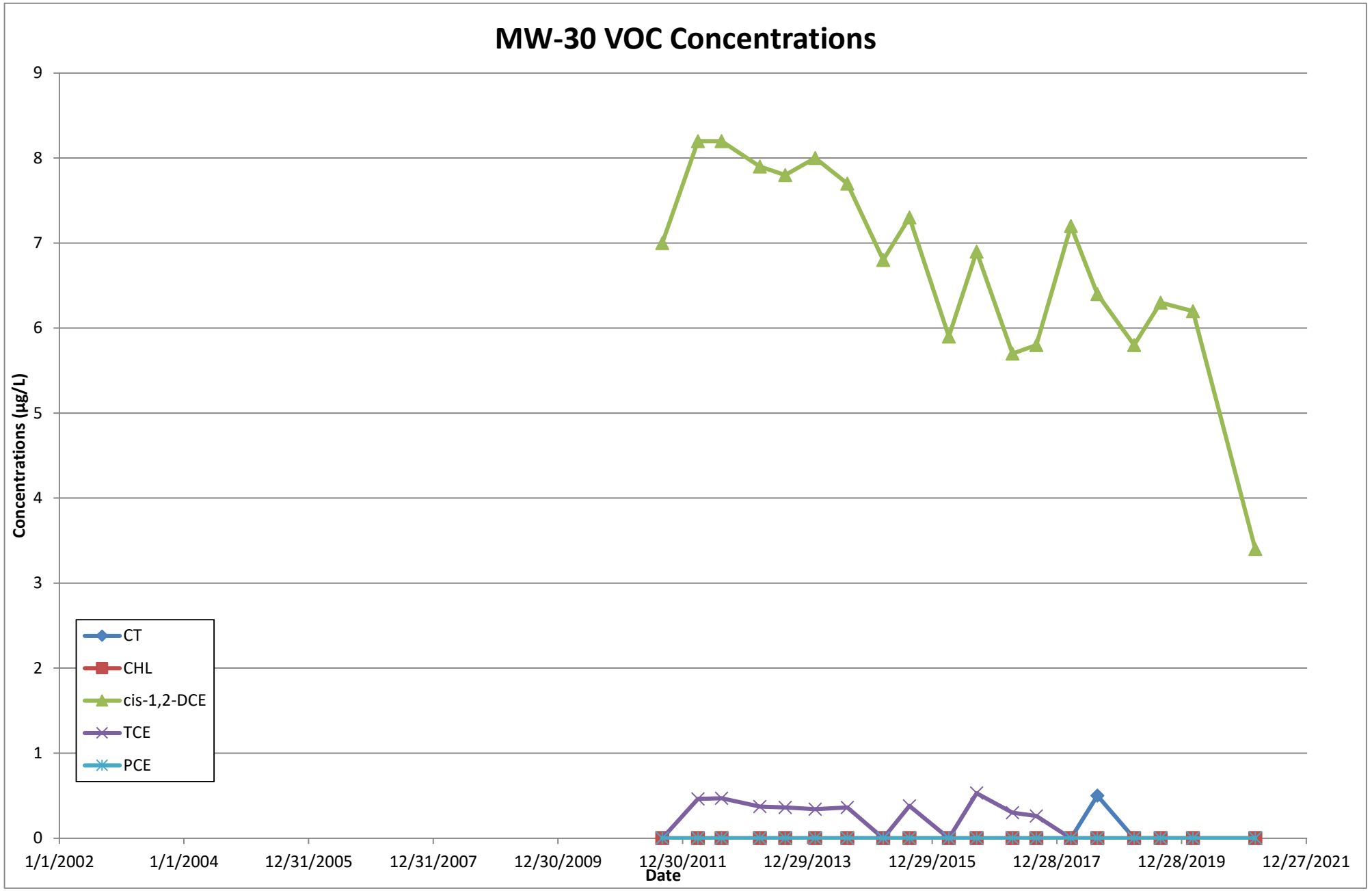

MW-25 VOC Concentrations
CT
CHL
cis-1,2-DCE
TCE
PCE
Concentrations (µg/L)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

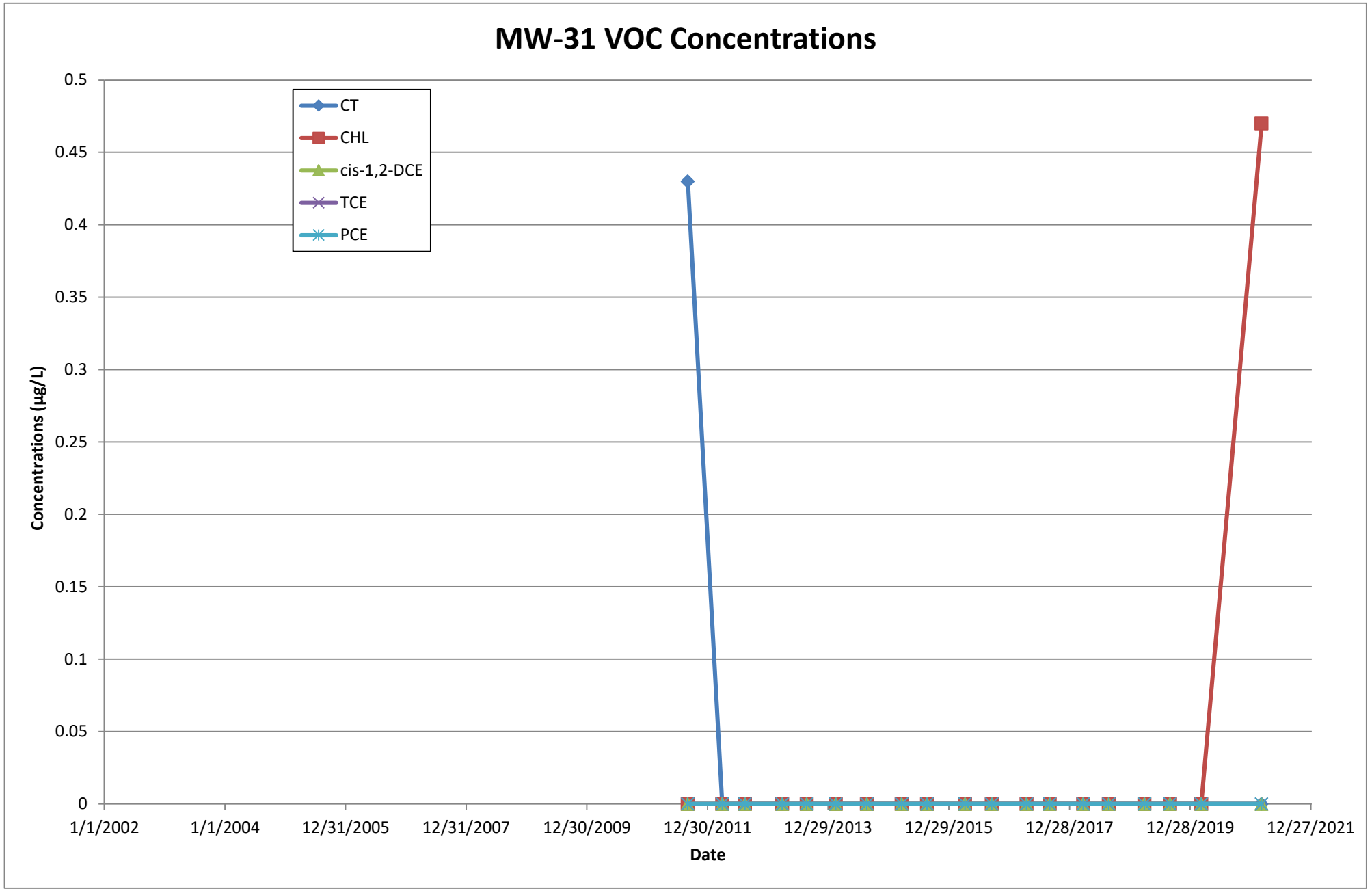

MW-26 VOC Concentrations
20
18
16
14
12
10
8
6
4
2
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

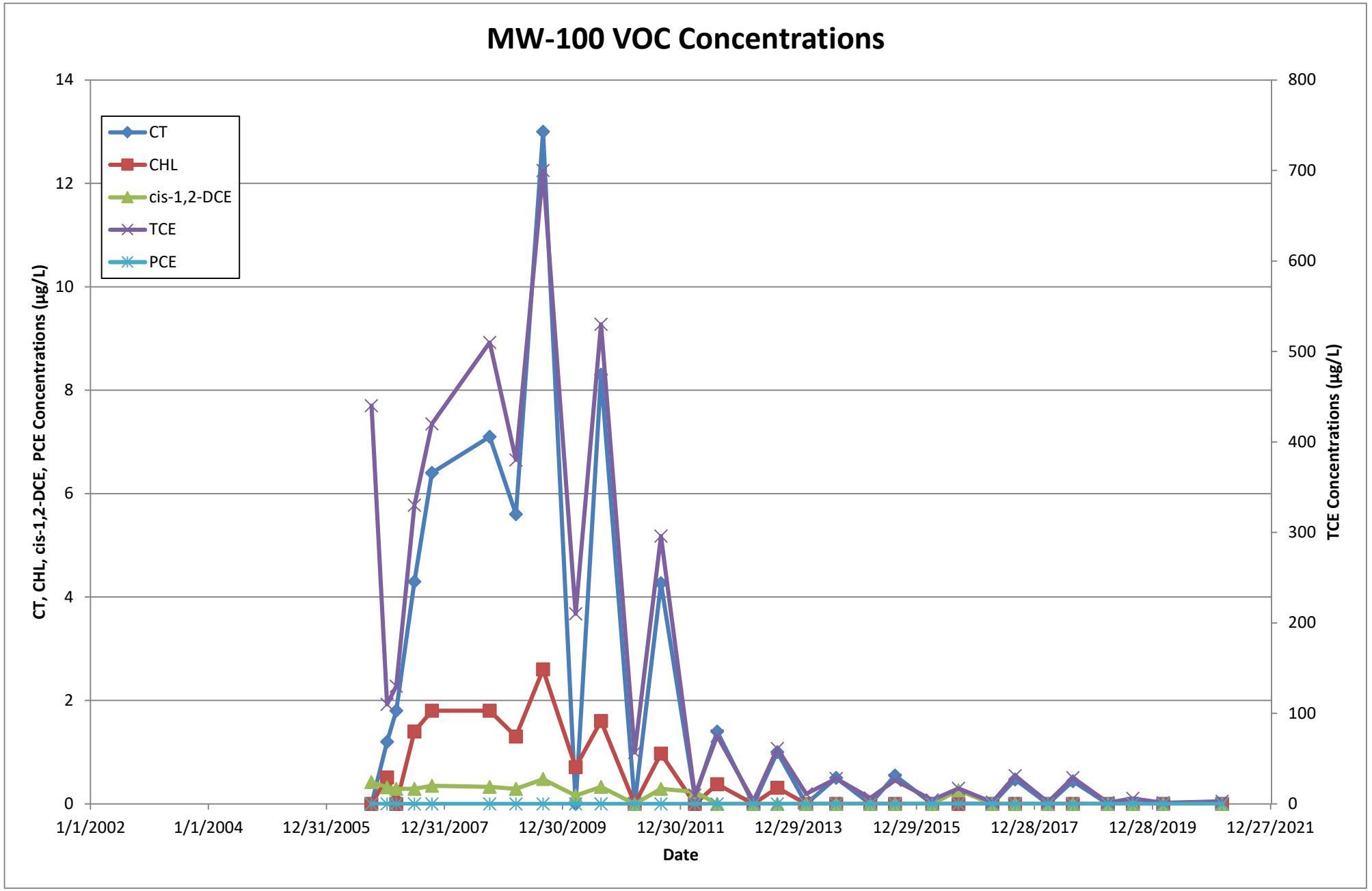

MW-27 VOC Concentrations
200
180
160
140
120
100
80
60
40
20
0
Concentrations (µg/L)
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date
CT
CHL
cis-1,2-DCE
TCE
PCE

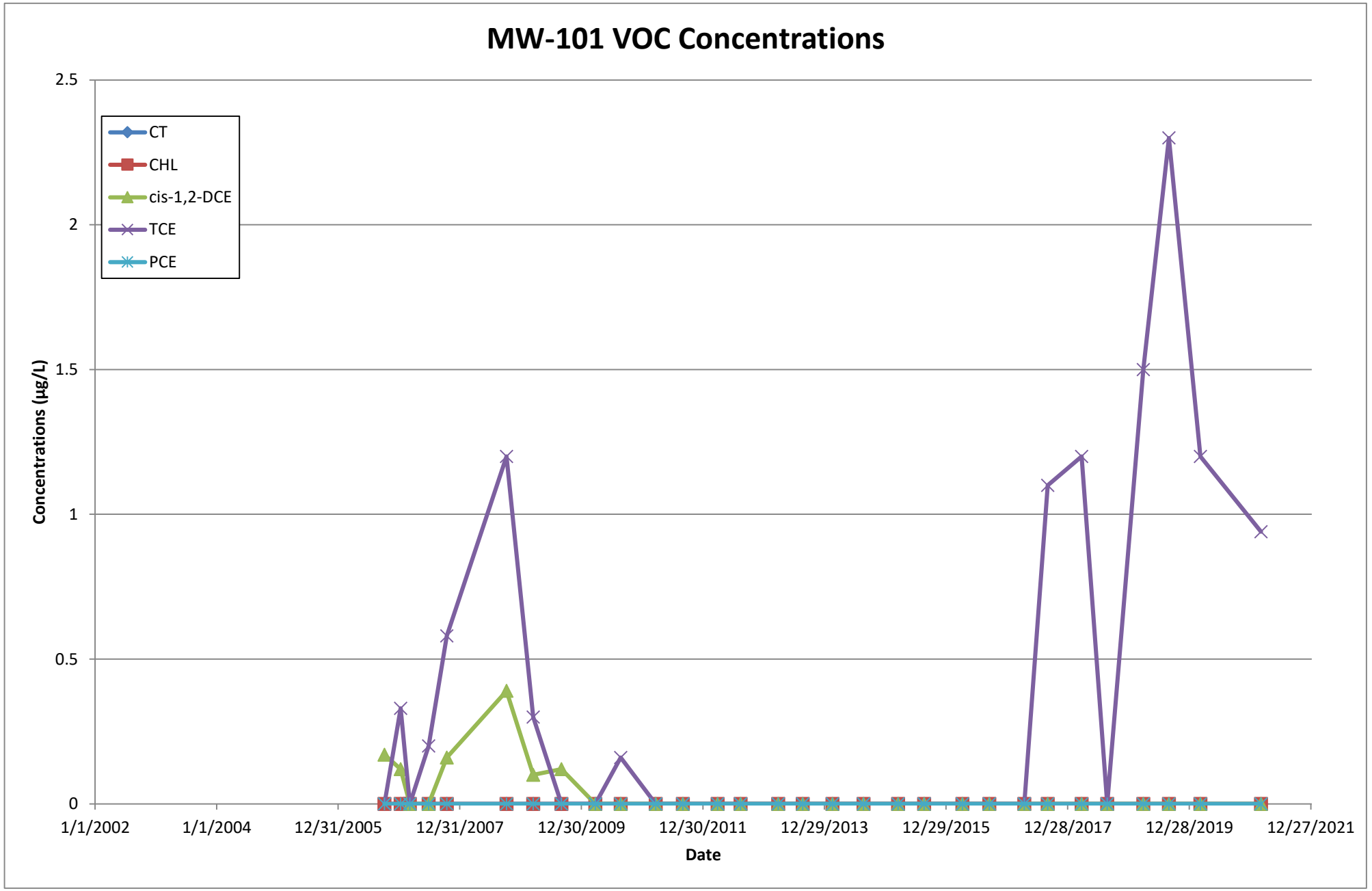

MW-28 VOC Concentrations
CT
CHL
cis-1,2-DCE
TCE
PCE
Concentrations (µg/L)
0
1
2
3
4
5
6
7
8
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

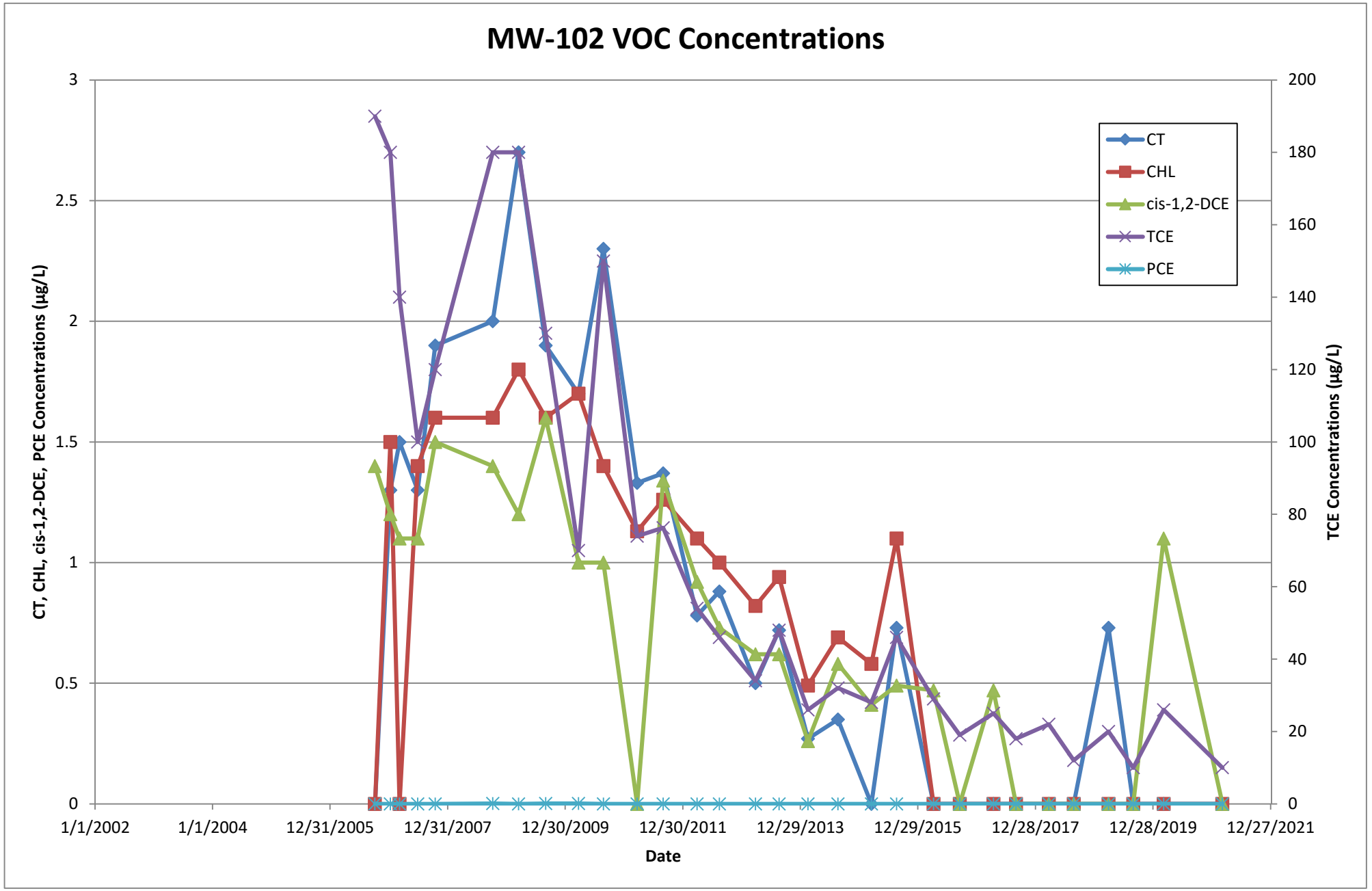

MW-29 VOC Concentrations
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date

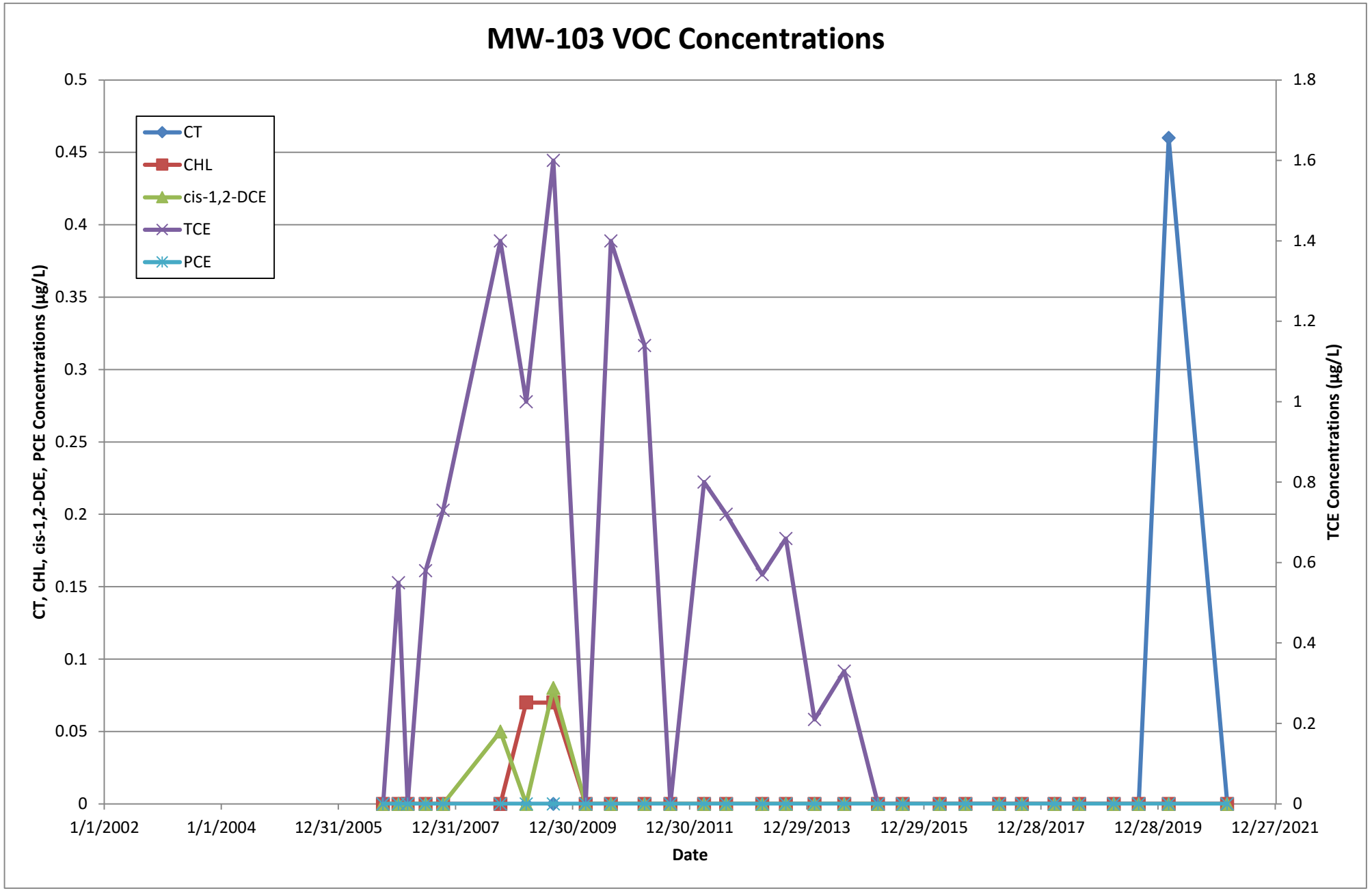

MW-30 VOC Concentrations
Concentrations (µg/L)
9
8
7
6
5
4
3
2
1
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date
CT
CHL
cis-1,2-DCE
TCE
PCE

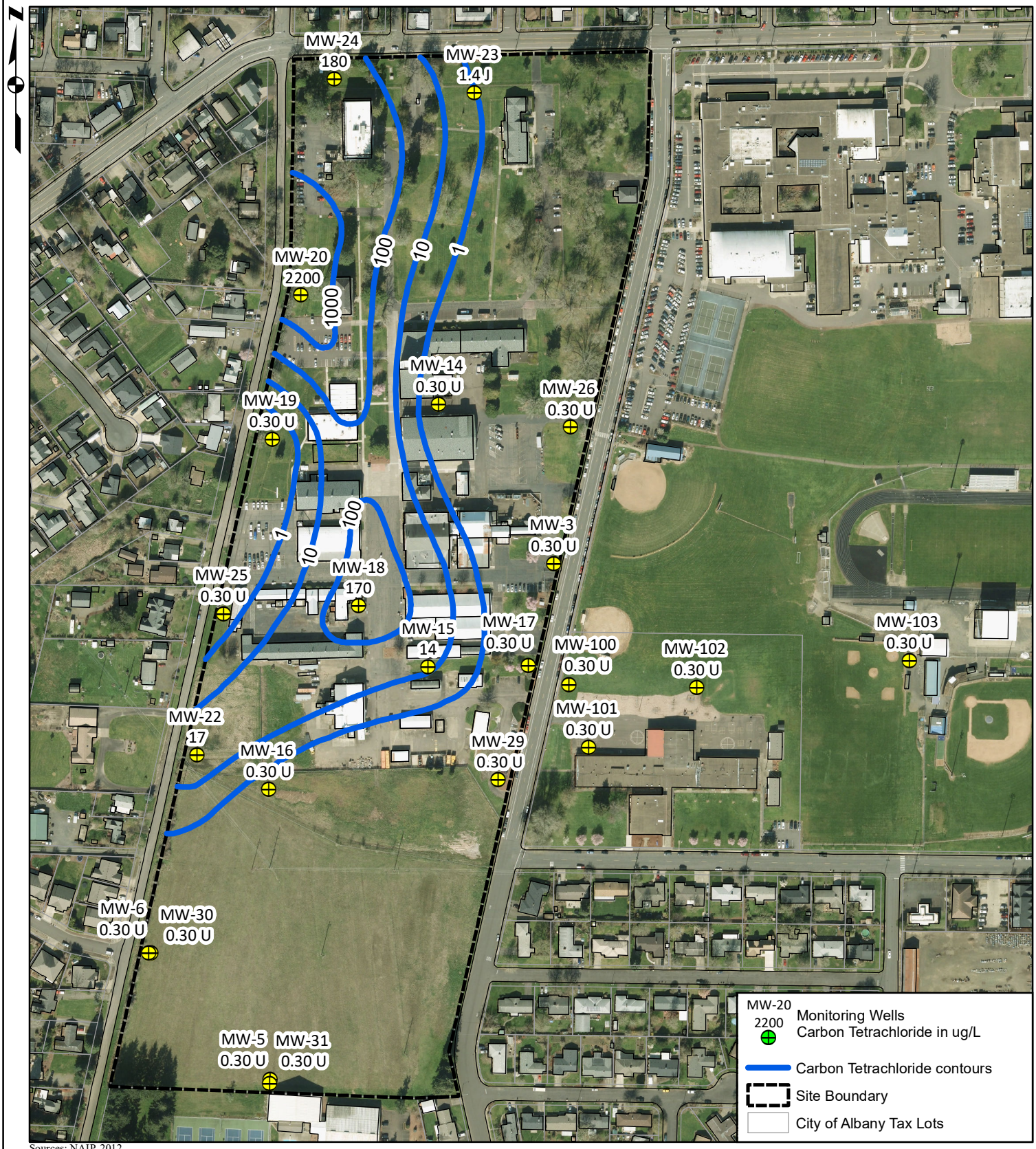

MW-31 VOC Concentrations
CT
CHL
cis-1,2-DCE
TCE
PCE
Concentrations (µg/L)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date


MW-100 VOC Concentrations
CT
CHL
cis-1,2-DCE
TCE
PCE
CT, CHL, cis-1,2-DCE, PCE Concentrations (µg/L)
TCE Concentrations (µg/L)
Date
0
2
4
6
8
10
12
14
0
100
200
300
400
500
600
700
800
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021


MW-101 VOC Concentrations
2.5
2
1.5
1
0.5
0
Concentrations (µg/L)
CT
CHL
cis-1,2-DCE
TCE
PCE
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021
Date


MW-102 VOC Concentrations
CT, CHL, cis-1,2-DCE, PCE Concentrations (µg/L)
TCE Concentrations (µg/L)
Date
CT
CHL
cis-1,2-DCE
TCE
PCE
3
2.5
2
1.5
1
0.5
0
200
180
160
140
120
100
80
60
40
20
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021


MW-103 VOC Concentrations
CT
CHL
cis-1,2-DCE
TCE
PCE
CT, CHL, cis-1,2-DCE, PCE Concentrations (µg/L)
TCE Concentrations (µg/L)
Date
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1/1/2002
1/1/2004
12/31/2005
12/31/2007
12/30/2009
12/30/2011
12/29/2013
12/29/2015
12/28/2017
12/28/2019
12/27/2021



Sources: NAIP, 2012.
Albany GIS, 2007.

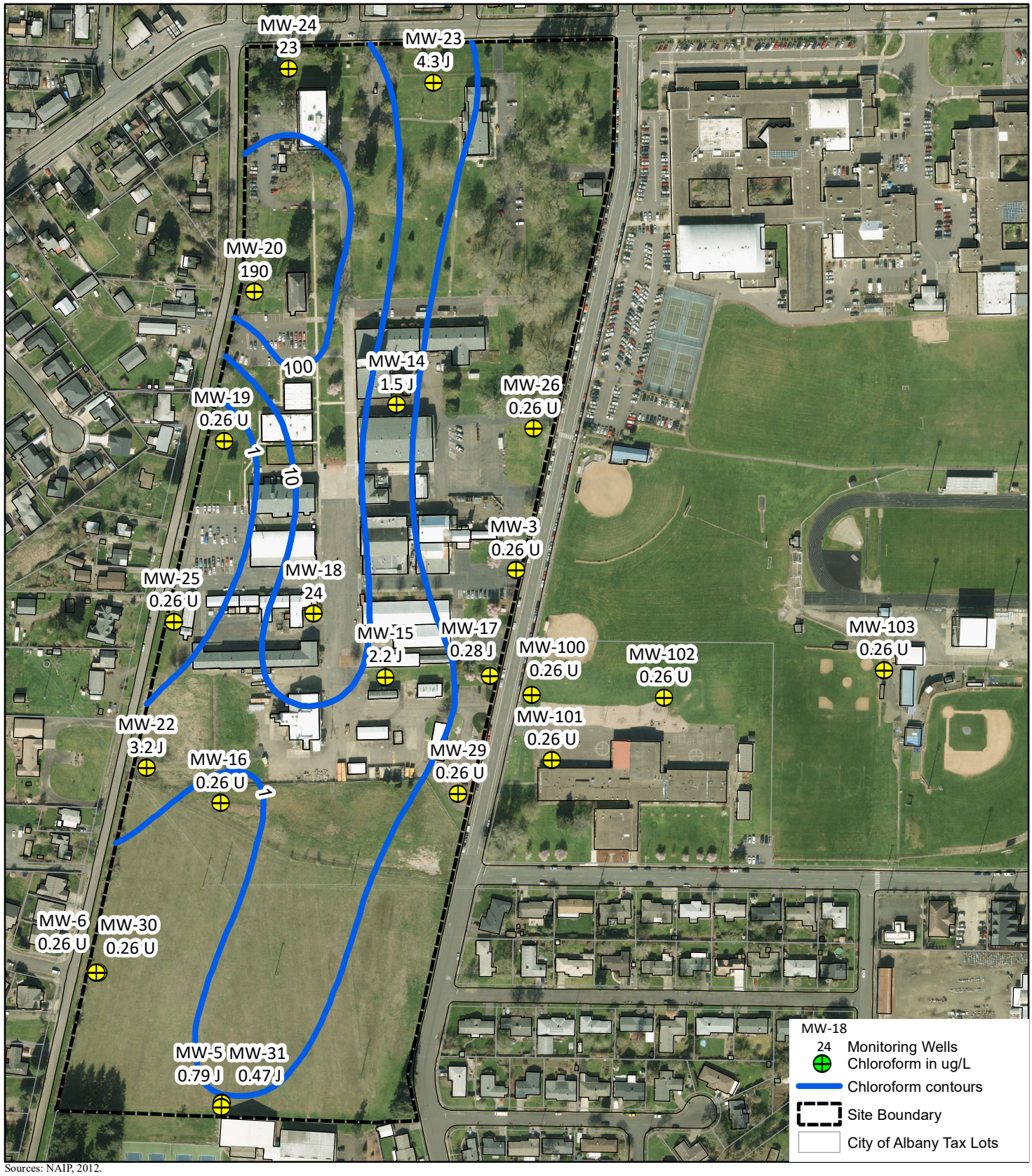
150 75 0 150 300
Feet

CONCENTRATION OF CARBON TETRACHLORIDE IN THE GRAVEL AQUIFER, MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 7



Sources: NAIP, 2012.
Albany GIS, 2007.

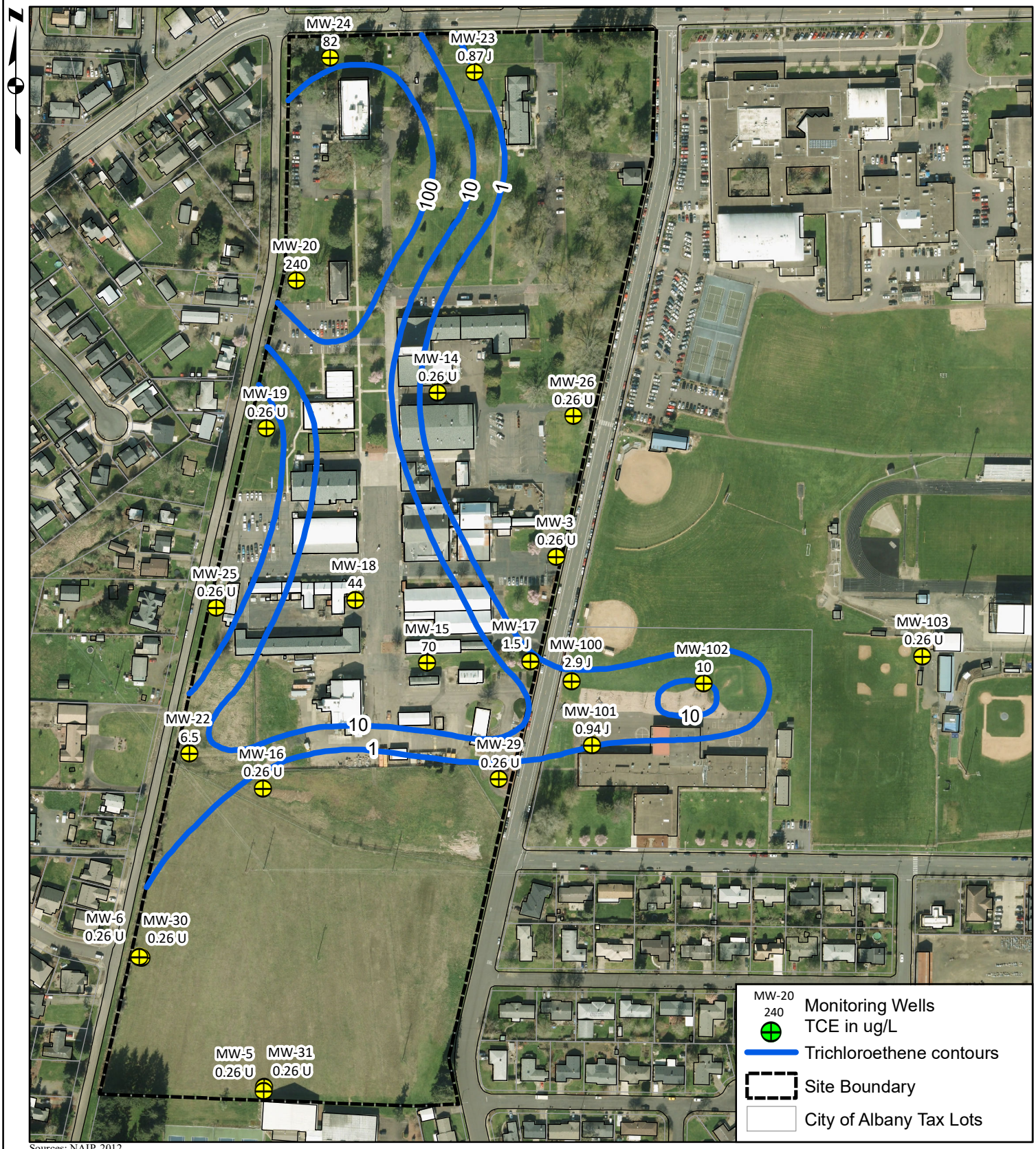
150 75 0 150 300
Feet

CONCENTRATION OF CHLOROFORM IN THE GRAVEL AQUIFER, MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 8



Sources: NAIP, 2012.
Albany GIS, 2007.

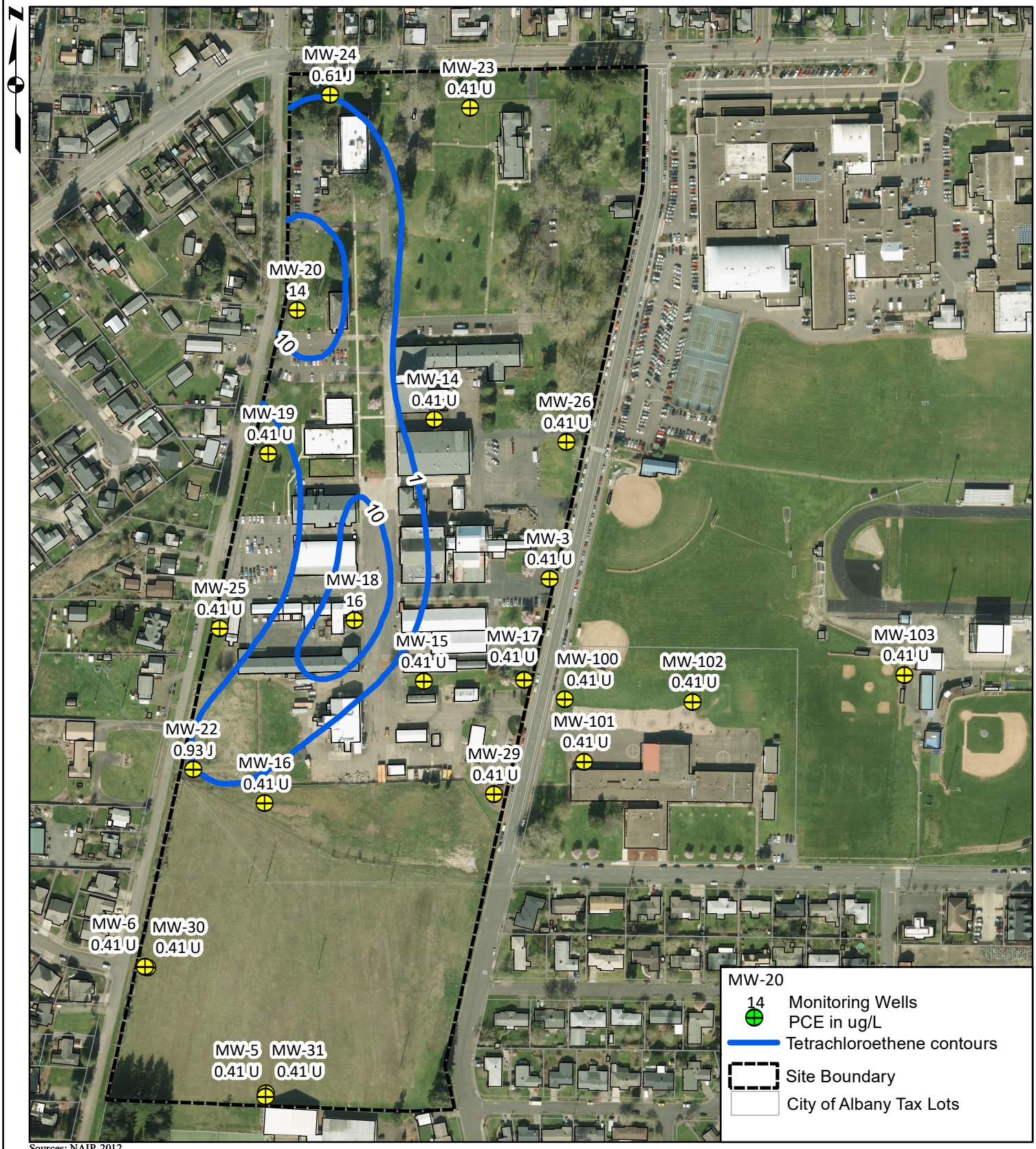
150 75 0 150 300
Feet

CONCENTRATION OF TRICHLOROETHENE IN THE GRAVEL AQUIFER, MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 9



Sources: NAIP, 2012.
Albany GIS, 2007.

150 75 0 150 300
Feet

CONCENTRATION OF TETRACHLOROETHENE IN THE GRAVEL AQUIFER, MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 10



Sources: NAIP, 2012.
Albany GIS, 2007.

150 75 0 150 300
Feet

CONCENTRATION OF CARBON TETRACHLORIDE IN THE PERCHED AQUIFER MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 11



Sources: NAIP, 2012.
Albany GIS, 2007.

150 75 0 150 300
Feet

CONCENTRATION OF CIS 1,2-DCE IN THE GRAVEL AQUIFER, MARCH 2021

NETL ALBANY
GROUNDWATER SAMPLING
ALBANY, OREGON

March 2021

FIGURE 12