



PANTEX QUARTERLY PROGRESS REPORT

Remedial Action Progress

1st Quarter 2021

In support of Hazardous Waste Permit #50284 and

Pantex Plant Interagency Agreement

June 2021

Pantex Plant

FM 2373 and U.S. Highway 60

P.O. Box 30030

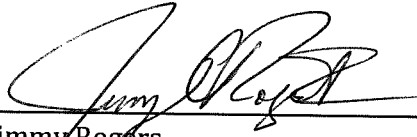
Amarillo, TX 79120



CERTIFICATION STATEMENT

1st Quarter 2021 Remedial Action Progress Report Pantex Plant, June 2021

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Jimmy Rogers
Acting Senior Director
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Consolidated Nuclear Security, LLC

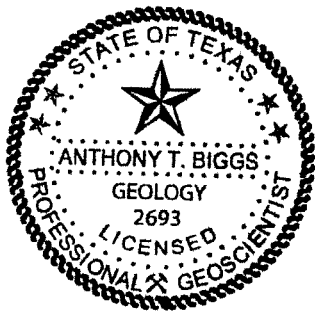
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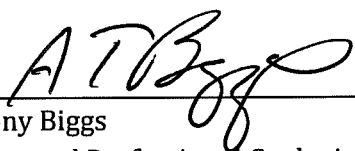
Date

**Quarterly Progress Report
1st Quarter 2021
in Support of Hazardous Waste Permit #50284
and Pantex Plant Interagency Agreement
for the Pantex Plant, Amarillo, Texas
June 2021**

Prepared by
Consolidated Nuclear Security, LLC
Management and Operating Contractor
for the
Pantex Plant and Y-12 National Security Complex
under Contract No. DE-NA0001942
with the
U.S. Department of Energy
National Nuclear Security Administration

In accordance with 30 TAC §335.553 (g), this report has been prepared and sealed by an appropriately qualified licensed professional engineer or licensed professional geoscientist.





Tony Biggs
Licensed Professional Geologist No. 2693
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Date

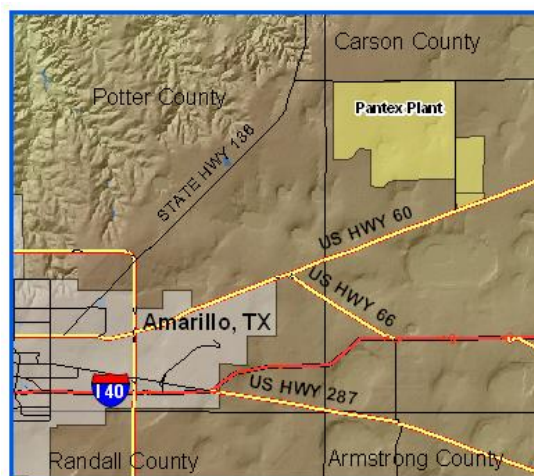
Project Team: Tony Biggs
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LIST OF ACRONYMS

µg/L	micrograms per liter
CatOX	catalytic oxidation
COC	contaminant of concern
CP	Compliance Plan
Cr(VI)	hexavalent chromium
DCE	dichloroethene
DNT4A	4-amino-2,6-dinitrotoluene
EVO	emulsified vegetable oil
FGZ	fine-grained zone
FY	fiscal year
GWPS	groundwater protection standard
HE	high explosive
ISB	<i>In Situ</i> bioremediation
ISPM	<i>In Situ</i> performance monitoring
lbs	pounds
Mgal	million gallons
mV	millivolts
NAPL	non-aqueous phase liquid
ORP	oxidation-reduction potential
P1PTS	Playa 1 Pump and Treat System
PID	photoionization detector
ppmv	parts per million by volume
PQL	practical quantitation limit
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
SAP	Sampling and Analysis Plan
Scfm	standard cubic feet per minute
SEPTS	Southeast Pump and Treat System
SVE	soil vapor extraction
TAC	Texas Administrative Code
TCE	trichloroethene
TZM	treatment zone monitoring
VOC	volatile organic compound
WWTF	wastewater treatment facility

INTRODUCTION

The Pantex Plant, located in the Texas Panhandle 17 miles northeast of Amarillo, has implemented a response action to remediate perched groundwater and soils. Two types of systems have been installed for the groundwater response action: pump and treat systems in two areas and *In Situ* bioremediation (ISB) systems in four areas. A soil vapor extraction (SVE) system has been installed to remediate volatile organic compounds (VOCs) in soils at the Burning Ground area. This quarterly report addresses progress achieved through implementation of the remedial actions for 1st quarter of 2021.



This report provides an intermediate data summary for response action systems throughout the year. More intensive data reporting is included in the annual progress reports. The quarterly progress reports address three of the five evaluations included in the annual progress report: response action effectiveness, uncertainty management, and early detection. The reports provide required information from Hazardous Waste Permit #50284 CP Table VII and the Pantex Interagency Agreement.

Maps of the plumes, remedial action systems, sampling locations, and system wells are provided in Appendix A. Graphs of operation and flow rates for the pump and treat systems are provided in Appendix B. Graphs of important parameters for the ISB treatment zone and downgradient wells are provided in Appendix C.

RESPONSE ACTION EFFECTIVENESS

This quarterly progress report focuses on specific criteria for the pump and treat systems, ISB systems, and a small-scale SVE system. System operation, mass removal, and evaluation of effluent in reference to established operational goals are reported for the pump and treat systems. For the ISB systems, this report evaluates geochemical conditions and availability of food source in the treatment zone and reduction of concentrations of contaminants of concern (COCs) in downgradient performance monitoring wells to evaluate whether the treatment zone is working effectively. System operation, mass removal, and effluent photoionization detector (PID) readings are evaluated for the SVE system.

All remediation systems were shut down the week of February 15, 2021 due to Winter Storm Uri, to help conserve energy and to protect vulnerable system components. Further details from the

impacts of the storm on operations and startup are found in each remediation system's section. Regulators were notified of the interruption in operation.

PUMP AND TREAT SYSTEMS

The groundwater remedial action at the Pantex Plant includes two pump and treat systems: Southeast Pump and Treat System (SEPTS) and Playa 1 Pump and Treat System (P1PTS). The pump and treat systems are designed to extract water and remove contaminant mass from the water before the effluent is beneficially used by the wastewater treatment facility (WWTF) and irrigation system, for general Plant needs, or for amendment injections at the ISB systems. The systems were also designed to remove water from the perched aquifer to reduce saturated thickness. This reduction in saturated thickness reduces migration of contaminants both vertically and horizontally so that natural breakdown processes can occur over time. Reducing migration provides protection for the underlying High Plains Aquifer (also known as and referred to herein as the Ogallala Aquifer). SEPTS has the capability to inject the treated water back into the perched aquifer when beneficial use is not possible. Operational priorities for the pump and treat systems emphasize beneficial use of water.

The drip irrigation system filter bank break that occurred in late June 2017 continues to impact operations of SEPTS and P1PTS. Due to the severity of the break, an engineering evaluation, contracting, and major repairs were required to restore the irrigation system. Repairs to the filter bank were completed in May 2019, with startup testing occurring afterward. Testing and repairs have been completed on the irrigation lines. Repairs are currently being completed on the communication interface and control module located in the pump house. A portion of the system is expected to be operational by summer 2021. Meanwhile, Pantex continues to release all WWTF water to Playa 1 as approved in the Texas Commission of Environmental Quality wastewater permit (WQ0002296000).

Current and future operations of both pump and treat systems will be impaired by the permitted restricted flow to Playa 1 until the irrigation system is operational. The SEPTS system has operated at a higher capacity using injection, release to Playa 1, and intermittent operations of P1PTS. Pantex continues to run P1PTS one week per quarter in the 2021 calendar year based on technical evaluations of Pantex's current overall system requirements and agreed upon by regulators. Reduction of operational time at P1PTS allows SEPTS to fully operate and support capture of water along the FM 2373 fence line and at the highest plume concentrations to the south on Texas Tech

Pump and Treat System 1st Quarter 2021 Operation

Playa 1 Pump and Treat System (P1PTS)

Days Operated	5
% Operation Time	2%
Volume Water Treated (Mgal)	0.4
HE Mass Removal (lbs)	0.1
Beneficial Use of Water	0%

Southeast Pump and Treat System (SEPTS)

Days Operated	81
% Operation Time	87%
Volume Water Treated (Mgal)	28.9
HE Mass Removal (lbs)	86.2
Chromium Mass Removal (lbs)	13.7
Beneficial Use of Water	0%

**Value below operational goals*

property. When P1PTS is operational, SEPTS is operated at a lower capacity to meet permit requirements.

SEPTS and P1PTS operations and throughputs were impacted in the 1st quarter due to a Winter Storm Uri. SEPTS was shut down on February 16, 2021, during the duration of the storm and operations resumed on February 21. No breaks occurred at SEPTS or P1PTS.

The SEPTS wellfield had more than 10 wells that required repair during the 1st quarter due to electrical and equipment issues. Pantex has issued a contract to address the problems, and all wells are expected to be operational by summer 2021. Most wells were operable at P1PTS. Graphs of

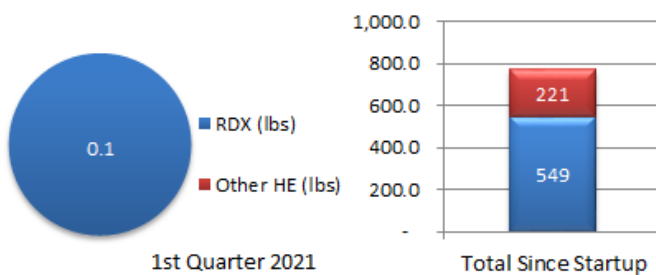


Figure 1. P1PTS Mass Removal

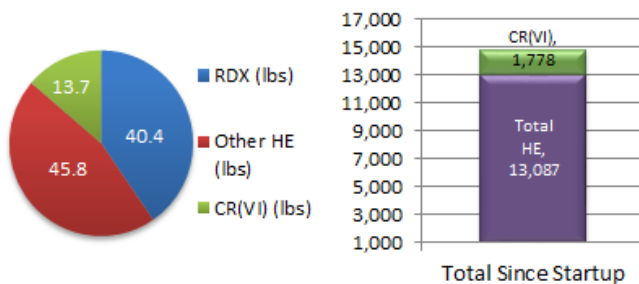


Figure 2. SEPTS Mass Removal

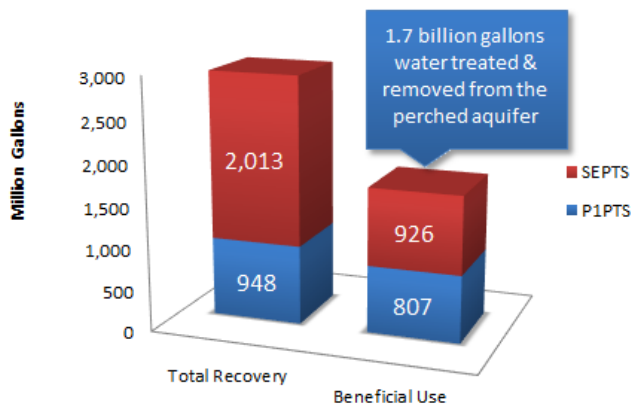


Figure 3. System Recovery and Use

monthly operation and throughput are included in Appendix B. Almost 98% of the treated water was released to Playa 1. Both systems combined treated about 30 million gallons (Mgal) during 1st quarter.

P1PTS primarily treats RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), and SEPTS primarily treats RDX and hexavalent chromium [Cr(VI)]. Figures 1 and 2 provide mass removal information for RDX and other high explosives (HEs) and Cr(VI) for the 1st quarter, as well as totals since system startup. Concentrations near Playa 1 are much lower due to declining source concentrations resulting in reduction of mass removal at P1PTS. Overall, the systems have removed over 15,600 pounds (lbs) of high explosives (HEs) and chromium contaminants from perched groundwater since operations began.

The total recovery and treatment from both systems since startup has been calculated at about 2.9 billion gallons. Because SEPTS was originally designed to inject treated water, all of the treated water prior to 2005 was injected. However, a significant volume of treated water has been used beneficially since 2005, with a total of over 1.7 billion gallons of treated water beneficially used since startup of the irrigation system. The recovery and beneficial use totals are

presented in Figure 3. Currently the systems are releasing water to the WWTF and then to Playa 1 or directly to injection wells, so a majority of the treated water is not beneficially used. Evaluation of effluent data from SEPTS indicates that all COCs were treated to levels below the groundwater protection standard (GWPS).

Pantex is planning for other irrigation alternatives on the property east of FM 2373 to provide additional long-term use of the treatment system water. Funding was received in fiscal year (FY) 2021 to design and construct infrastructure for irrigation of land east of FM 2373 using center pivot sprinklers. Pantex has contracted the design of the new irrigation system with completion expected in May 2021. Construction is expected to begin in late FY21, after contracting is complete. Pantex also identified funding to design and construct three new perched injection wells to the east of Playa 2 and northwest of the Zone 11 ISB. Construction of the injection wells and infrastructure is underway, with the project scheduled to be complete in summer of 2021. These new injection wells will provide a consistent outlet for a portion of the treated water when irrigation is not an available method for beneficial use of the treated water. These wells will also provide a method to inject the treated water without affecting movement and capture of plumes in the southeast area.

Perchlorate was detected in two downgradient extraction wells starting in 2017, with concentrations increasing since the first detection. Pantex has evaluated options for the treatment of perchlorate through the SEPTS as it is expected to move through the extraction well field. Pantex has begun contracting actions to expand the SEPTS with a perchlorate pre-treatment for wells in the southwestern part of the system. A new contract is expected to be awarded in June 2021, with design expected to begin in July 2021.

Pantex has not observed any current issues with the movement of plumes due to the continued injection of water from the SEPTS and shutdown caused by COVID-19. Pantex expects to continue injection at SEPTS in the near future, as repairs to the current irrigation system will be limited to two 100-acre plots. Once the three new injection wells are installed near Playa 2 and a new irrigation system east of FM 2373 is designed and constructed, the systems will be able to operate consistently at or near capacity.

ISB SYSTEMS

Three ISB systems (Zone 11 ISB, Southeast ISB, and Southeast ISB Extension) are installed and operating at Pantex, with a 4th ISB system (Offsite ISB) expected to be in operation during the 3rd Quarter of 2021. The systems are designed with closely spaced wells to set up a treatment zone in areas of the perched groundwater where pump and treat may not be as effective, or where the area is sensitive to vertical migration of COCs to the Ogallala Aquifer. Amendment is injected into these systems to establish treatment zones where COCs are degraded. Monitoring wells were installed downgradient of the treatment zone to monitor whether the system is effectively degrading the COCs (see maps in Appendix A). The primary COCs at the Zone 11 ISB are trichloroethene (TCE) and perchlorate. The primary COCs at the Southeast ISB are RDX and Cr(VI). The primary COC at the Southeast ISB Extension and the Offsite ISB is RDX.

Sampling of the ISB systems has been reduced to a semi-annual frequency. As a system's data is not always available for quarterly evaluation, only new and complete data sets will be assessed during the current quarter. All other systems will be evaluated during the following quarter. In the 1st quarter, only the Southeast ISB Extension system was sampled completely. Zone 11, Southeast and Offsite ISB systems will be evaluated in the 2nd quarter.

For the treatment zone wells, this report evaluates whether the conditions are present to degrade the COCs in each area, and evaluates the presence of a continued food source for the microbial reduction of COCs (see Table 1). Downgradient monitoring wells are evaluated to determine if the ISB systems are effective in degrading the COCs and any breakdown products of the COCs. Graphs of data from sampled treatment zone wells and downgradient *In Situ* performance monitoring (ISPM) wells are included in Appendix C. Graphs in Appendix C represent all data points since the start of remedial action for each system. Table 1 summarizes ISB system performance for the current quarter.

SOUTHEAST ISB EXTENSION

The Southeast ISB Extension was installed in 2017 as an extension of the chosen remedy for the

Table 1. ISB System Performance

Treatment Zone Wells			Downgradient Performance Monitoring Wells		
System	Reducing Conditions	Food Source Available	Primary COCs Being Reduced?	COCs ≤ GWPS?	Degradation Products of COCs Reduced?
Southeast ISB Extension	Very Mild to Strong	Yes	Yes	RDX in 1 of 3 wells ¹	Yes ¹

Mild conditions = ORP (oxidation-reduction potential) of 0 to -50 millivolts (mV)

Strong conditions = ORP < -100 mV and sulfate and nitrate reduced, indicating that reducing conditions are present.

¹ This system was injected for the first time in February 2019. One ISPM well in this system has demonstrated concentrations below GWPS since installation; therefore, measured concentrations do not reflect arrival of treated water.

southeast perched groundwater. Four additional wells were installed in late 2020 along the eastern property line in a north-south alignment to further encompass the plume (Appendix A) and were injected for the first time in April 2021. Overall, four injection events have been completed at this system, with the latest injection completed in May 2021. Due to the success with distribution of a more soluble carbon (molasses) and the long turnaround needed to order EVO, Pantex began injection at the Southeast ISB Extension using only soluble carbon (molasses), as recommended in the 4th Quarter 2018 Progress Report. Pantex plans to continue injection at this system using only molasses to improve distribution and treatment. Because this system has not been treated with EVO, injections have been scheduled at approximately six to nine months.

The first post-injection treatment zone data were collected in 2nd quarter 2019. Six wells in the injected area of the ISB were sampled during the 1st quarter of 2021, including one of the newly installed wells (PTX06-ISB329), which at the time of sampling, had not been injected and reported

data represents baseline sampling. Treatment zone data indicates that mild to strong reducing conditions are present for treatment of HEs. ORP was between -98 mV and 150 mV, nitrate was reduced in all wells, and sulfate values ranged from 3.6 to 140 µg/L. Soluble metals (arsenic and manganese) increased, indicating that reducing conditions are establishing. Total organic carbon results indicate that a sufficient food source is available to support establishment of reducing conditions at the wells. Sampling results from the ISB wells indicate HEs are not detected. Downgradient wells did not demonstrate treatment during this quarter. The downgradient wells in or near the faster moving core of the plume are expected to demonstrate treatment during 2021.

BURNING GROUND SVE

The Burning Ground SVE system began operation in 2002 as a large-scale catalytic oxidizer (CatOX) system. Due to a large reduction in VOC concentrations, a small CatOX system has been operating at the Burning Ground SVE system since April 2012. This small-scale system focuses on treating residual non-aqueous phase liquid (NAPL) and soil gas at a single extraction well (SVE-S-20) near the source area.

As part of a planned system pulse, to determine current recovery efforts of the system, the system was not operated during the first part of the quarter (January – February). System restart was scheduled to occur at the beginning of March, but due to sub-freezing temperatures during Winter Storm Uri, a break occurred at the system's water softener. The system will not be operational until June 2021. The pulse plan will be updated to reflect these changes. A more detailed discussion is included in the 2020 Annual Progress Report.

UNCERTAINTY MANAGEMENT AND EARLY DETECTION

Uncertainty management and early detection wells are evaluated to determine if there are unexpected conditions in areas where previous groundwater contamination has not been detected or confirmed (Ogallala and perched aquifers), or in previous plume locations where concentrations have fallen below GWPS, background, and the practical quantitation limit (PQL) (e.g., perched wells at the Burning Ground and Old Sewage Treatment Plant areas). Indicator COCs are evaluated at the uncertainty management/early detection wells in the quarterly report. A map depicting the wells evaluated is included in Appendix A.

Review of the uncertainty management/early detection data collected during the 1st quarter indicates unexpected conditions at one Ogallala Aquifer well, PTX06-1056. No detections exceeded the GWPS in the Ogallala Aquifer uncertainty management/early detection wells sampled during the 1st quarter. There were no unexpected conditions at perched uncertainty management wells in the 1st quarter.

4-amino-2,6-Dinitrotoluene (DNT4A), a breakdown product of 2,4,6-trinitrotoluene (TNT), has been detected at PTX06-1056, with the initial detection occurring in April 2014. Sample results collected since that time have been variable, with values exceeding the PQL since late 2016. A trend of DNT4A (performed using Mann-Kendall statistics) continues to indicate a slight increasing trend across all data.

Summary of Unexpected Ogallala Detections, 1st Quarter 2021

Well ID	Sample Date	Analyte	Measured Value (µg/L)	PQL (µg/L)	GWPS (µg/L)
PTX06-1056	01/26/2021	4-amino-2,6-dinitrotoluene	0.642	0.259	1.2

PTX06-1056 also continues to demonstrate detections of 1,2-Dichloroethane (DCA12). DCA12 has been variably detected since August 2015, with the most recent detection below the PQL (PQL = 1.0 µg/L).

Pantex has proactively evaluated potential sources for the contamination. A nearby perched well that was drilled deep into the fine-grained zone (FGZ) was plugged to address that potential source. An outside review indicated that, based on fate and transport modeling the perched well was the most likely source of the contamination. A cement bond log was run on PTX06-1056 in October 2016 to determine the competency of the concrete seal at the FGZ. The log indicates that the seal is competent and that PTX06-1056 is likely not acting as a preferential pathway for contamination to reach the Ogallala Aquifer. As of May 2020, Pantex went back to semi-annual sampling for PTX06-1056 as approved by regulatory agencies. Further actions will be determined based on results of sampling and in accordance with the Pantex Groundwater Contingency Plan.

Pantex has contracted new labs able to fulfill HE analysis requirements. Pantex is continuing to evaluate labs for HE analysis to ensure that sampling can be split between two labs when further confirmation of HE results is warranted. New HE analysis capability is expected to be available in summer of 2021.

OTHER UNEXPECTED CONDITIONS

Pantex routinely evaluates data as they come in from the laboratory to determine if data are off-trend, at an all-time high, or represent a new detection that may require further sampling or evaluation. Through the well maintenance program, Pantex also inspects wells at least every five years to ensure they are not silting in and to evaluate whether the well remains in contact with the formation. No unexpected conditions were noted in the 1st quarter.

SCHEDULE UPDATE

Pantex provided a detailed schedule of upcoming work in the 2020 Annual Progress Report. An update of the activities scheduled to be started or completed by the publication date of this report is provided below.

Pantex completed the following:

- Injection into the Southeast ISB Extension system was completed in May 2021.
- Design of the new center pivot irrigation system was completed in May 2021.

Pantex continues progress toward completion of the following items:

- Pantex began contracting for the construction of the new irrigation system planned to be installed east of FM 2373. The contract is planned to be awarded in July, with construction beginning in September 2021.
- Pantex continues to work with neighbors to obtain necessary deed restrictions to control drilling and use of groundwater beneath the properties where impacted perched groundwater is present. Pantex has obtained a Right of Entry agreement with one neighbor that includes appropriate restrictions and is currently pursuing deed restrictions with a second neighbor. As noted in the 2020 3rd Quarter Progress Report, Pantex will require additional time to complete the necessary deed restrictions, as required by the Five-Year Review. It is expected that all needed restrictions can be completed in 2022.
- In October 2020, work commenced for the optimization of the pump and treat systems and re-optimization of the Offsite Remediation System, and is scheduled for completion by the end of September 2021.
- The new SEPTS injection well project near Playa 2 is underway. The project is expected to be complete in summer of 2021 and will provide a new outlet for up to 150 gpm (half of design capacity) of treated water from the SEPTS.
- Phase 1 and 2 construction of the offsite infrastructure began in January 2021 and is expected to be completed in July of 2021.
- Drilling of the new row of Zone 11 ISB wells will commence in April 2021.
- Bids for the new SEPTS perchlorate pre-treatment system are expected in June 2021. Completion of design is anticipated in September 2021, with construction beginning in August 2021.

Upcoming work includes the following:

- Pantex will begin contracting actions to build mobile pump and treat system that will be used at the Offsite Remediation System.
- Injection into the new Offsite ISB is expected to begin in June 2021.
- Landfill maintenance of SVS 7b has been contracted and work is expected to begin in summer 2021.

CONCLUSIONS AND RECOMMENDATIONS FOR CHANGE

The remedial actions continue to operate and meet short-term expectations for cleanup of the perched groundwater in areas under the influence of the remediation systems. Perched water levels are declining, mass is being removed or reduced, and institutional controls provide protection from use of impacted groundwater, while the remedial actions continue to operate to meet long-term goals. Pantex is working to extend treatment systems to areas that are not currently under the influence of an existing remediation system. Pantex is also working to extend treated water injection and beneficial use to new areas to ensure consistent operation of the pump and treat systems.

The pump and treat systems continue to remove COC mass and water from critical areas in the perched aquifer; thus, decreasing head that drives vertical and lateral movement of perched groundwater. The systems have been impacted this quarter by the shutdown of the irrigation system and Winter Storm Uri. Pantex is continuing to pursue other options for release or use of the treated water. Pantex will continue to inject and release water to Playa 1 until the irrigation system is repaired or other uses can be constructed. Most system repairs were completed in February 2021, and startup testing is expected in June. Pantex is designing and installing perched injection wells east of the Playa 2 area, as previously recommended. These wells will help provide a consistent outlet for release of treated water from SEPTS when beneficial use is not possible. Pantex expects to inject up to 150 gpm of treated perched groundwater once construction is complete in summer 2021. Pantex has designed and plans to construct a center pivot irrigation system east of FM 2373. Funding has been provided for that project in 2021. Pantex is currently pursuing a contract to design and build a perchlorate treatment system to address the perchlorate moving southeast through the SEPTS extraction wellfield.

Monitoring results for areas downgradient of the established ISB systems continue to demonstrate that system treatment has been generally effective. The Southeast ISB Extension is demonstrating treatment in the treatment zone where injection has occurred, but downgradient wells are not expected to demonstrate treatment for at least 2 years following the first injection (expected in 2021).

Pantex continues to progress toward cleanup of the southeast lobe of perched groundwater. As recommended in the 2016 Annual Progress Report, Pantex has completed extending the SEPTS operation to that area to address the continued plume movement to the south. Installation of the Southeast ISB Expansion system will further help to prevent offsite movement of contamination. Wells drilled on a neighboring property in early 2019 indicate that extent of the southeast contamination had been found. A new ISB system (Offsite ISB) was designed to address HE contamination found beneath neighbors' property. Installation of infrastructure for Phase 1 and 2 of the Offsite ISB is underway and the first injection into the system is expected in June 2021.

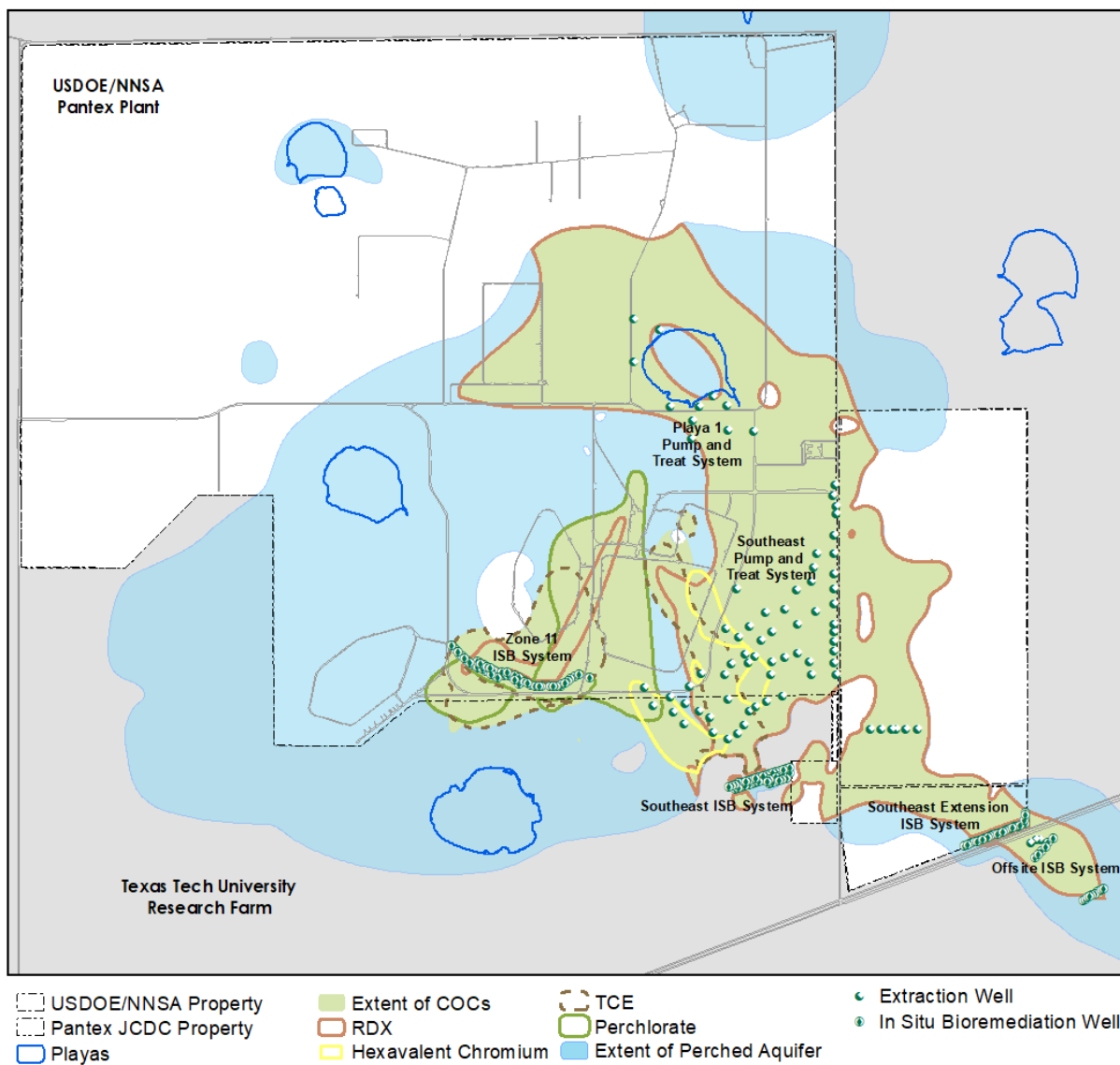
The SVE system continues to treat soil gas and residual NAPL in the solvent evaporation pit/chemical burn pit area of the Burning Ground, thereby mitigating vertical movement of VOCs to groundwater. Pantex has continued to have problems with completing rebound tests, and has been

unable to prepare a path to closure as recommended in the first Five-Year Review. Therefore, Pantex has evaluated other paths to closure for this system. In May 2017, Pantex completed a modification to six inactive SVE extraction wells surrounding the active extraction well SVE-S-20 to open the wells to ambient air. This modification enhances airflow through the formation while the system is operating. The airflow was increased from 32 scfm to about 44 scfm over time. Evaluation of hourly VOC removal indicates that the mass removal rate initially increased with the increase in influent airflow. Data collected in late 2020 indicate significant reduction of VOCs at the influent of the system. Pantex is actively working the plan to pulse the system to evaluate final closure of the system. Pantex will provide further recommendations based on review of influent SVE data over time.

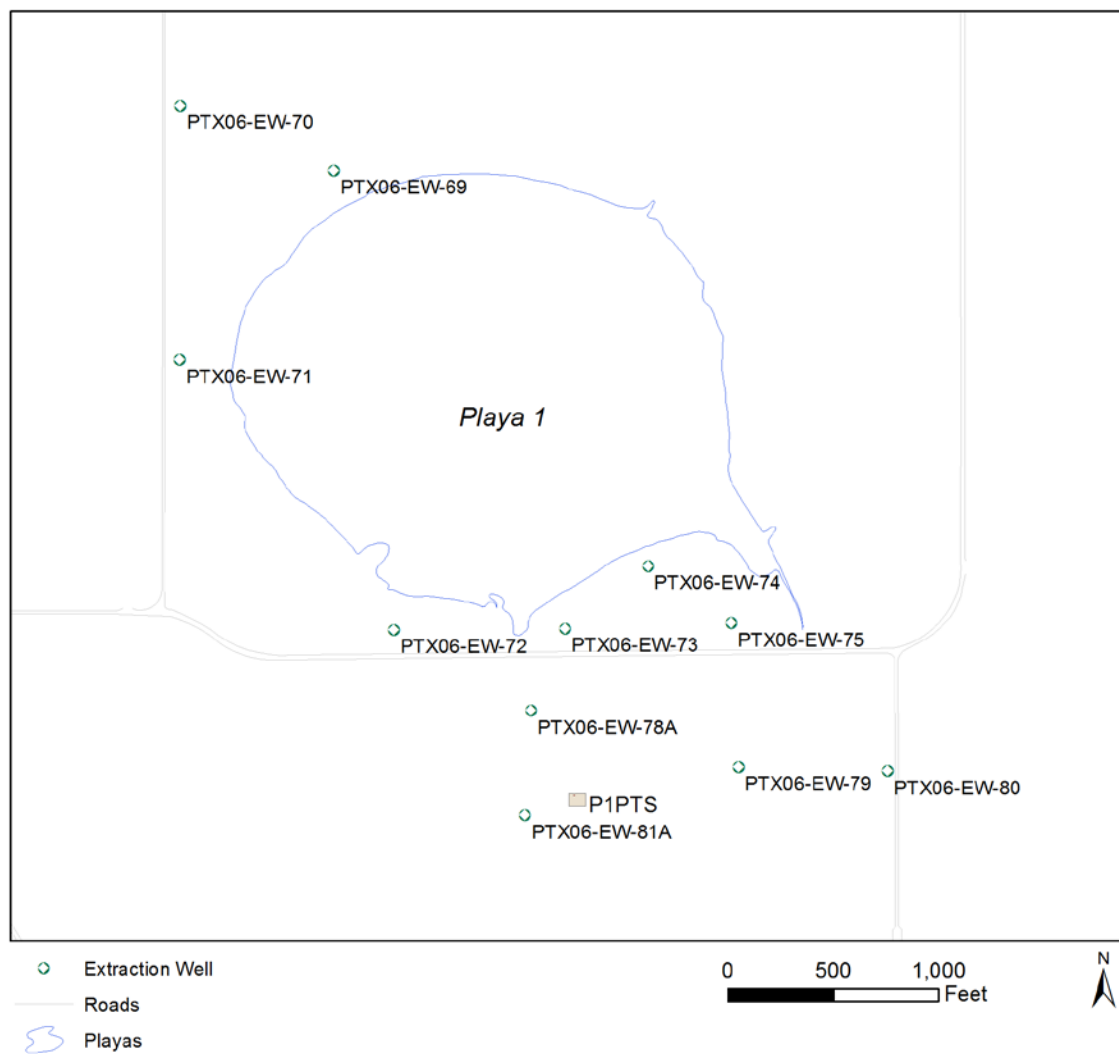
The groundwater remedies are considered to be protective for the short-term, as untreated perched groundwater use is controlled to prevent human contact and monitoring data continue to indicate that the remedial actions remain protective of the Ogallala Aquifer.

Appendix A

Maps



Extent of Perched Groundwater and Contaminant Plumes



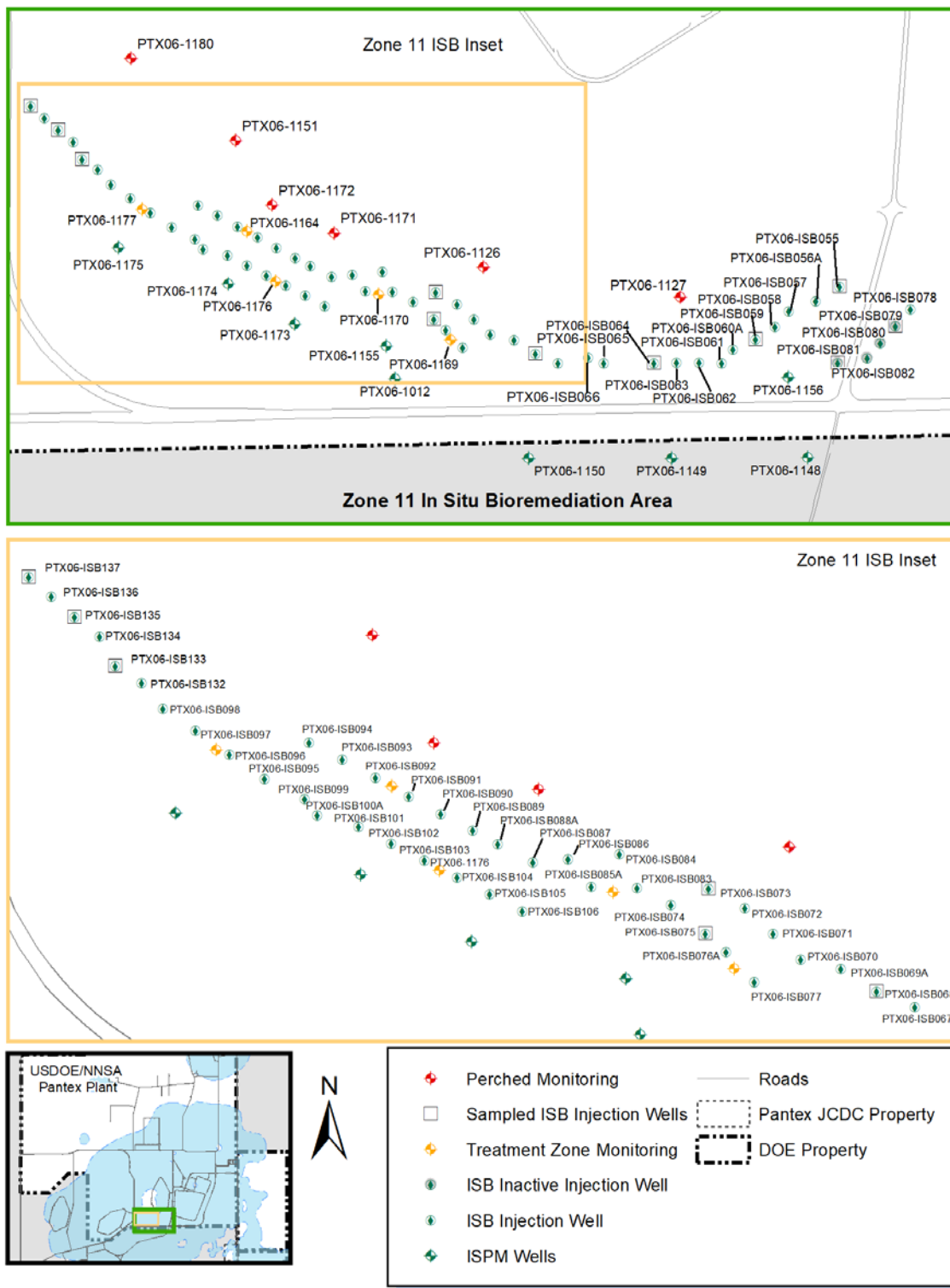
Playa 1 Pump and Treat System Wells



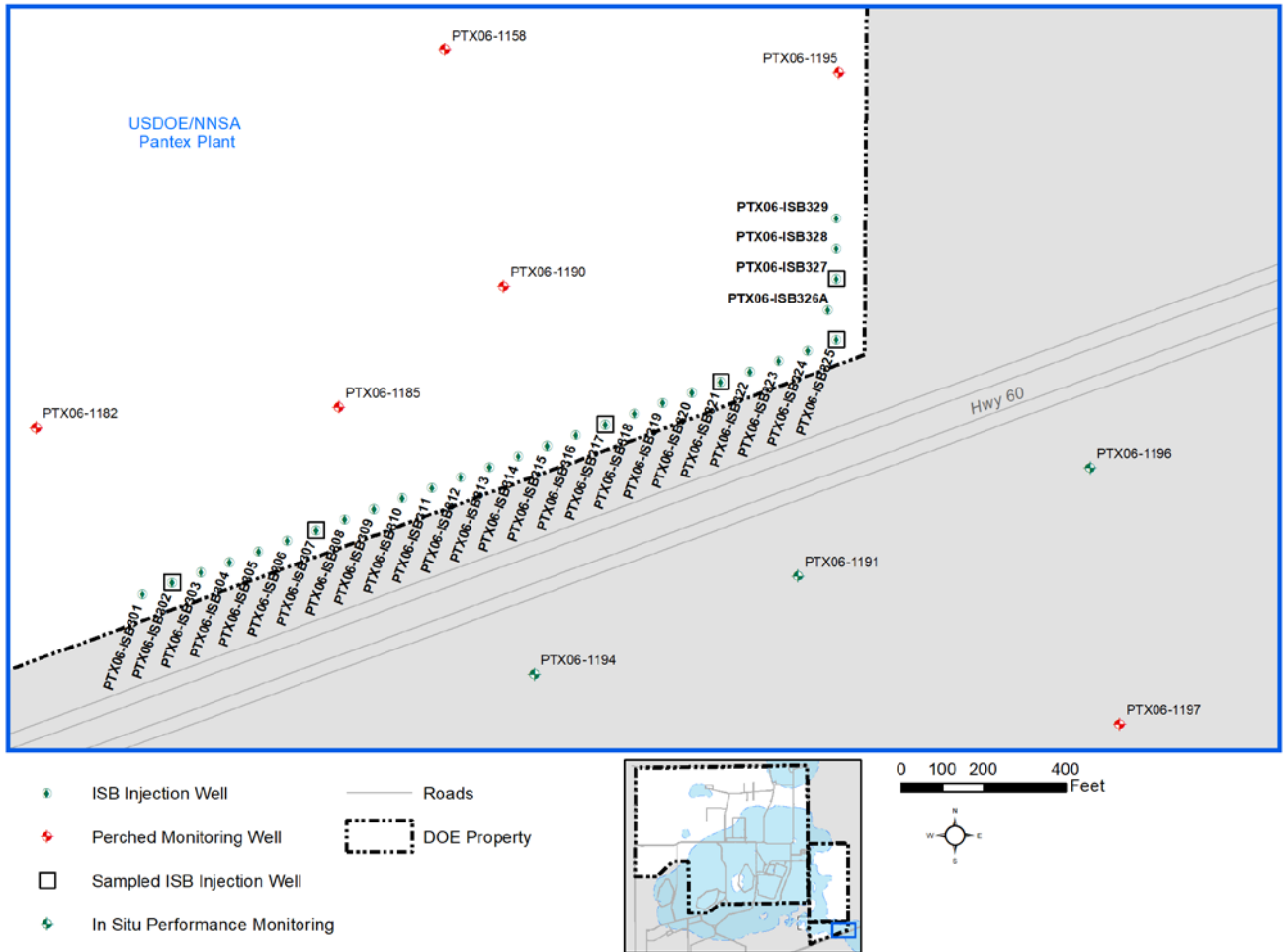
Southeast Pump and Treat System Wells



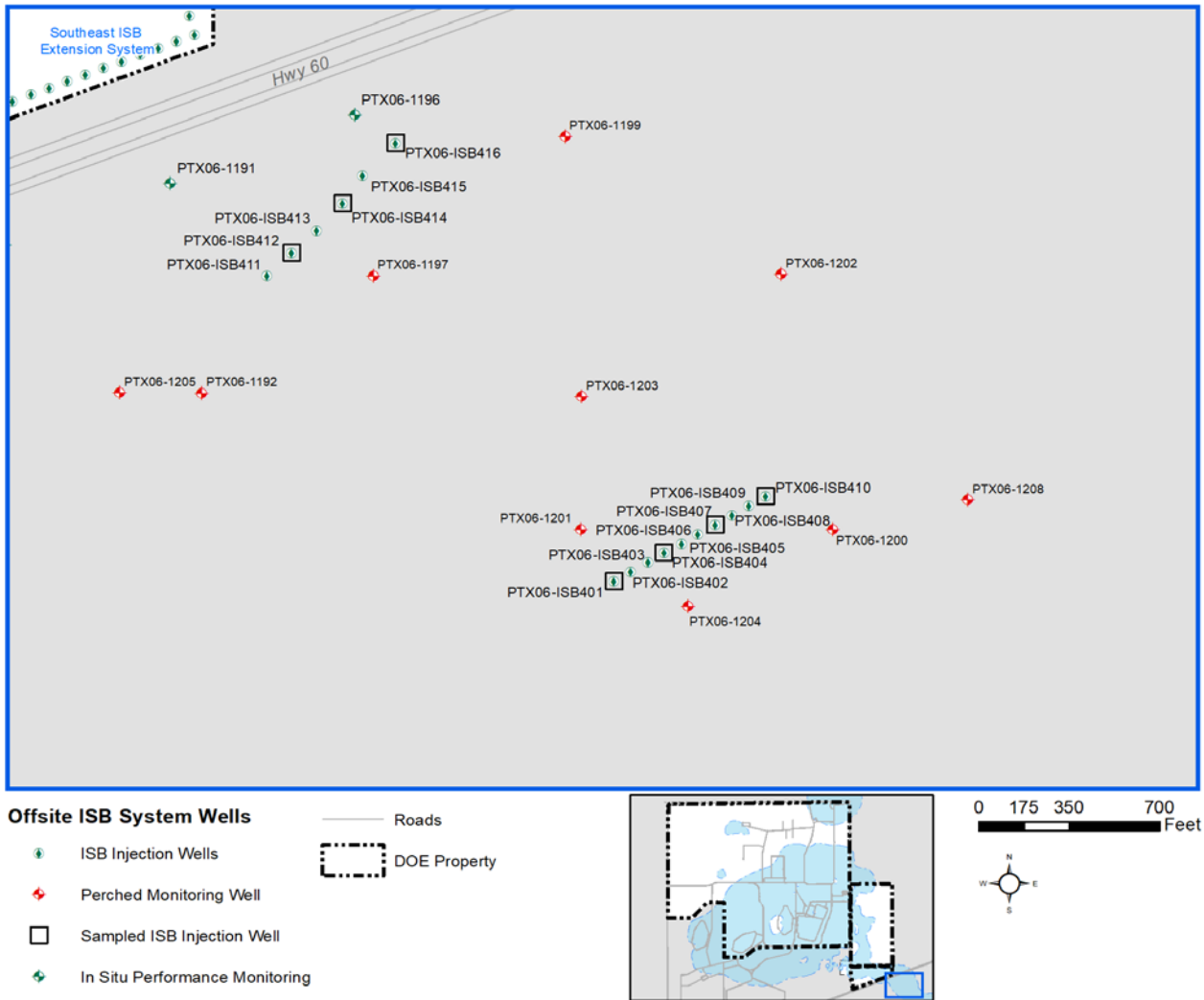
Southeast ISB Wells and Sampling Locations



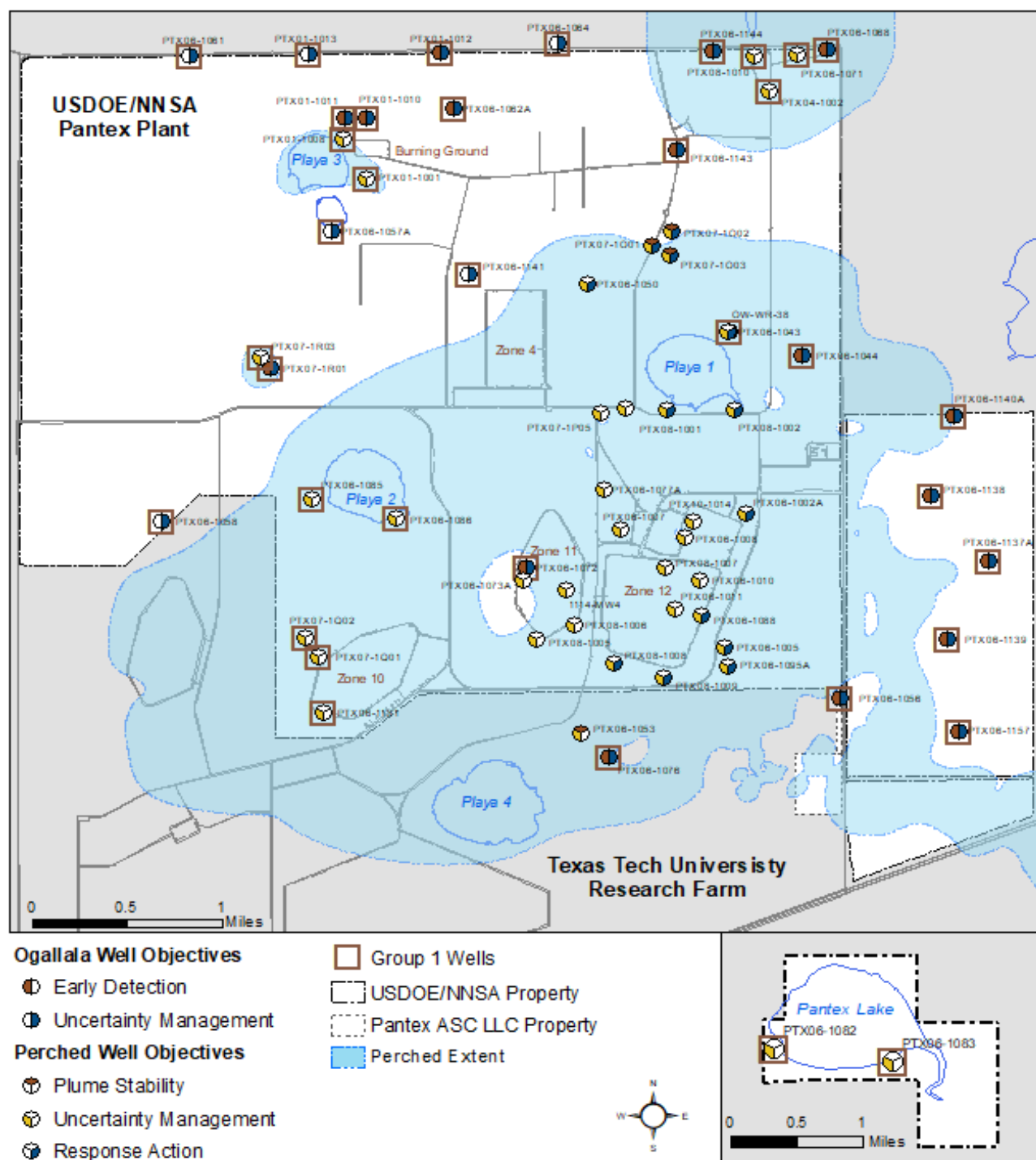
Zone 11 ISB Wells and Sampling Locations



Southeast ISB Extension Wells and Sampling Locations



Offsite ISB Wells and Sampling Locations

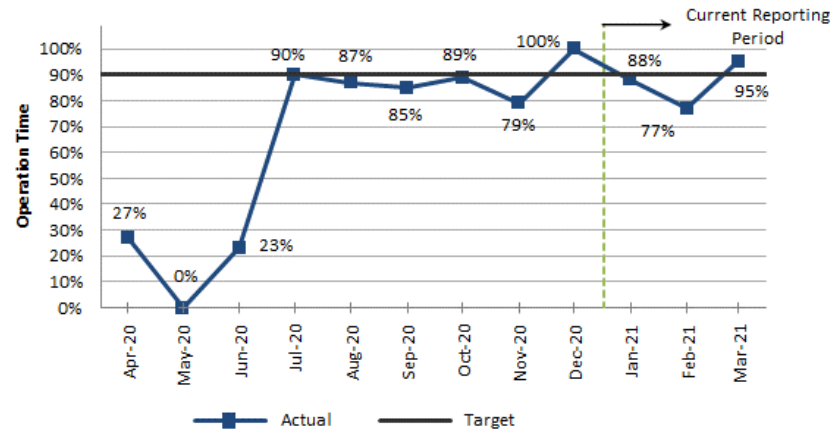


Uncertainty Management and Early Detection Wells
Evaluated in the Quarterly Progress Report

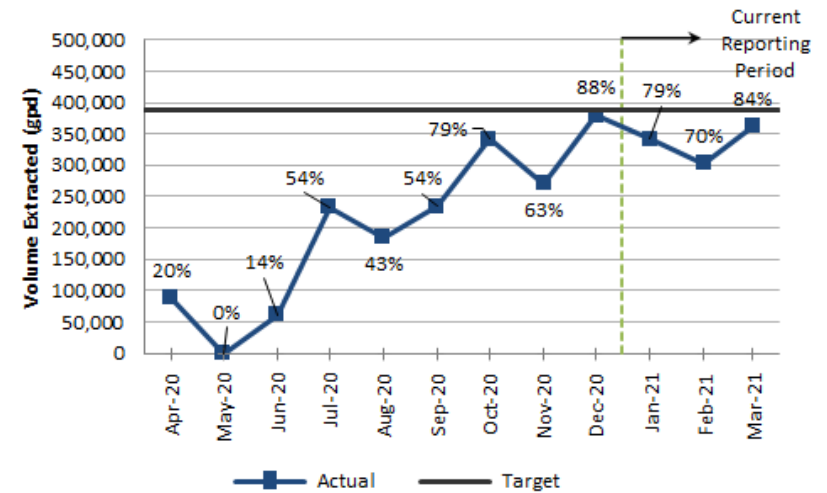
Appendix B

Pump and Treat System Graphs

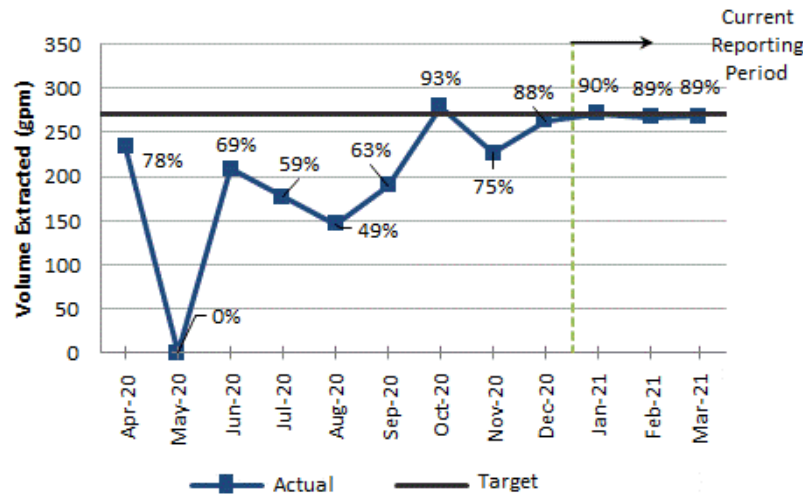
Southeast Pump and Treat System Graphs



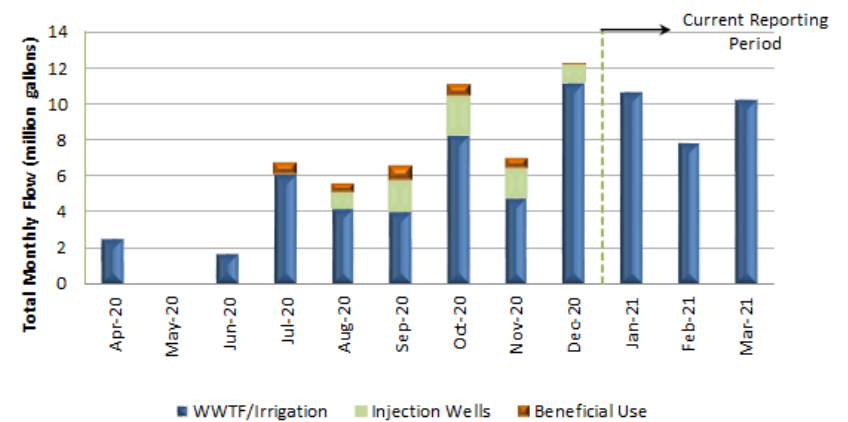
SEPTS Operation Time vs Target



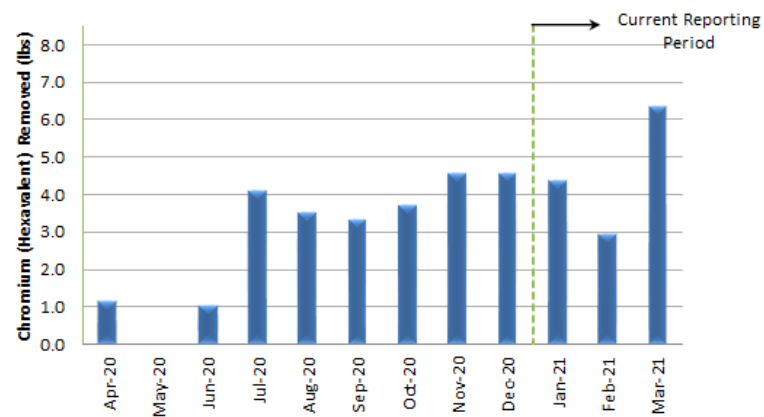
SEPTS GPD and % Capacity



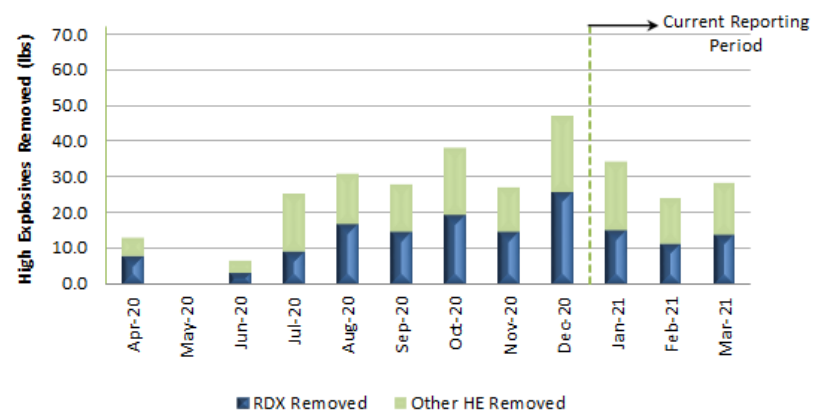
SEPTS Average GPM and % Capacity



SEPTS Monthly Total Flow

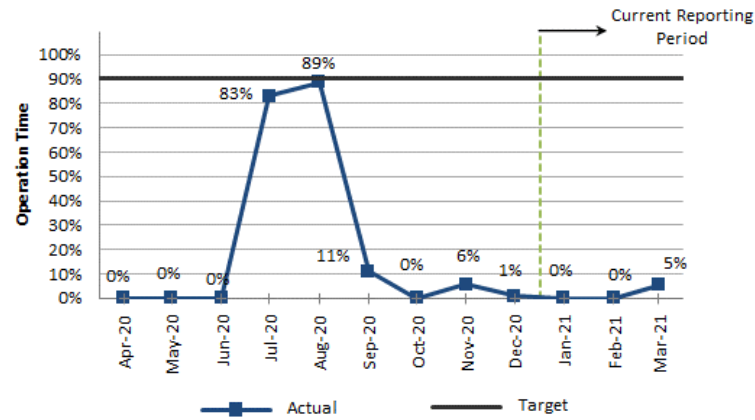


SEPTS Chromium Mass Removal by Month

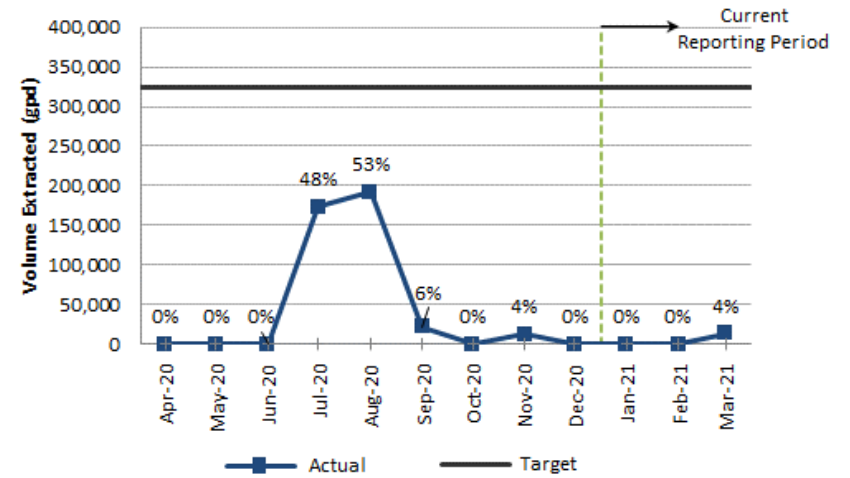


SEPTS HE Mass Removal by Month

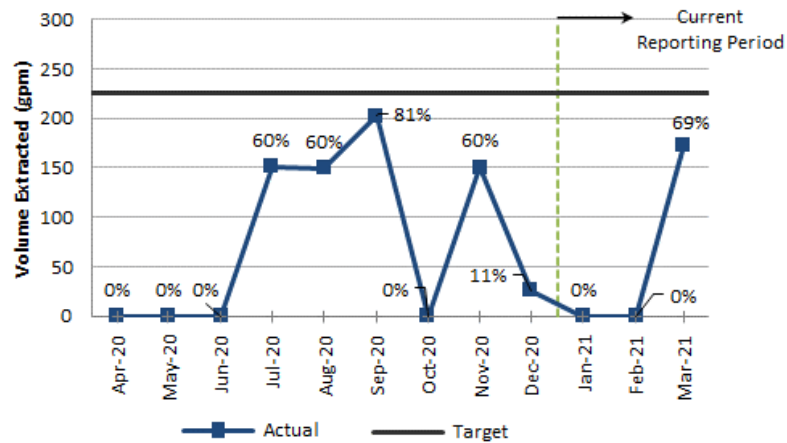
Playa 1 Pump and Treat System Graphs



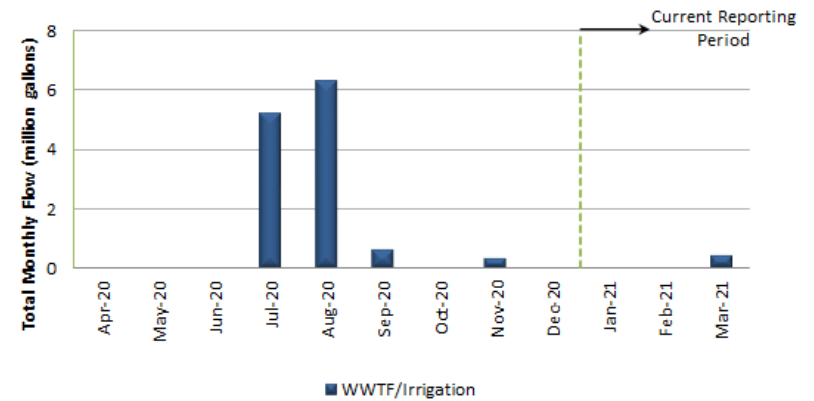
P1PTS Operational Time Vs Target



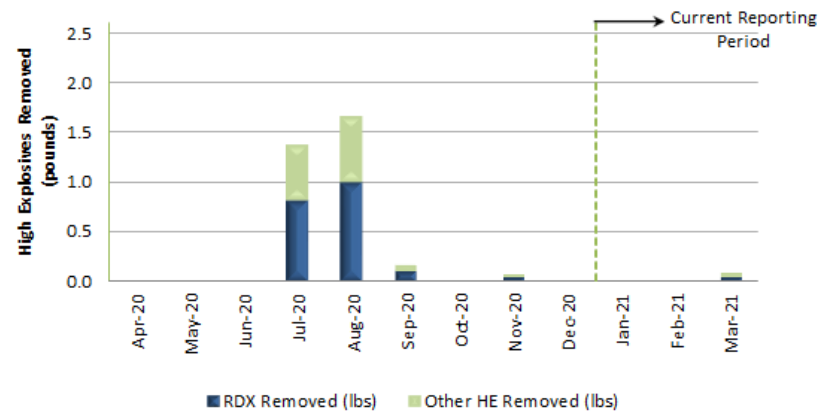
P1PTS Average GPD and % Capacity



P1PTS Average GPM and % Capacity



P1PTS Monthly System Total Flow



P1PTS HE Mass Removal by Month

Appendix B Glossary

Operation Time	Operation time represents the percentage of the total number of hours the system was actually operated vs. the total possible hours the system could have operated on a monthly basis.
GPM Extraction	The gallons per minute (GPM) extraction rate represents the extraction rate from the well field while the system was operating. This is a measurement of the well field's capability to support the overall system throughput goals. Low well field rates can occur due to inoperable wells or decline in saturated thickness that makes extraction difficult.
GPD Extraction	The gallons per day (GPD) extraction rate represents the system's ability to meet overall throughput goals, considering the well field extraction rate and the system's operational rate. This rate is affected by the ability to extract water from the well field and the system downtime.
Total Monthly Flow	Total monthly flow is the total volume of extracted water measured at the influent point of the pump and treat system. Individual well measurements and flow rates are provided in the annual progress report.

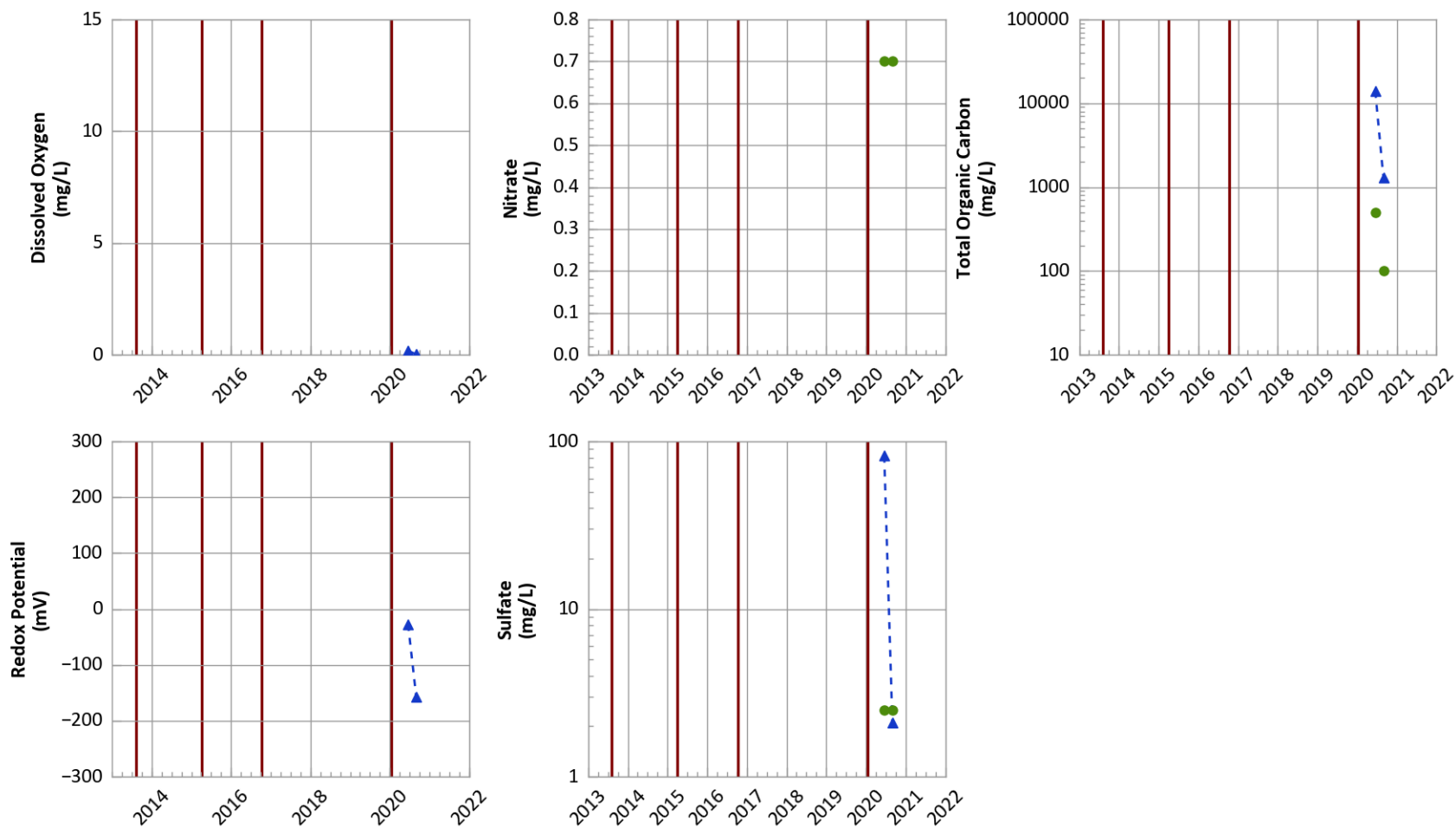
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Appendix C

ISB Graphs

Southeast ISB Graphs

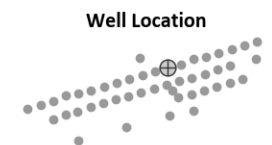
**PTX06-ISB021 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



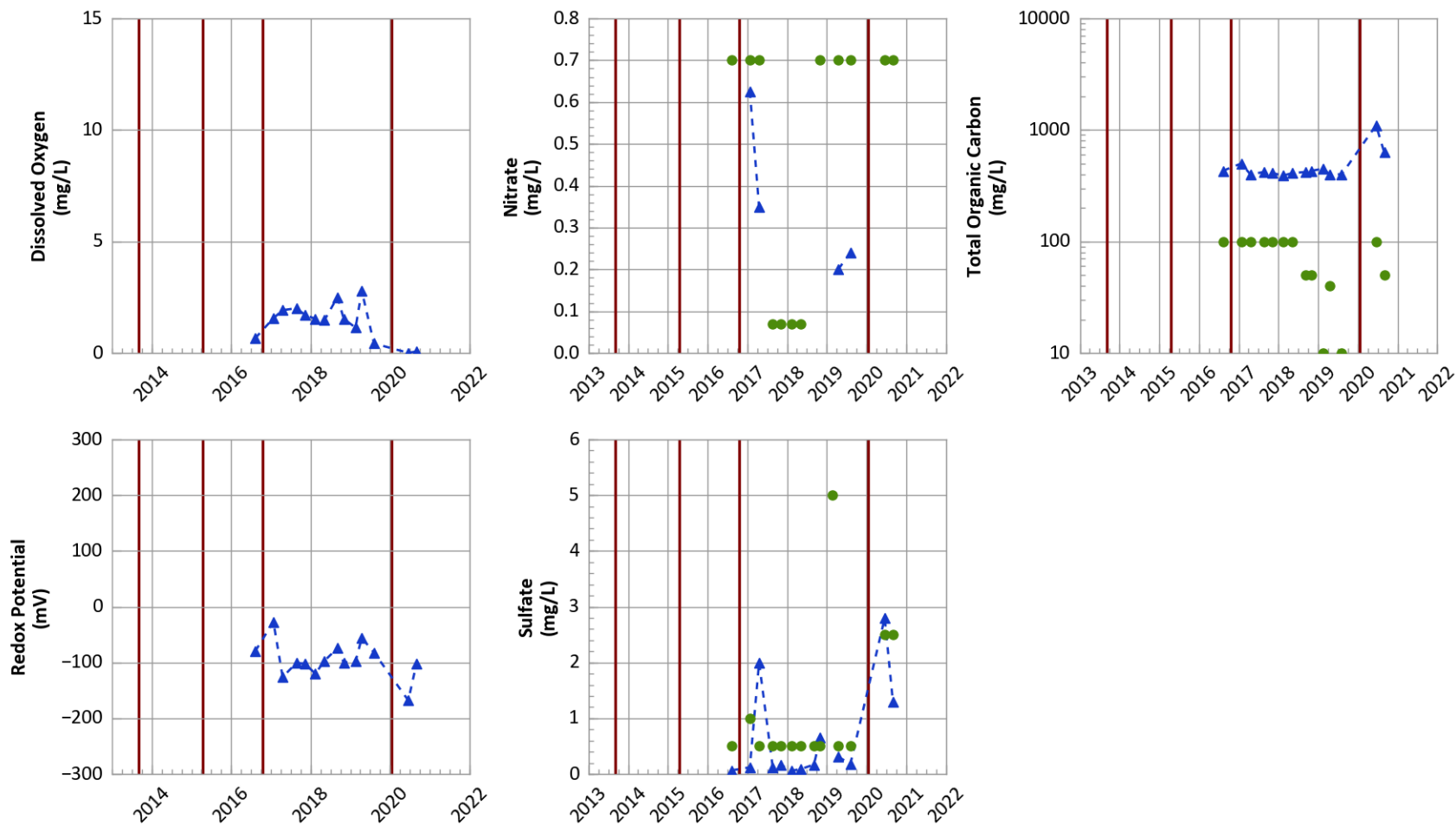
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



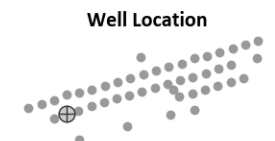
PTX06-ISB030B Treatment Zone Performance Indicators USDOE/NNSA Pantex Plant



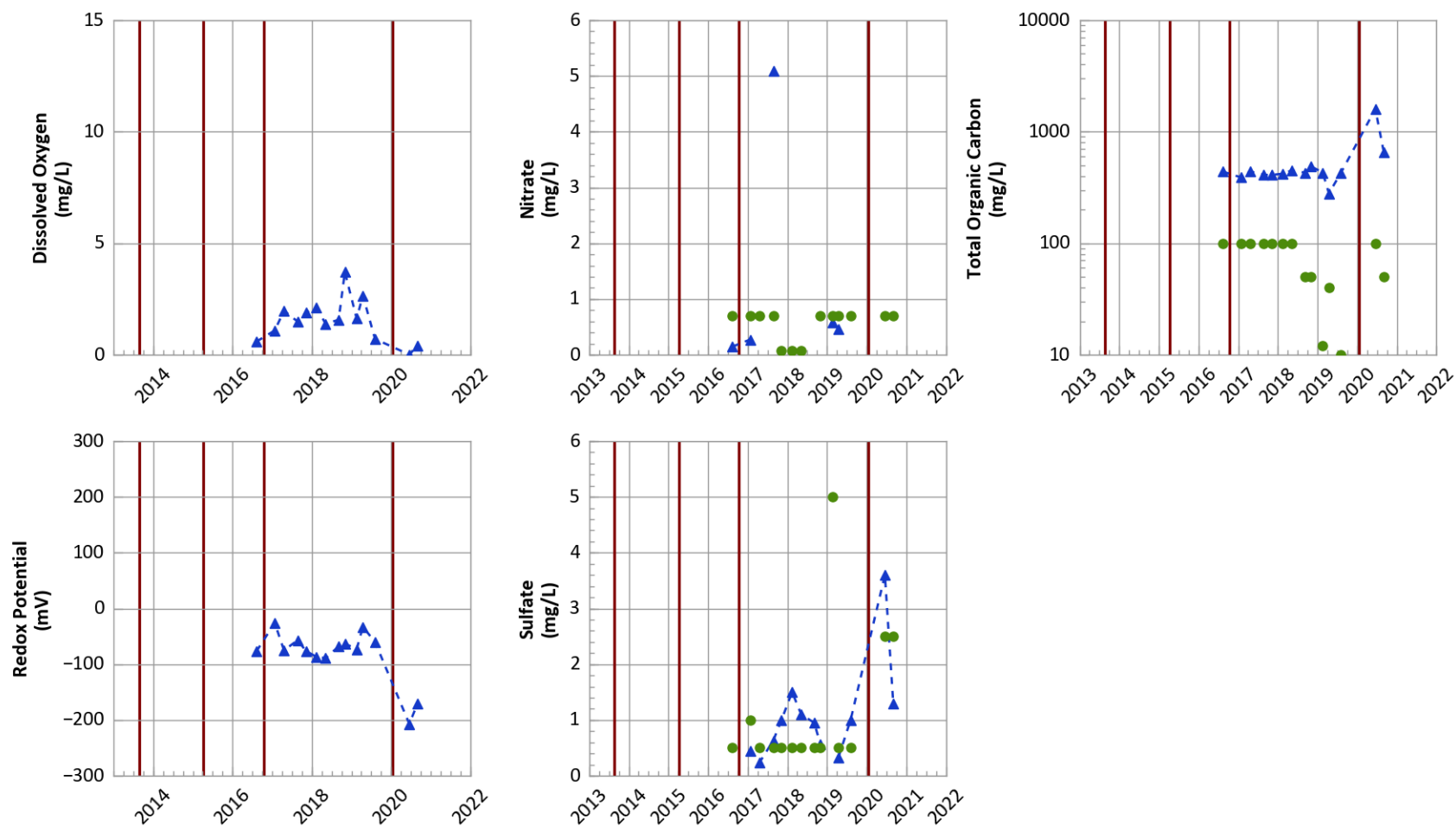
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



PTX06-ISB038 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



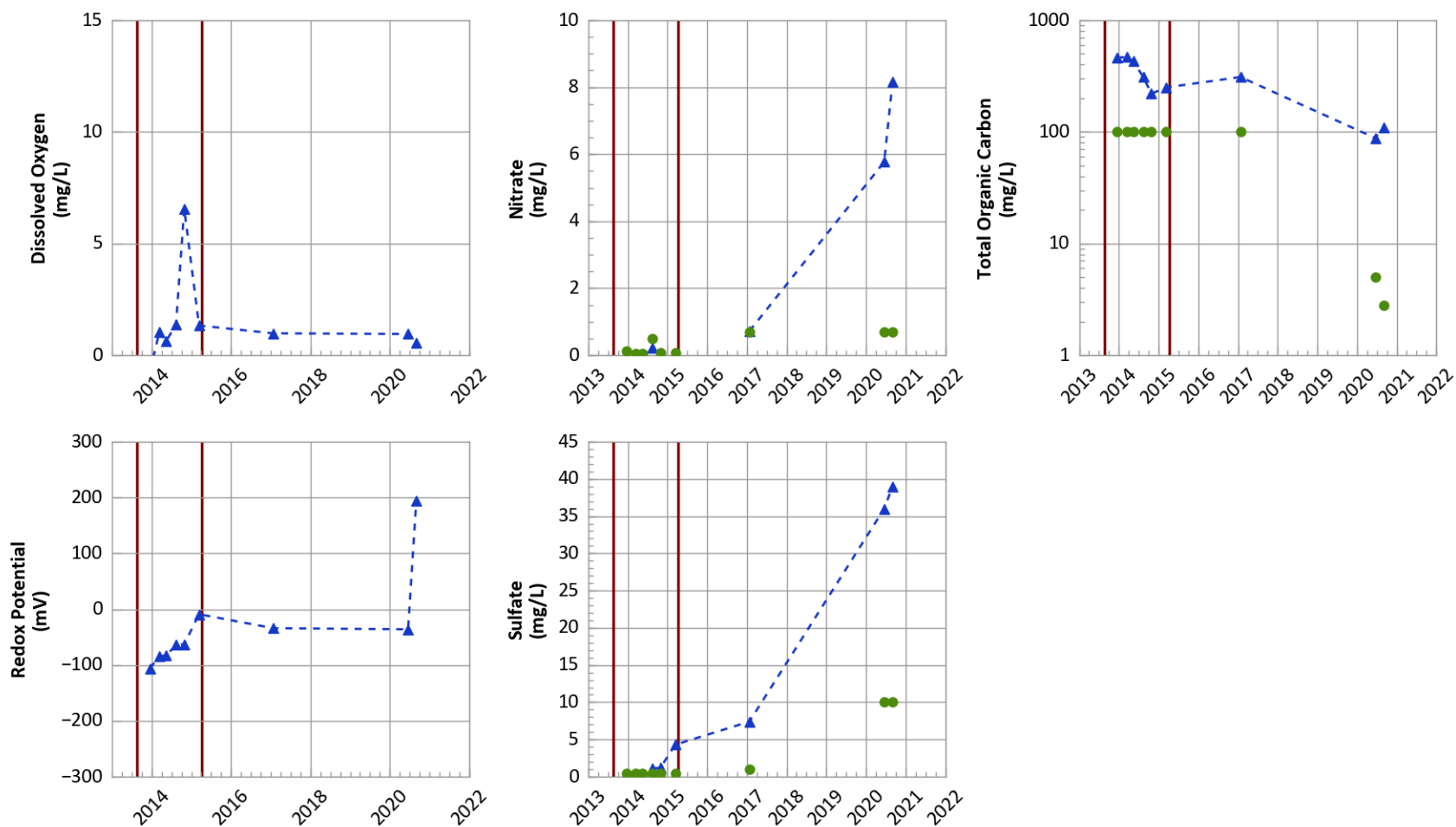
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates

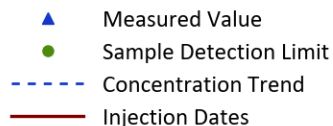


**PTX06-ISB042 Treatment Zone Performance Indicators
USDOE/NSNA Pantex Plant**

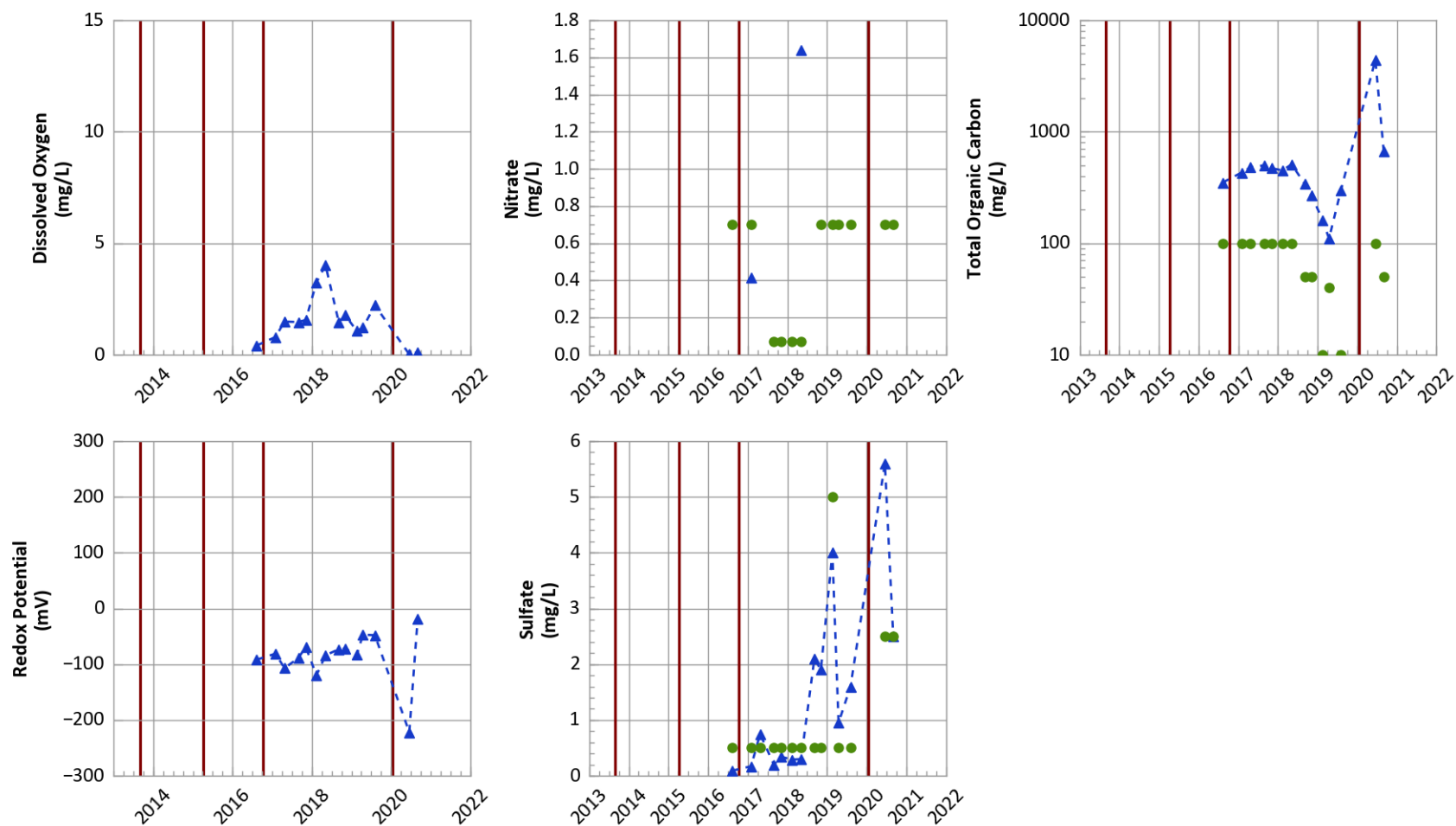


Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected



**PTX06-ISB046 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



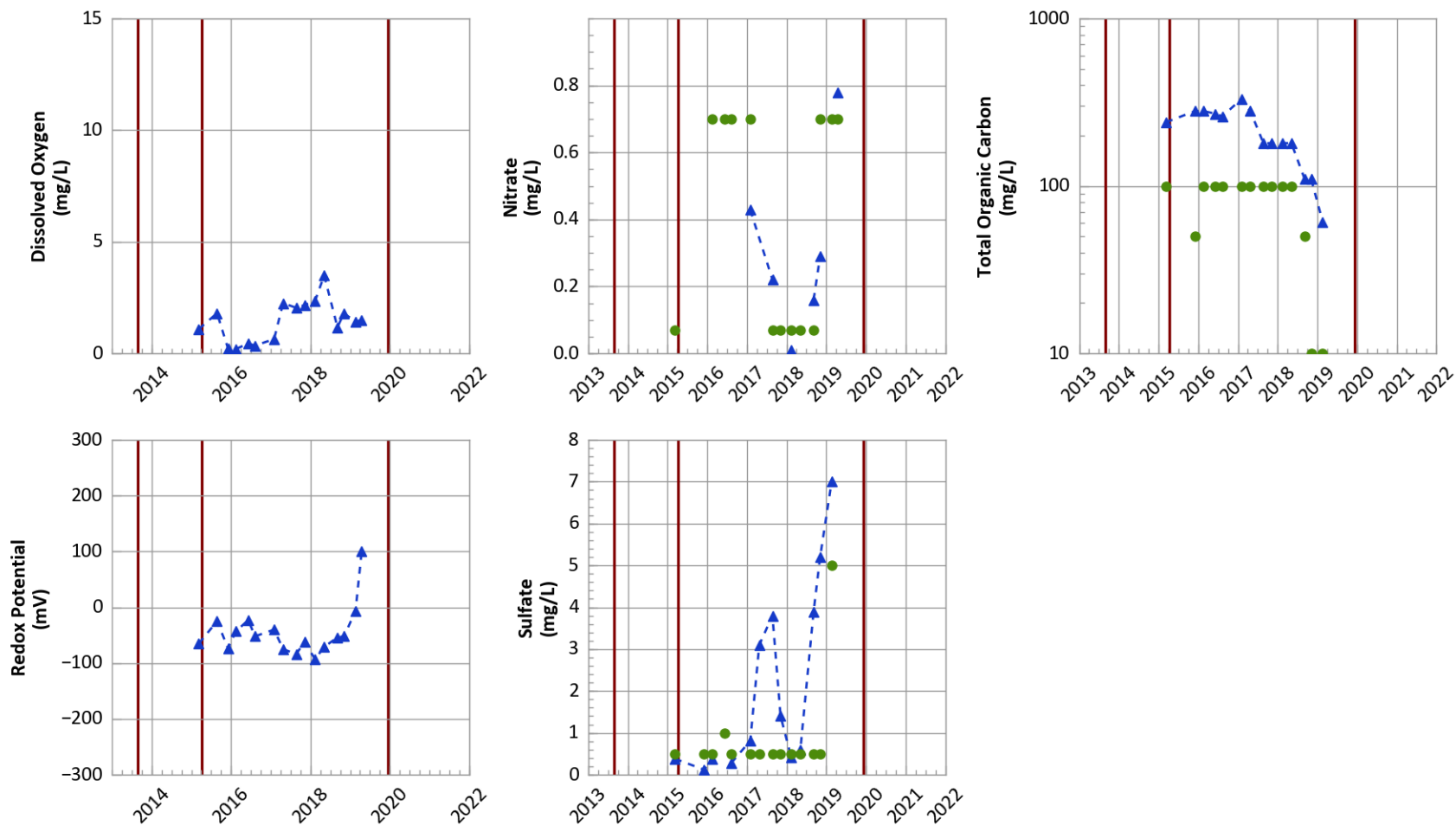
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



**PTX06-ISB048 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



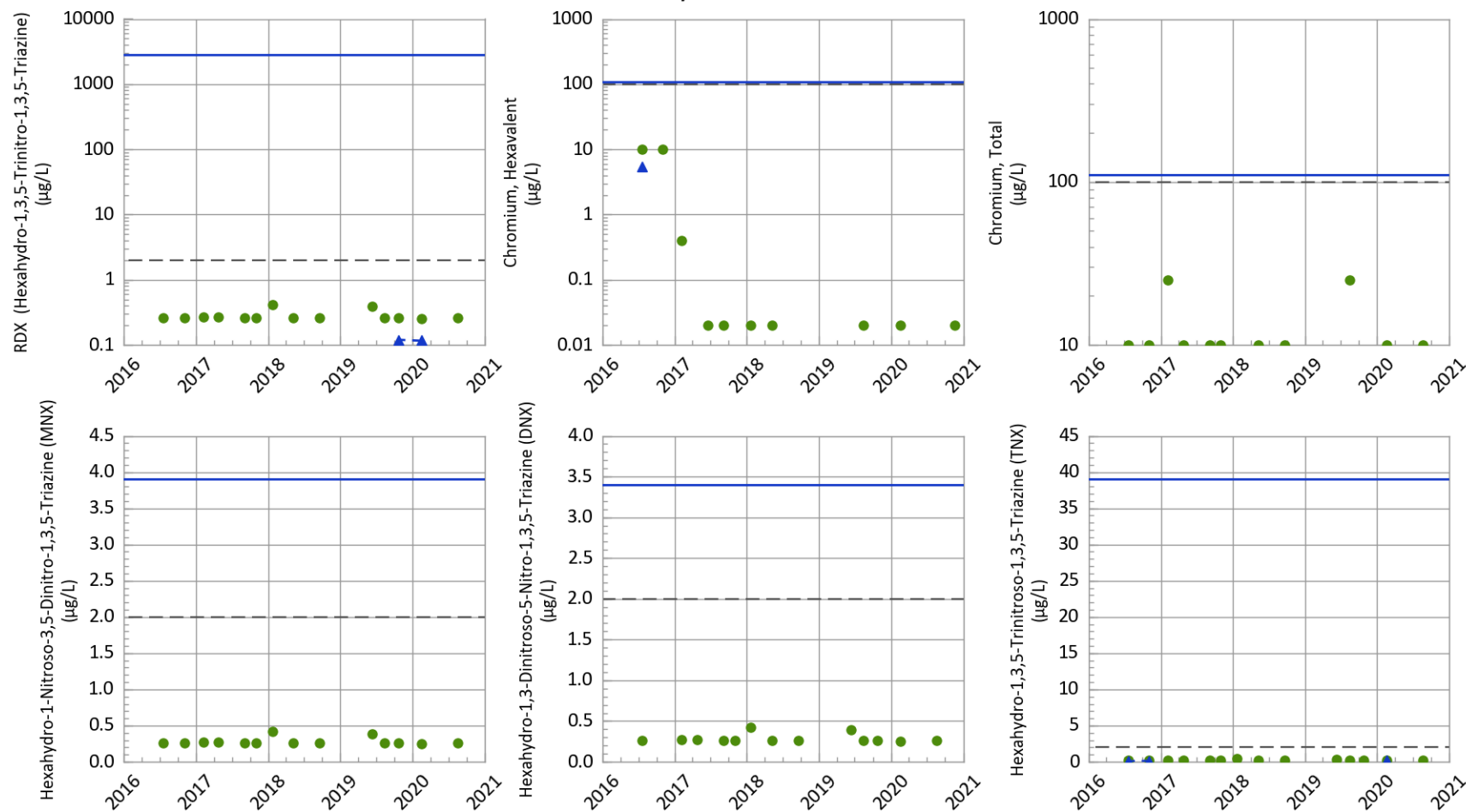
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



**PTX06-1037 Downgradient Performance Indicators
Southeast In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



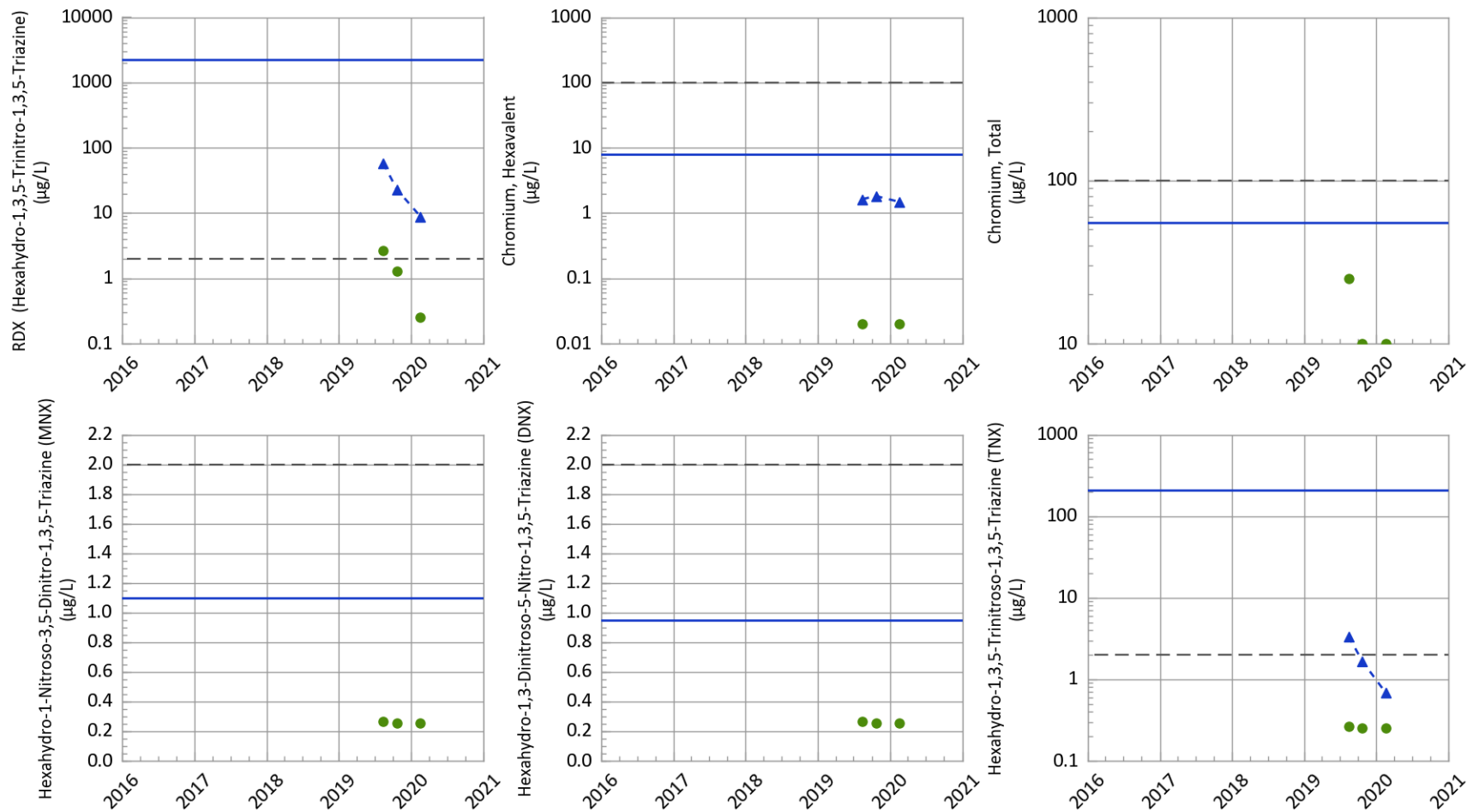
Most Recent Measured COC Concentrations (Feb 18, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	Non-Detect	2.0
MNX	Non-Detect	2.0
CR-6	Non-Detect	100.0
DNX	Non-Detect	2.0
CR	Non-Detect	100.0
TNX	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



**PTX06-1045 Downgradient Performance Indicators
Southeast In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



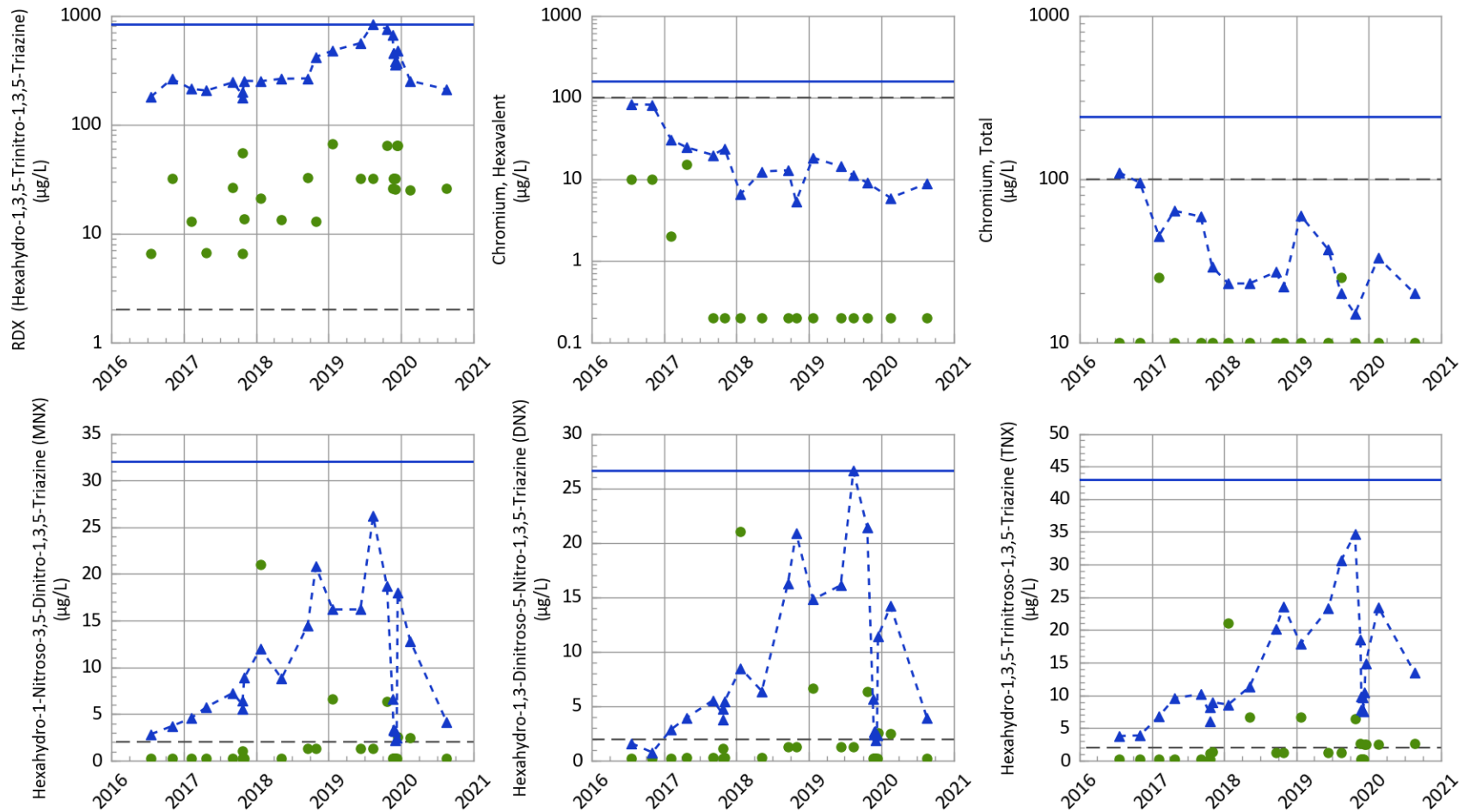
Most Recent Measured COC Concentrations (Feb 18, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	8.86	2.0
MNX	Non-Detect	2.0
CR-6	1.48	100.0
DNX	Non-Detect	2.0
CR	Non-Detect	100.0
TNX	0.68	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



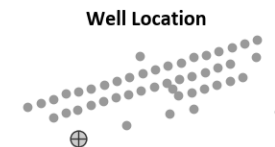
**PTX06-1153 Downgradient Performance Indicators
Southeast In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



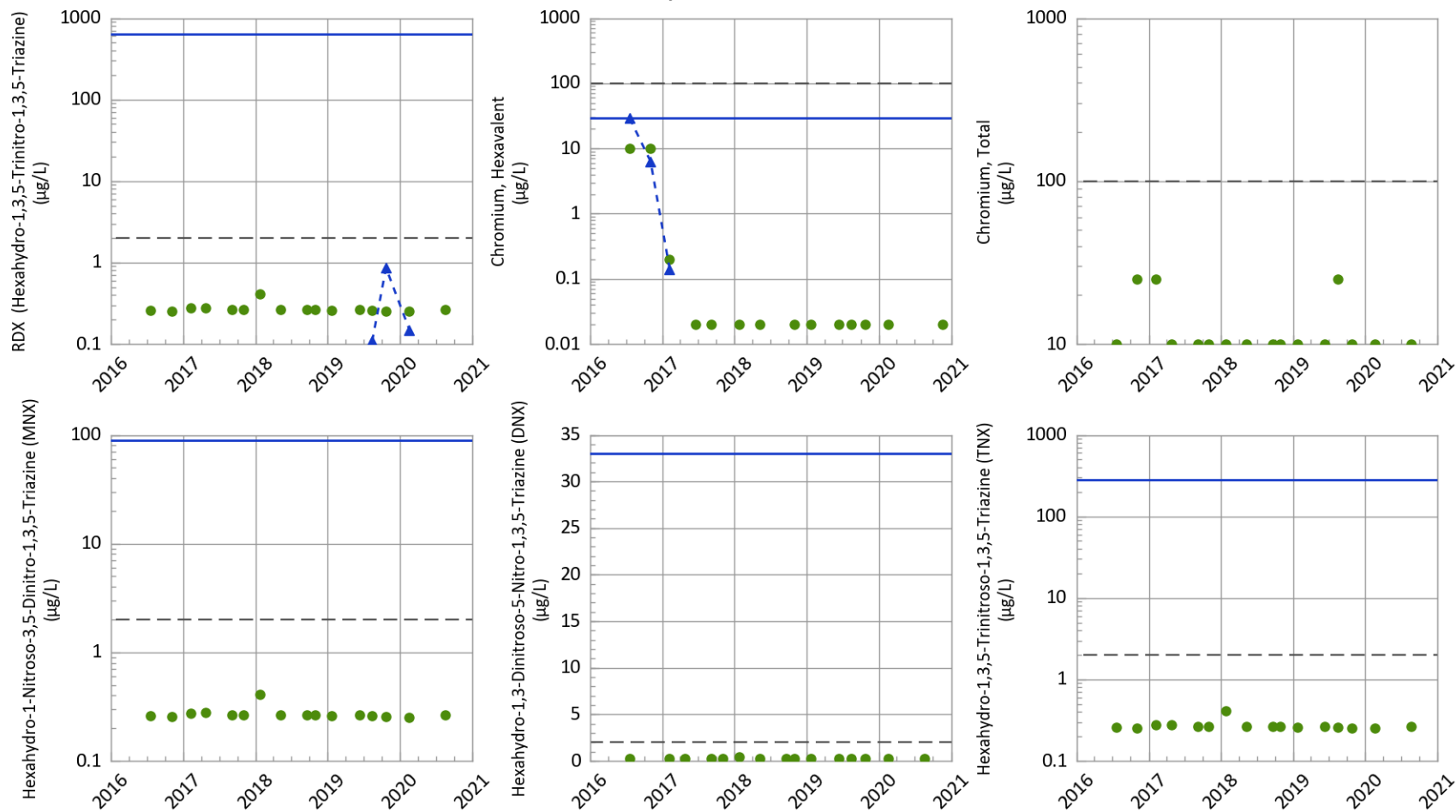
Most Recent Measured COC Concentrations (Aug 19, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	210.0	2.0
MNX	4.17	2.0
CR-6	8.83	100.0
DNX	3.96	2.0
CR	20.0	100.0
TNX	13.5	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



**PTX06-1154 Downgradient Performance Indicators
Southeast In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



Most Recent Measured COC Concentrations (Aug 19, 2020)

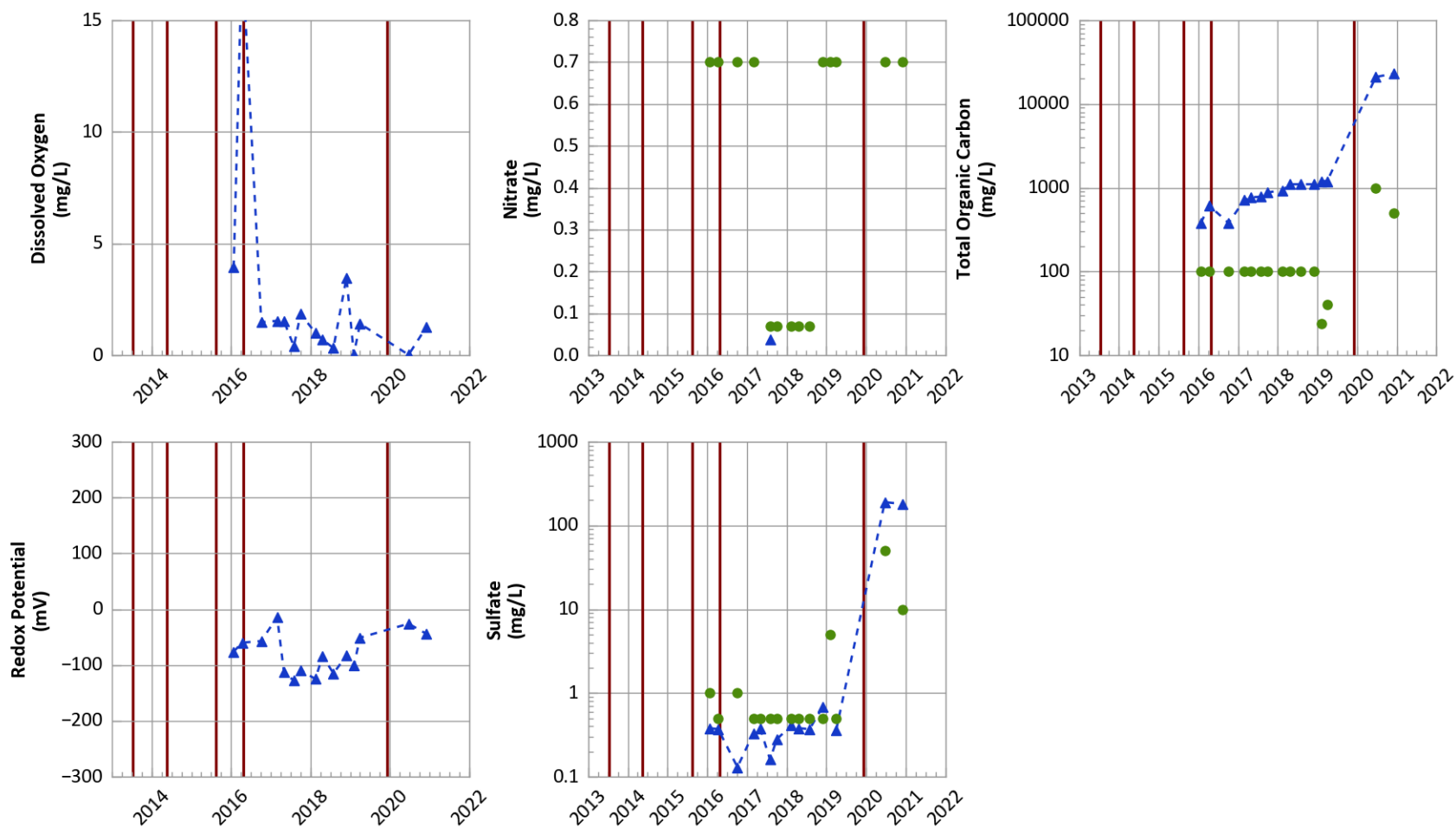
COC	Concentration (μg/L)	GWPS (μg/L)
RDX	Non-Detect	2.0
MNX	Non-Detect	2.0
CR-6	Non-Detect	100.0
DNX	Non-Detect	2.0
CR	Non-Detect	100.0
TNX	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



Zone 11 ISB Graphs

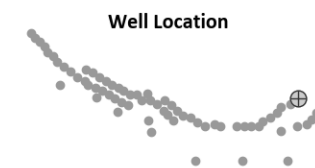
**PTX06-ISB055 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



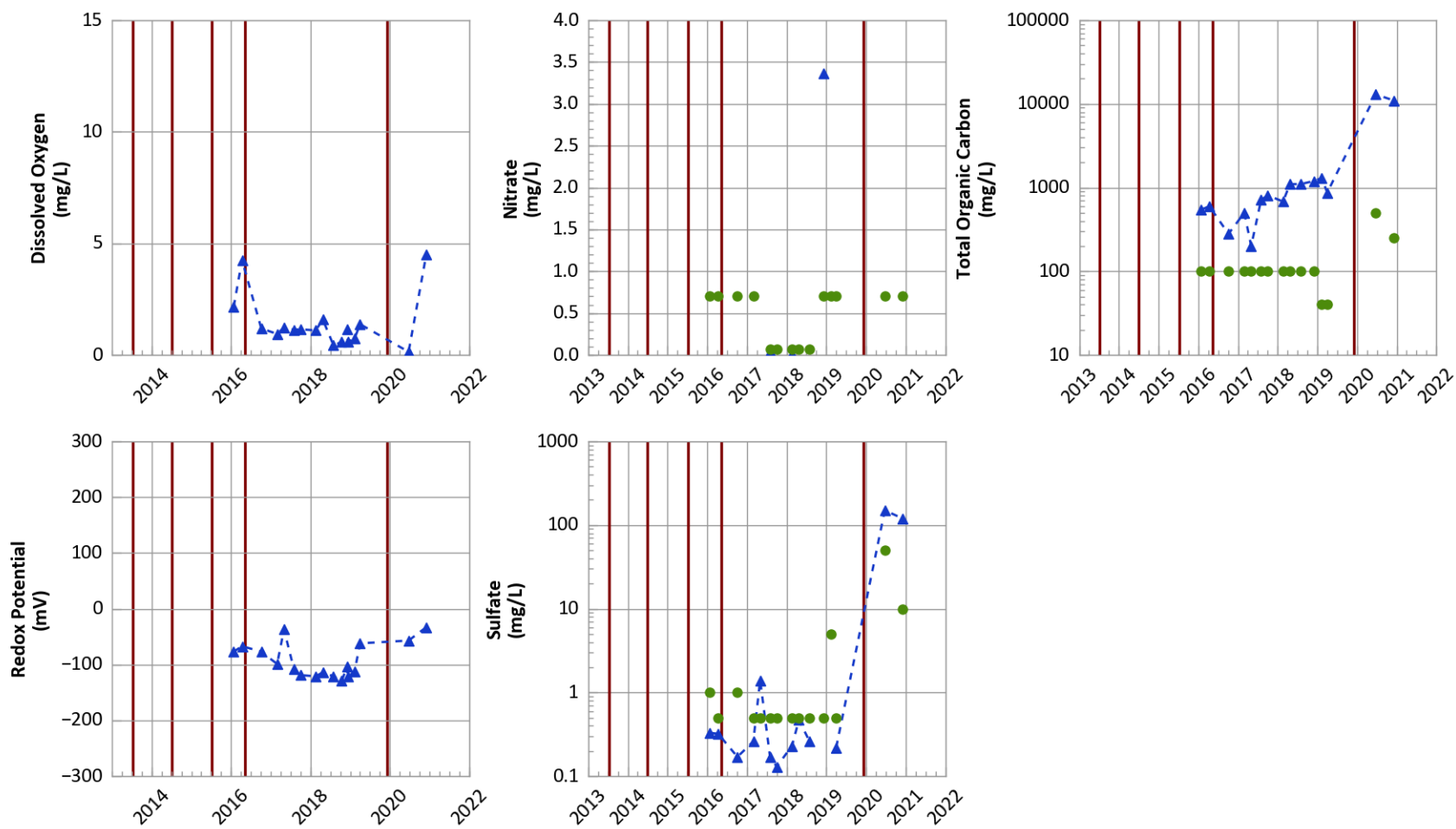
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



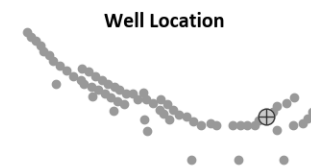
**PTX06-ISB059 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



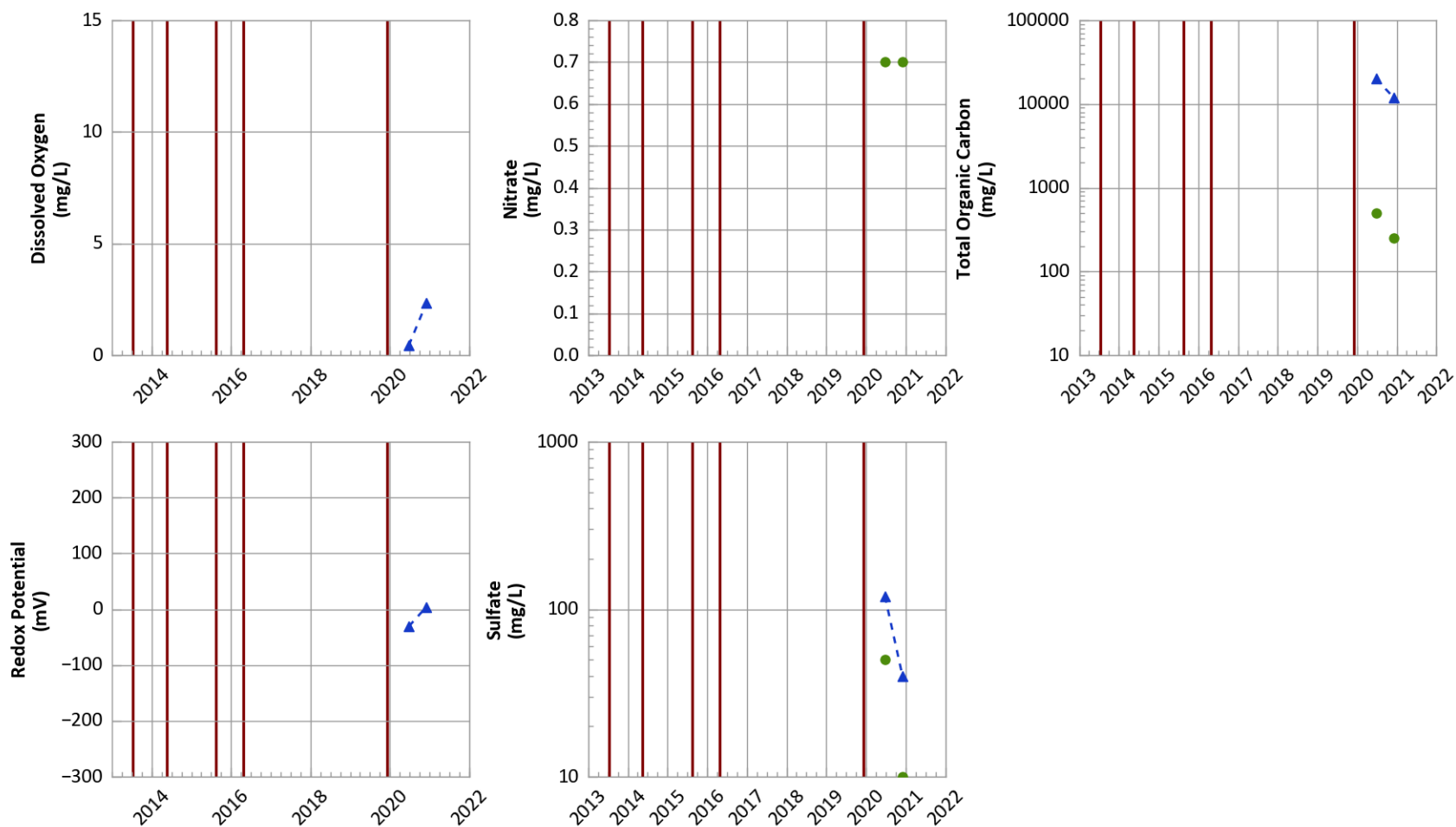
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



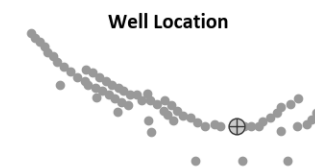
**PTX06-ISB064 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



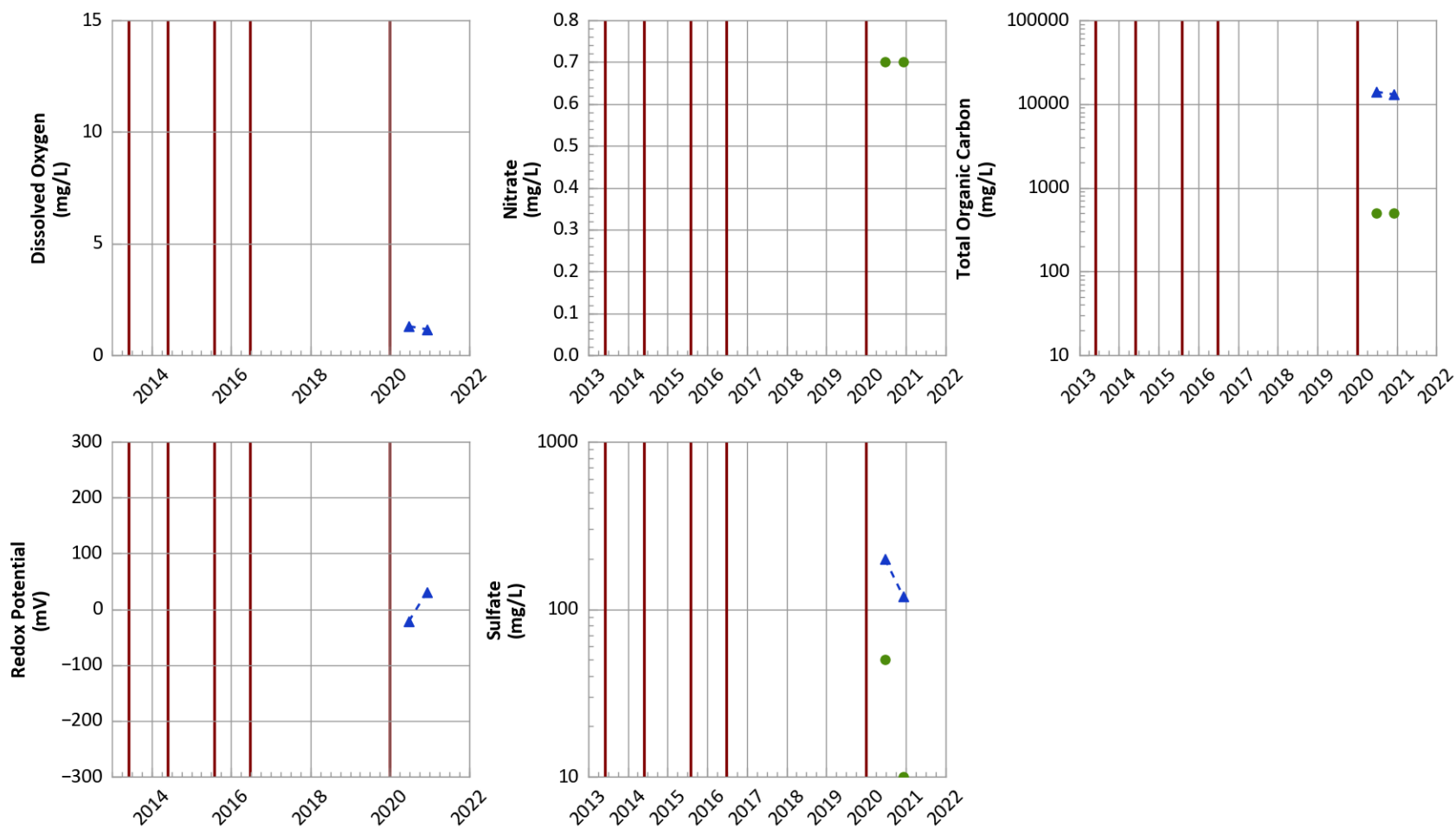
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



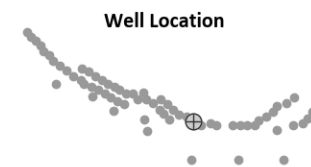
**PTX06-ISB068 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



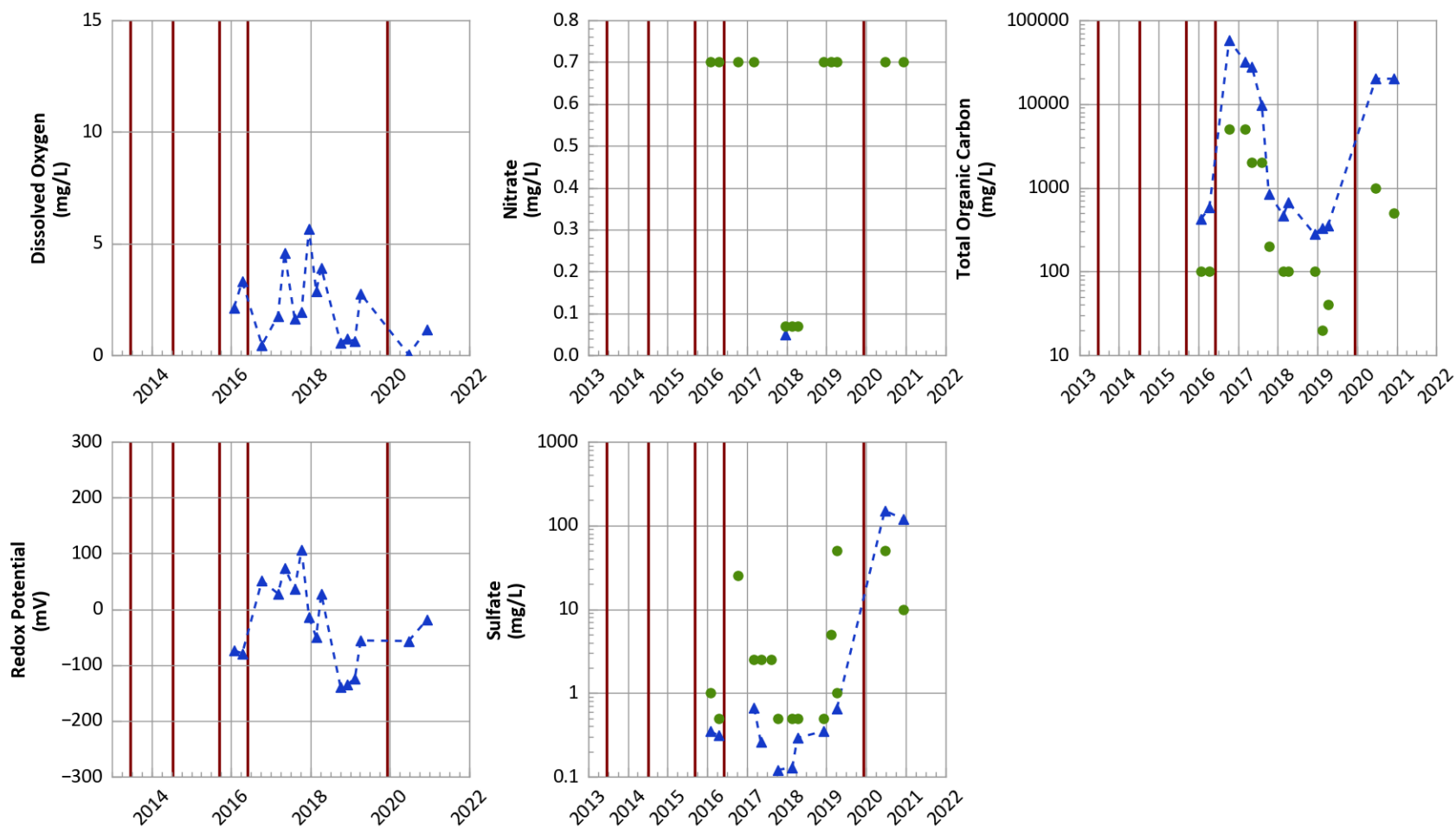
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



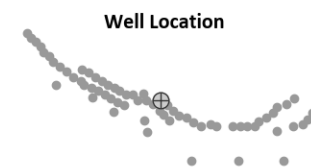
**PTX06-ISB073 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



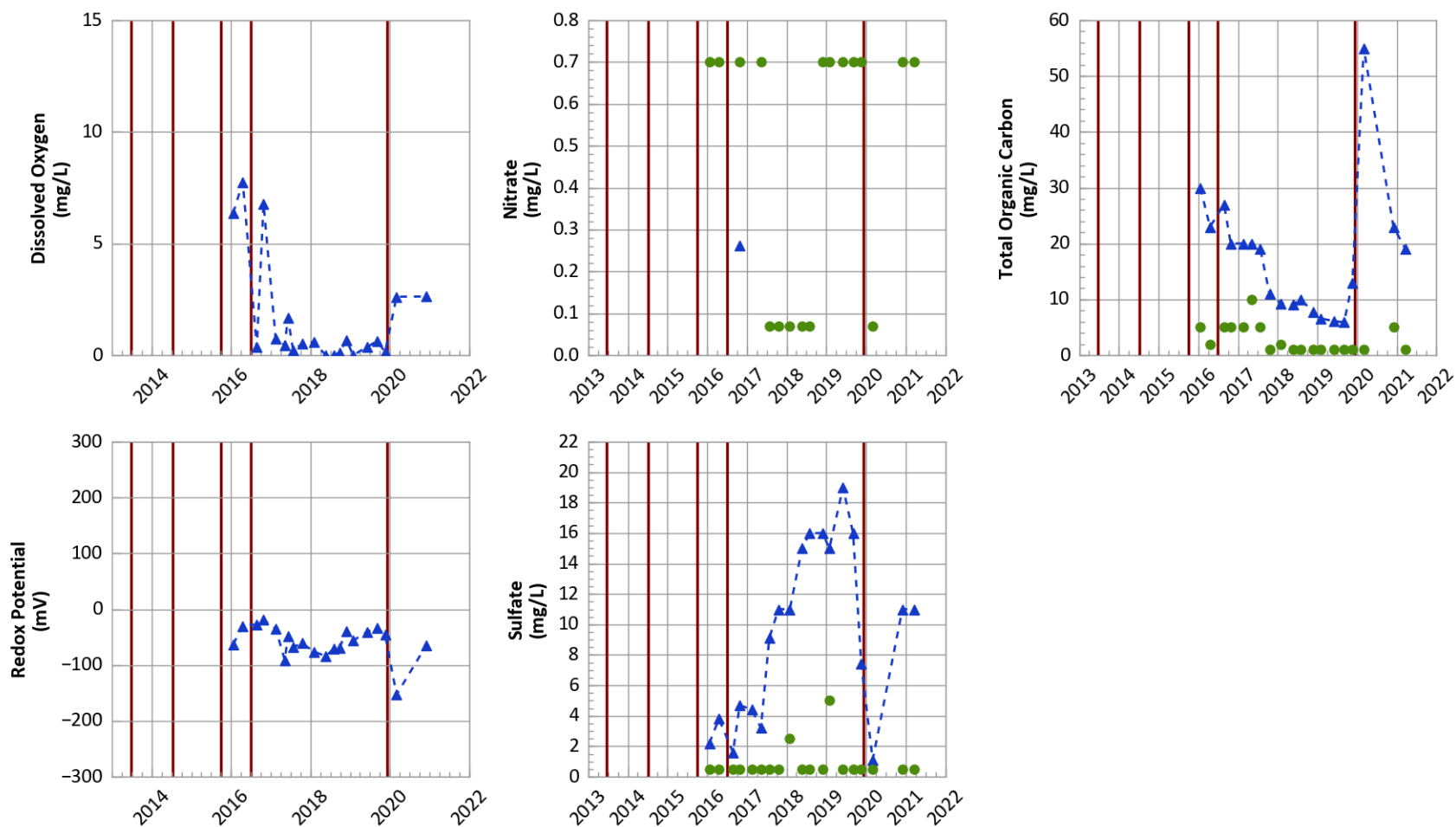
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



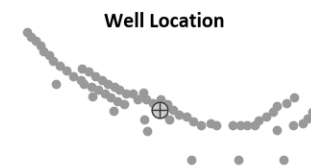
**PTX06-ISB075 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



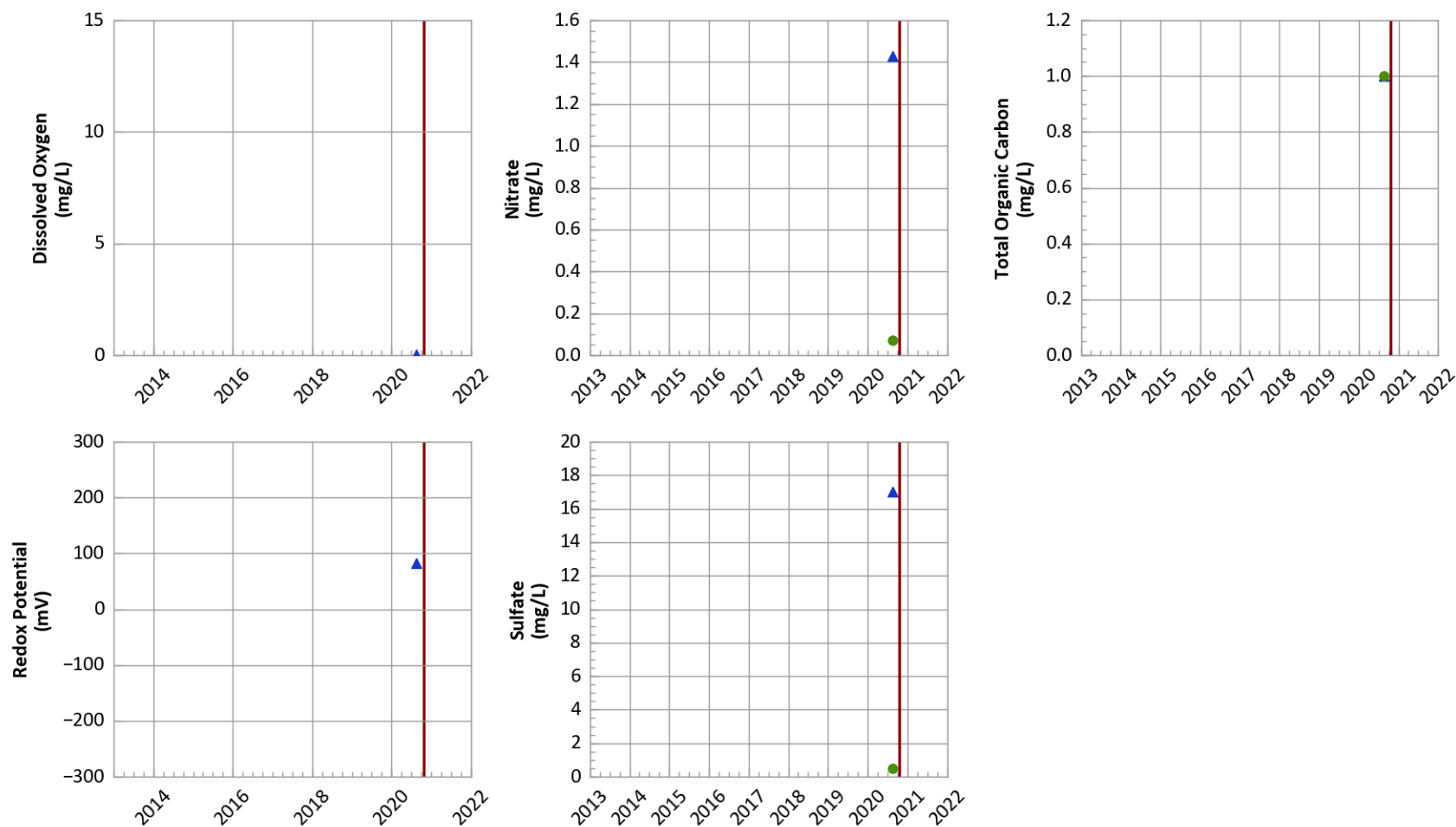
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



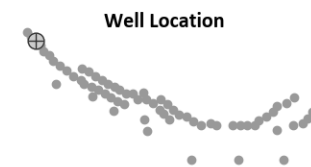
**PTX06-ISB135 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



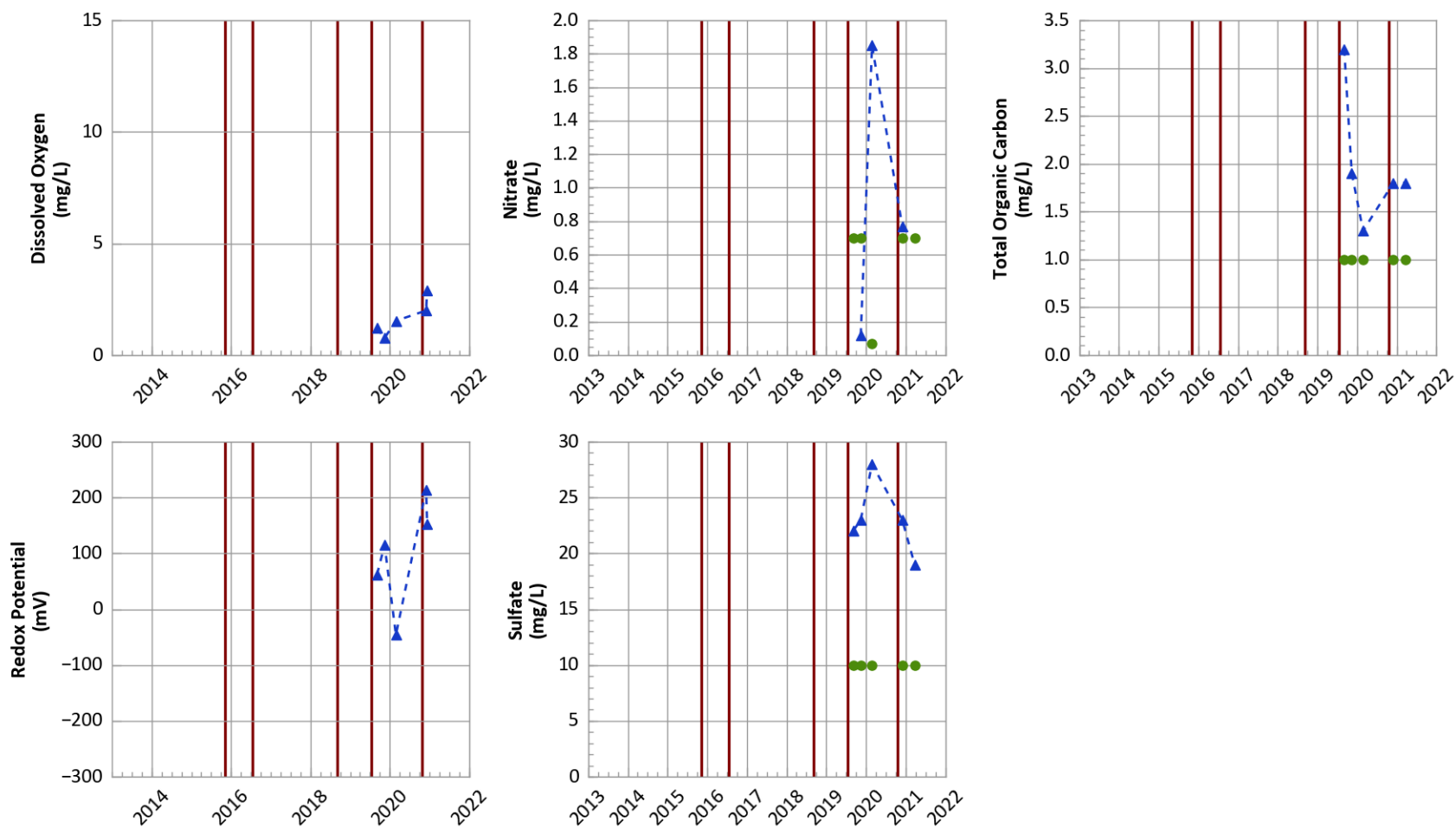
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Injection Dates



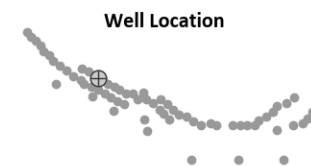
**PTX06-1164 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



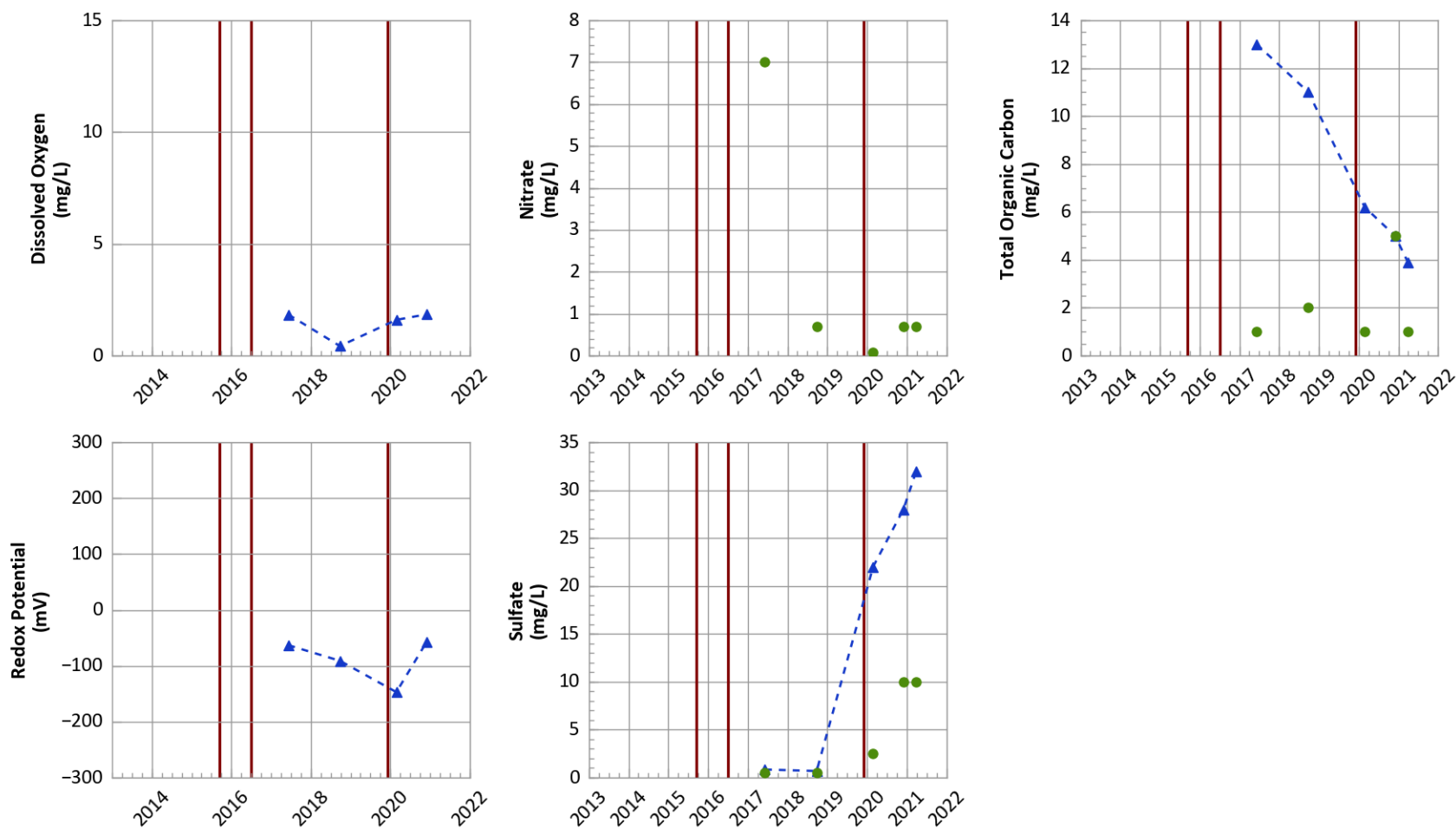
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



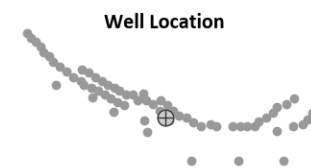
PTX06-1169 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



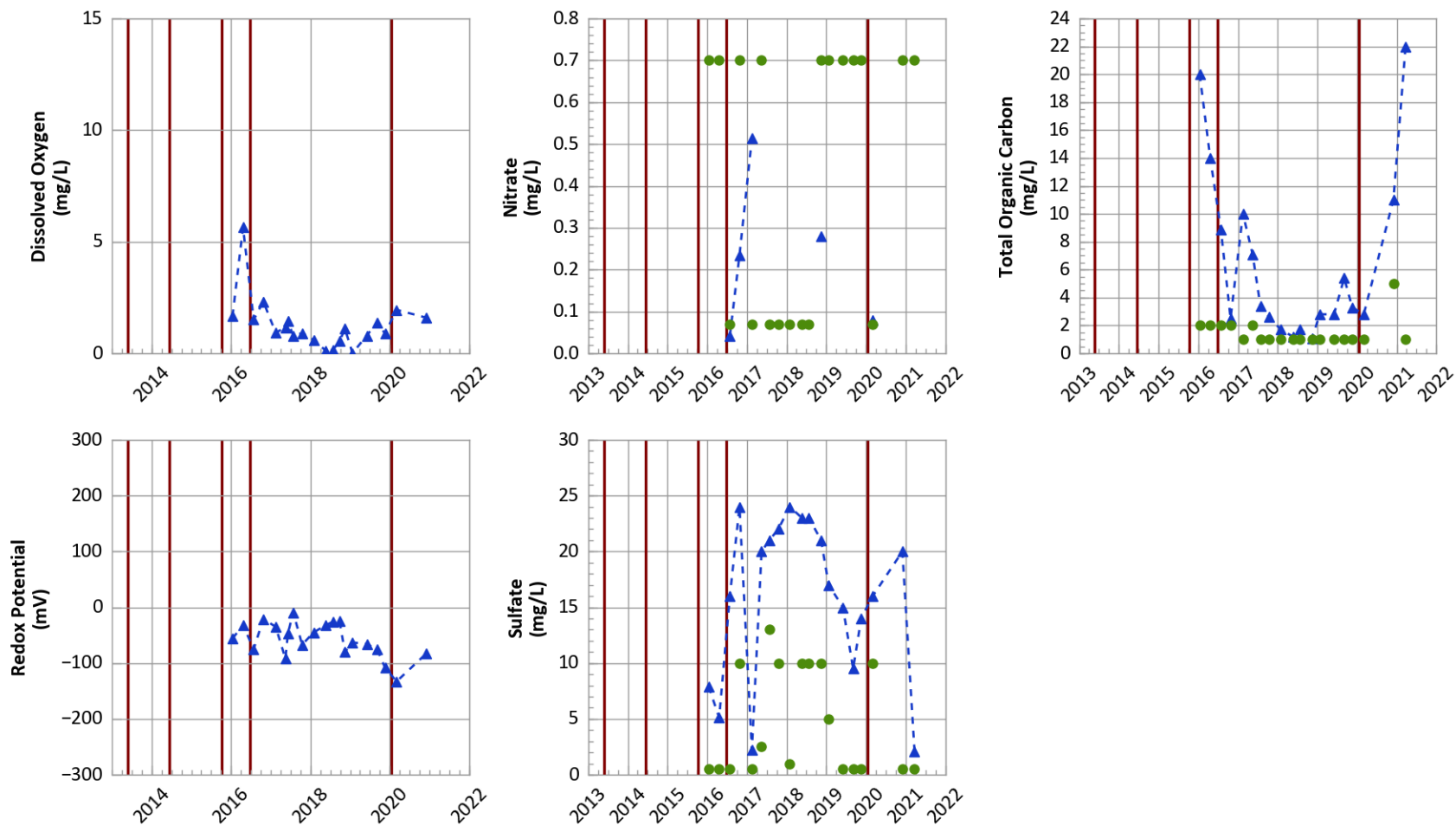
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



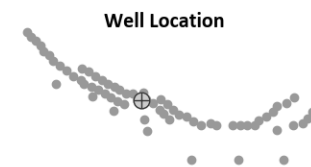
**PTX06-1170 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



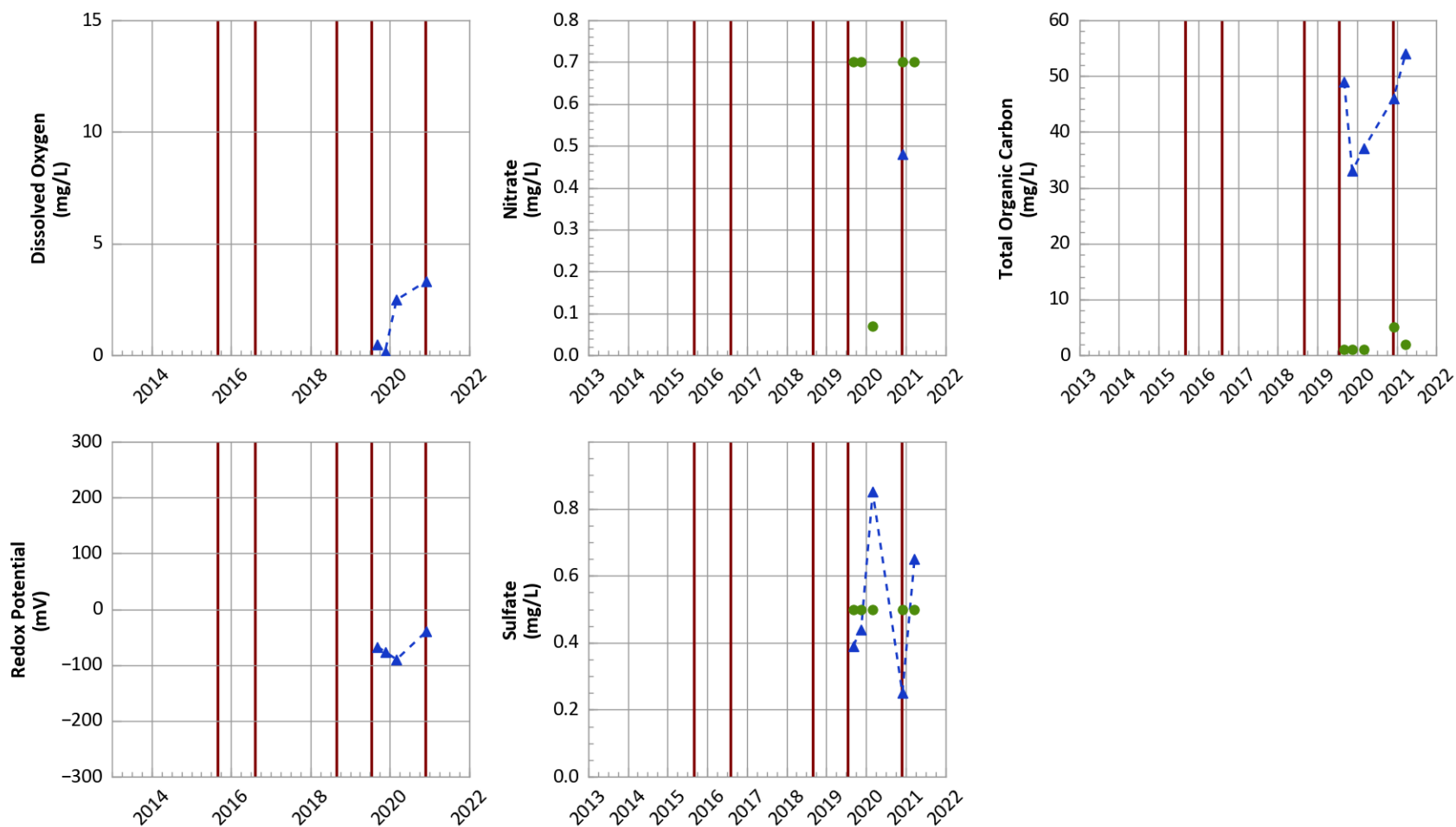
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



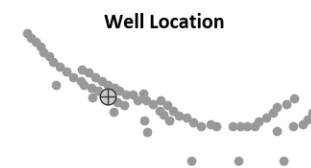
PTX06-1176 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



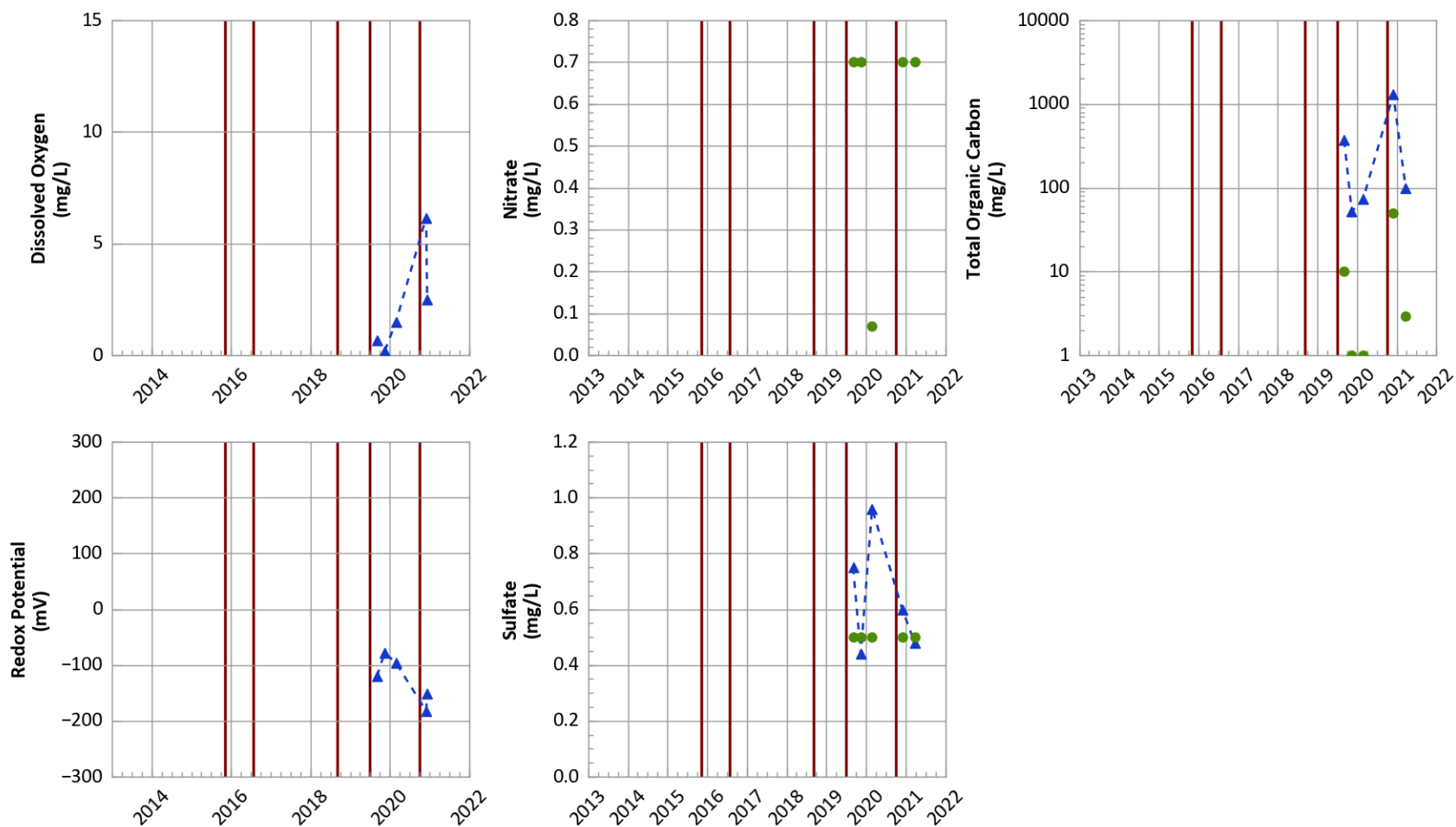
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



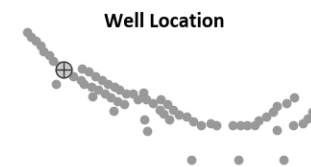
**PTX06-1177 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



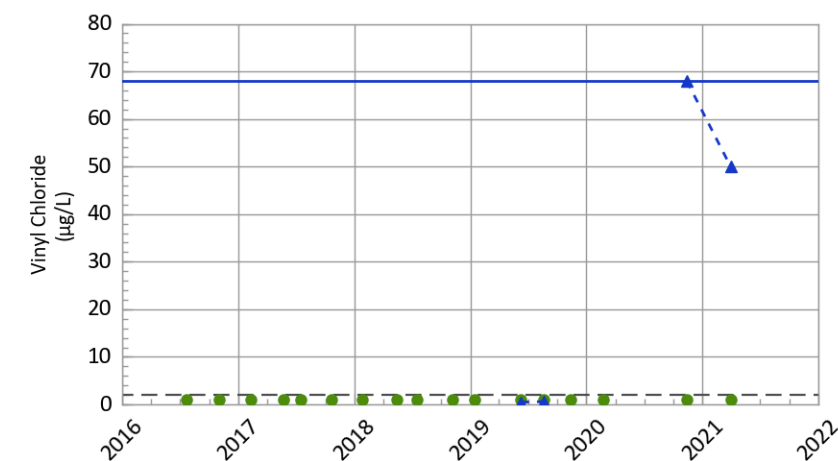
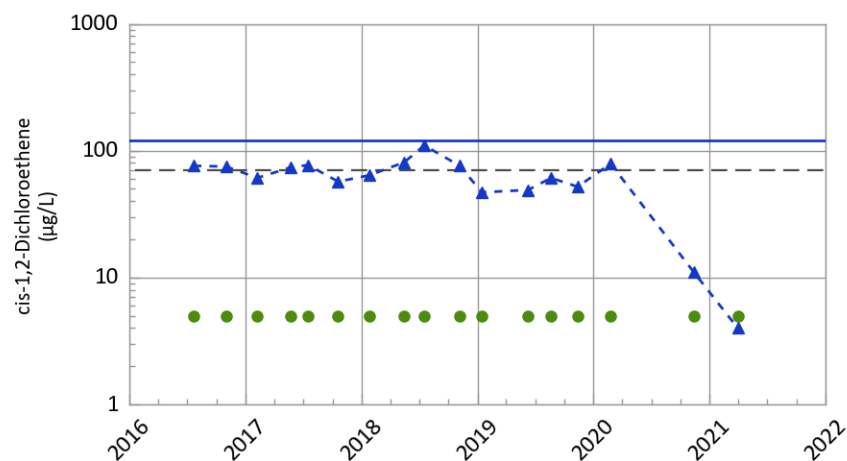
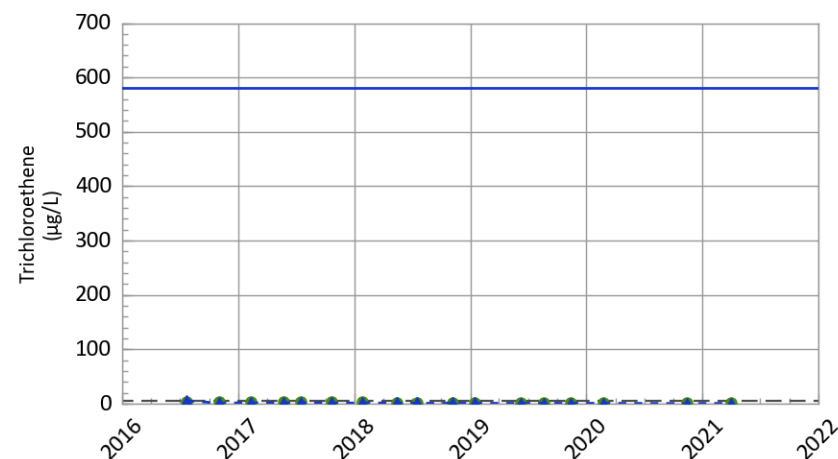
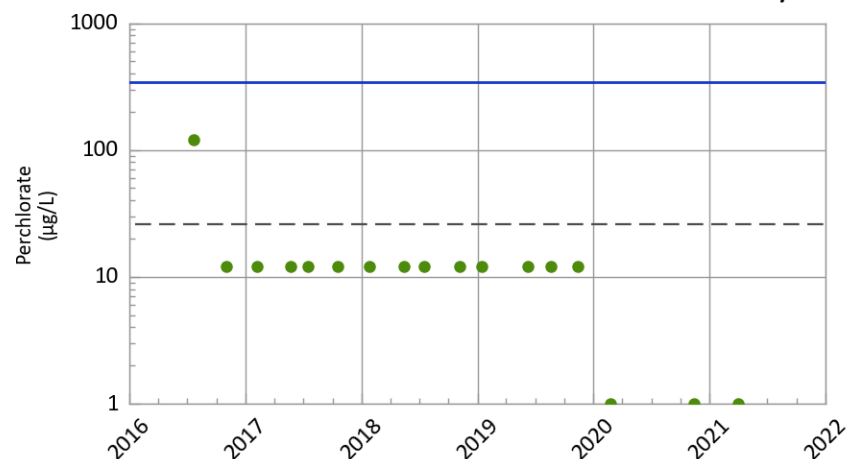
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



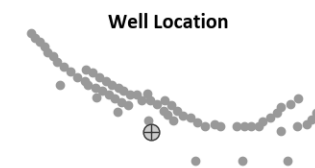
**PTX06-1012 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



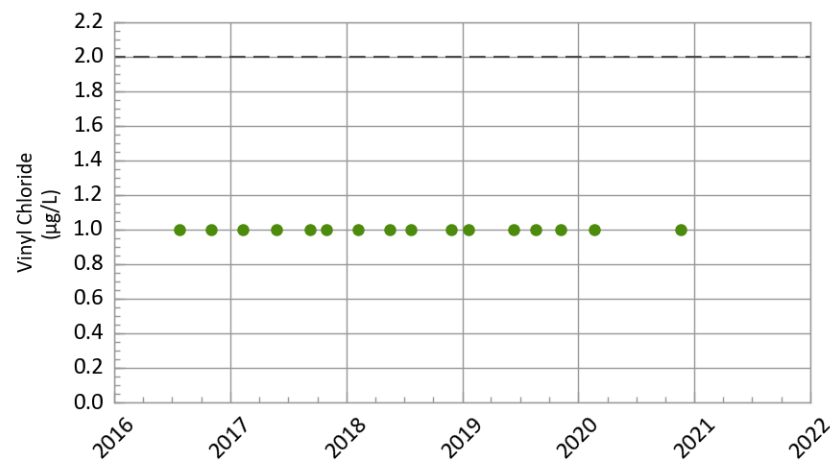
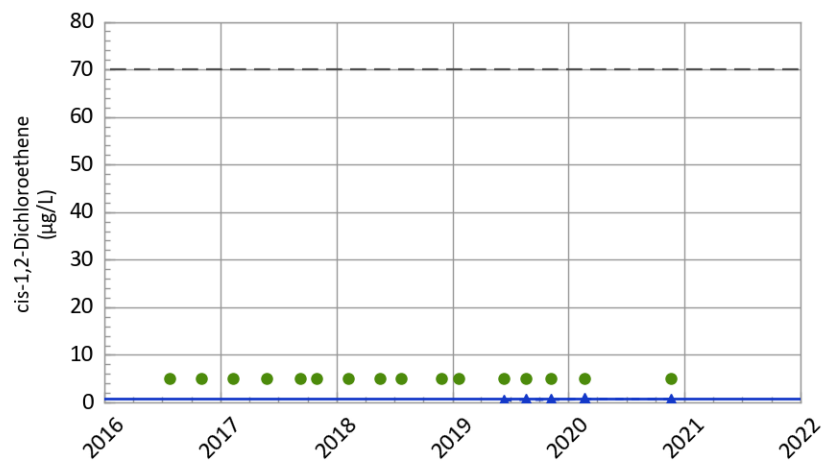
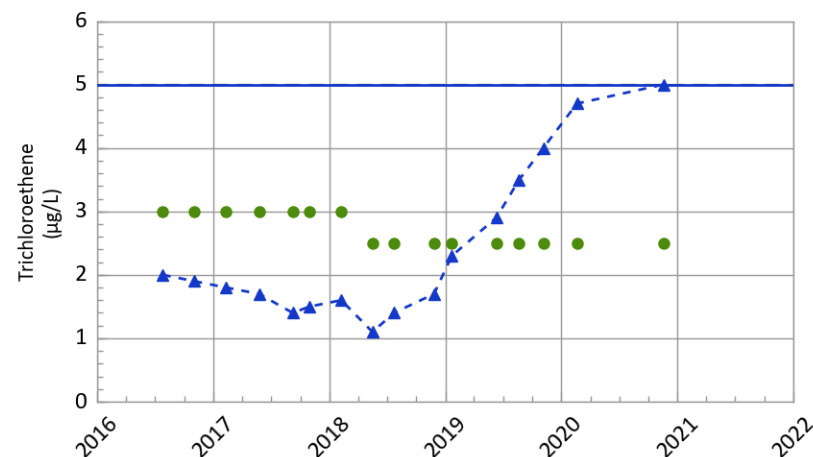
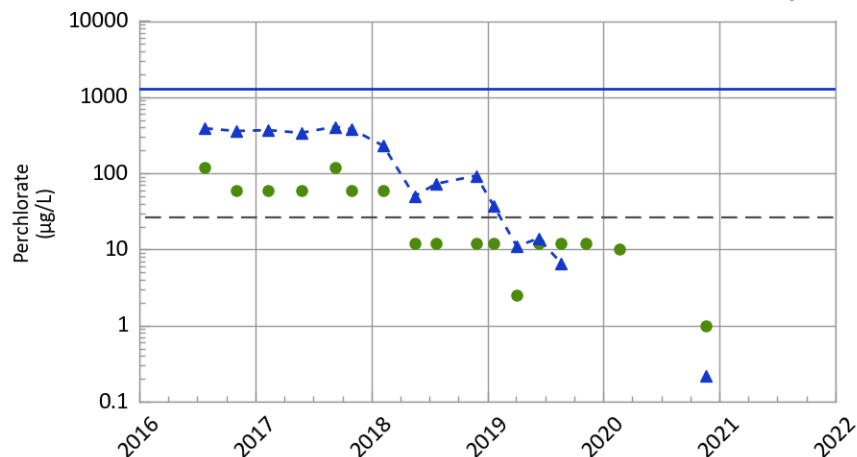
Most Recent Measured COC Concentrations (Mar 30, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
PERC	Non-Detect	26.0
DCE12C	4.0	70.0
TCE	0.8	5.0
VC	50.0	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



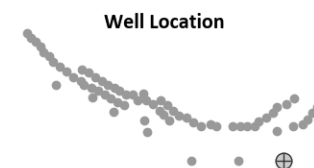
**PTX06-1148 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



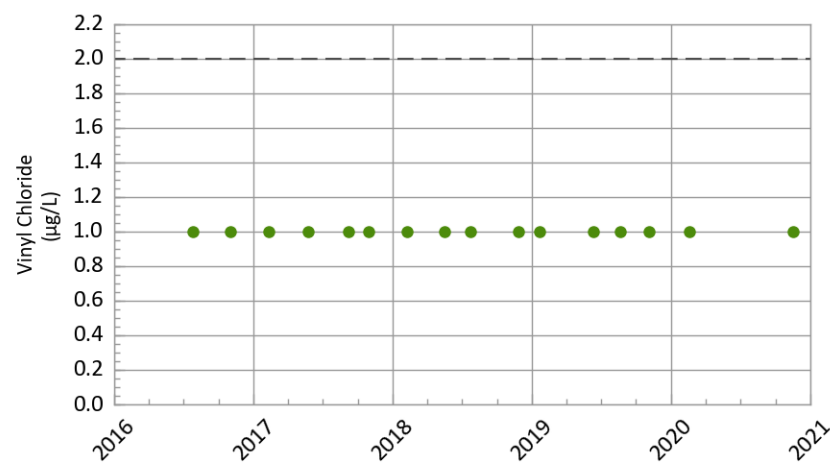
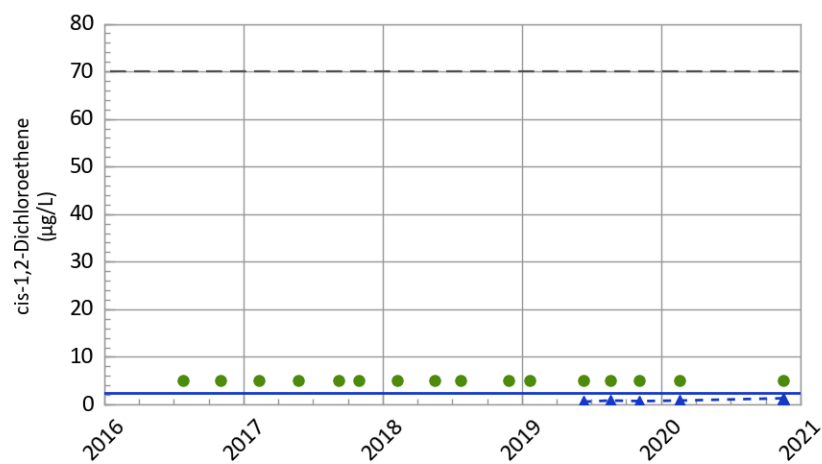
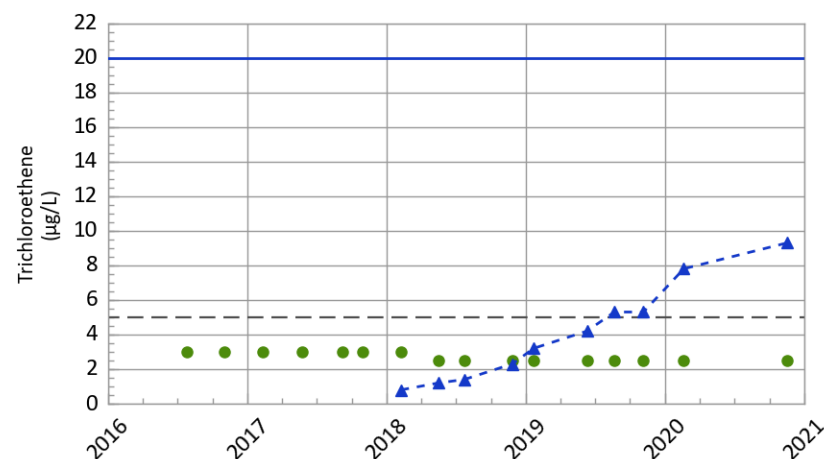
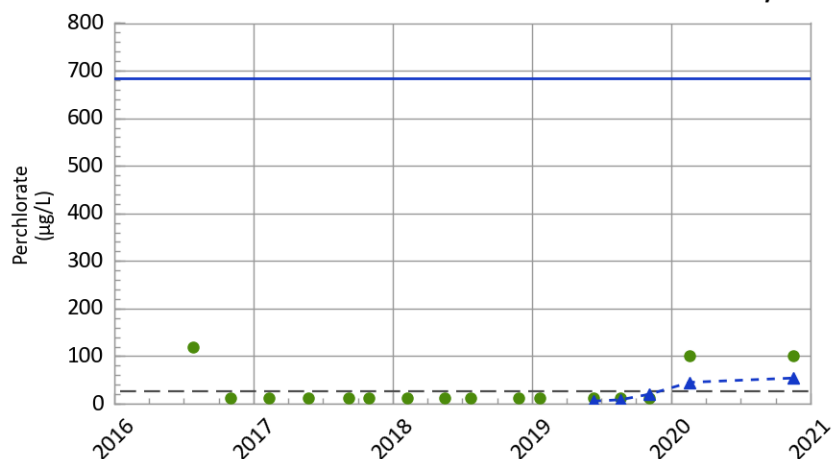
Most Recent Measured COC Concentrations (Nov 17, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	0.22	26.0
DCE12C	0.68	70.0
TCE	5.0	5.0
VC	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



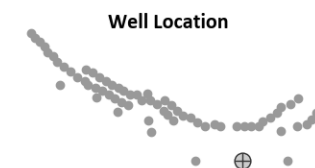
**PTX06-1149 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



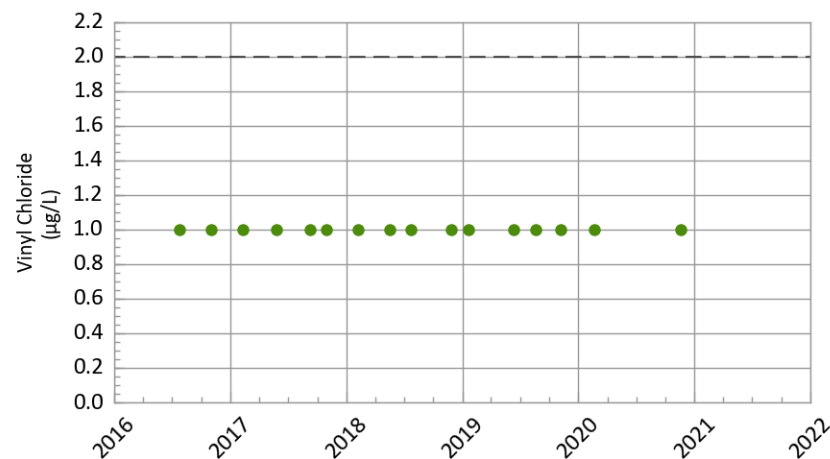
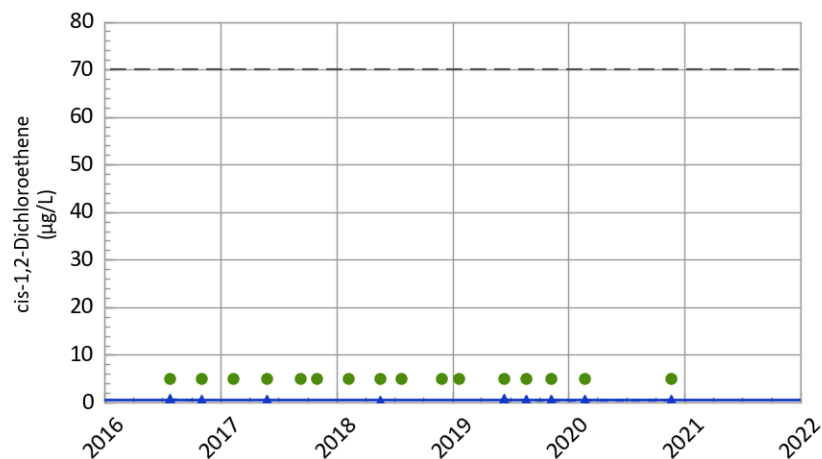
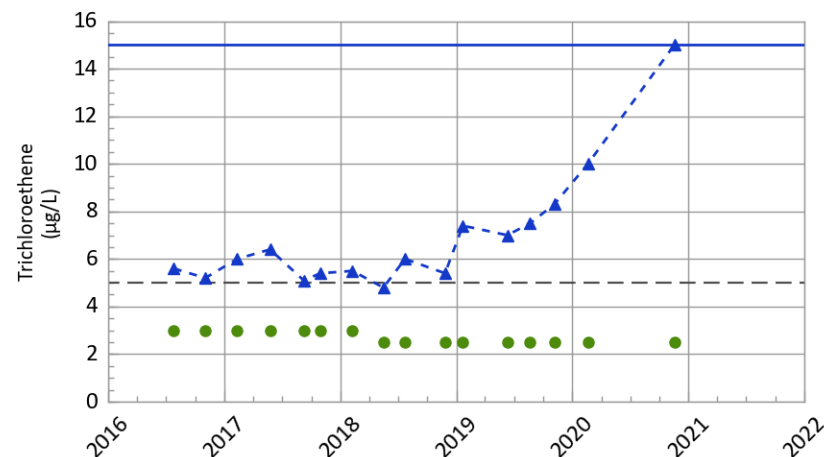
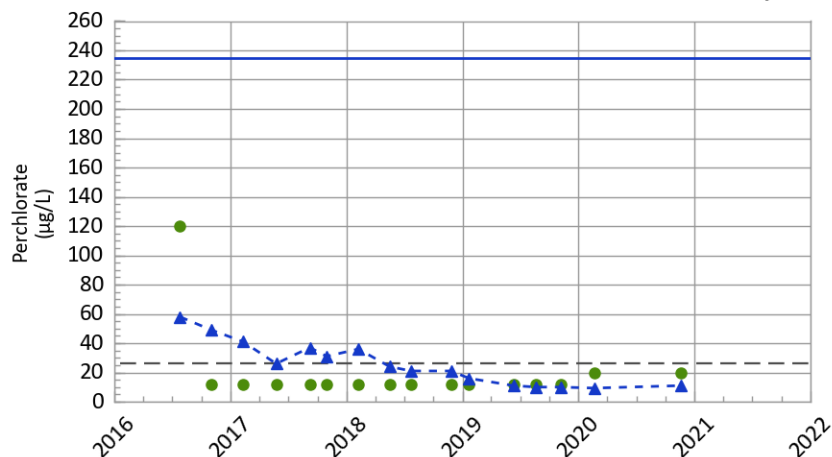
Most Recent Measured COC Concentrations (Nov 17, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	54.0	26.0
DCE12C	1.3	70.0
TCE	9.3	5.0
VC	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



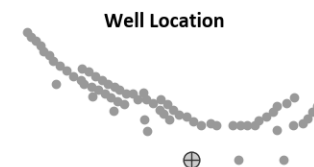
**PTX06-1150 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



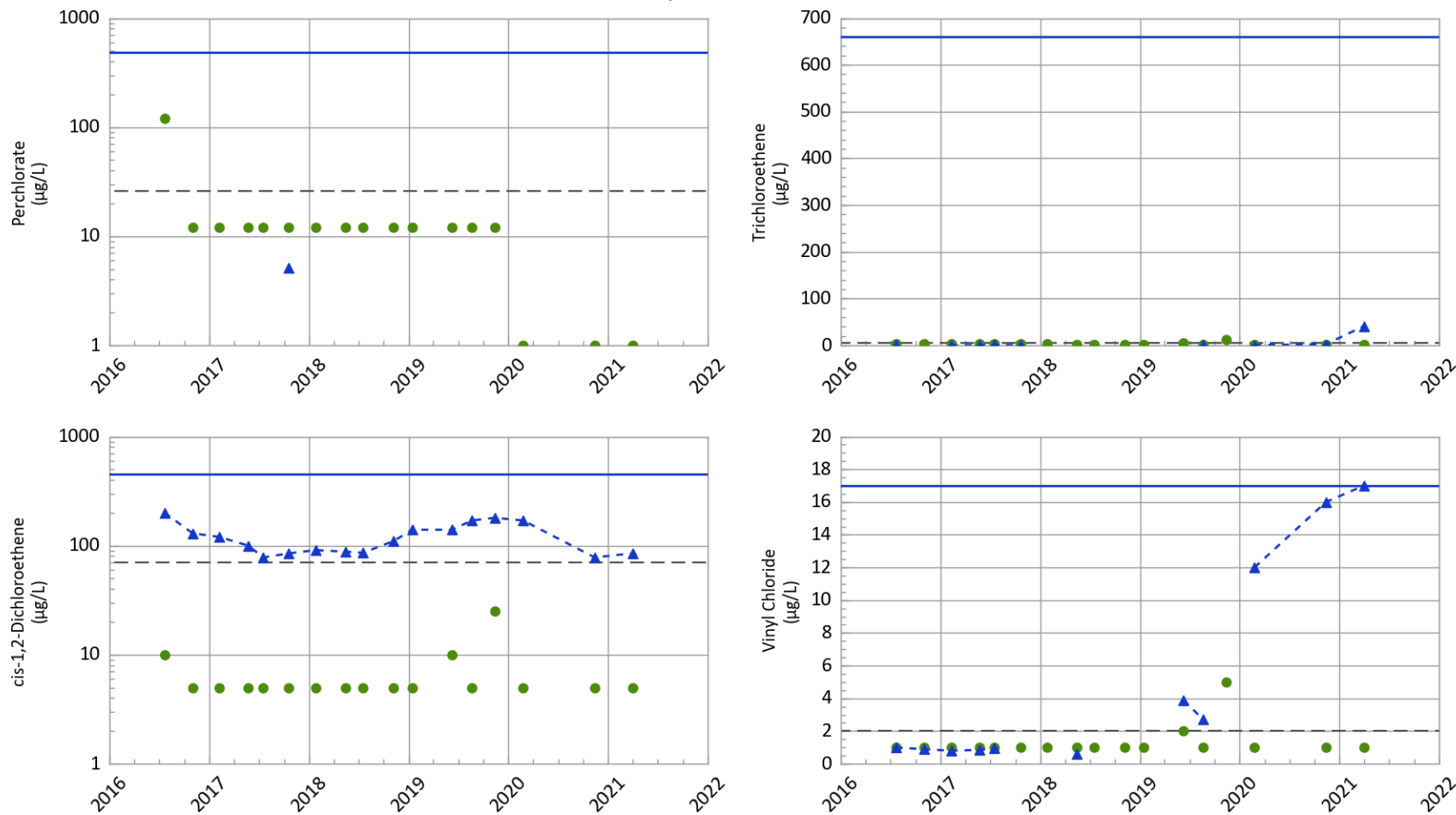
Most Recent Measured COC Concentrations (Nov 17, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	11.0	26.0
DCE12C	0.44	70.0
TCE	15.0	5.0
VC	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



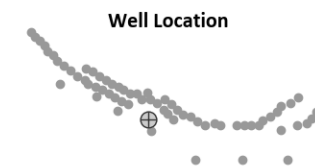
**PTX06-1155 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



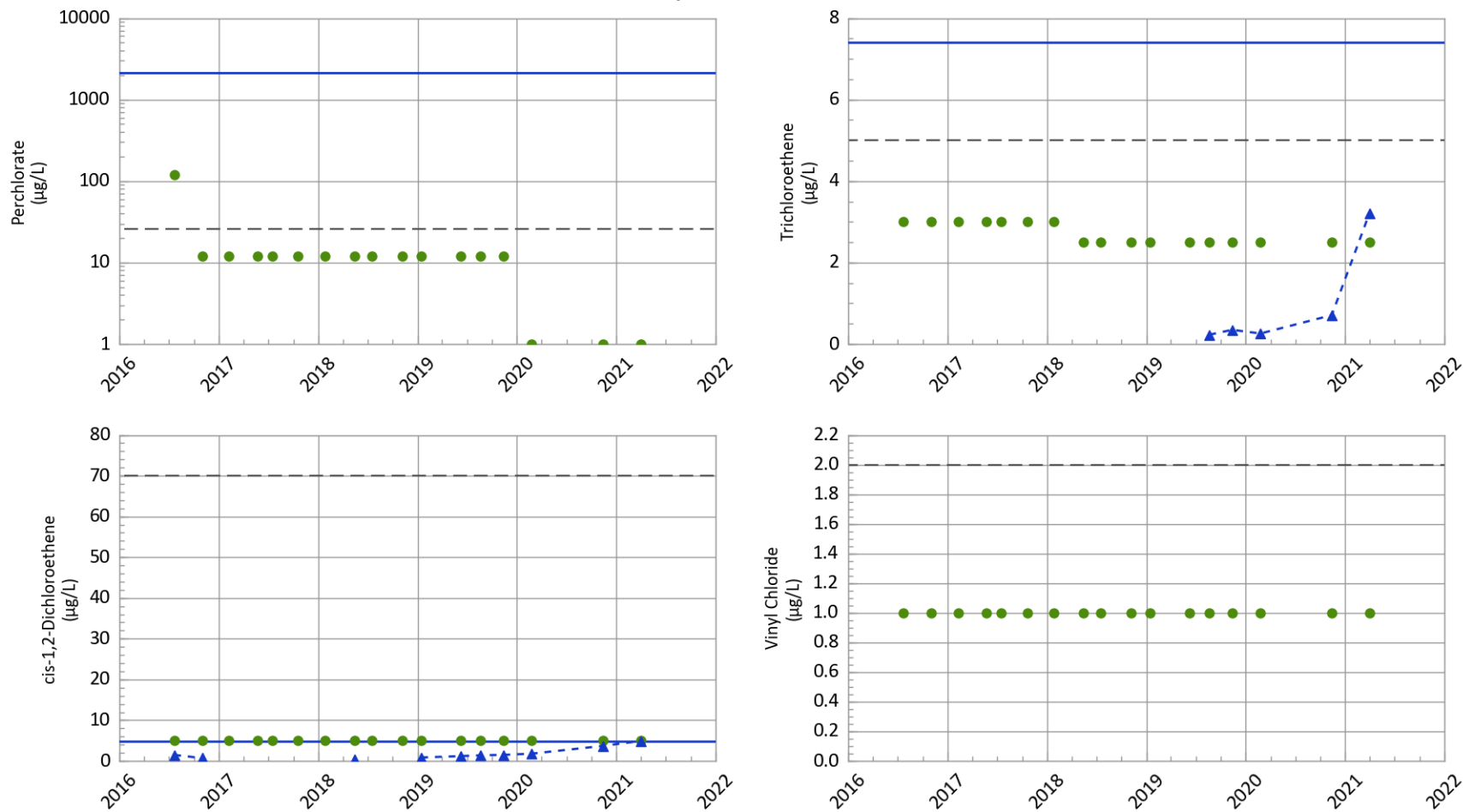
Most Recent Measured COC Concentrations (Mar 30, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
PERC	Non-Detect	26.0
DCE12C	85.0	70.0
TCE	41.0	5.0
VC	17.0	2.0

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Maximum Concentration
- Groundwater Protection Standard



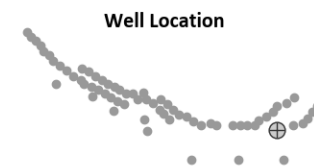
**PTX06-1156 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



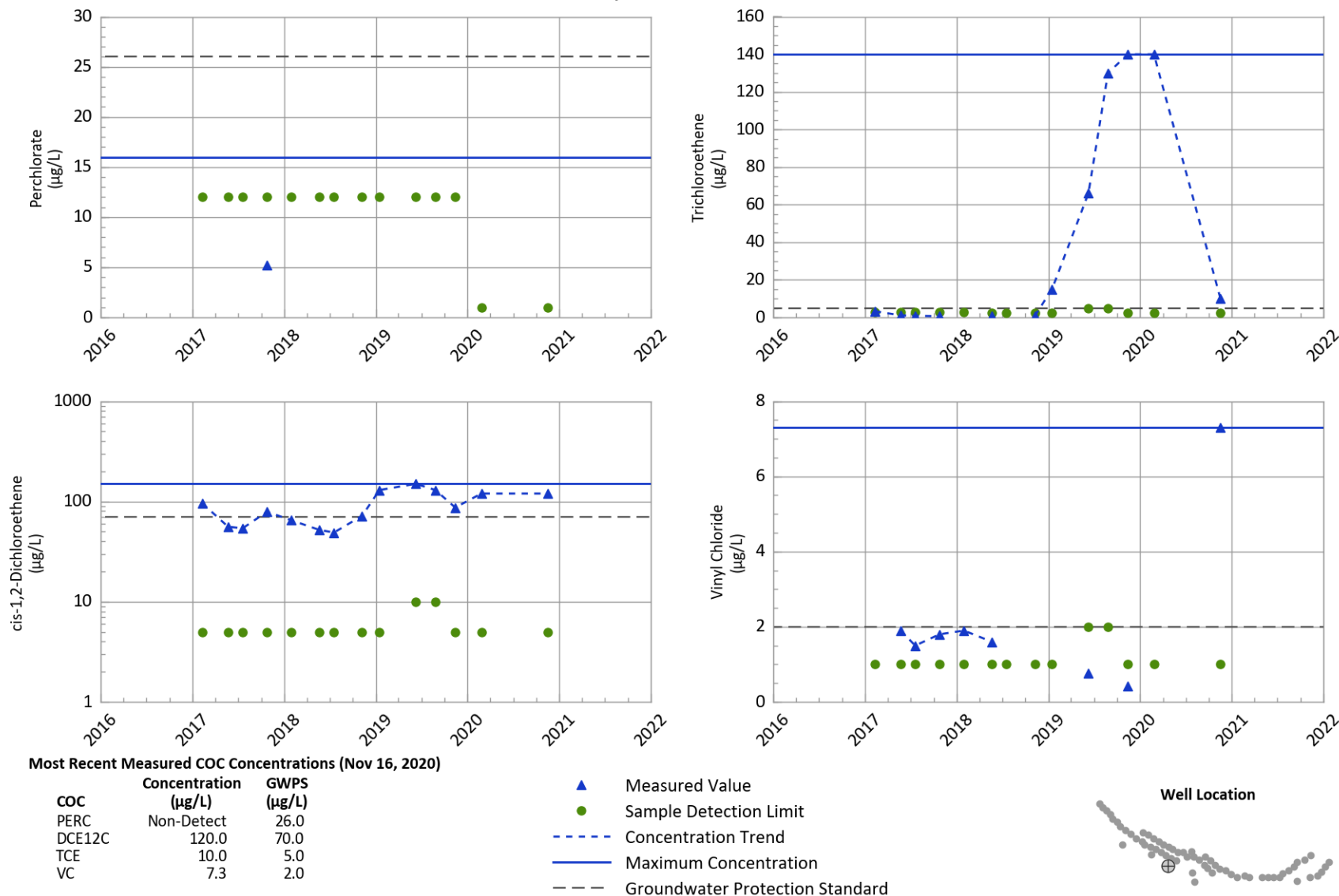
Most Recent Measured COC Concentrations (Mar 30, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
PERC	Non-Detect	26.0
DCE12C	4.9	70.0
TCE	3.2	5.0
VC	Non-Detect	2.0

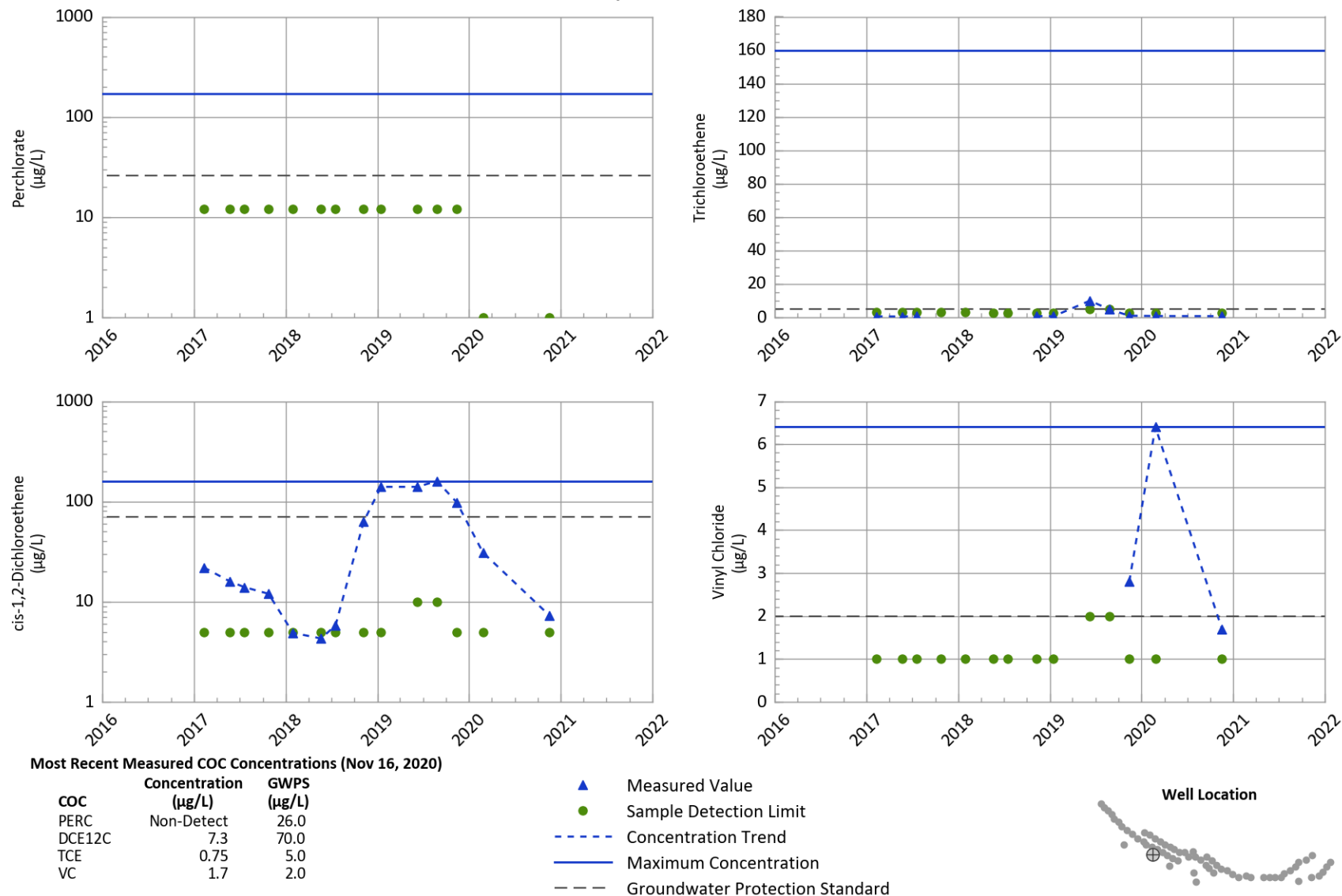
- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



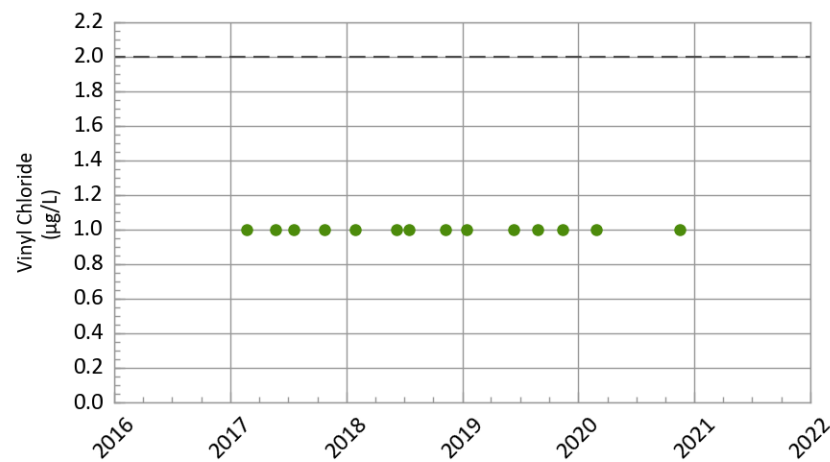
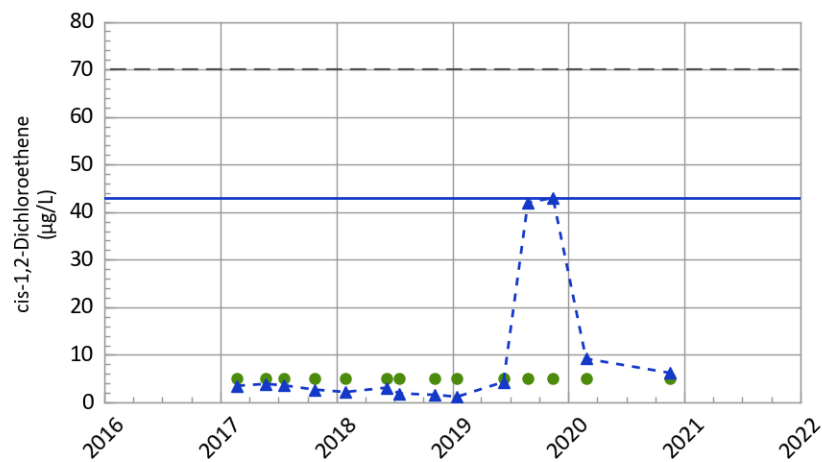
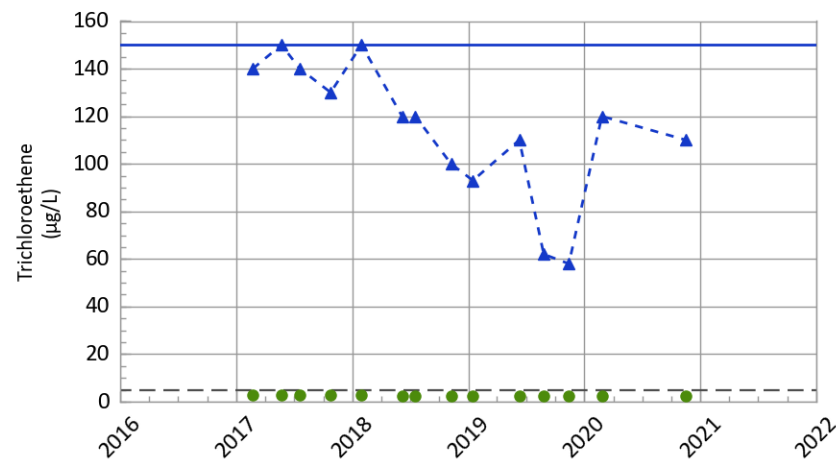
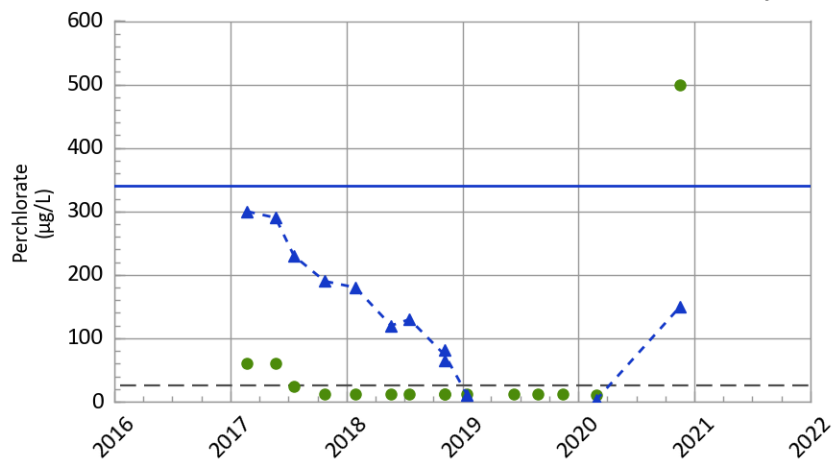
**PTX06-1173 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



**PTX06-1174 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



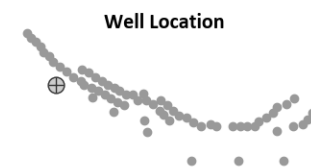
**PTX06-1175 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



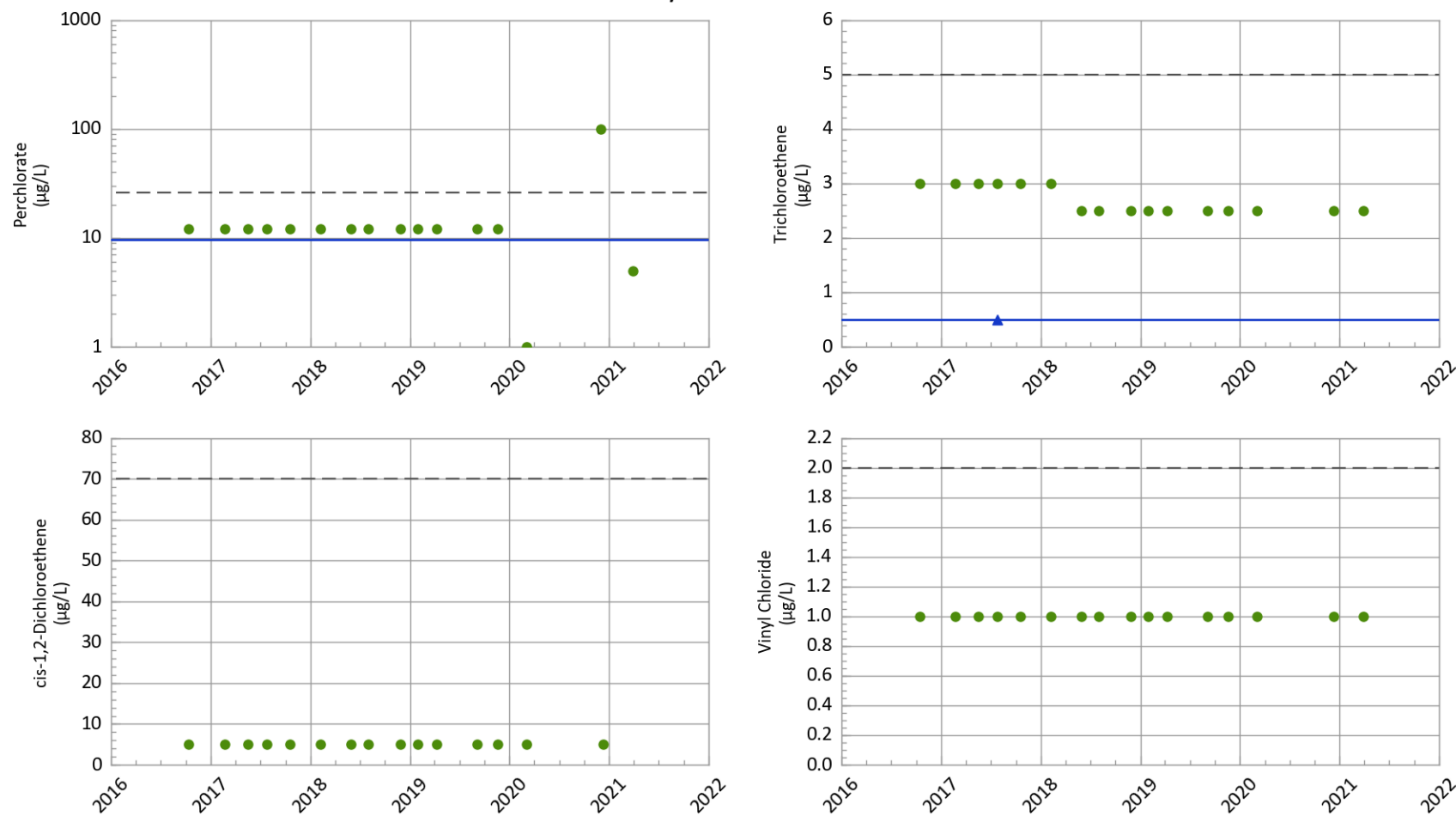
Most Recent Measured COC Concentrations (Nov 16, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	150.0	26.0
DCE12C	6.2	70.0
TCE	110.0	5.0
VC	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



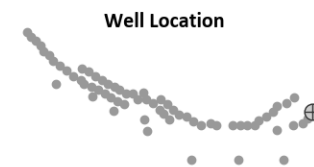
**PTX06-ISB079 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



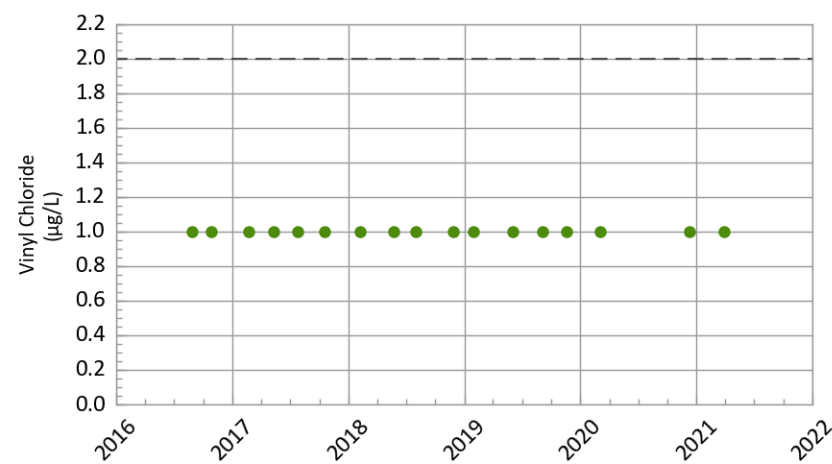
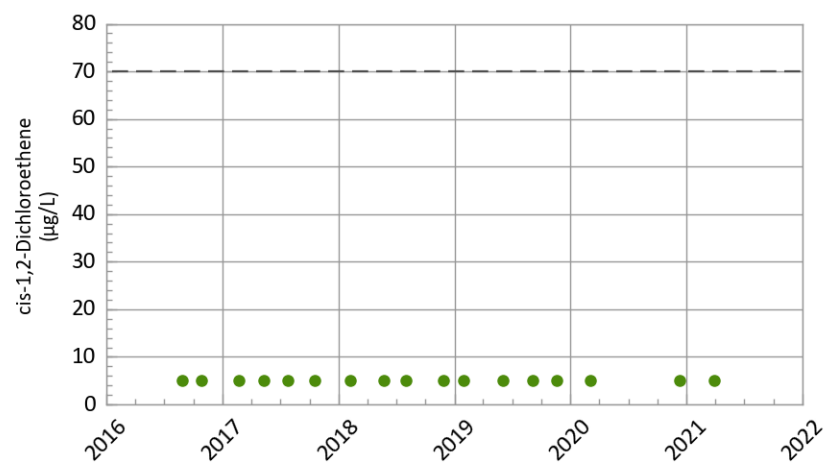
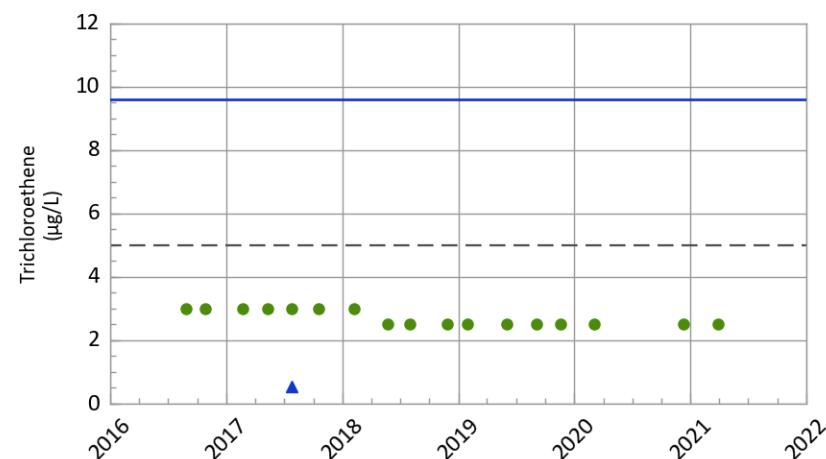
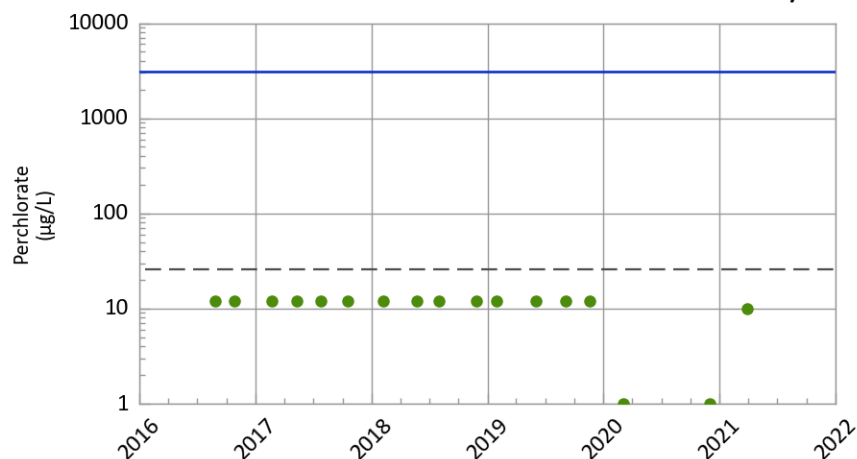
Most Recent Measured COC Concentrations (Mar 29, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
PERC	Non-Detect	26.0
DCE12C	Non-Detect	70.0
TCE	Non-Detect	5.0
VC	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Maximum Concentration
- Groundwater Protection Standard



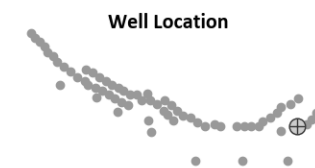
**PTX06-ISB082 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



Most Recent Measured COC Concentrations (Mar 29, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	Non-Detect	70.0
TCE	Non-Detect	5.0
VC	Non-Detect	2.0

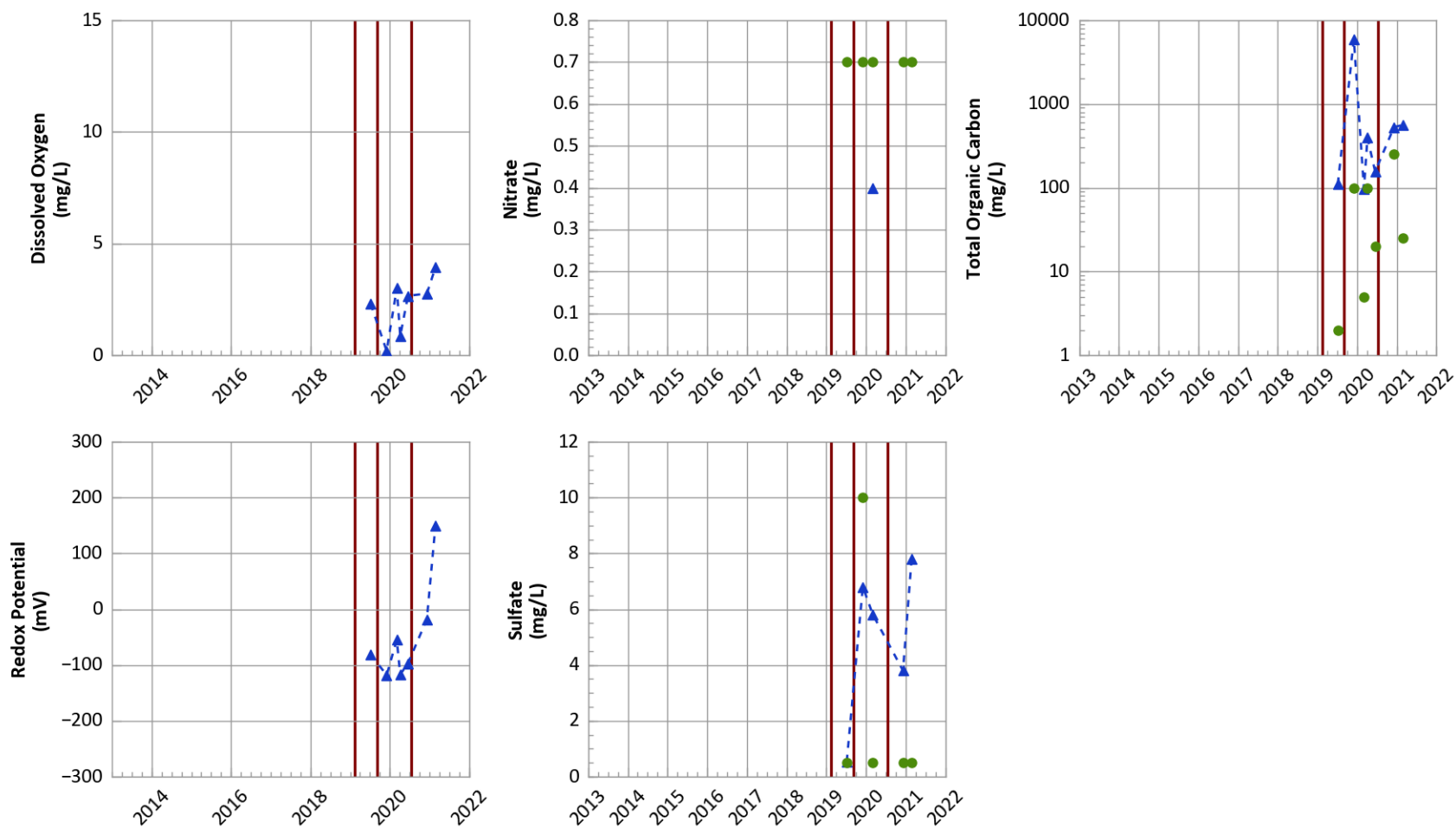
- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



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Southeast ISB Extension

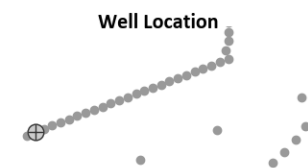
**PTX06-ISB302 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



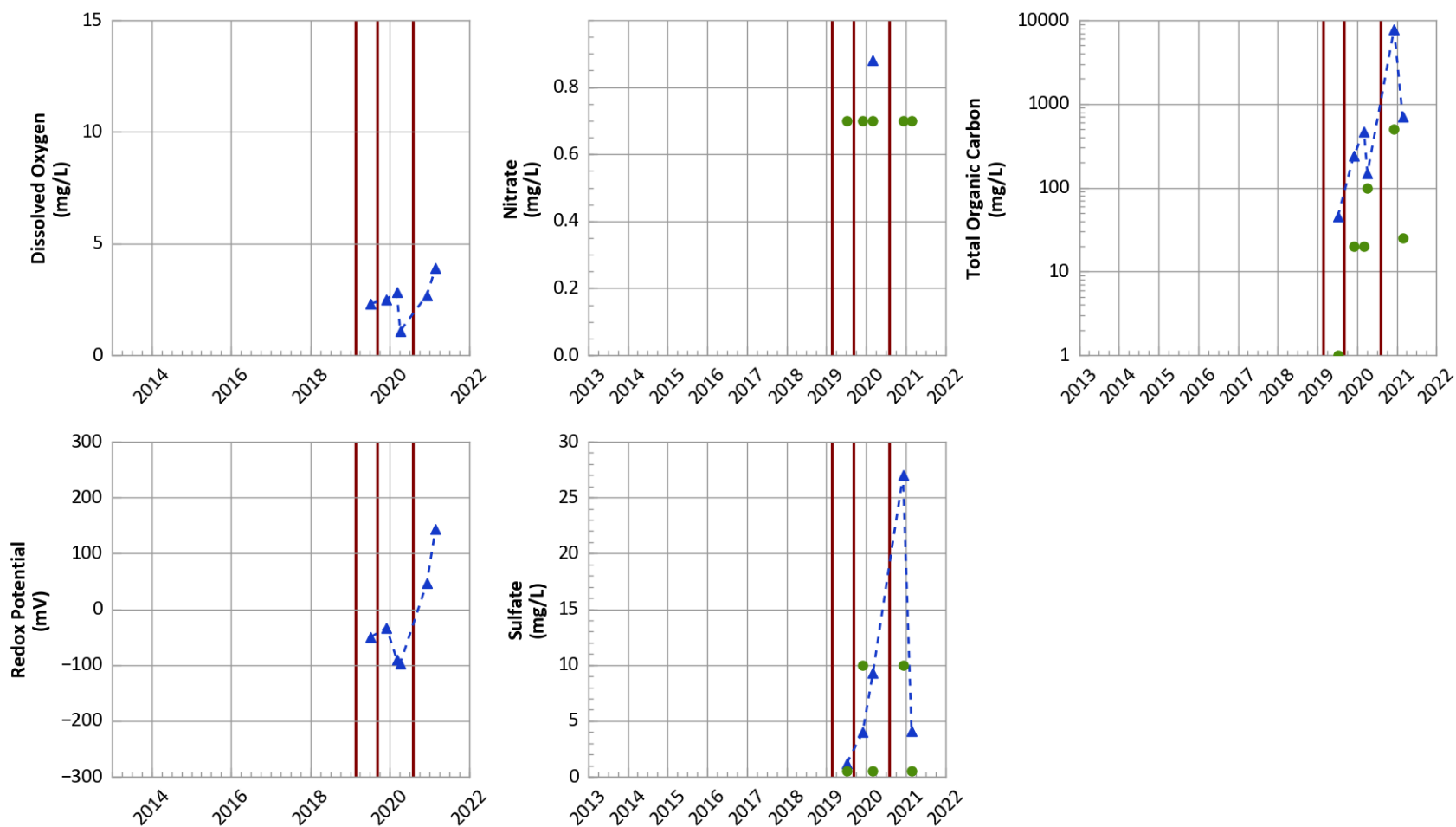
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



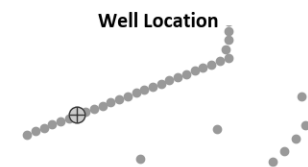
**PTX06-ISB307 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



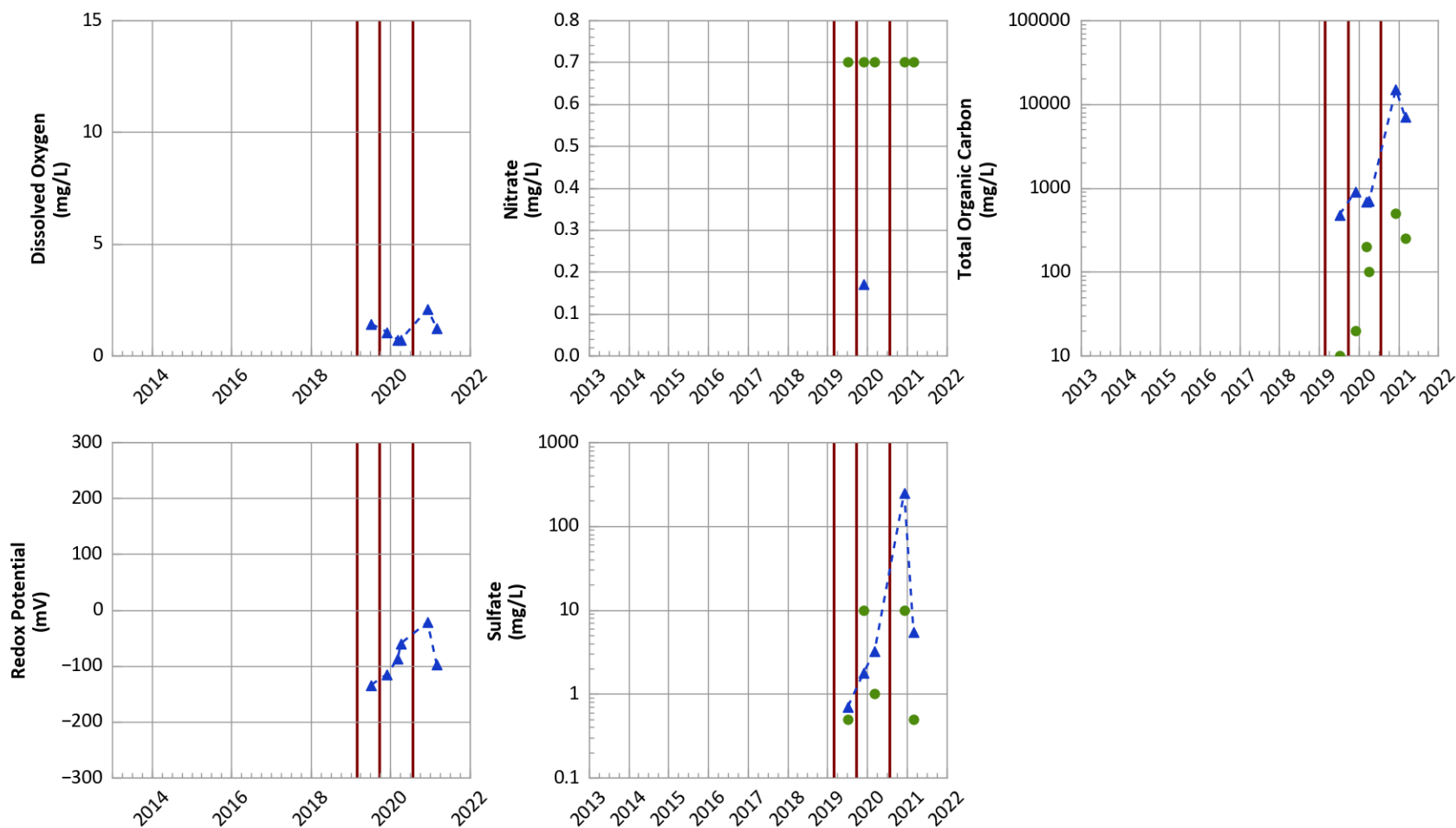
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



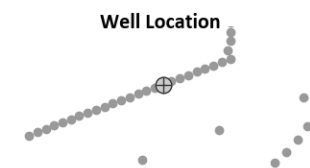
PTX06-ISB317 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



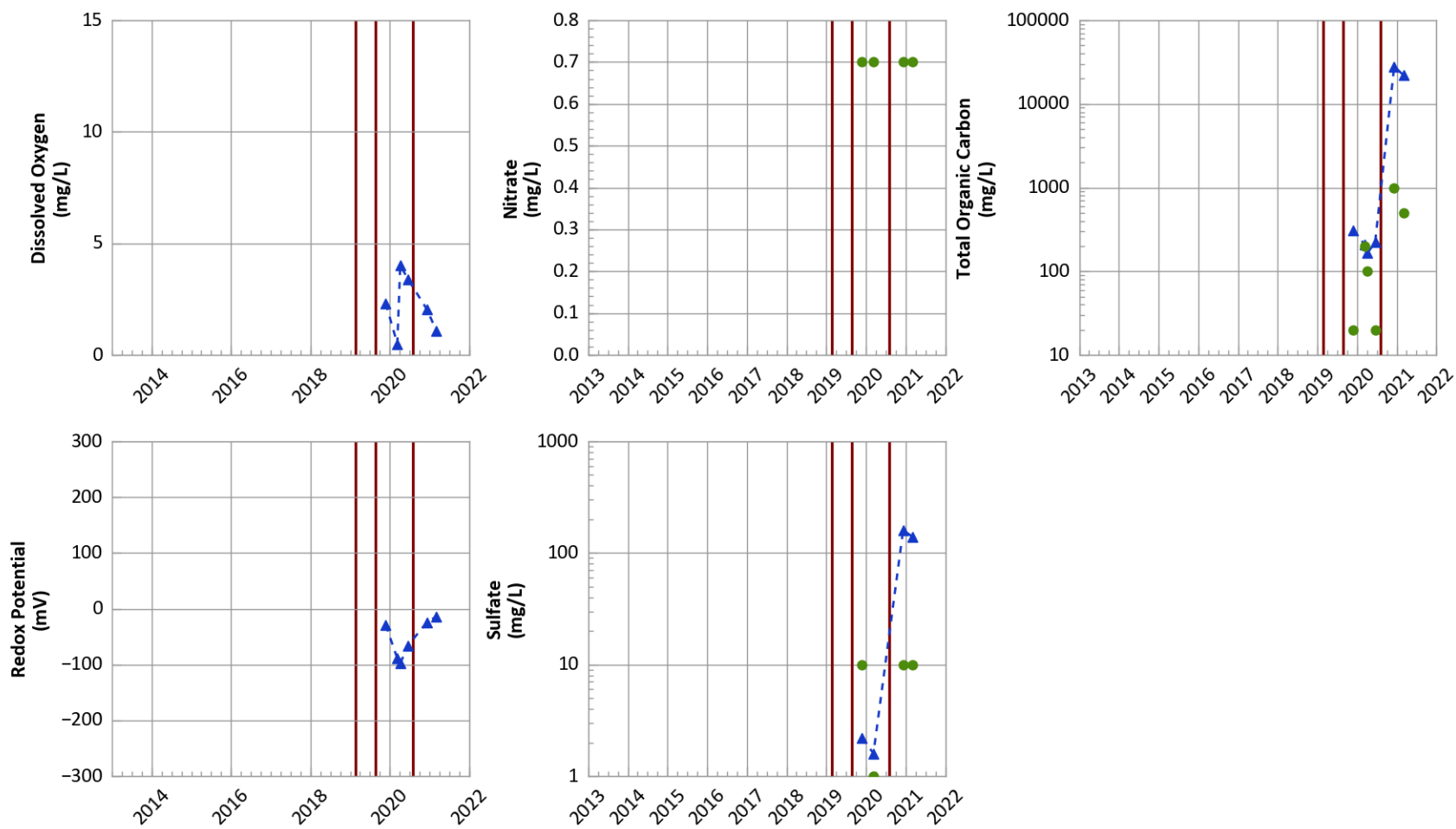
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



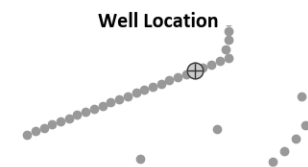
**PTX06-ISB321 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



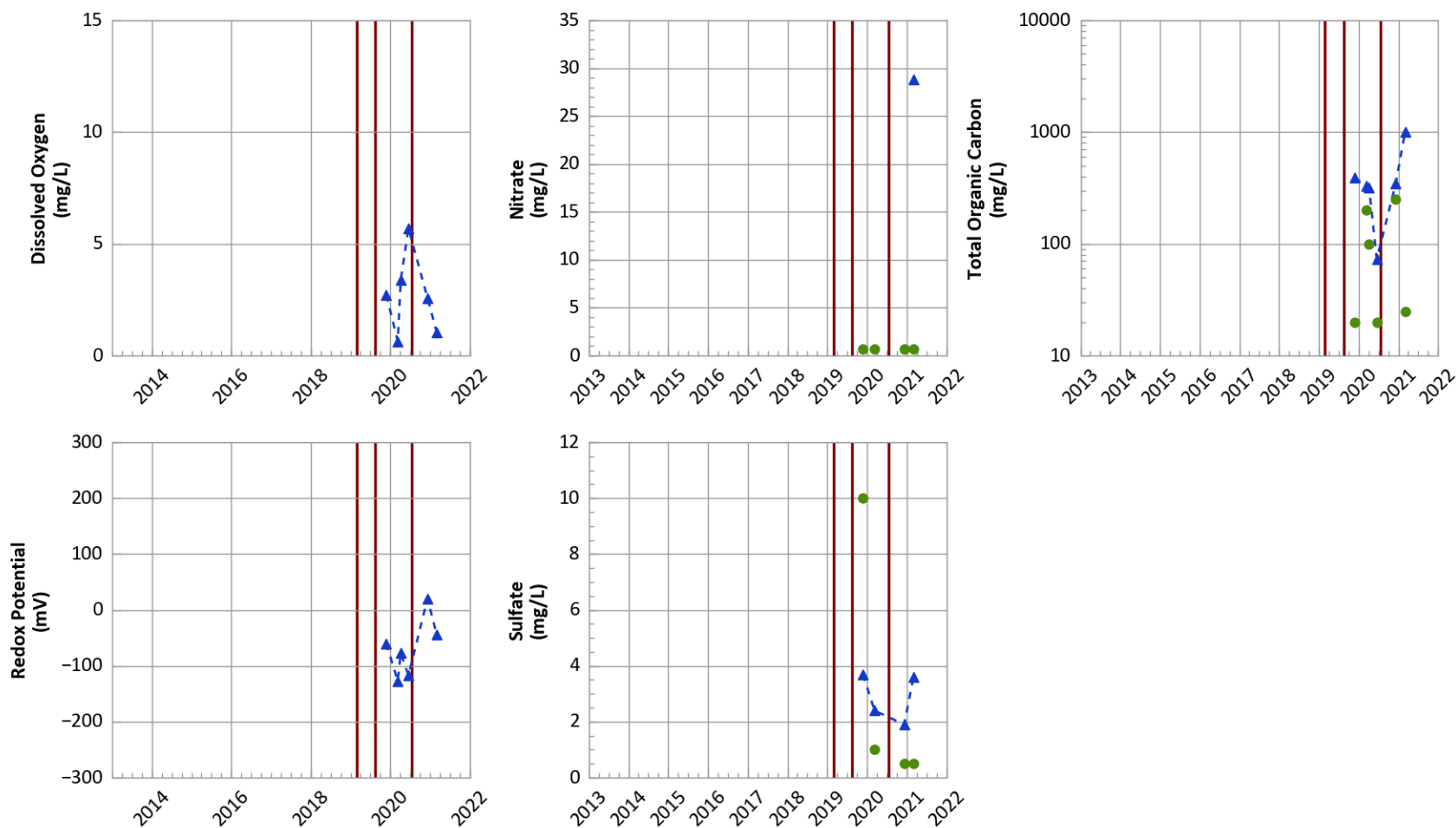
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



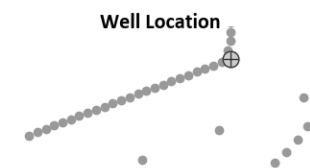
PTX06-ISB325 Treatment Zone Performance Indicators USDOE/NNSA Pantex Plant



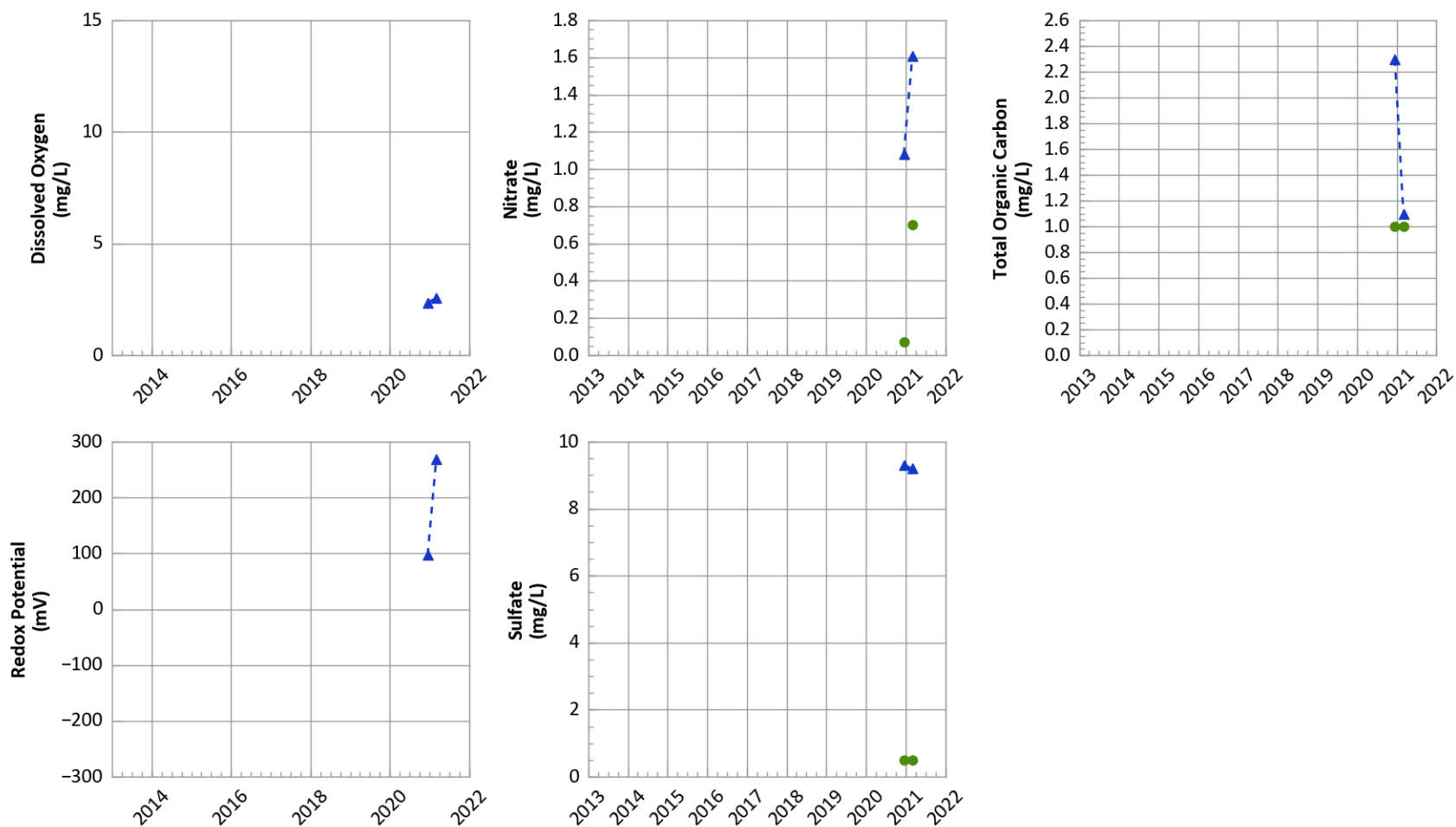
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



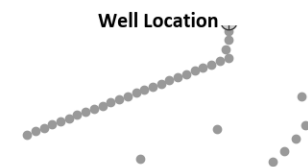
PTX06-ISB329 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



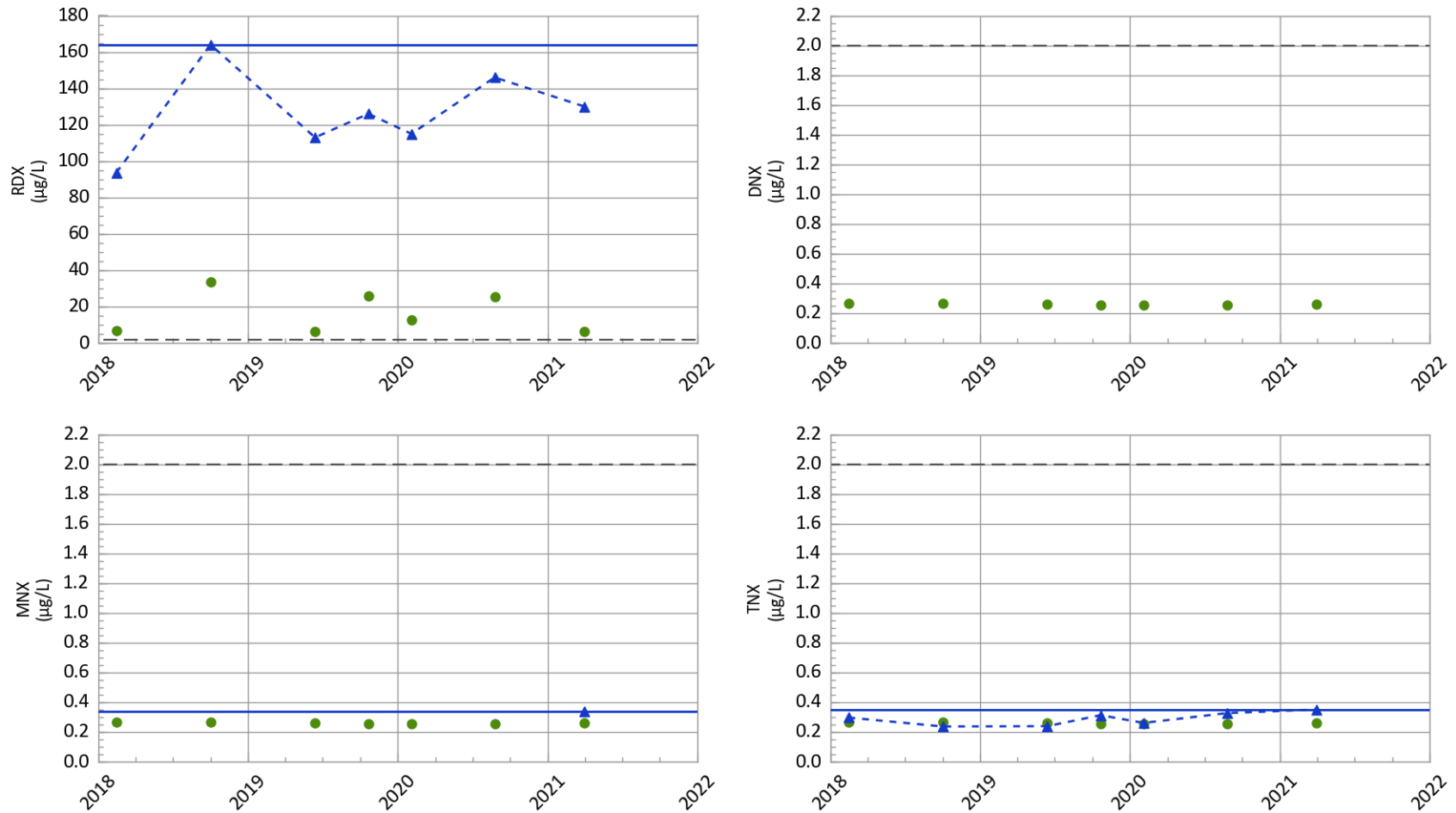
Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



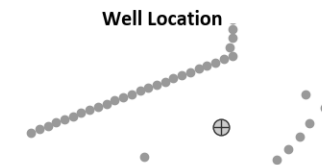
PTX06-1191 Downgradient Performance Indicators
Southeast Ext In Situ Bioremediation System
USDOE/NNSA Pantex Plant



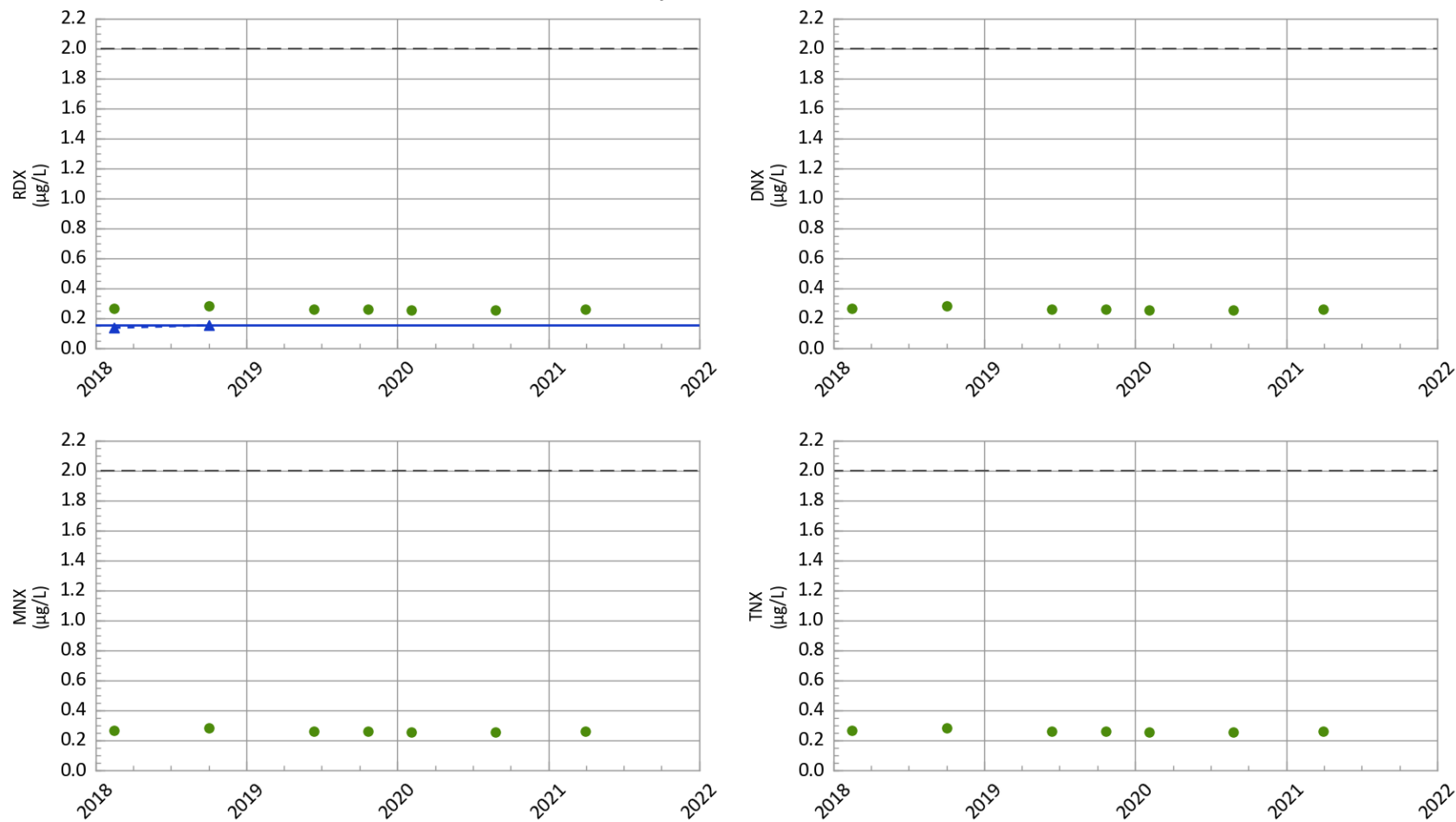
Most Recent Measured COC Concentrations (Mar 31, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
RDX	130.0	2.0
MNX	0.341	2.0
DNX	Non-Detect	2.0
TNX	0.351	2.0

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



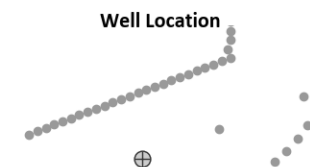
**PTX06-1194 Downgradient Performance Indicators
Southeast Ext In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



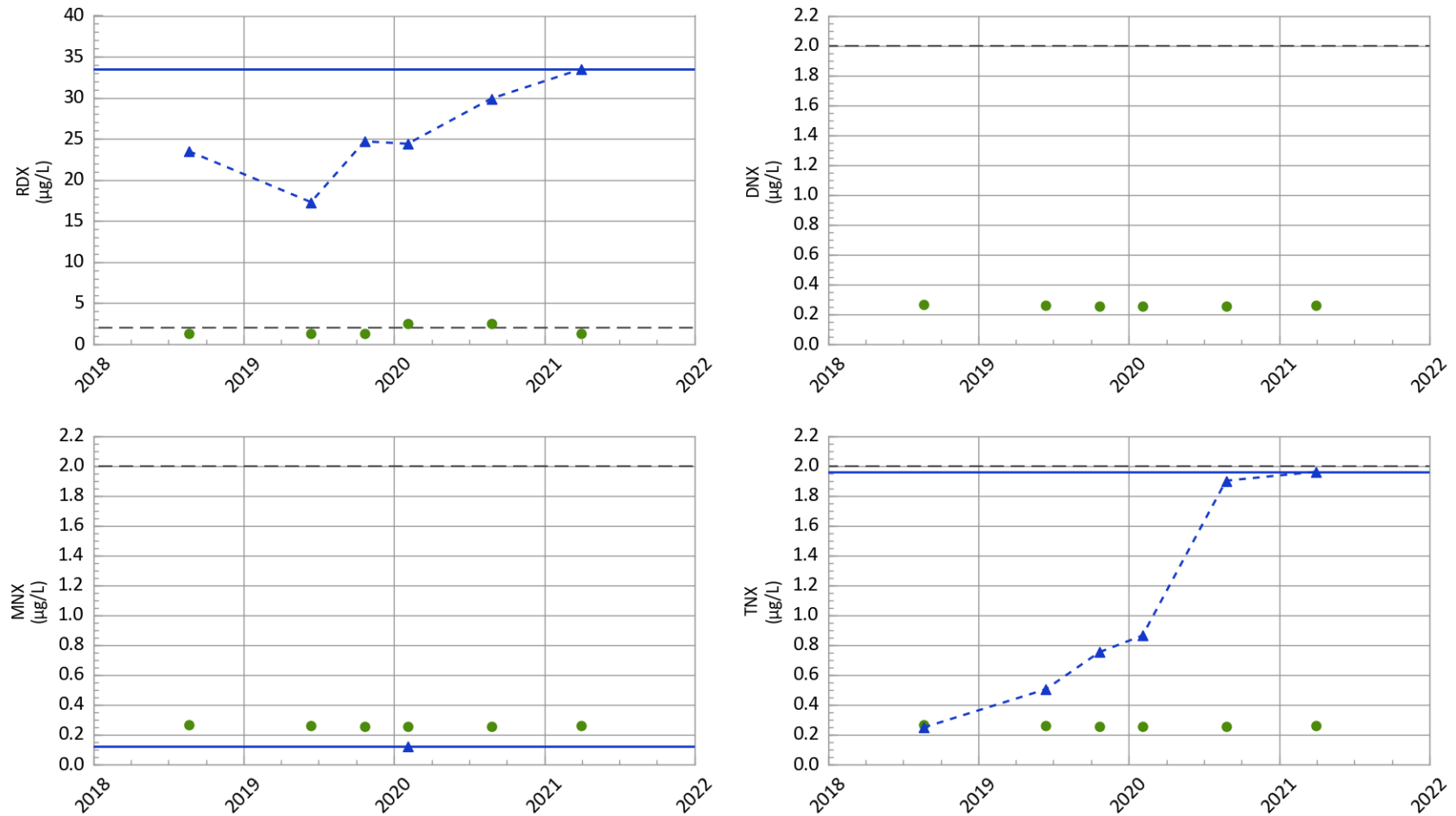
Most Recent Measured COC Concentrations (Mar 31, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	Non-Detect	2.0
MNX	Non-Detect	2.0
DNX	Non-Detect	2.0
TNX	Non-Detect	2.0

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Maximum Concentration
- Groundwater Protection Standard



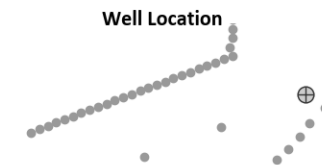
PTX06-1196 Downgradient Performance Indicators
Southeast Ext In Situ Bioremediation System
USDOE/NNSA Pantex Plant



Most Recent Measured COC Concentrations (Mar 31, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
RDX	33.5	2.0
MNX	Non-Detect	2.0
DNX	Non-Detect	2.0
TNX	1.96	2.0

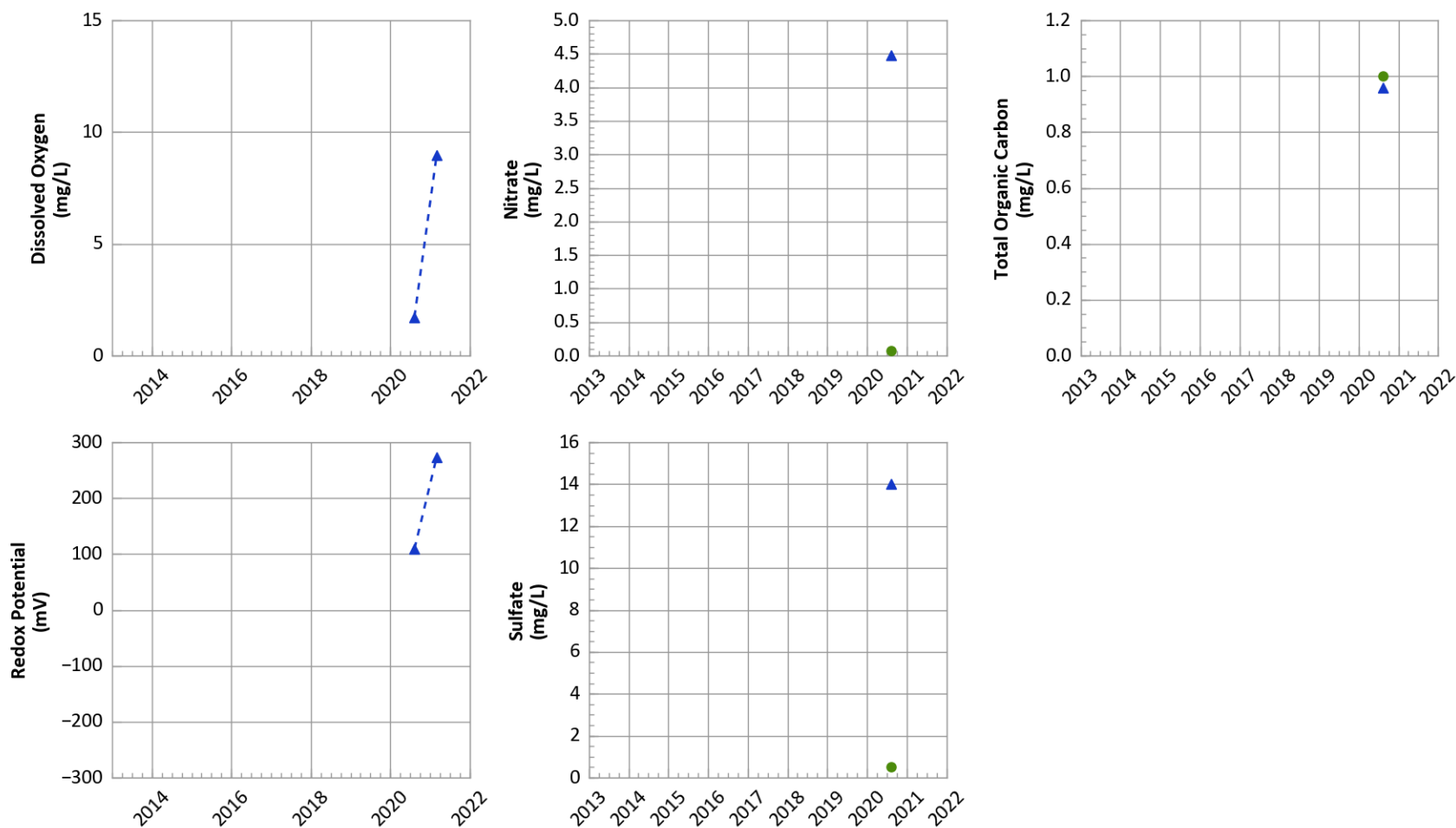
- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



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Offsite ISB System

PTX06-ISB401 Treatment Zone Performance Indicators USDOE/NNSA Pantex Plant



Typical Baseline Concentrations in Perched Groundwater

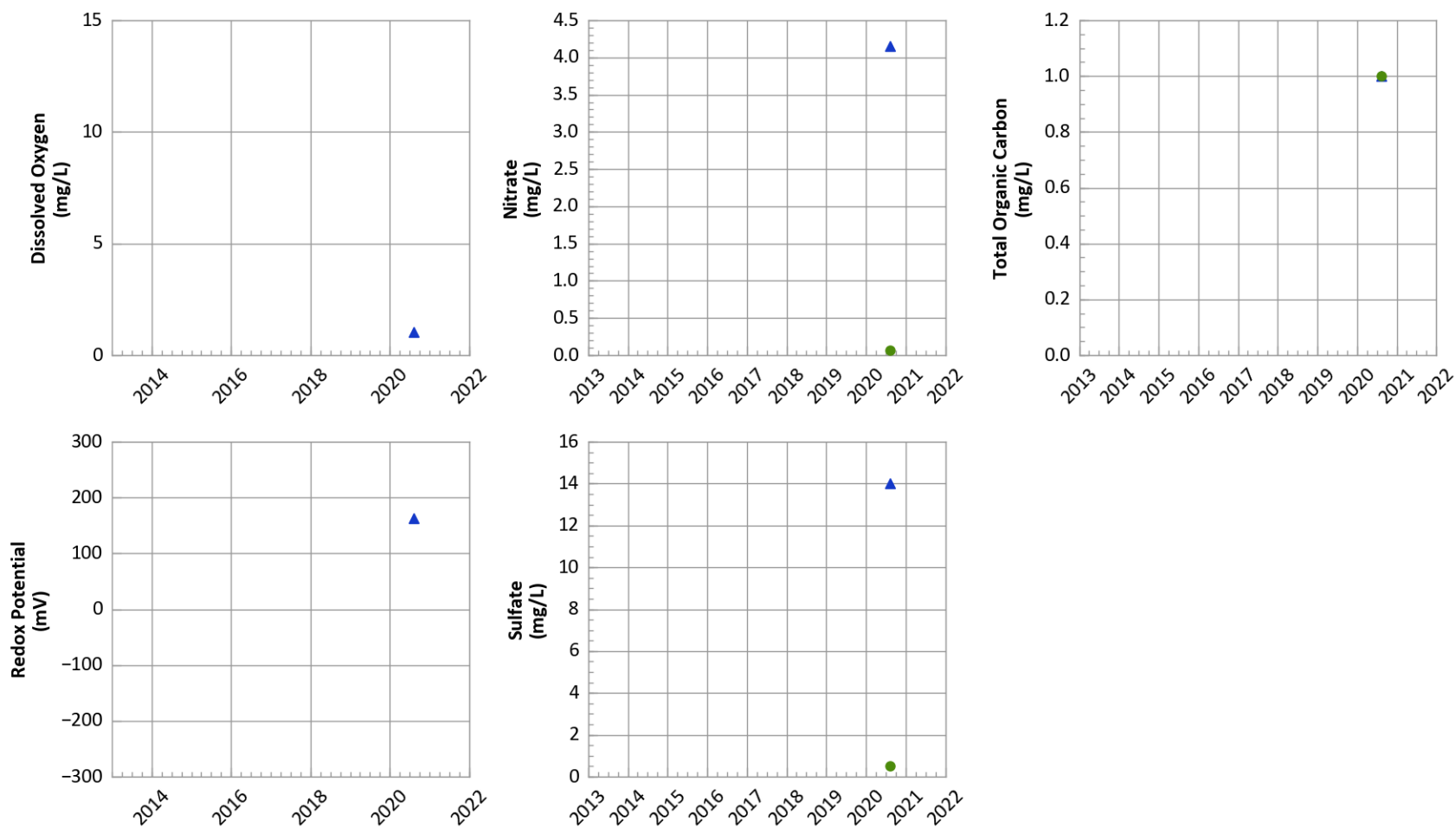
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates

Well Location



**PTX06-ISB404 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



Typical Baseline Concentrations in Perched Groundwater

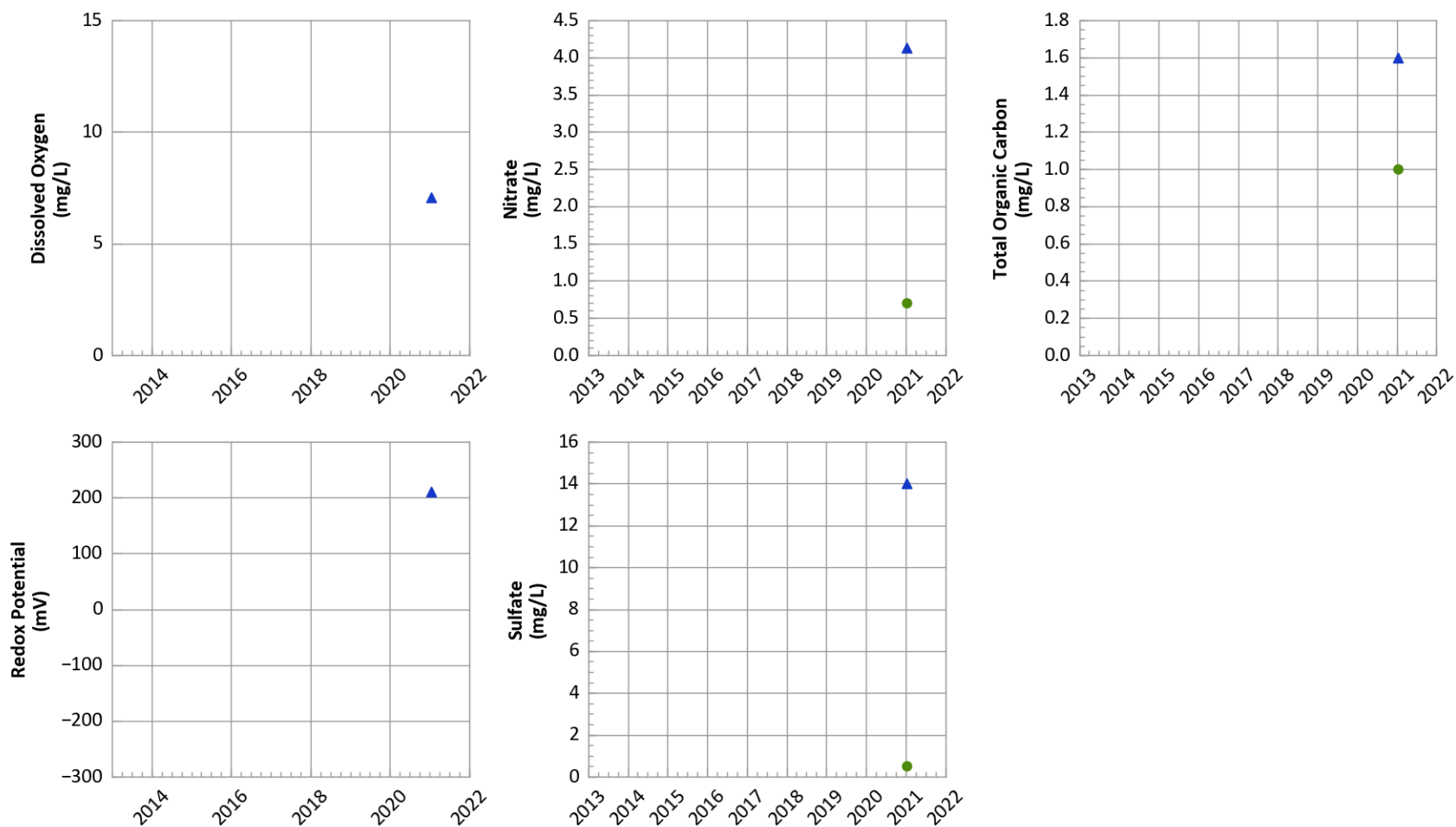
Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Injection Dates

Well Location



PTX06-ISB407 Treatment Zone Performance Indicators USDOE/NNSA Pantex Plant



Typical Baseline Concentrations in Perched Groundwater

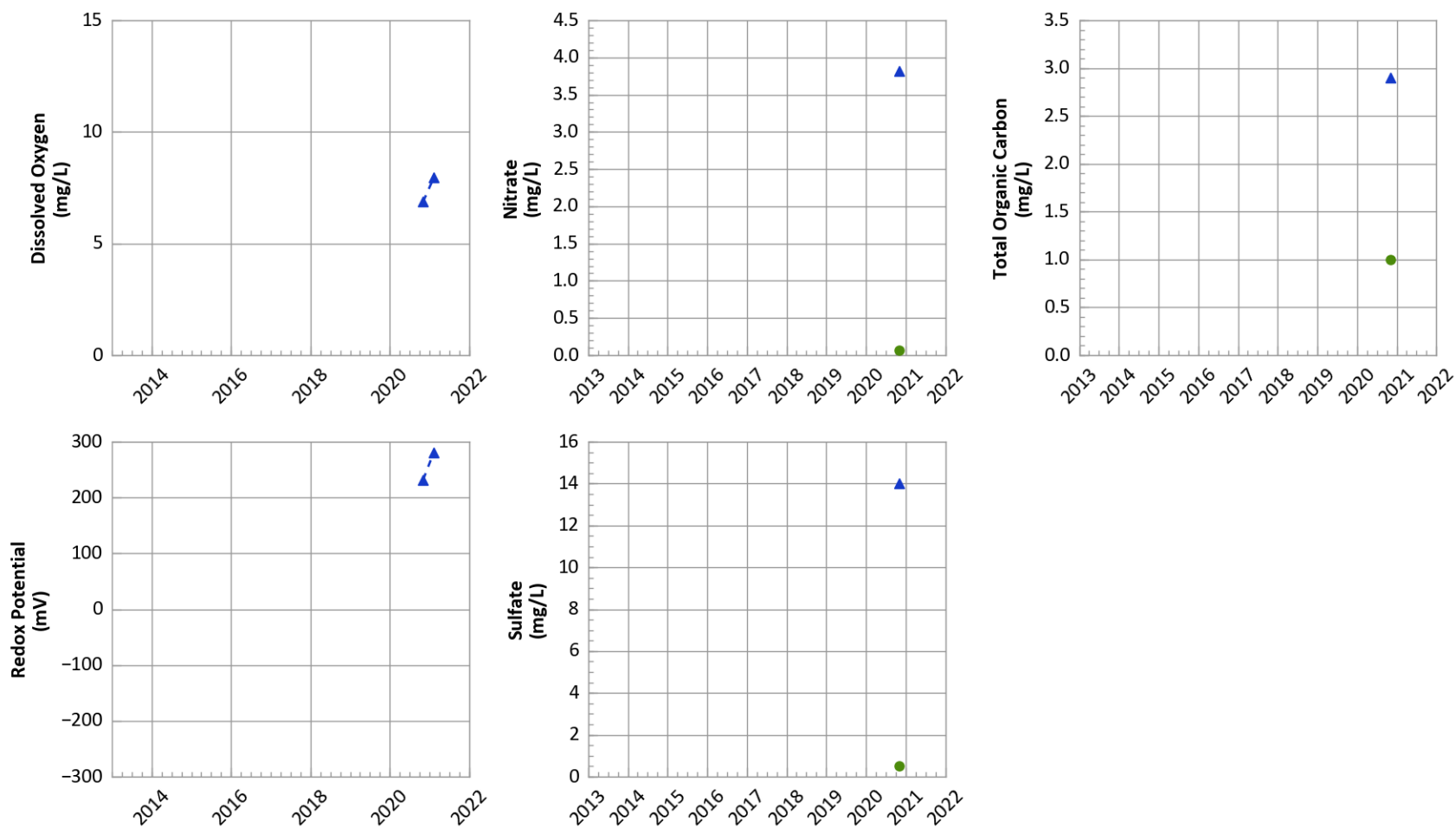
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates

Well Location



**PTX06-ISB412 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



Typical Baseline Concentrations in Perched Groundwater

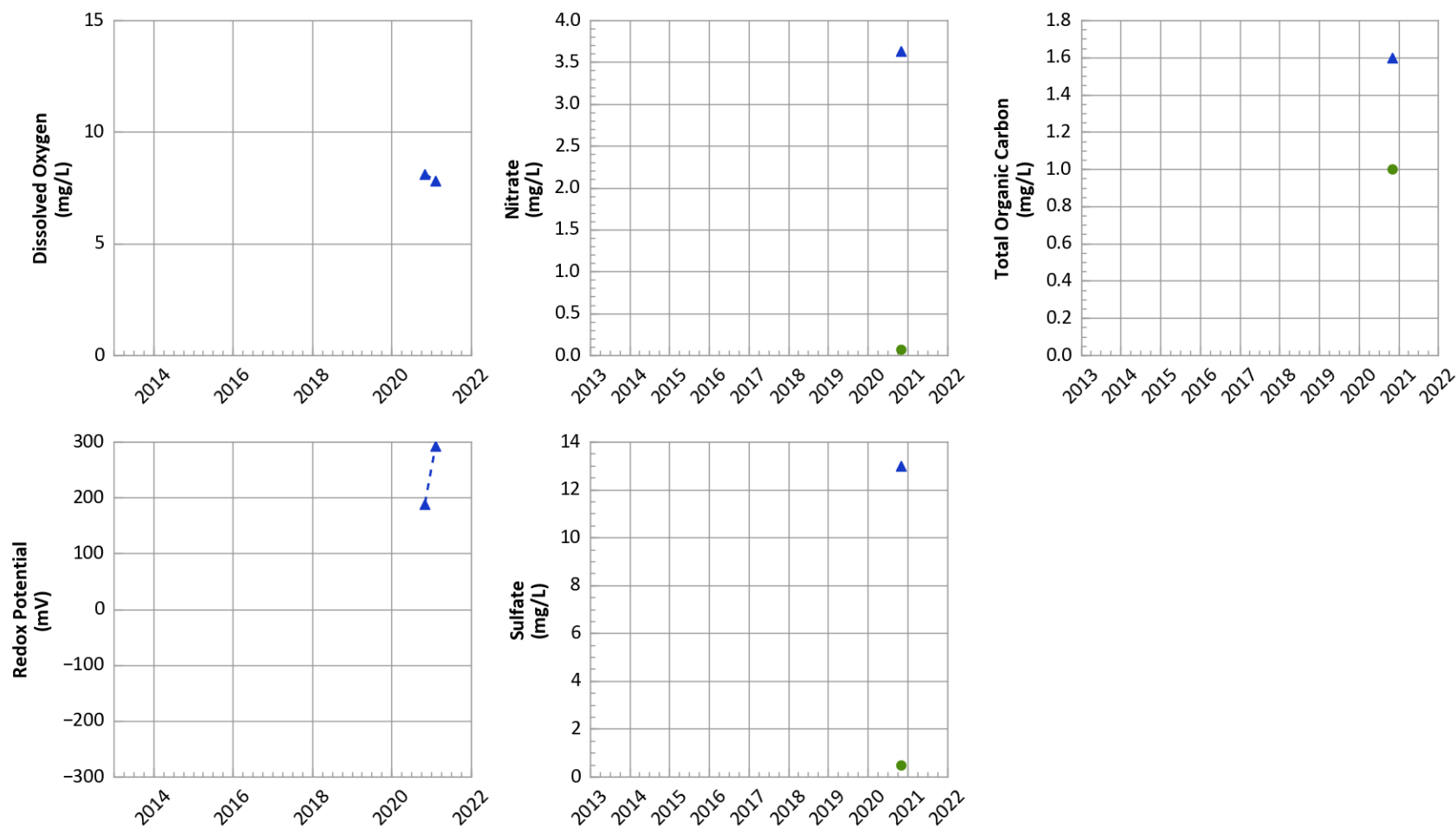
Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Injection Dates

Well Location



PTX06-ISB414 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



Typical Baseline Concentrations in Perched Groundwater

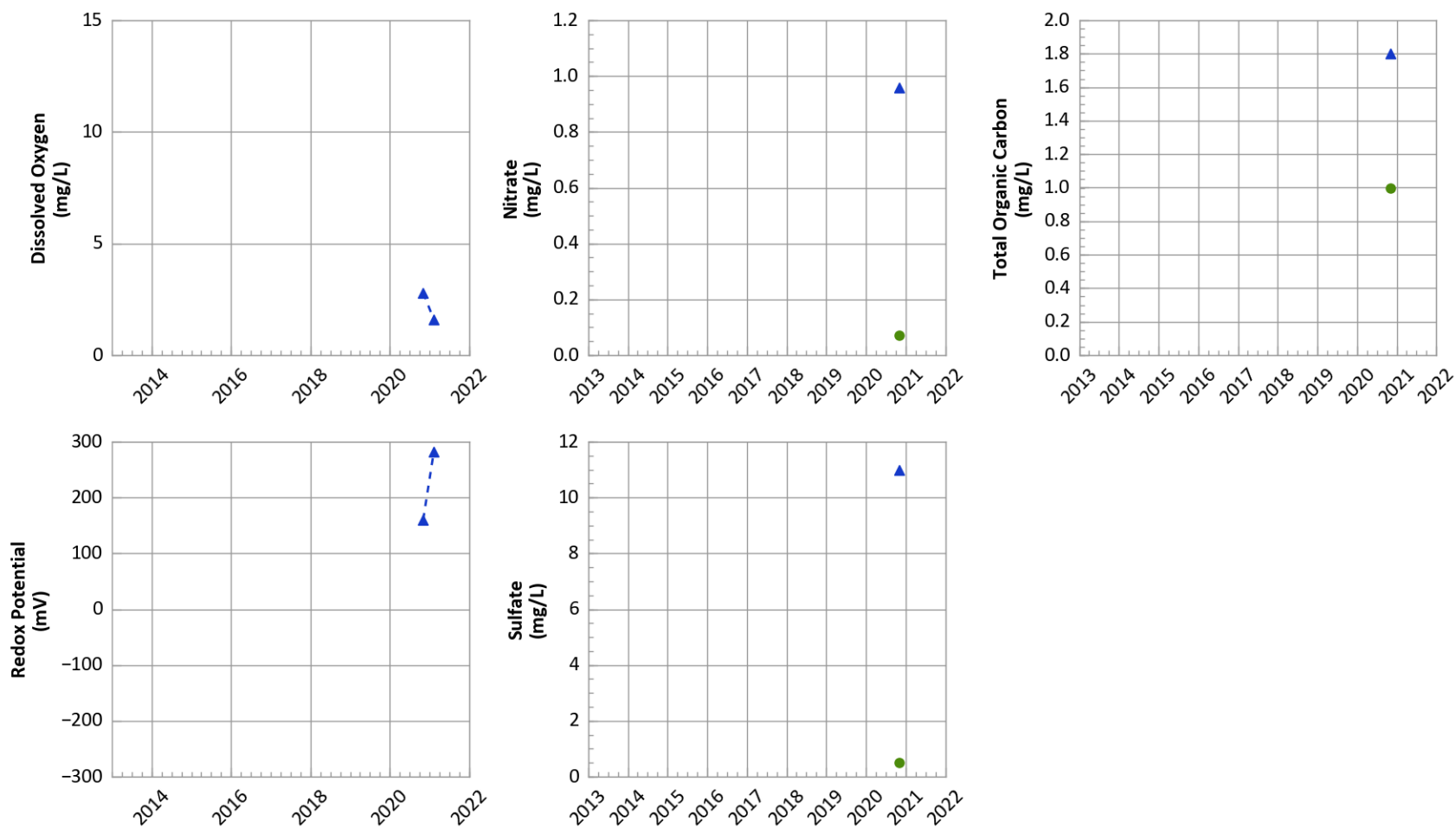
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Injection Dates

Well Location



**PTX06-ISB416 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



Typical Baseline Concentrations in Perched Groundwater

Dissolved Oxygen: 5-10 mg/L
 Redox Potential: > 100 mV
 Nitrate: > 1 mg/L
 Sulfate: > 10 mg/L
 Total Organic Carbon: < 5 mg/L
 Total Volatile Fatty Acids: Not Detected

- ▲ Measured Value
- Sample Detection Limit
- Concentration Trend
- Injection Dates

Well Location

