PANTEX QUARTERLY PROGRESS REPORT

Remedial Action Progress

2nd Quarter 2021

In support of Hazardous Waste Permit #50284 and

Pantex Plant Interagency Agreement

September 2021

Pantex Plant

FM 2373 and U.S. Highway 60

P.O. Box 30030

Amarillo, TX 79120

NNSA PRODUCTION OFFICE — UNITED BY A COMMON GOAL

CNS consolidated nuclear security, llc

PANTEX PLANT | Y-12 NATIONAL SECURITY COMPLEX

CERTIFICATION STATEMENT

2nd Quarter 2021 Remedial Action Progress Report
Pantex Plant, September 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.

9/21/21

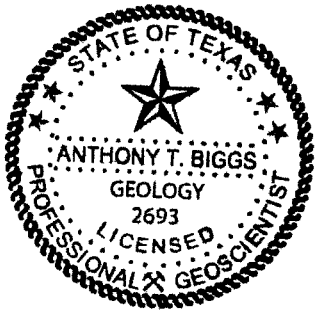
Jimmy Rogers
Acting Senior Director
Pantex Environment, Safety and Health
Consolidated Nuclear Security, LLC

Date

Quarterly Progress Report
2nd Quarter 2021
in Support of Hazardous Waste Permit #50284
and Pantex Plant Interagency Agreement
for the Pantex Plant, Amarillo, Texas
September 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.



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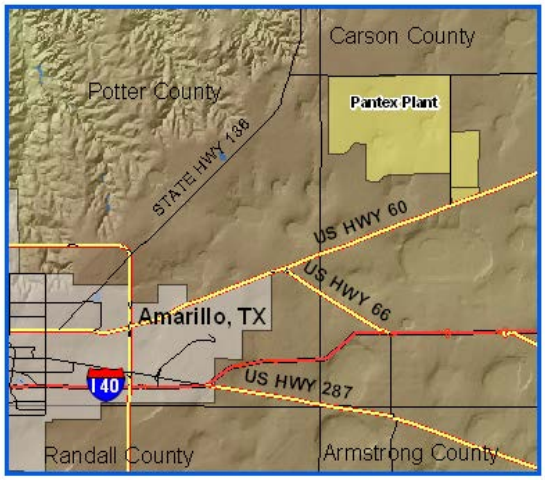
List of Acronyms

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	*In Situ* bioremediation
ISPM	*In Situ* 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
TOC	total organic carbon
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 2nd 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 reports: 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.

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.

Pump and Treat System
2nd Quarter 2021 Operation

Playa 1 Pump and Treat System (P1PTS)	
Days Operated	4
% 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	82
% Operation Time	86%
Volume Water Treated (Mgal)	26.8
HE Mass Removal (lbs)	121.4
Chromium Mass Removal (lbs)	14.4
Beneficial Use of Water	0%

*Value below operational goals

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 fall 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 permit 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 shutdowns 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 as 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, at wells east of FM 2373, and at the highest plume concentrations to

the south on Texas Tech property. When P1PTS is operational, SEPTS is operated at a lower capacity to meet permit requirements.

The SEPTS wellfield had more than 15 wells that required repair during the 2nd 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 fall 2021. Most wells were operable at P1PTS. Graphs of monthly operation and throughput are included in Appendix B. Almost 98% of the treated water was released to Playa 1. Both systems treated about 27 million gallons (Mgal) during 2nd quarter.

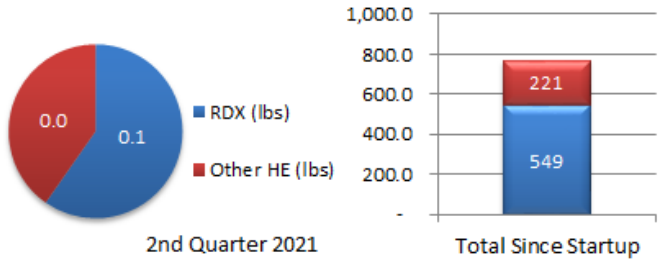


Figure 1. P1PTS Mass Removal

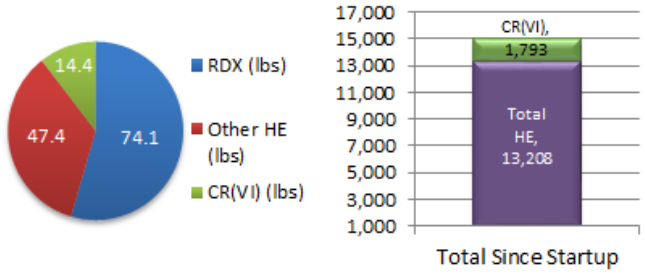


Figure 2. SEPTS Mass Removal

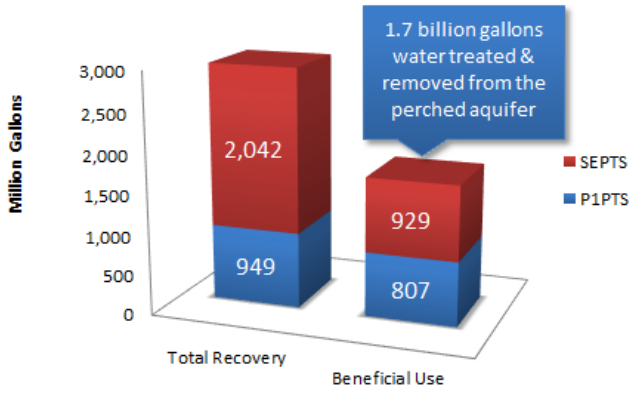


Figure 3. System Recovery and Use

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 2nd 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 15,700 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 currently beneficially used. Evaluation

of effluent data from SEPTS indicates that all COCs were treated to levels below the groundwater protection standard (GWPS).

Pantex is currently 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 requested in fiscal year (FY) 2021 to design and construct infrastructure for irrigation of land east of FM 2373 using five center pivot sprinklers. The design of the new irrigation system was completed in May 2021 and a new construction contract was awarded in August. Construction is scheduled to begin in October 2021. 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 System. Construction of the injection wells and infrastructure was completed in June 2021 and operation of the system will begin in fall 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 contracted to expand the SEPTS with a perchlorate pre-treatment for wells in the southwestern part of the system. The design portion of the contract started in August 2021.

ISB Systems

Four ISB systems (Zone 11 ISB, Southeast ISB, Southeast ISB Extension, and Offsite) are installed and operating at Pantex during the 2nd 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 2nd quarter, the Southeast, Zone 11 and Offsite systems were sampled completely. The Southeast ISB extension will be evaluated in the 3rd 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.

Table 1. ISB System Performance

Treatment Zone Wells			Downgradient Performance Monitoring Wells		
System	**Reducing Conditions**	**Food Source Available**	**Primary COCs Reduced?**	**COCs ≤ GWPS?**	**Degradation Products of COCs Reduced?**
Zone 11 ISB	Very Mild to Strong	Yes	Yes	$ClO4^-$ in 7 of 9 wells TCE in 4 of 9 wells	No
Southeast ISB	Very Mild to Strong	Yes	Yes	RDX in 2 of 4 wells Cr(VI) in 4 of 4 wells	No
Offsite ISB[1,2]	Very Mild	No			

Mild conditions = ORP (oxidation-reduction potential) of 0 to -50 millivolts (mV)
Strong conditions = ORP < -100 mV and sulfate and nitrate reduced, indicating that conditions are present for reductive dechlorination.
[1] This system was injected for the first time in July 2021.
[2] System currently does not have designated downgradient performance monitoring wells.

ZONE 11 ISB

Installation of the Zone 11 ISB remedial action was completed in 2009, and an expansion to the northwest of PTX06-ISB083 was completed in early 2015 and another in late 2019 (see Appendix A maps). Ten injection events have been completed at the current system, with the first injection event occurring in the expansion zone in 2015. The 11th injection event for the ISB is scheduled for Summer/Fall 2021. Pantex has moved to the use of a more soluble carbon source, molasses, as studies conducted at the Zone 11 ISB in 2018 indicated that molasses distributed between injection wells at a much higher concentration than emulsified vegetable oil (EVO). More frequent injections are required for molasses and have been planned annually for the Zone 11 ISB to maintain reducing conditions. Pantex will continue to evaluate the system to ensure appropriate timing of injections with the molasses.

The Zone 11 ISB has a well-established treatment zone in the original portion of the system, where injection has occurred since 2009. Portions of the northwest expansion area have received more than three injections, so deeper reducing conditions are likely established at the injection wells. Eight injected wells, six treatment zone monitoring (TZM) wells, nine downgradient ISPM, and two inactive injection wells were sampled in the Zone 11 ISB system in the 2nd quarter.

Evaluation of data in the treatment zone indicates very mild to strong reducing conditions (oxidation-reduction potential (ORP) ranging from -128 to 93 and sulfate from 0.5 to 370 µg/L) across the Zone 11 ISB. Monitored conditions inside the treatment zone indicate that sulfate was reduced in five of fourteen wells, nitrate was reduced at all fourteen wells and negative ORP was measured in all but two wells, indicating deeper reducing conditions in most areas. Conditions improved at most of the non-injected wells in the northwest expansion area, following the molasses injections that began in 2018. TCE continues to be reduced to cis-1,2-dichloroethene (DCE), with TCE concentrations below GWPS in nine monitored wells inside of the treatment zone and cis-1,2-DCE present at concentrations below the GWPS in thirteen of the fourteen monitored wells. When greater amounts of TCE and cis-1,2-DCE are being degraded, ethene and vinyl chloride are expected to be detected. Vinyl chloride was detected in the five sampled wells inside the treatment zone, and ethene was detected in two wells, an improvement from previous results. The low vinyl chloride results, coupled with the detection of ethene, indicate that a portion of the TCE is being completely degraded in some areas of the treatment zone. When TCE concentrations inside the treatment zone are low (< 300 µg/L), these low degradation rates may be enough to treat TCE and its breakdown products to GWPS, as indicated by downgradient monitoring well data.

Pantex evaluates performance at nine downgradient ISPM wells for the Zone 11 ISB and two former ISB injection wells (PTX06-ISB079 and PTX06-ISB082). Seven of nine ISPM wells exhibit perchlorate concentrations below the GWPS in the 2nd quarter. TCE concentrations are at or below the GWPS in four of nine ISPM wells. The first breakdown product of TCE, cis-1,2-DCE, was below the GWPS in eight of nine downgradient wells. Data indicate that due to treatment, concentrations of TCE and its breakdown products are very close to meeting the GWPS in treated water from the original portion of the system. One downgradient well, PTX06-1175, is not demonstrating strong treatment. This well is downgradient of a single row of injection wells. Pantex will continue to evaluate data and determine if an additional row of injection wells upgradient of this location is needed to ensure treatment of TCE and perchlorate. With the continuing change in flow direction to the southeast at the Zone 11 ISB, this area will eventually no longer require injections as all water is eventually expected to move to the southeast.

PTX06-ISB079 and PTX06-ISB082 are now monitored to evaluate perchlorate conditions on the eastern side of the ISB, in the second row of injection wells. Pantex no longer injects into the second row of wells, and will evaluate these wells to ensure that treatment continues on the perchlorate side of the ISB. Perchlorate, TCE, and TCE degradation products were not detected in PTX06-ISB079 and PTX06-ISB082. Currently, perchlorate and TCE that move through the eastern side are non-detect.

SOUTHEAST ISB

The Southeast ISB was installed in 2007. Seven injection events have been completed at this system. The Southeast ISB continues to demonstrate declining water levels at the system; as a result, only 60% of the system was injected during 2019, which included some dry wells to attempt to affect PTX06-1153. A discussion of the injection and issues encountered is provided in the 2019 Annual Progress Report. As recommended in the 2018 Annual Progress Report, Pantex plans to use molasses for all upcoming injection events to improve distribution of amendment thereby

improving reducing conditions at the ISBs. With the move to molasses, the next injection event is planned for late 2021.

Five injection wells and four downgradient ISPM wells were sampled at Southeast ISB in the 2nd quarter. One downgradient ISPM well has gone dry and can no longer be sampled. Analytical data indicate that reducing conditions continue at the treatment zone in four of five wells. Very mild reducing conditions were observed at PTX06-ISB048, a third row well, indicating that treatment may not be effective at that location. All wells have total organic carbon (TOC) to allow continued treatment.

Downgradient wells indicate that complete treatment is occurring at all but one well, PTX06-1153. PTX06-1153 indicates partial treatment as the breakdown products of RDX are present, but RDX continues to linger at this location. Additionally, water was measured in one of the four downgradient wells previously dry and likely disconnected from the Southeast ISB. It is near the new Administrative Complex at Pantex and percolation beneath the runoff retention ponds likely contributed water to the well. Currently, RDX is almost at cleanup level, as expected.

In late 2019, injections were completed at the Southeast ISB. Some wells were unable to be injected due to dry or low water (< 1 ft) conditions. The inability to sample or inject into these wells is expected to persist with continued upgradient removal of water by the SEPTS. Evaluation of data indicates that most wells in the Southeast ISB will not contain appreciable water by end of 2022. By the end of 2019, all downgradient wells had less than 5 ft of water and all wells in the treatment zone had less than 10 ft of water (see Section 2 of the 2019 Annual Report for more discussion). Pantex plans to inject the system in 2021 with molasses, but further injections may be limited or unnecessary.

Offsite ISB

The installation of the wells for the Offsite ISB system was completed in 2020. Phase 1 and 2 infrastructure to support an injection event was completed in June 2021, with first injection of molasses beginning at the end of June and is expected to be completed by the end of September 2021. A second injection is planned late in 2021. Post-injection treatment zone data has not yet been collected at this system. Samples will be collected once injection has been completed and sufficient time (60-90 days) has passed to evaluate results of the injection. It is expected that results will be available in the 1st Quarter 2022 report.

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 focused on treating

residual non-aqueous phase liquid (NAPL) and soil gas at a single extraction well (SVE-S-20) near the source area.

Overall, the system operated 12% of the quarter (~ 260 hours of operation). The SVE was shut down starting the 2nd week of December as part of the pulsing plan for path to closure of the system. The system was restarted in March 2021, but was shutdown during the month of April due to a recirculation pump failure. The system was repaired and restarted in July 2021. Figure 4 shows mass removal calculated for the 2nd Quarter and since startup for VOCs that historically contribute to the total VOC concentration.

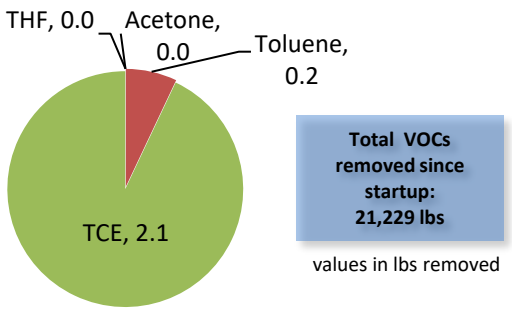


Figure 4. SVE Mass Removal

The system removed ~ 2.3 lbs of VOCs during the 2nd quarter, but has removed about 21,300 lbs of VOCs since startup. Based on PID data collected at the system effluent port, system destruction efficiency was at least 97%. Analytical data collected at startup indicate that the toluene source is almost depleted, as reflected in the current mass removal values. Pantex will continue to evaluate the system at startup and as the system continues to operate.

The system operated at a higher flow due to the modifications to the system, with the flow increased from 32 standard cubic feet per minute (scfm) in early 2017 to the current level of 44 scfm. The hourly VOC removal rates increased with the increased flow until 4th Quarter 2018. The removal rate declined during 2018, but began to improve over the first 2 quarters of 2019. In the 3rd and 4th quarter of 2019, removal rates decreased and continued to remain low in the 2nd Quarter 2021. As concentrations continue to drop below 100 ppmv, Pantex is actively pulsing the system to determine current recovery efforts and feasibility of system closure. 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 2nd quarter indicates no unexpected conditions at any wells in the perched or Ogallala Aquifers.

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 2nd 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.
- In October 2020, work commenced for the optimization of the pump and treat systems and re-optimization of the Offsite Remediation System, and was completed by the end of September 2021.
- Phase 1 and 2 construction of the offsite infrastructure was completed in August 2021.
- Drilling of the new row of Zone 11 ISB wells was completed by September 2021.
- Landfill maintenance at SVS 7b was completed by September 2021.

Pantex continues progress toward completion of the following items:

- 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 2021.
- The new SEPTS injection well project near Playa 2 is almost complete. The project is expected to be operational in fall of 2021 and will provide a new outlet for up to 150 gpm (half of design capacity) of treated water from the SEPTS.
- Bids for the new SEPTS perchlorate pre-treatment for wells were accepted in June 2021. The contract was awarded in July and design will be completed by the end of 2021, with construction starting in early 2022.

- Pantex began contracting actions to build two mobile pump and treat systems that will be used at the Offsite Remediation System and in other areas where plume control may be required.
- The first injection into the new Offsite ISB began in June 2021 and is expected to be completed in September 2021. A second injection is planned in late 2021.
- The design of the new irrigation system planned to be installed east of FM 2373 was completed in May 2021. The new construction contract was awarded in August and mobilization for construction will begin in October 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. 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 subsurface irrigation system is repaired or other uses can be constructed. Most system repairs have been completed at the subsurface irrigation system, but startup testing continues to identify issues that require further repairs. Pantex has installed 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 the system in brought online in late 2021. Pantex completed the design and started the construction of a center pivot irrigation system east of FM 2373. Pantex also contracted for design and construction of 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. COC concentrations meet the GWPS at the Southeast ISB at two downgradient wells, with a third dry well having previously met GWPS. One downgradient well that was previously dry, now has water, possibly due to retention ponds at the new Administrative Complex. COC concentrations are near cleanup levels at this well. One other downgradient well (PTX06-1153) for the Southeast ISB is not responding to treatment as well as the others. Pantex injected molasses during the 2019 injection event to attempt better distribution of the amendment and will continue to monitor the results over time to determine if the injection

will affect the water moving into that area. Monitoring will continue at PTX06-1153 as described in the SAP. Further recommendations will be made based on evaluation of data over time.

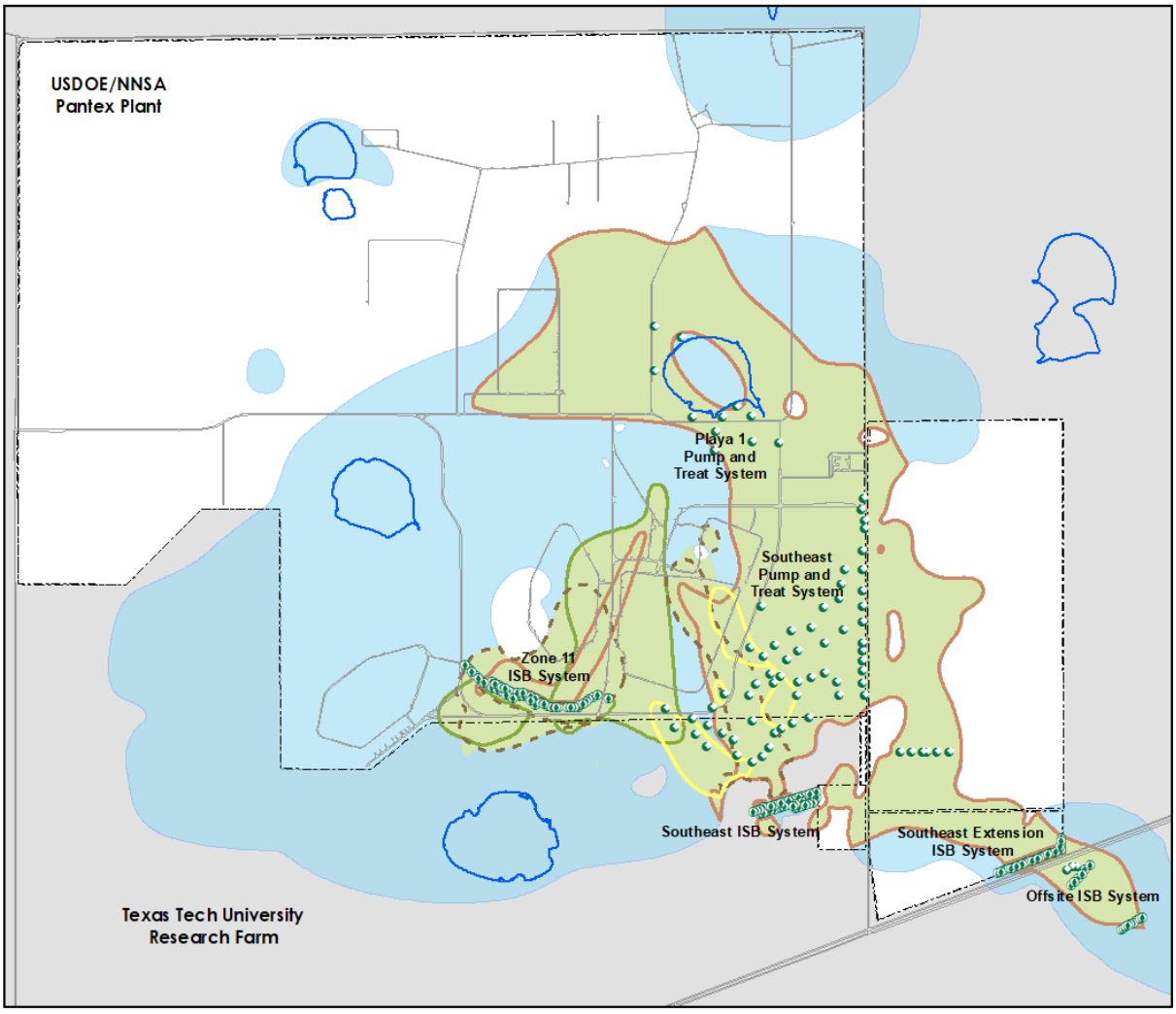
Downgradient wells at the Zone 11 ISB are generally demonstrating treatment. Most downgradient wells meet or are near the GWPS for the primary contaminants and breakdown products. One well indicates slower response to treatment in the newer areas of the ISB. Pantex has changed the injection strategy at the ISB to attempt better distribution of amendment between wells and provide better treatment of TCE. Data indicate that the injection of a more soluble carbon source (molasses) has distributed widely where injected and that reducing conditions have improved in those areas. Pantex will continue to evaluate the data and make appropriate recommendations for treatment in the upcoming progress reports. In lieu of installing a recirculation system, Pantex drilled a second row of closely spaced wells across the southern portion of the ISB to address higher concentrations of TCE moving into those areas. Wells that can no longer be injected will be infilled with new wells, rather than replacing the old wells, so that injections can be more closely spaced and EVO can be used to improve treatment in those areas. Molasses will continue to be used in the more widely spaced areas of the ISB, with timing of injections planned for 1-2 years.

Pantex continues to progress toward cleanup of the southeast lobe of perched groundwater. A system (Southeast ISB Extension) was installed at the Pantex fence line to arrest the continued movement of COCs to offsite properties. That system has been operating and is being evaluated for its effectiveness at the offsite property. A new ISB system (Offsite ISB) was designed to address HE contamination found on neighboring properties. Installation of infrastructure for Phase 1 and 2 of the Offsite ISB is complete and the 1st injection into the system is currently ongoing as of this report. Phase 3 construction will begin in early 2022, and Phase 4 beginning in 2023.

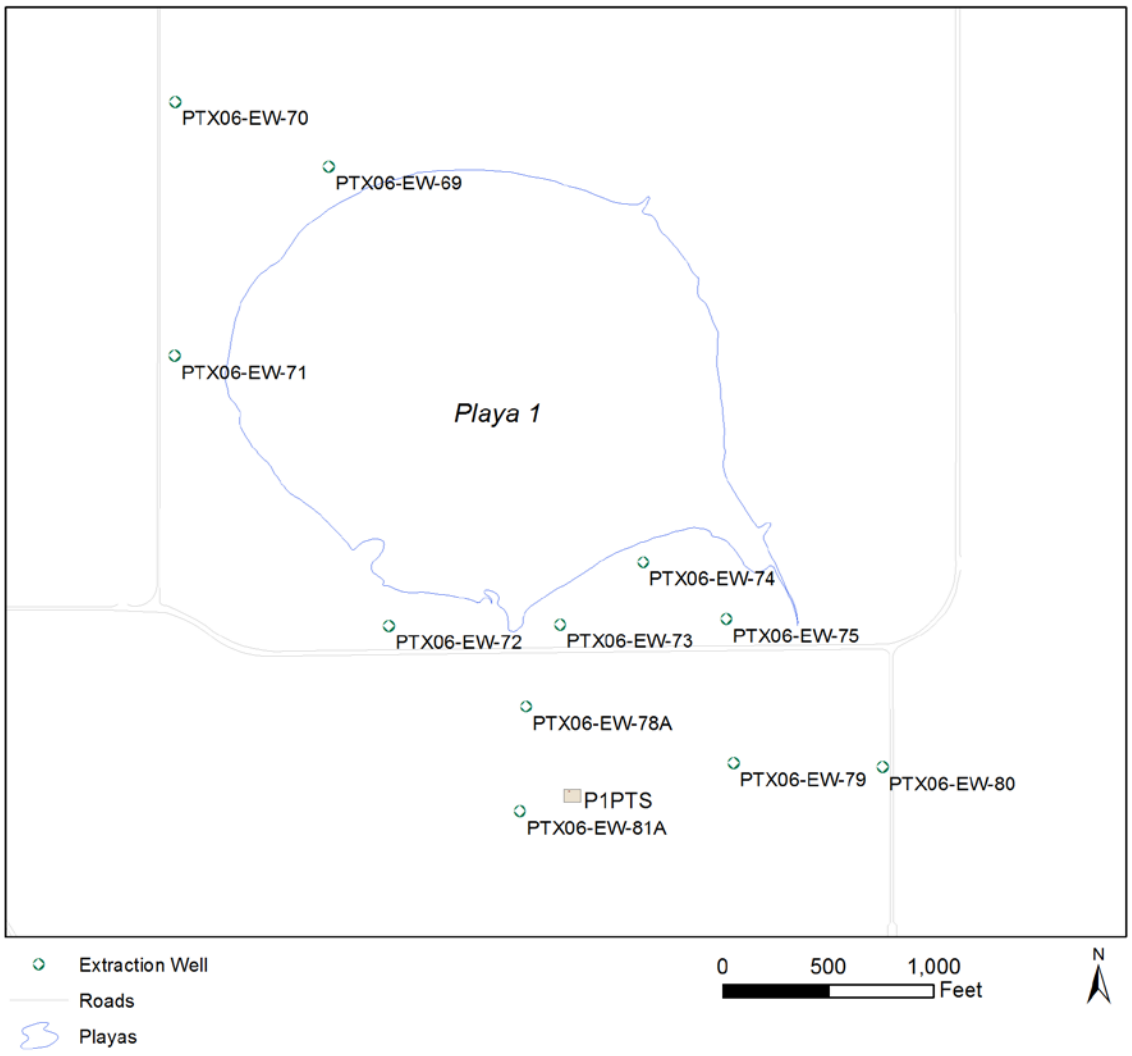
The SVE system continues to treat soil gas and residual NAPL in the solvent evaporation pit/ chemical burn pit area of the Burning Ground, thereby mitigating vertical movement of VOCs to groundwater. Pantex has continued to have problems with completing rebound tests, and has been unable to prepare a 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. Pantex is actively working the plan to pulse the system to evaluate final closure of the system. Current influent data at startup indicate the toluene source is near depletion. 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

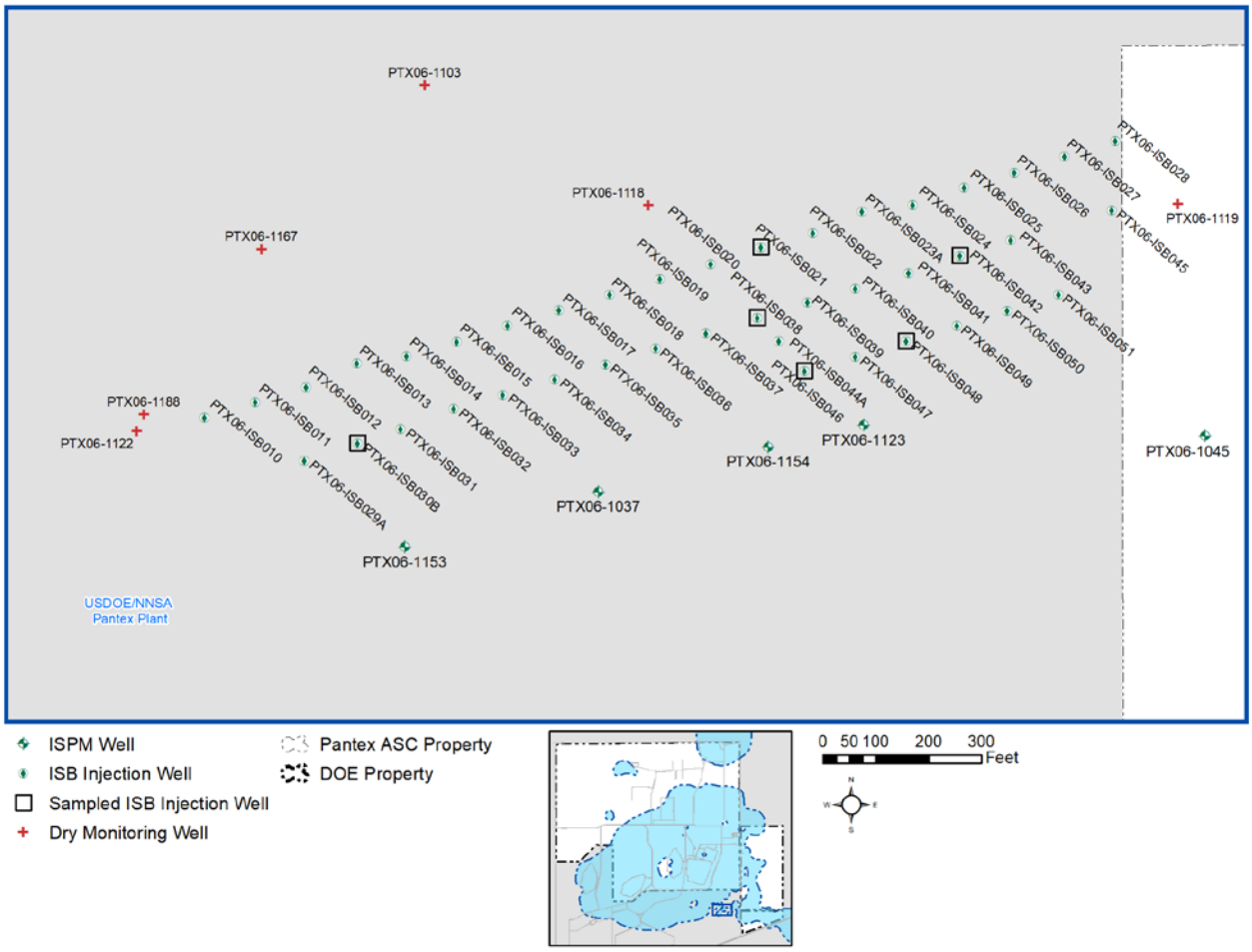


Extent of Perched Groundwater and Contaminant Plumes

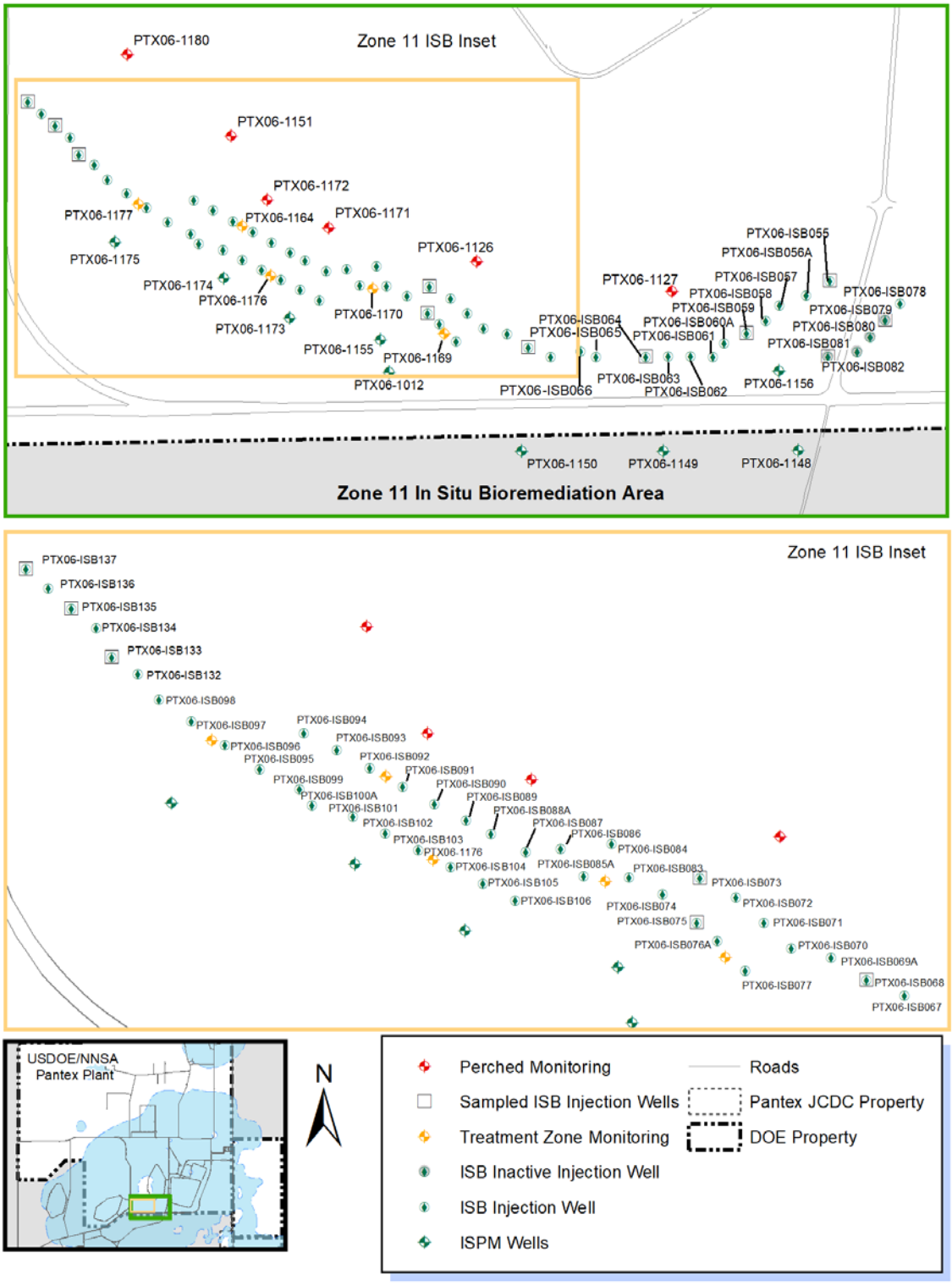


Playa 1 Pump and Treat System Wells

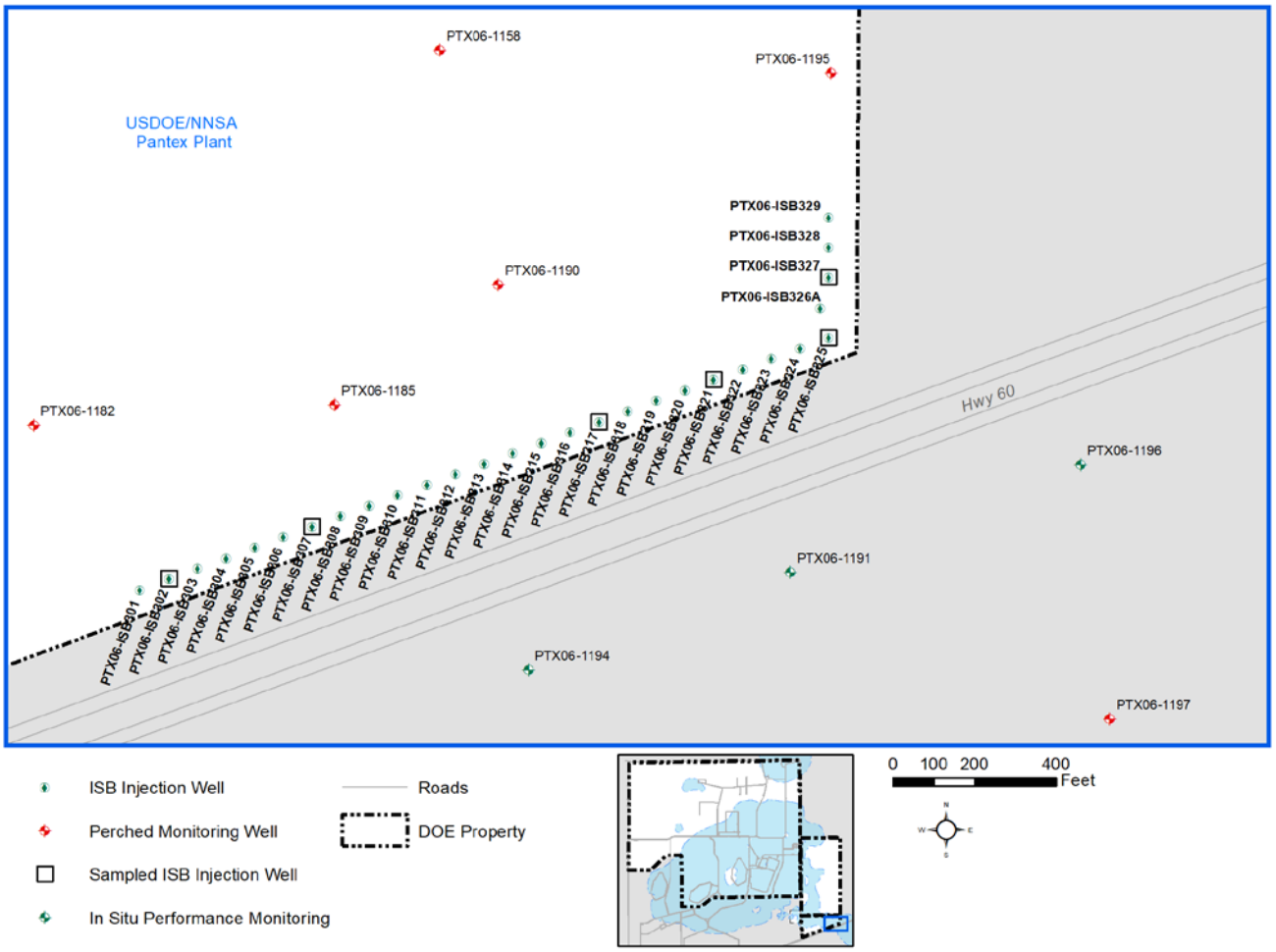
Southeast Pump and Treat System Wells



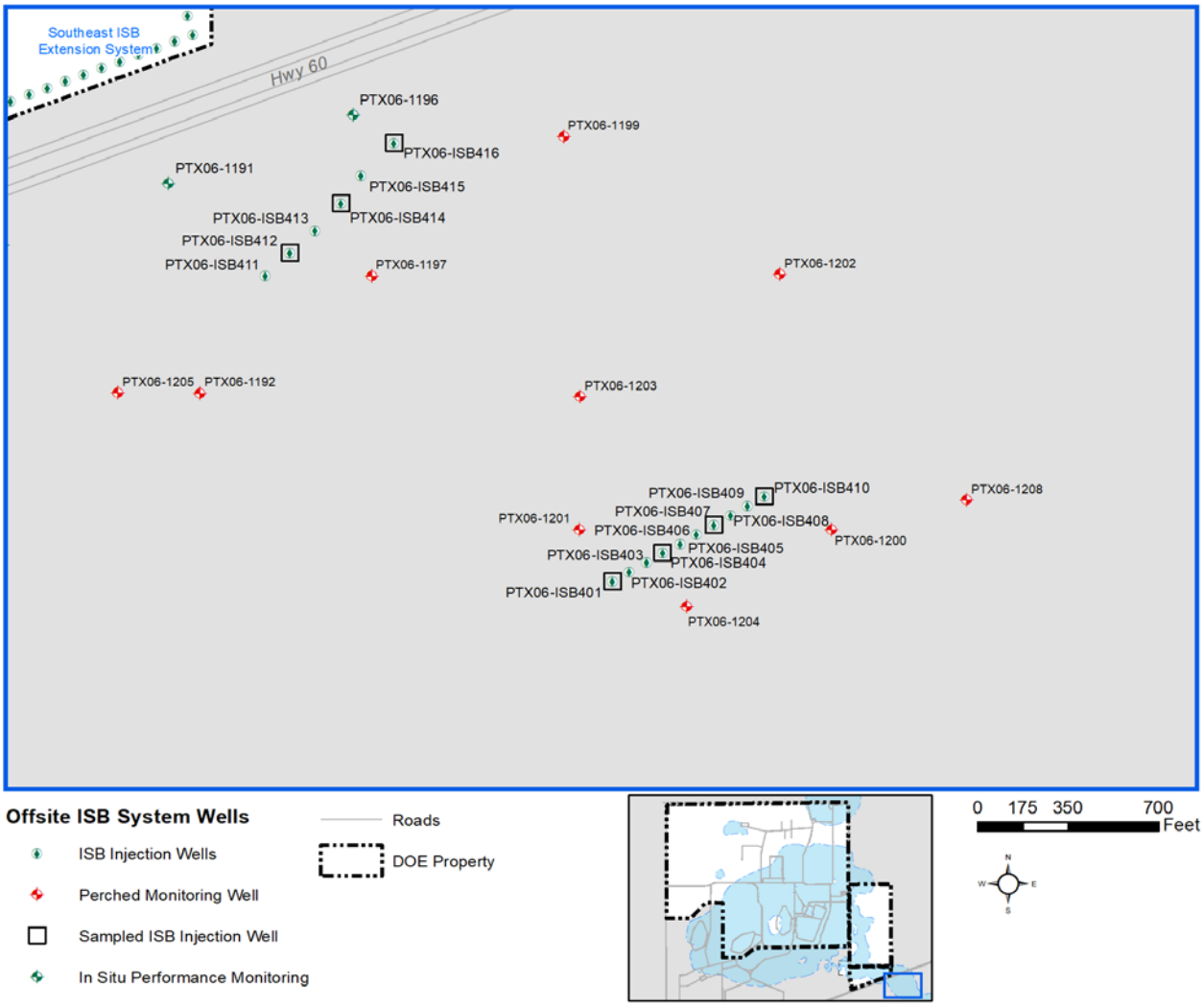
Southeast ISB Wells and Sampling Locations



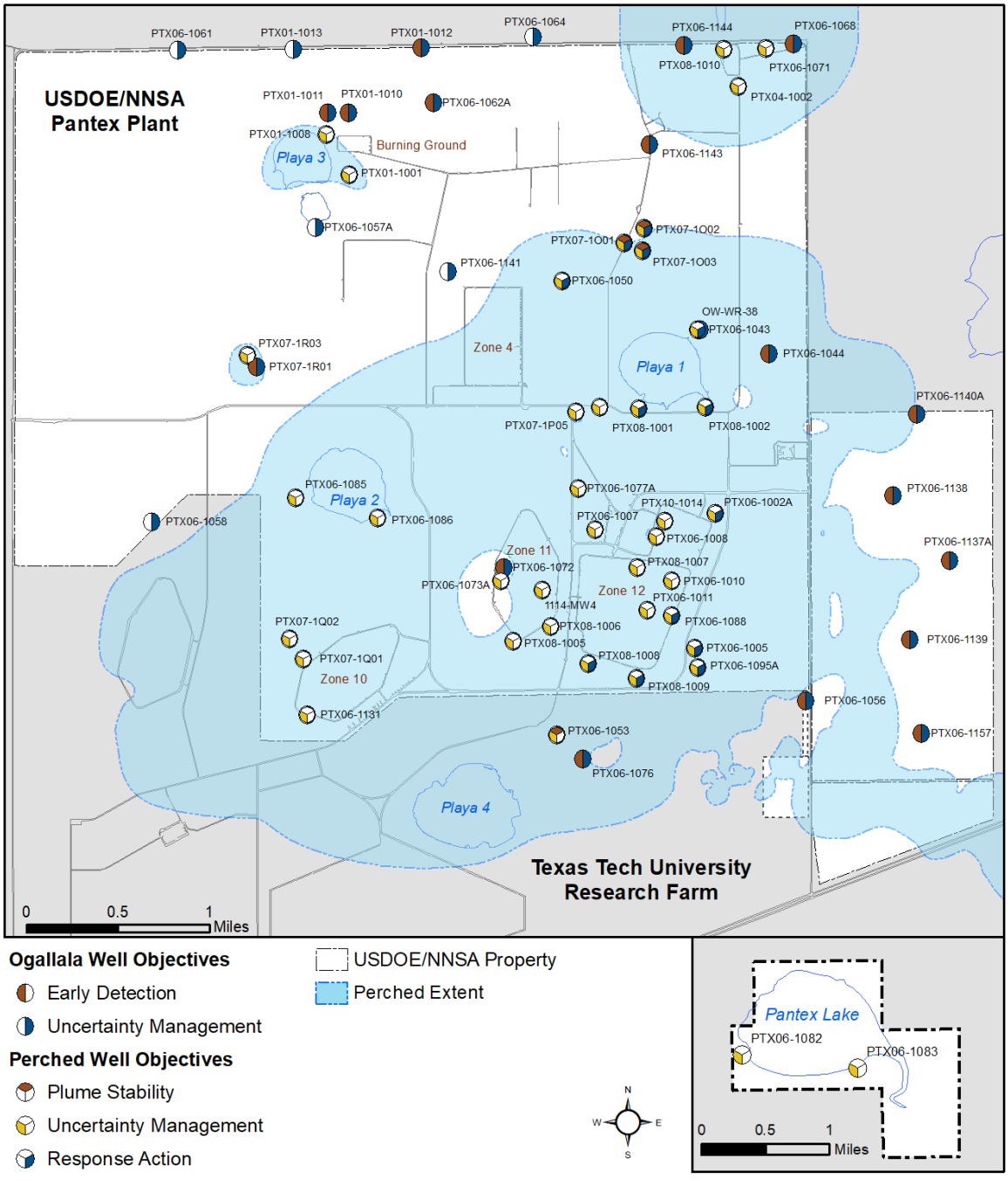
Zone 11 ISB Wells and Sampling Locations



Southeast ISB Extension Wells and Sampling Locations



Offsite ISB Wells and Sampling Locations



Ogallala Well Objectives

- Early Detection
- Uncertainty Management

Perched Well Objectives

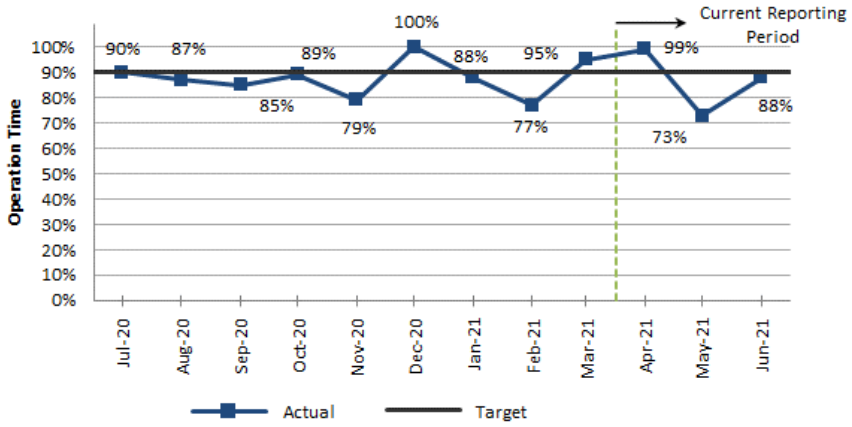
- Plume Stability
- Uncertainty Management
- Response Action

- USDOE/NNSA Property
- Perched Extent

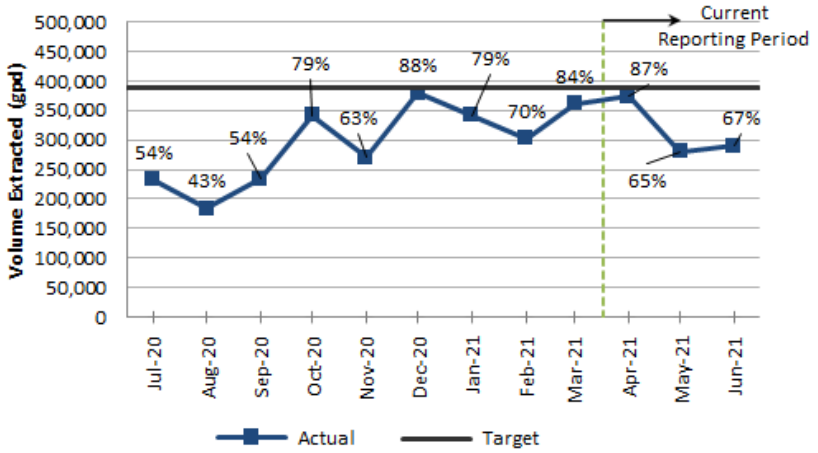
Uncertainty Management and Early Detection Wells Evaluated in the Quarterly Progress Report

Appendix B
Pump and Treat System Graphs

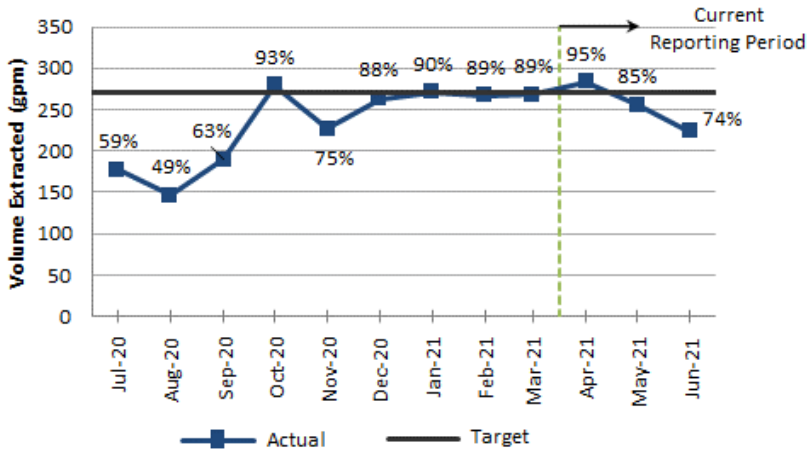
Southeast Pump and Treat System Graphs



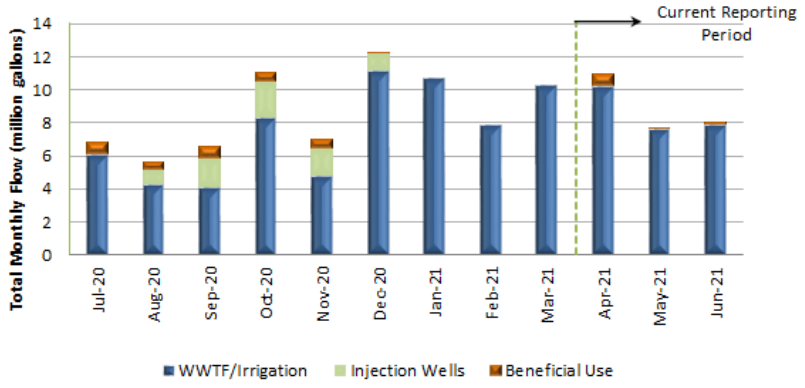
SEPTS Operation Time vs Target



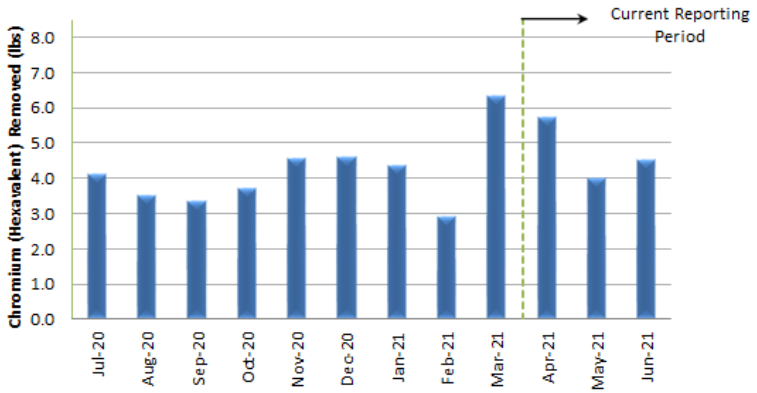
SEPTS GPD and % Capacity



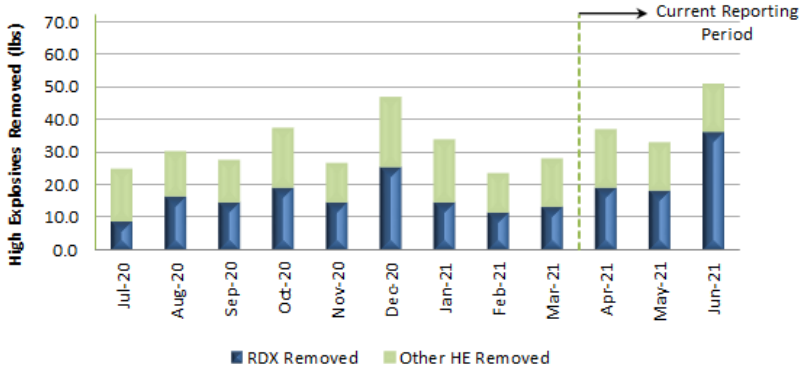
SEPTS Average GPM and % Capacity



SEPTS Monthly Total Flow

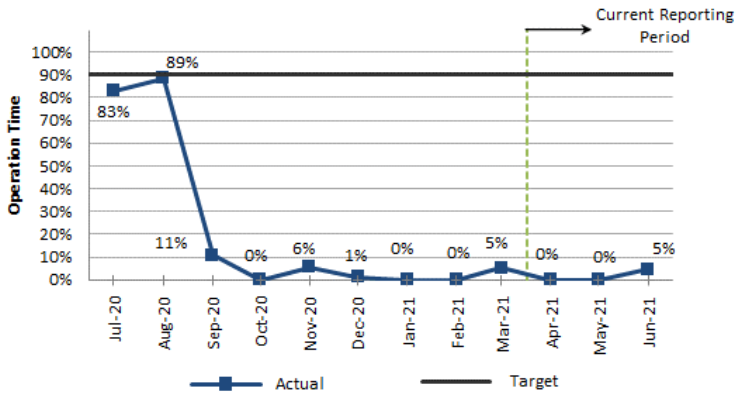


SEPTS Chromium Mass Removal by Month

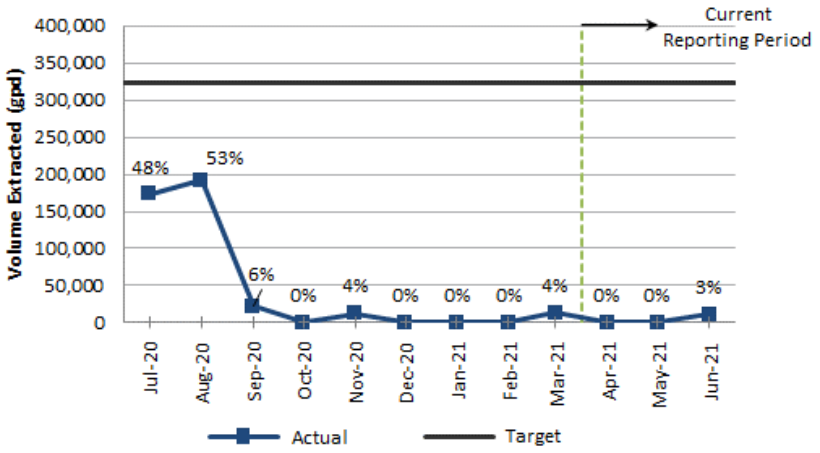


SEPTS HE Mass Removal by Month

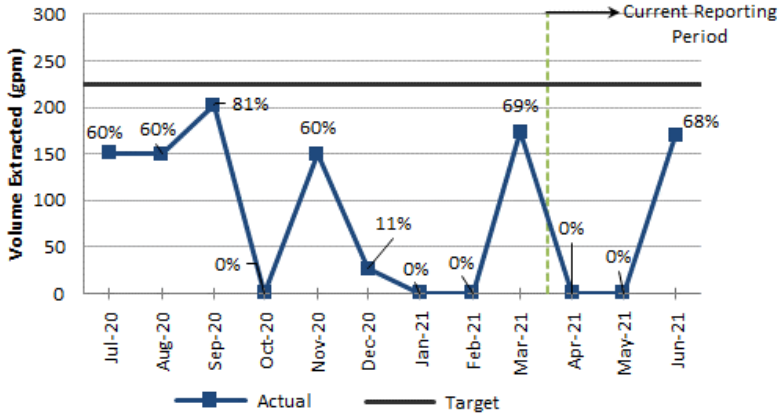
Playa 1 Pump and Treat System Graphs



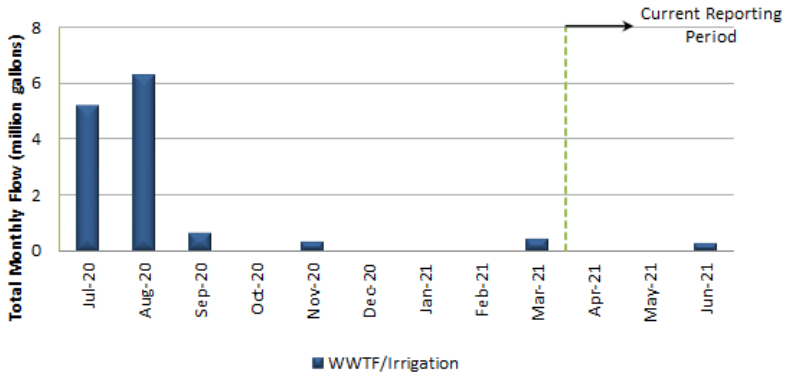
P1PTS Operational Time Vs Target



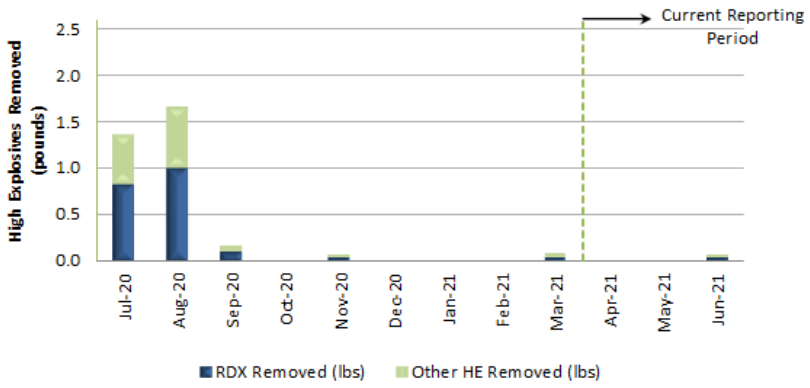
P1PTS Average GPD and % Capacity



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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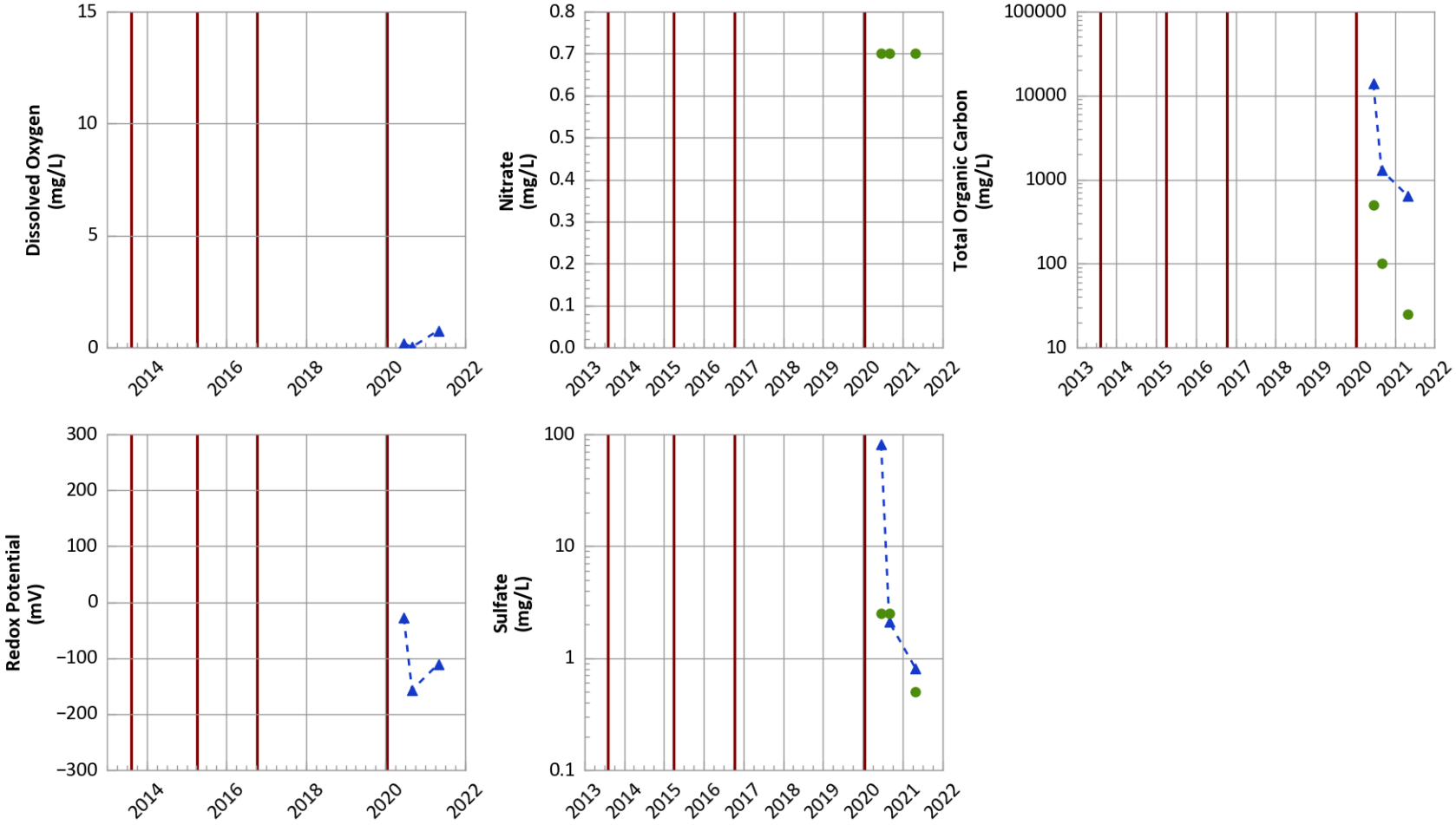
Appendix C
ISB Graphs

Southeast ISB Graphs

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

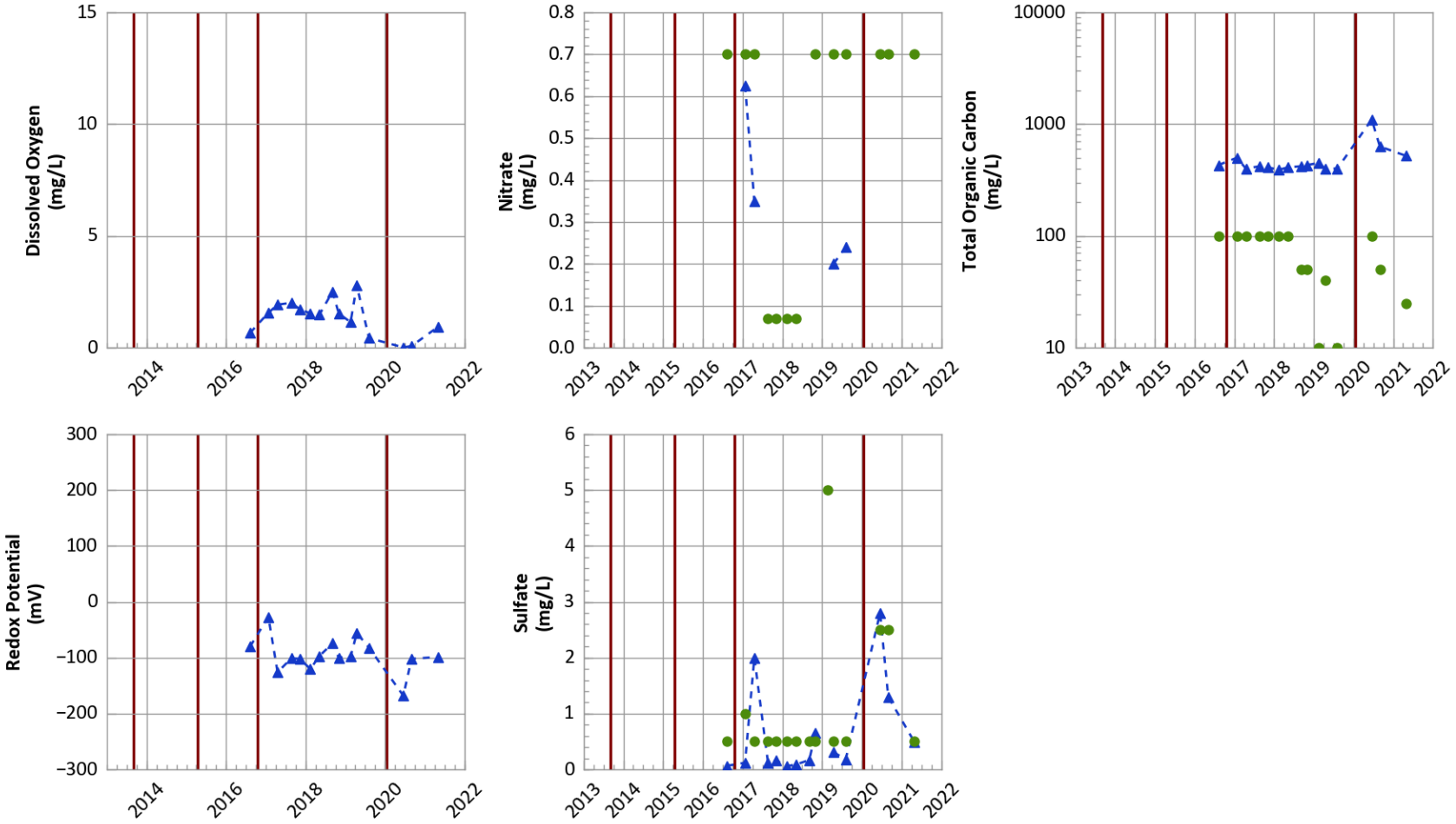


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

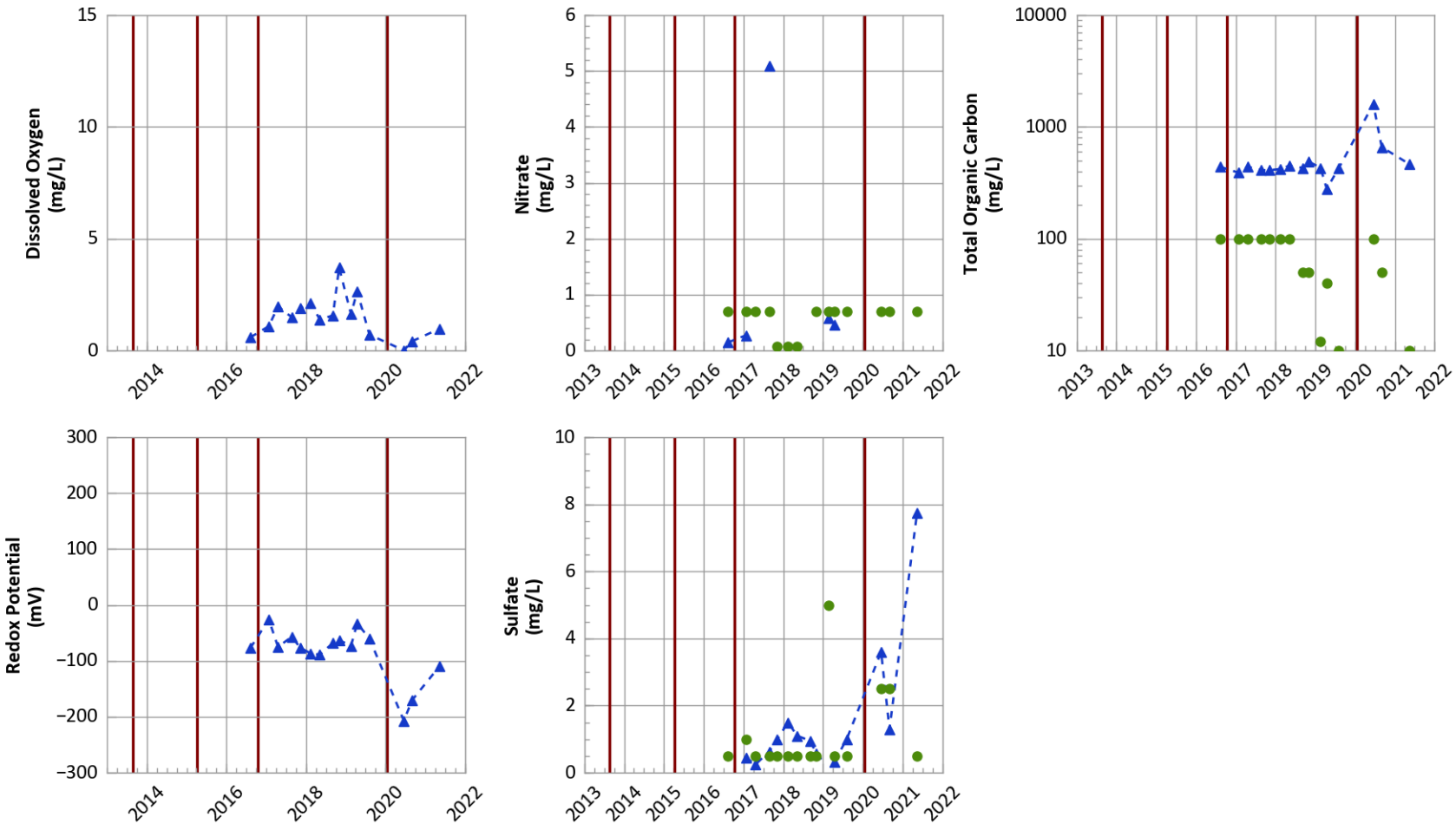
Well Location

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

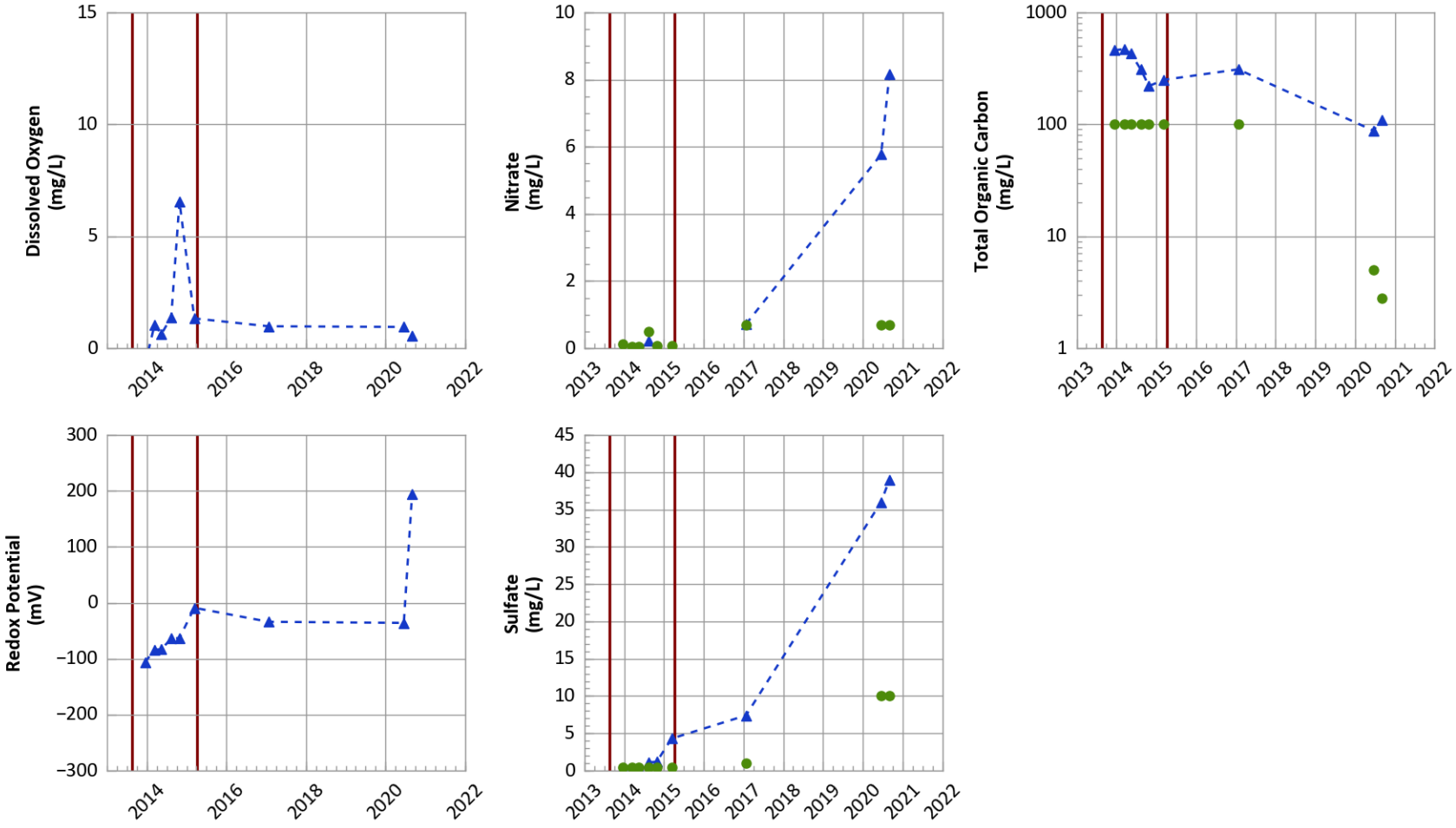
PTX06-ISB038 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



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

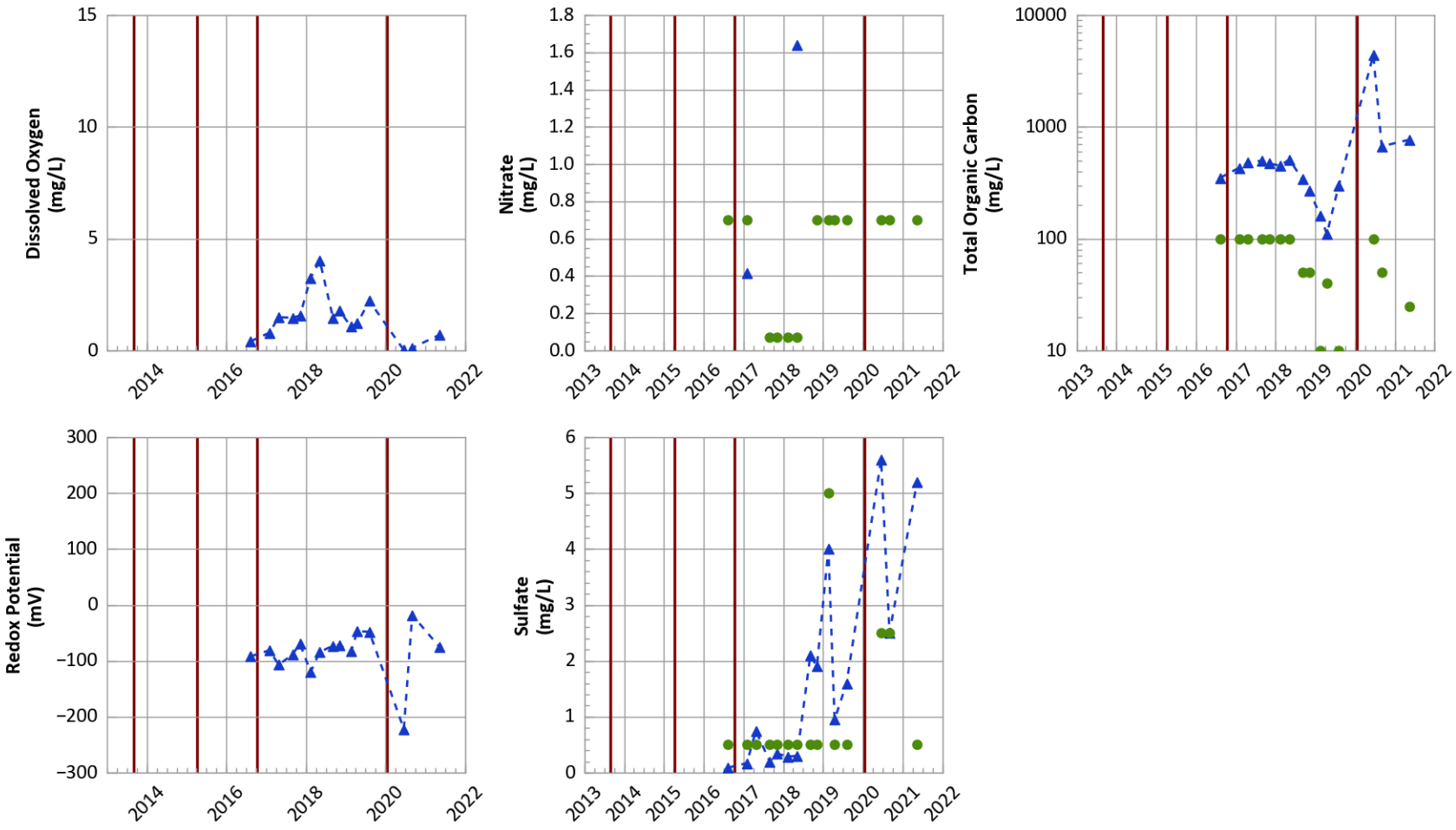
Well Location

PTX06-ISB042 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



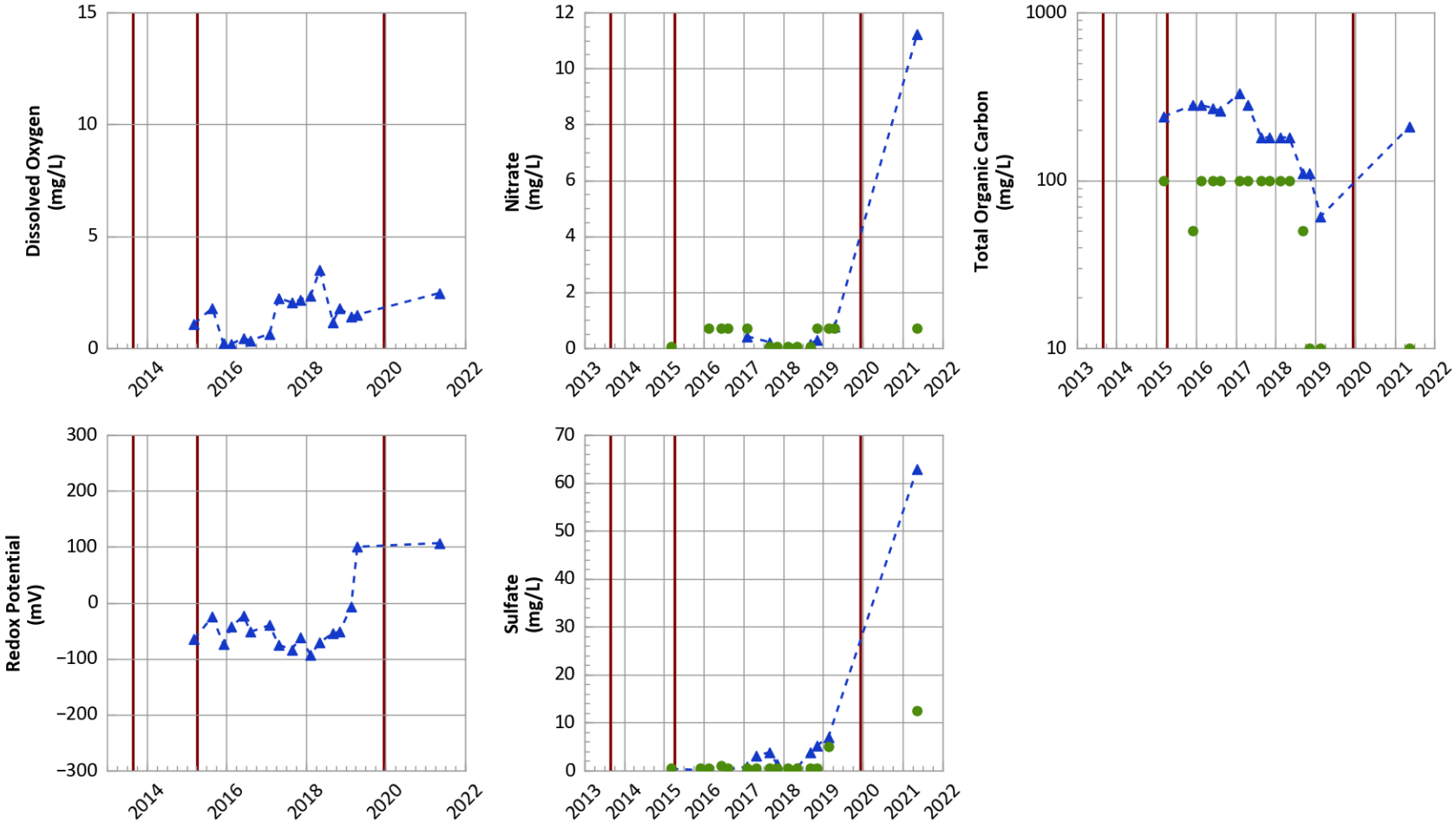
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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



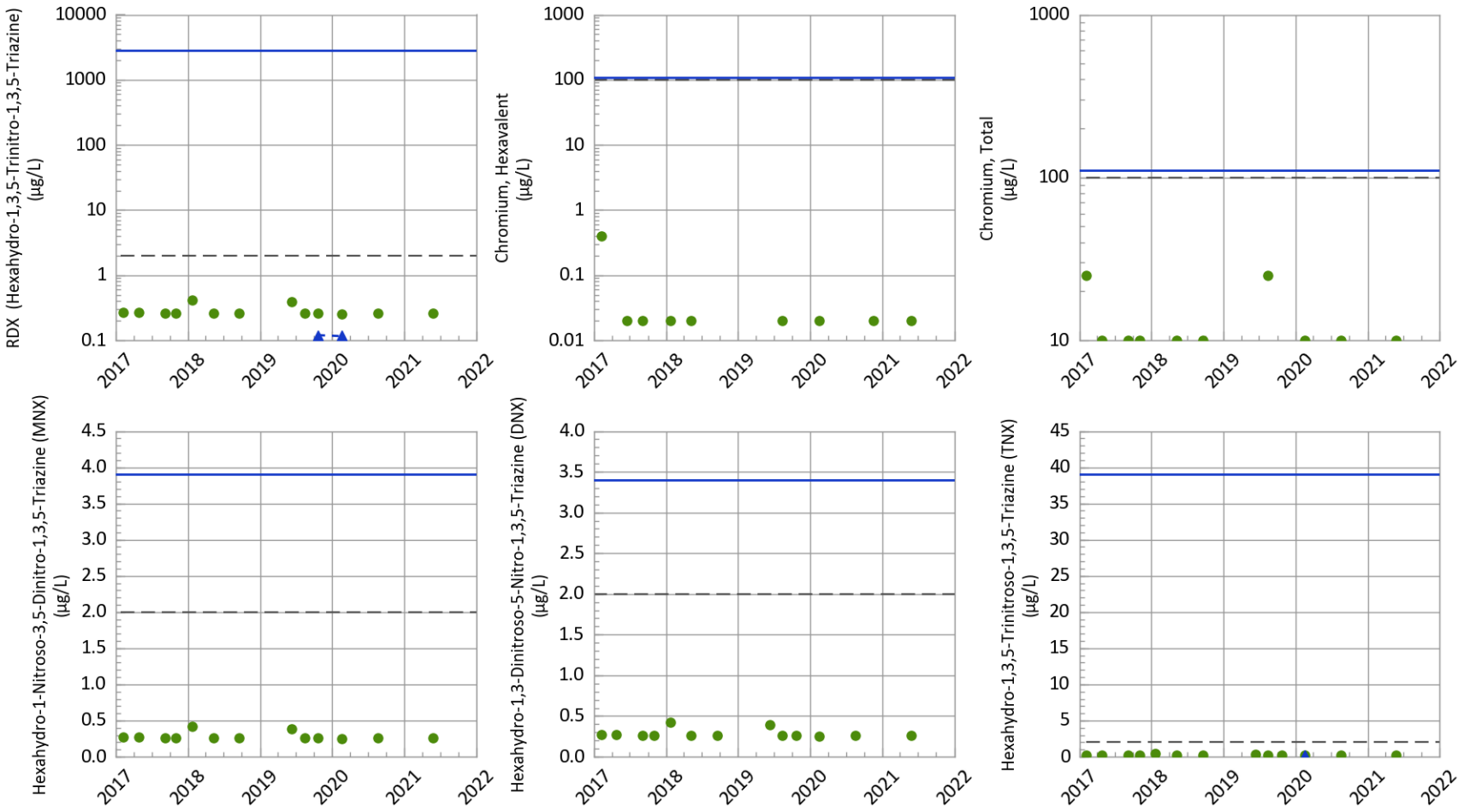
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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



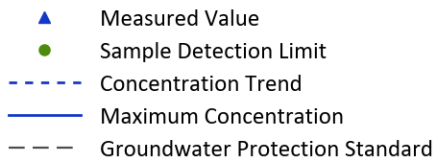
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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



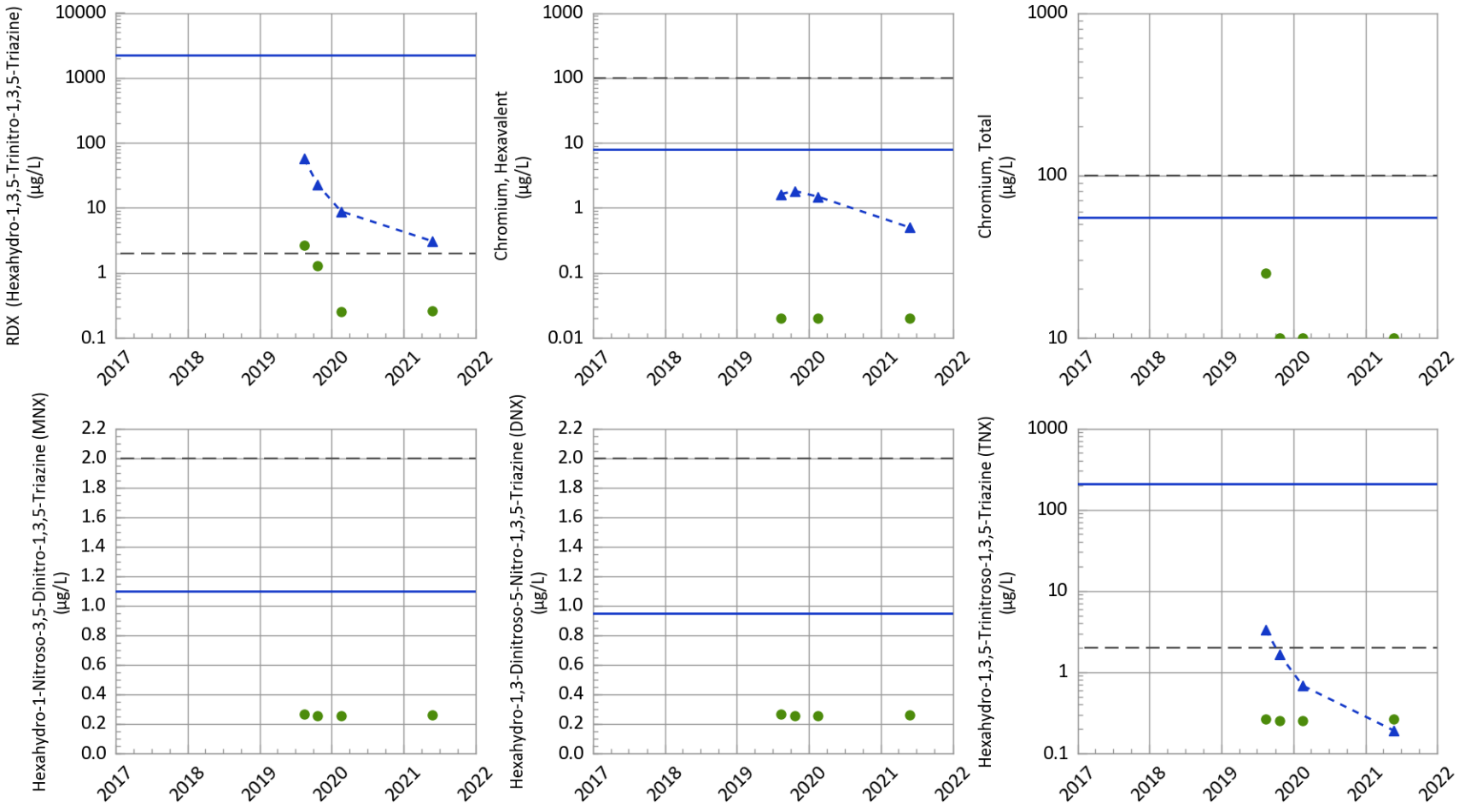
Most Recent Measured COC Concentrations (Feb 18, 2020)

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



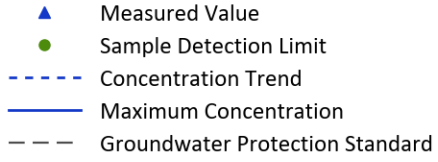
Well Location

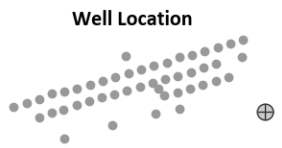
PTX06-1045 Downgradient Performance Indicators
Southeast In Situ Bioremediation System
USDOE/NNSA Pantex Plant



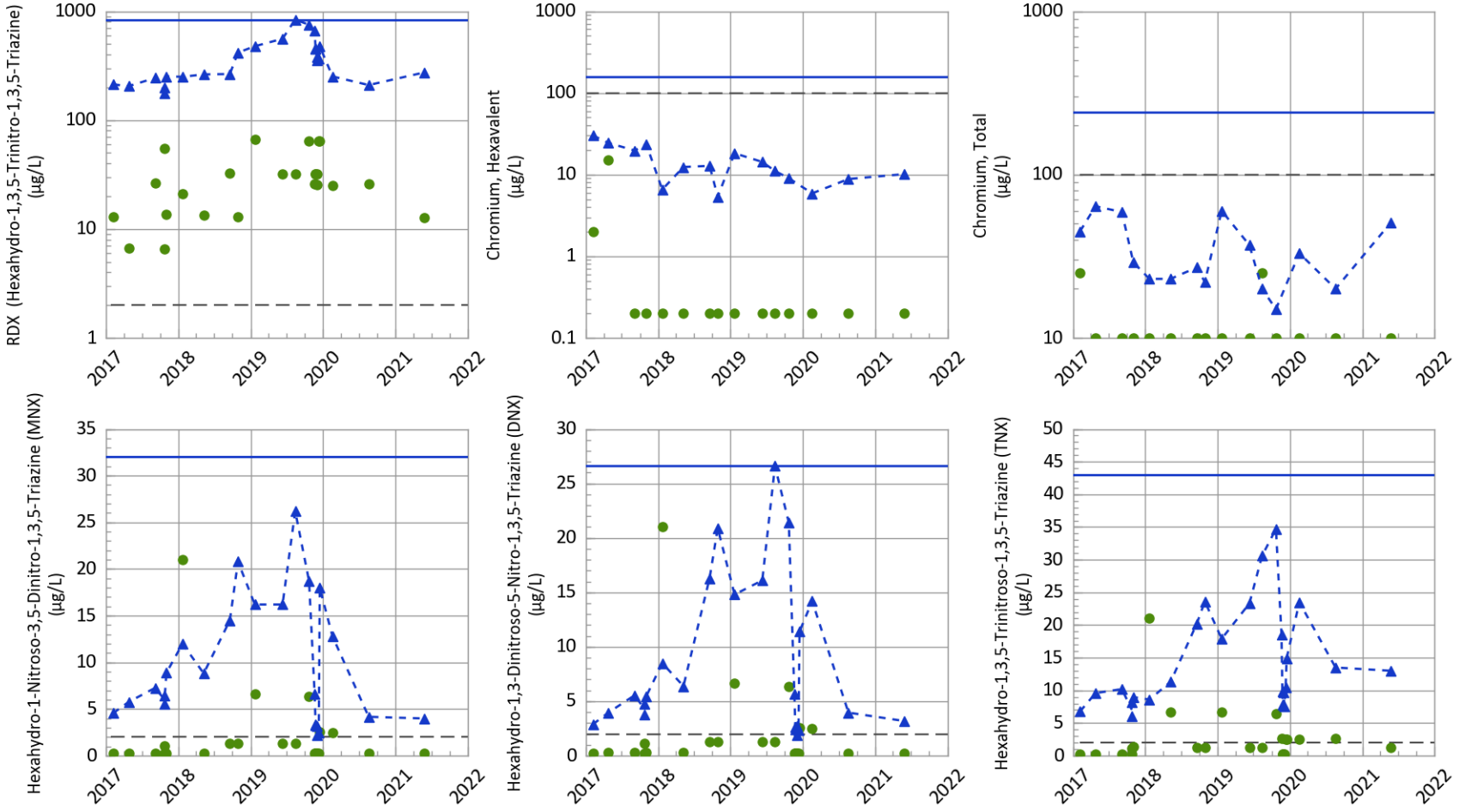
Most Recent Measured COC Concentrations (May 26, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	3.08	2.0
MNX	Non-Detect	2.0
CR-6	0.5	100.0
DNX	Non-Detect	2.0
CR	Non-Detect	100.0
TNX	0.19	2.0



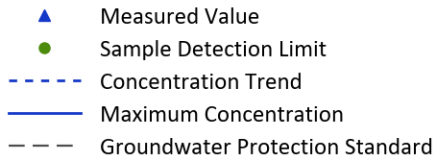


PTX06-1153 Downgradient Performance Indicators
Southeast In Situ Bioremediation System
USDOE/NNSA Pantex Plant



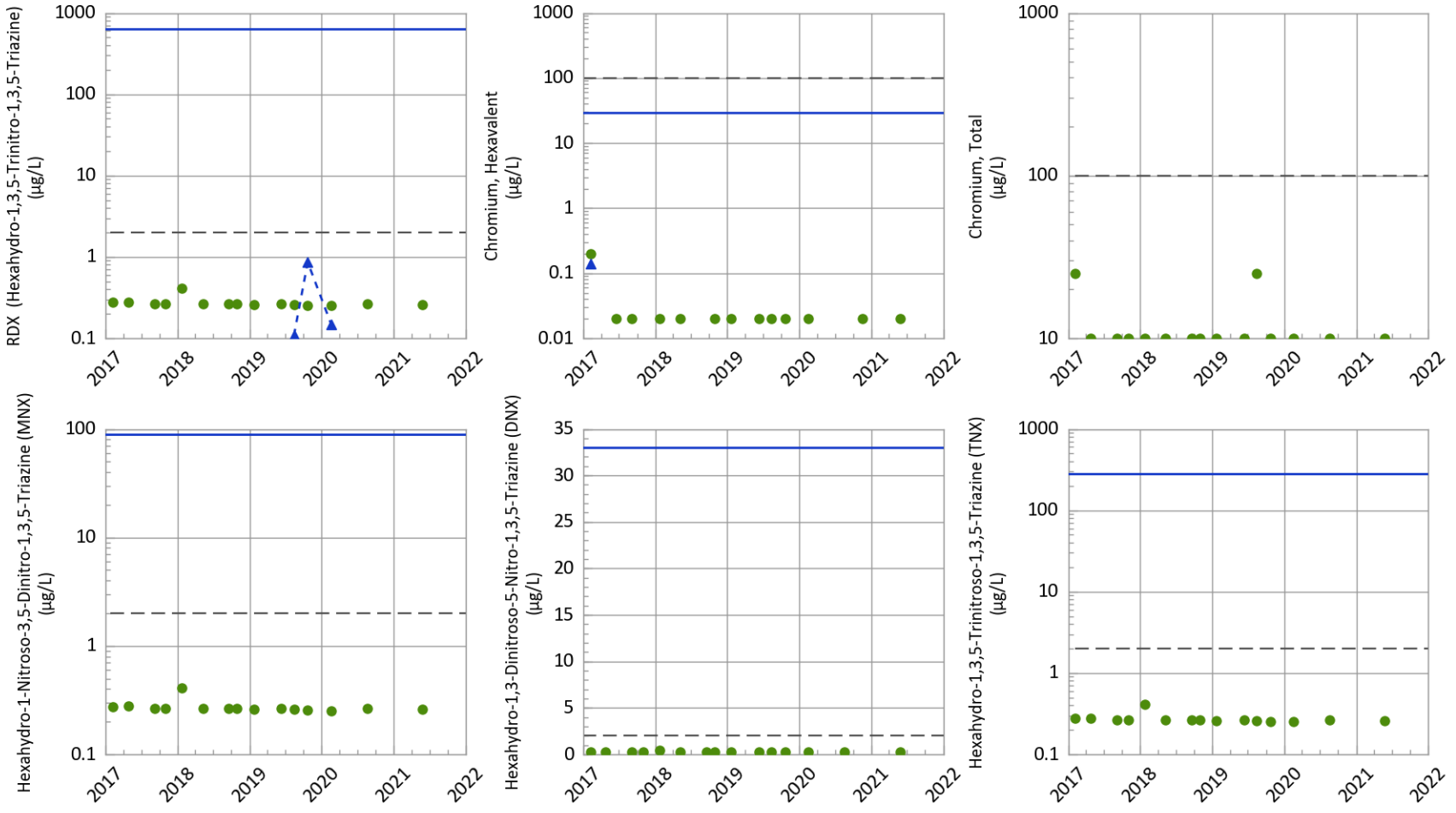
Most Recent Measured COC Concentrations (May 26, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	274.0	2.0
MNX	3.99	2.0
CR-6	10.12	100.0
DNX	3.19	2.0
CR	51.0	100.0
TNX	13.0	2.0



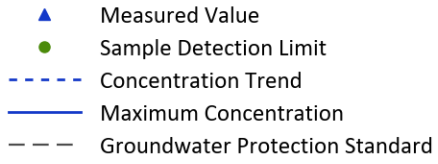
Well Location

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



Most Recent Measured COC Concentrations (May 26, 2021)

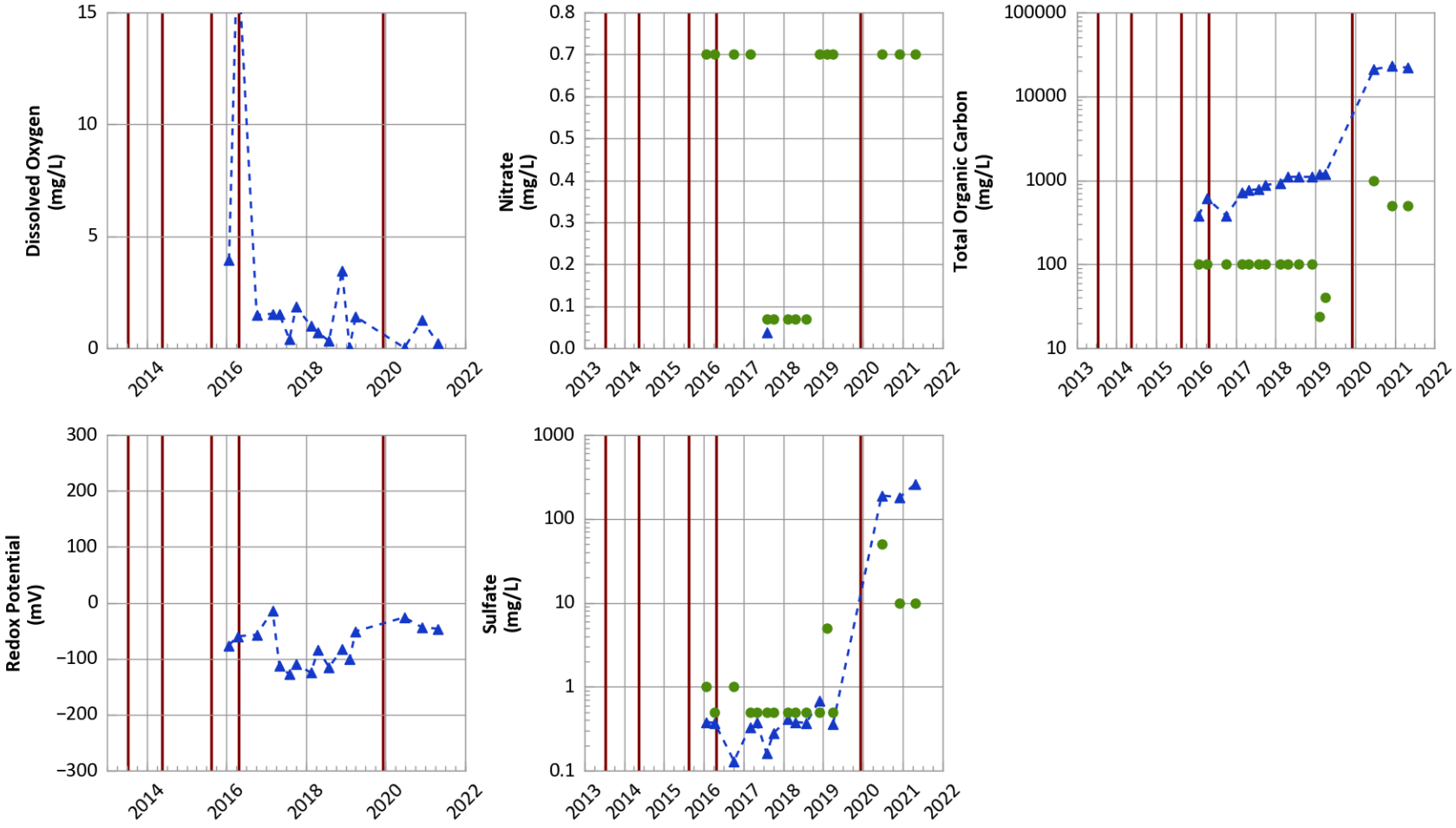
COC	Concentration (µg/L)	GWPS (µg/L)
RDX	Non-Detect	2.0
MNX	Non-Detect	2.0
CR-6	Non-Detect	100.0
DNX	Non-Detect	2.0
CR	Non-Detect	100.0
TNX	Non-Detect	2.0



Well Location

Zone 11 ISB Graphs

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

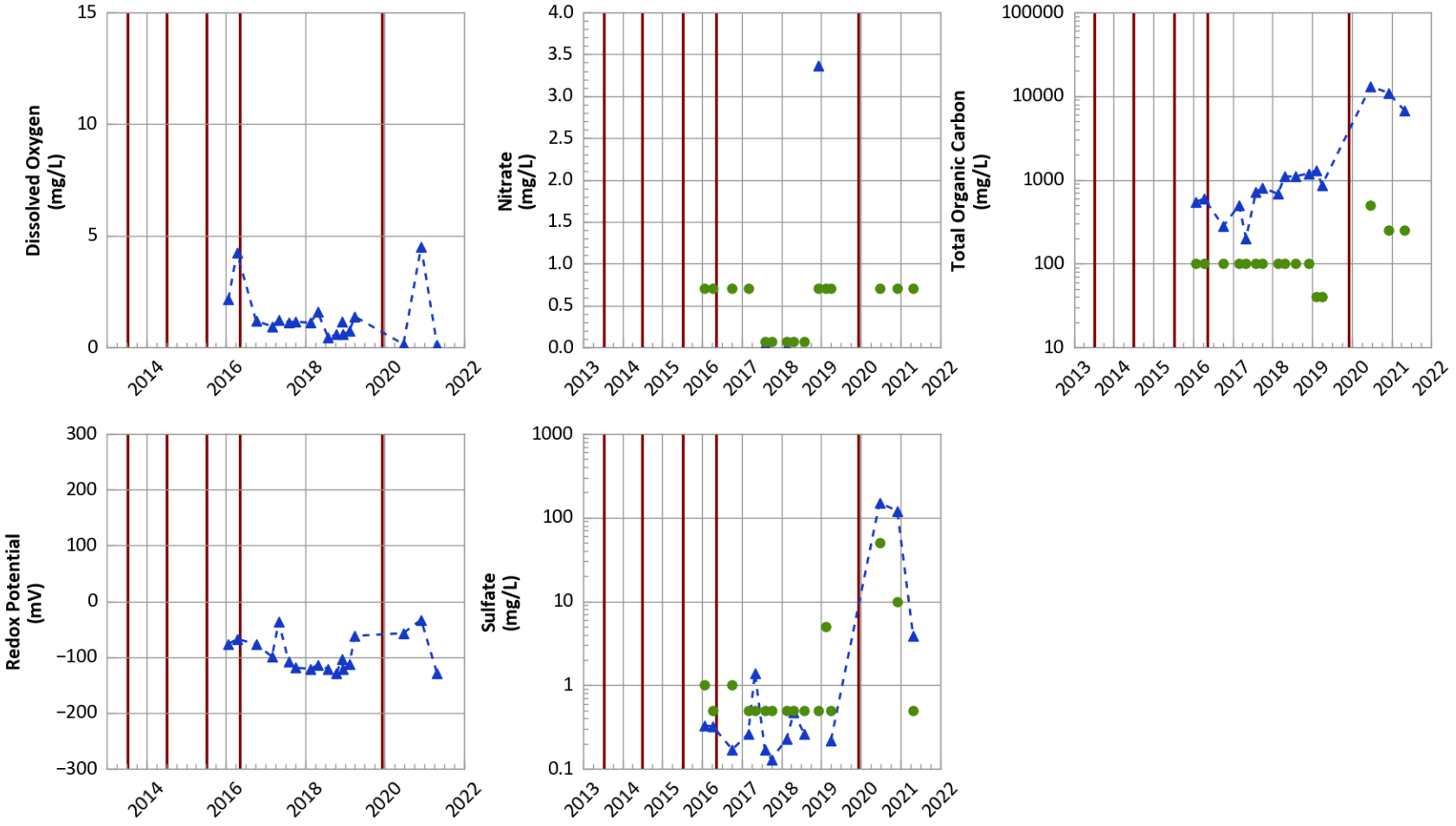


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

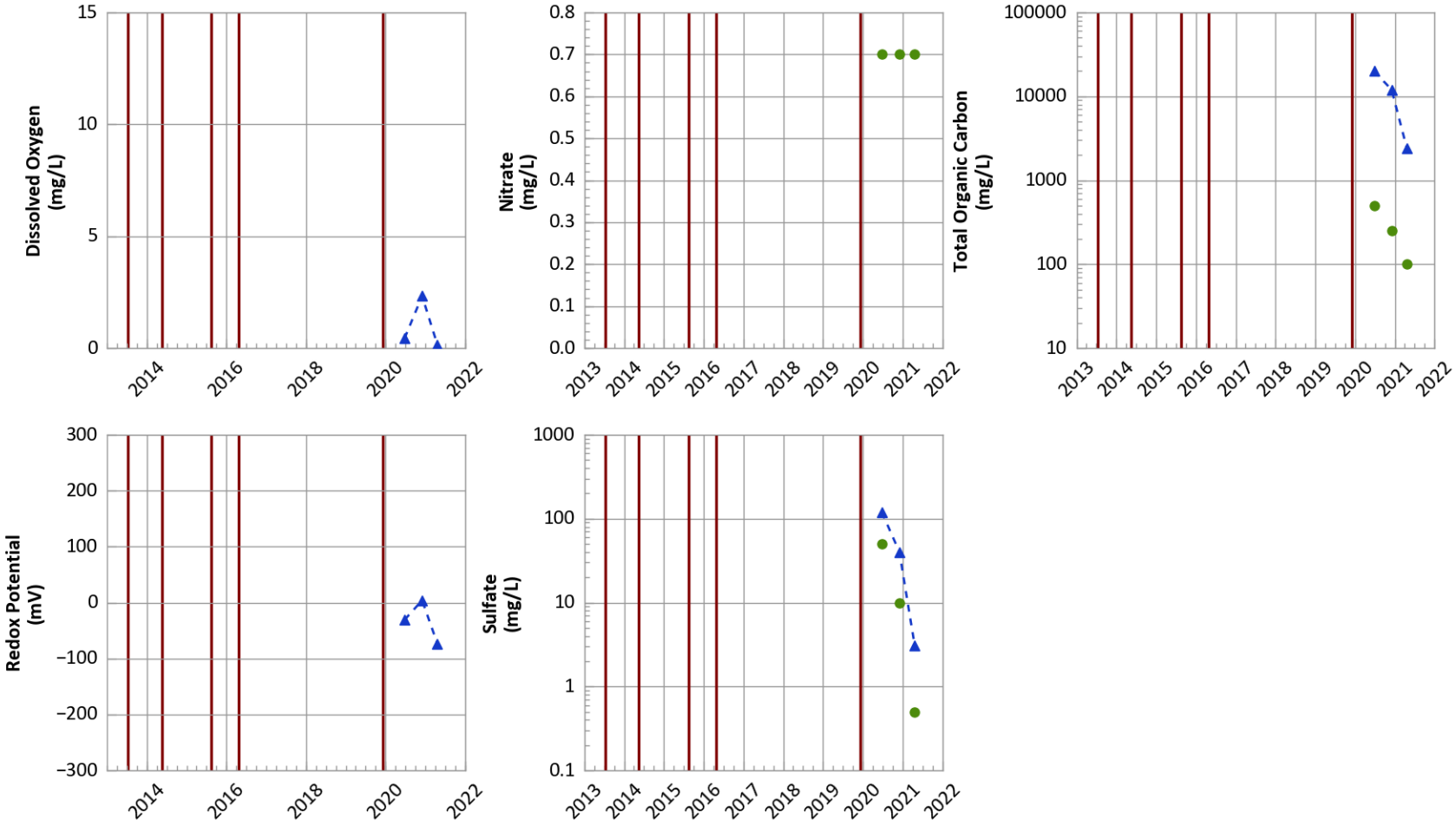
Well Location

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

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

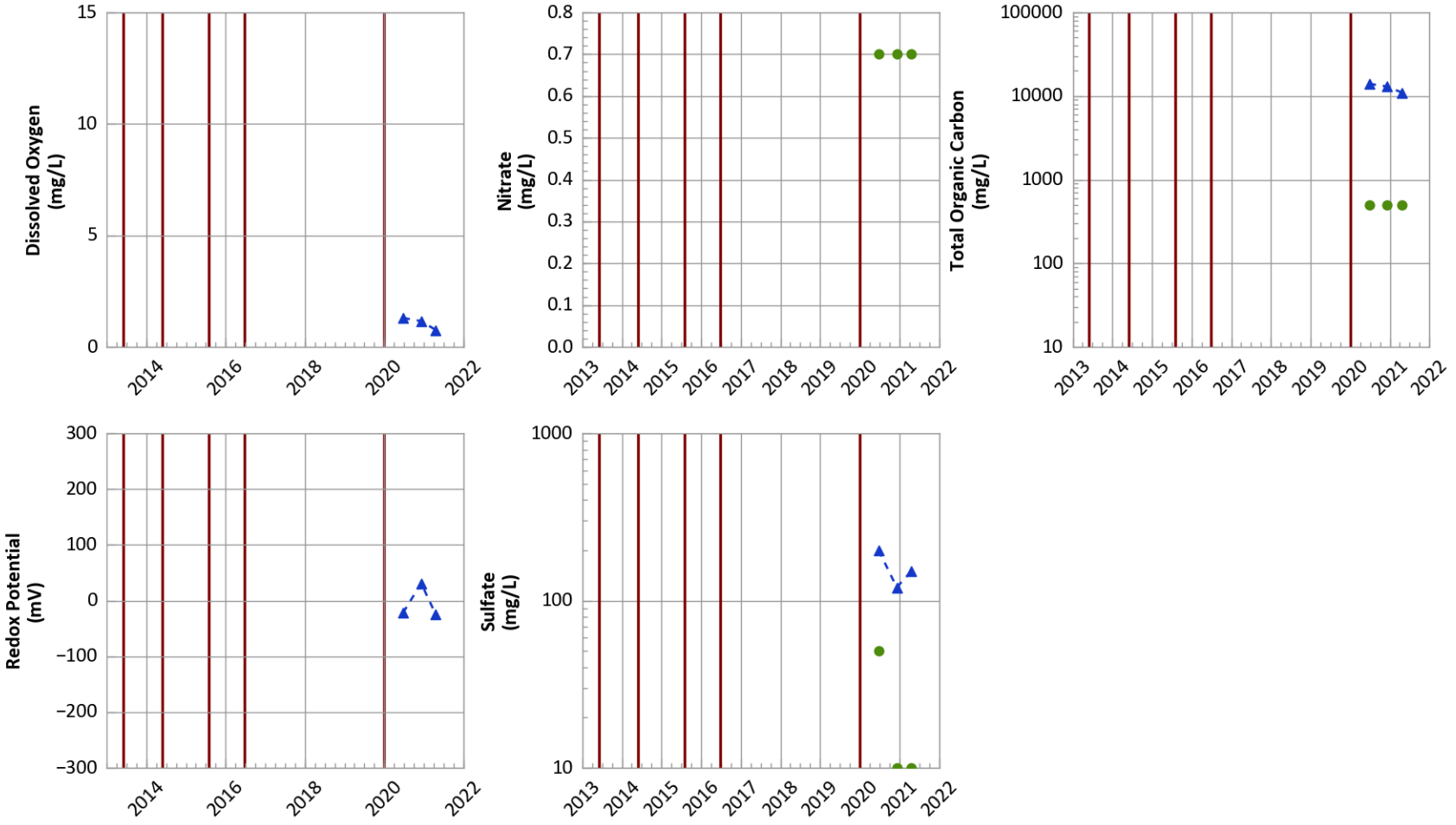


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

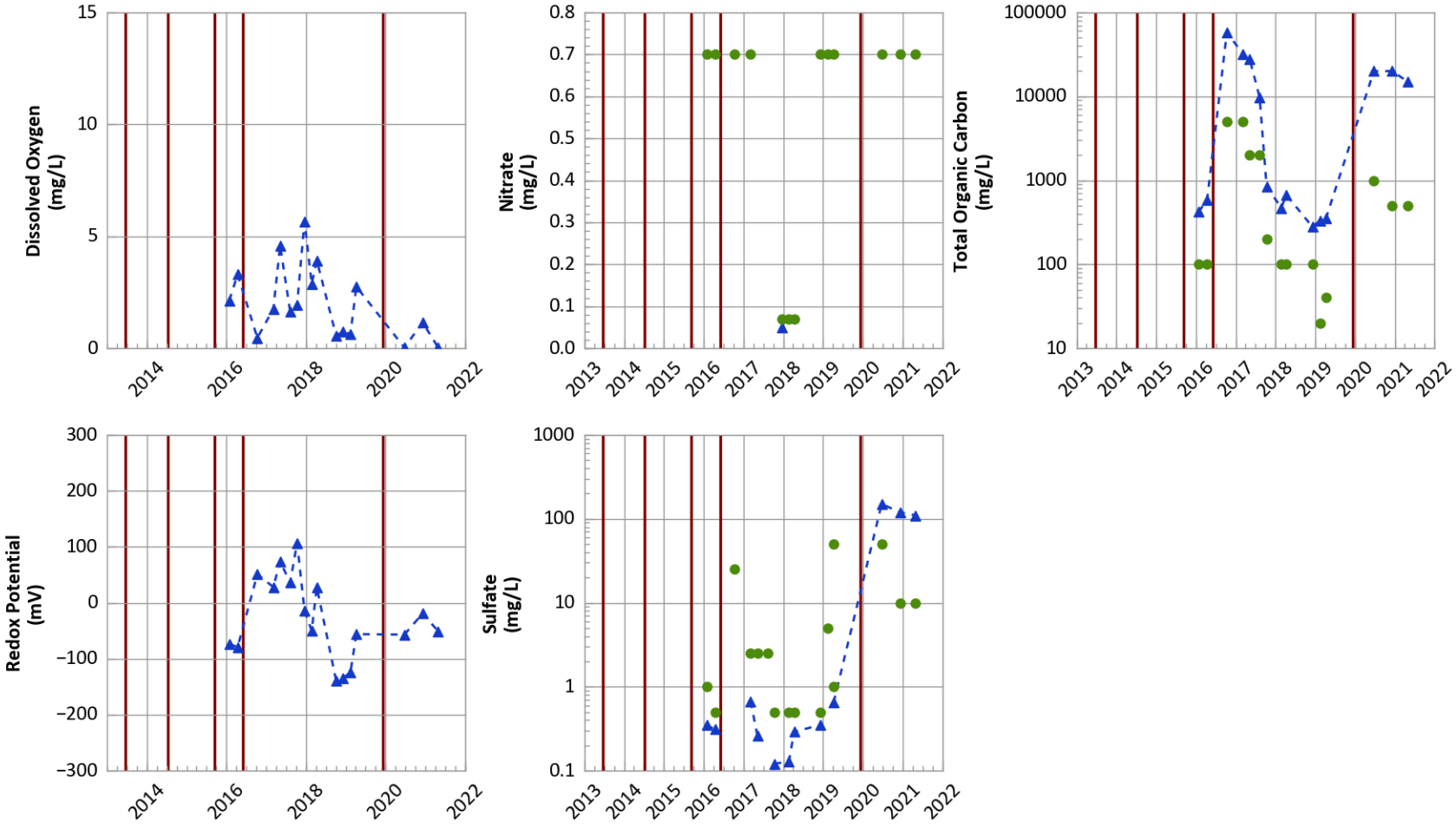
Well Location

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

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

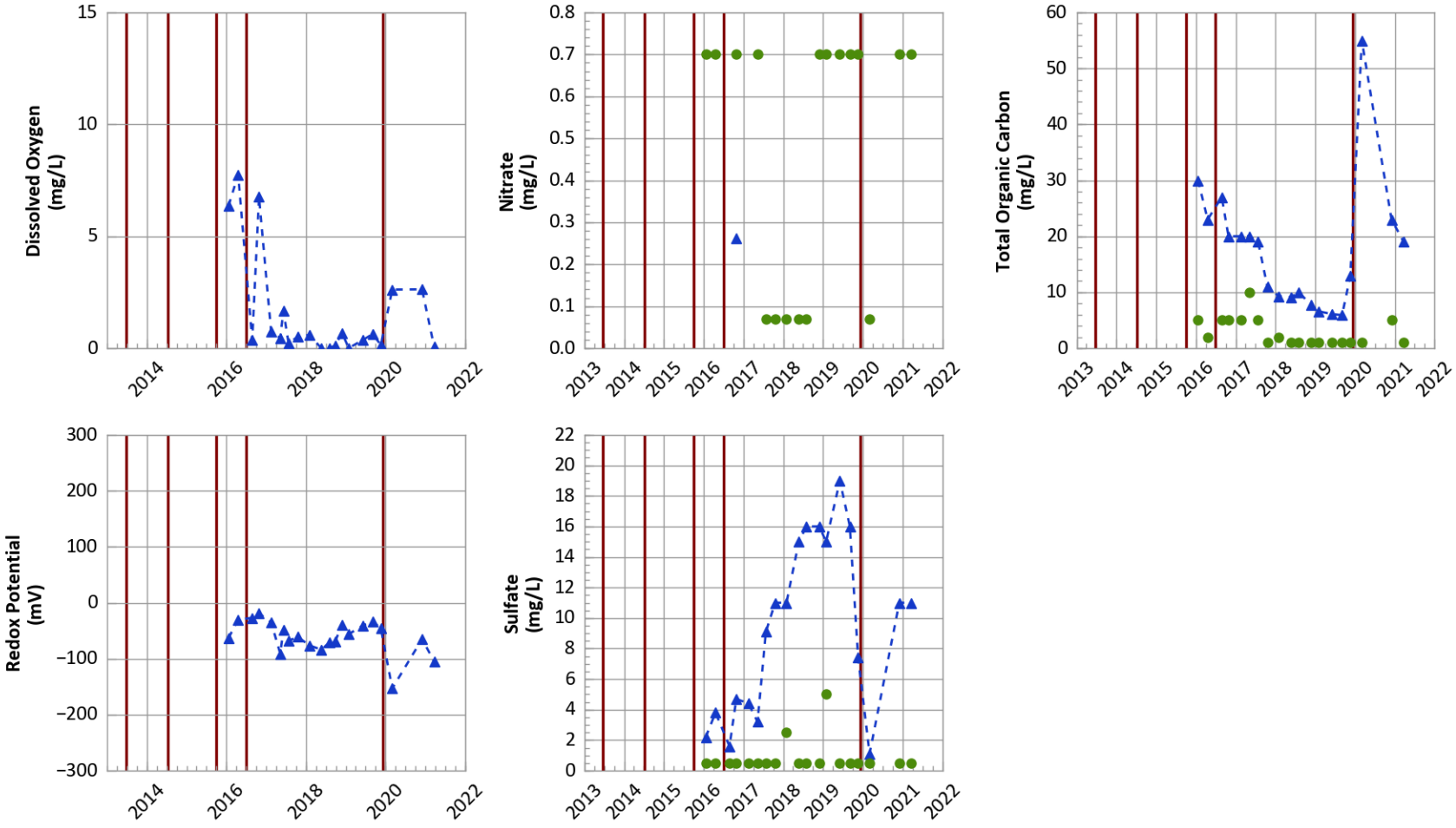


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

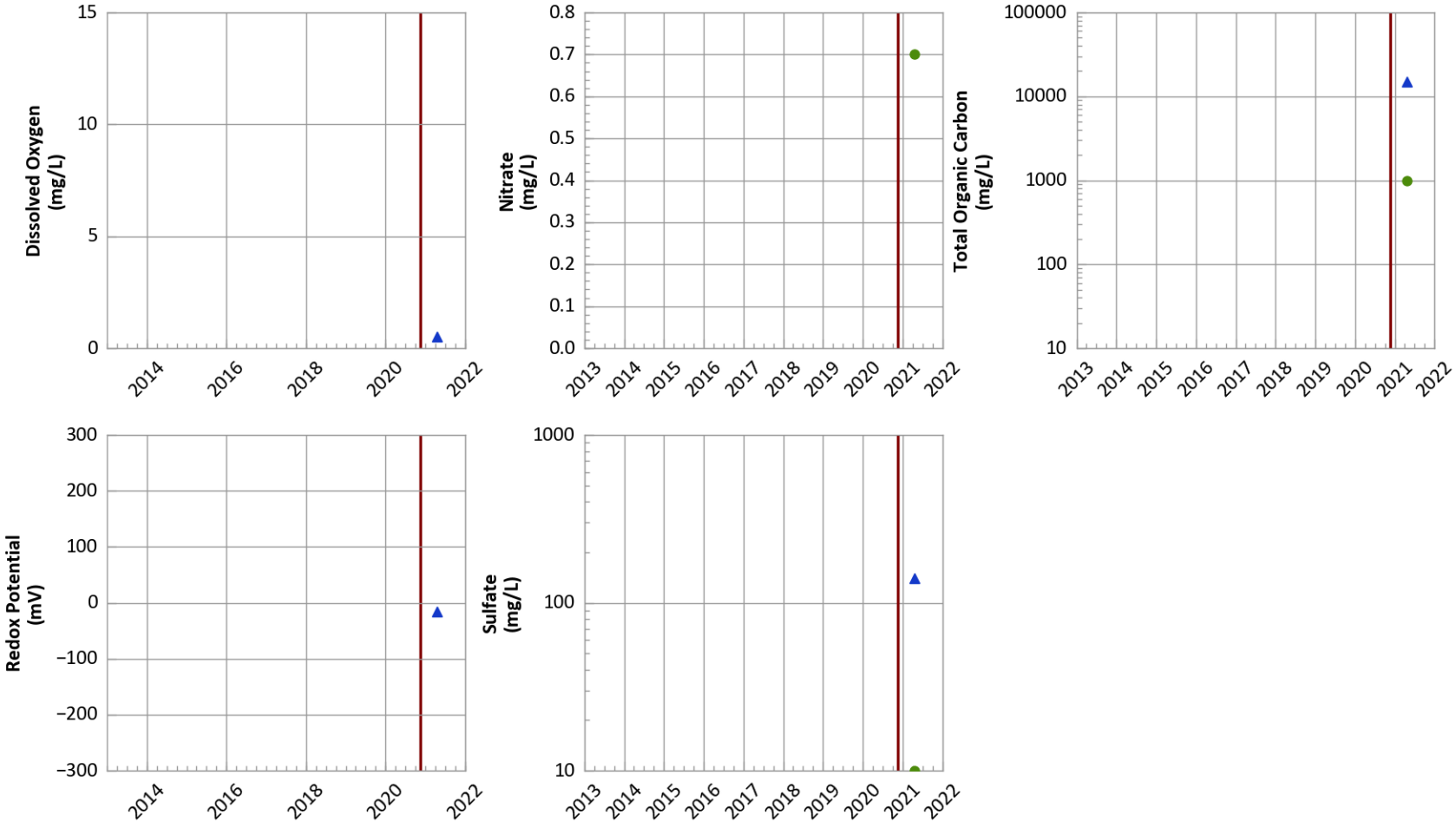
Well Location

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

PTX06-ISB133 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

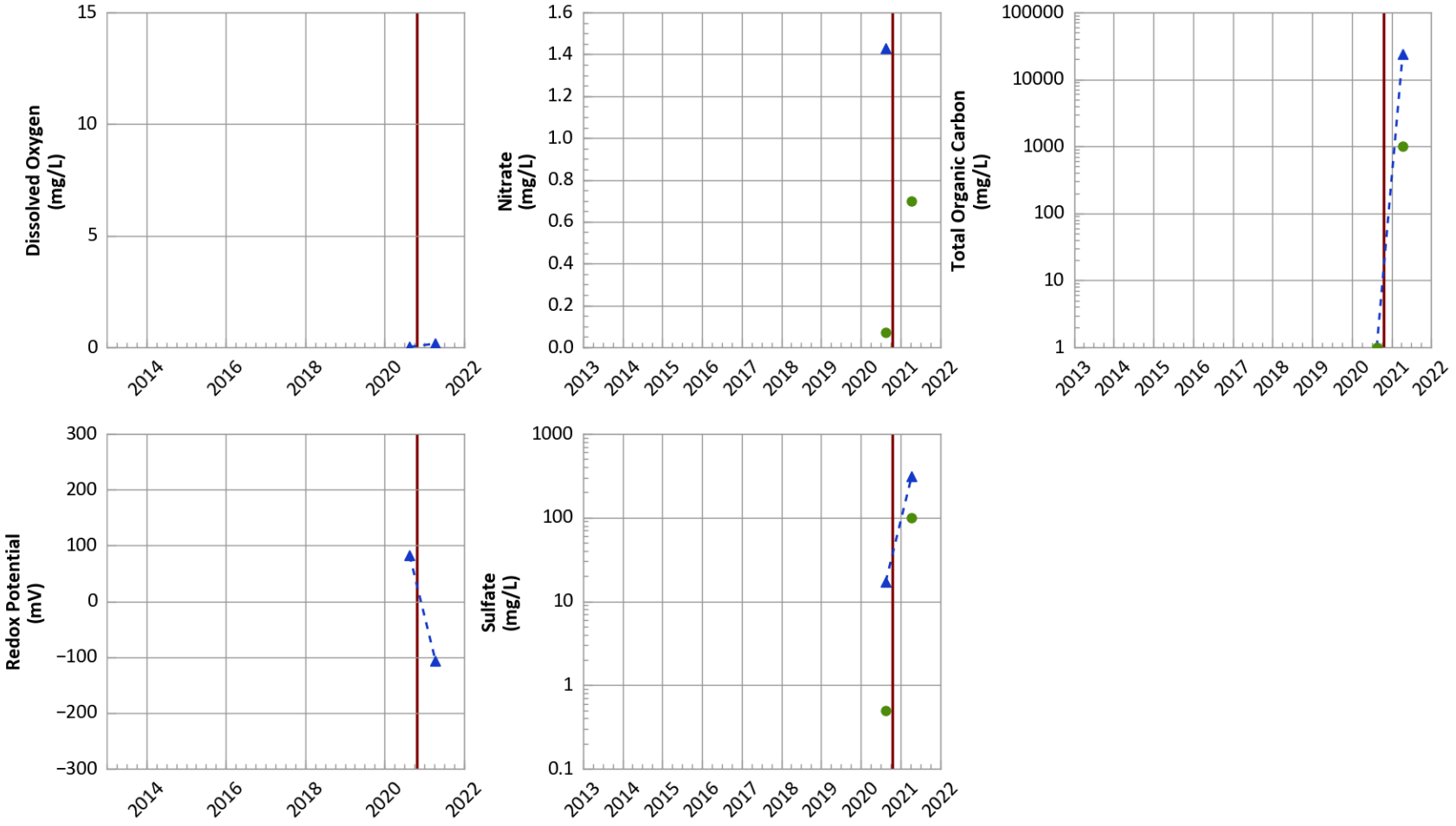


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

Well Location

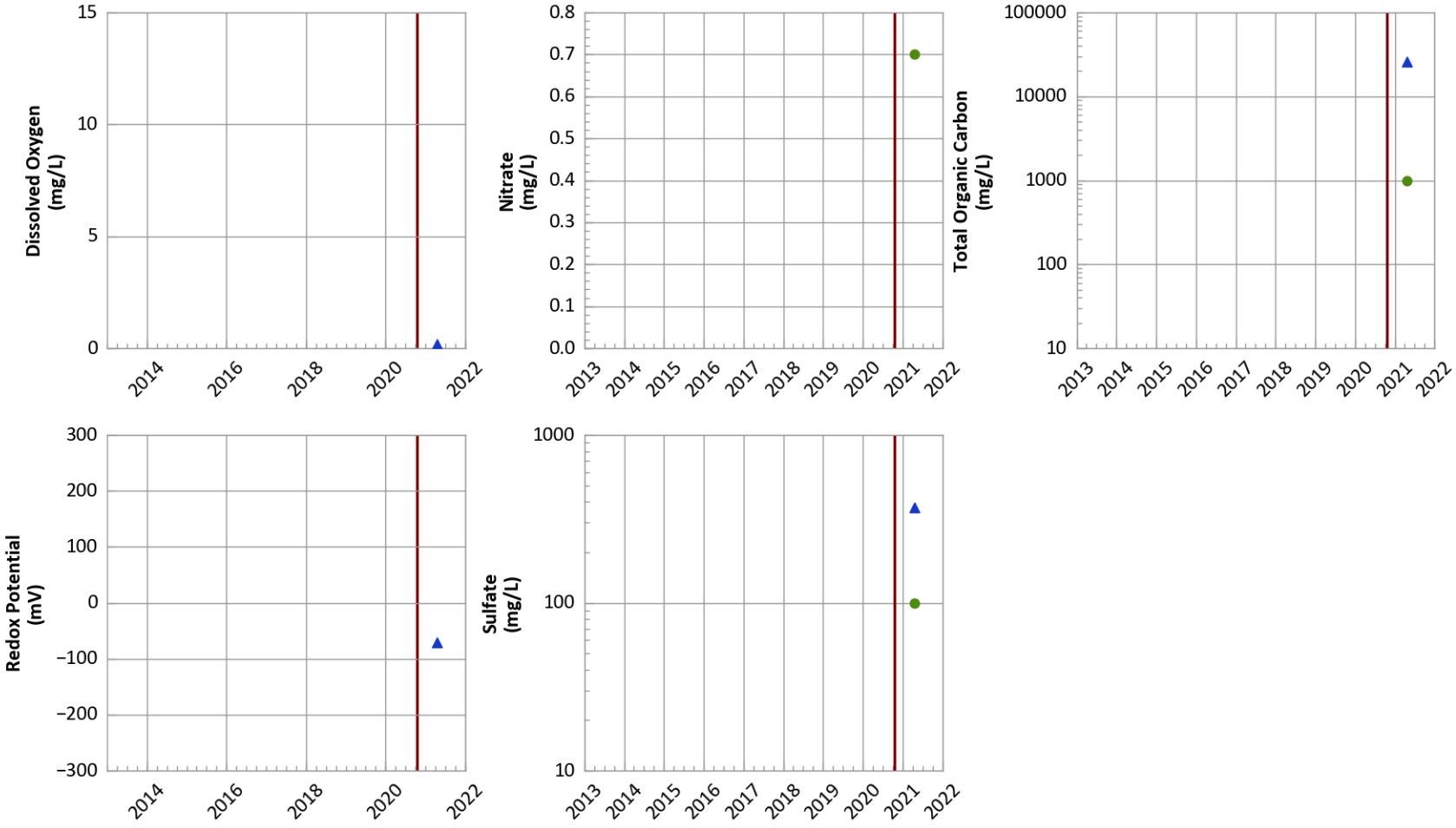
PTX06-ISB135 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



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

Well Location

PTX06-ISB137 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

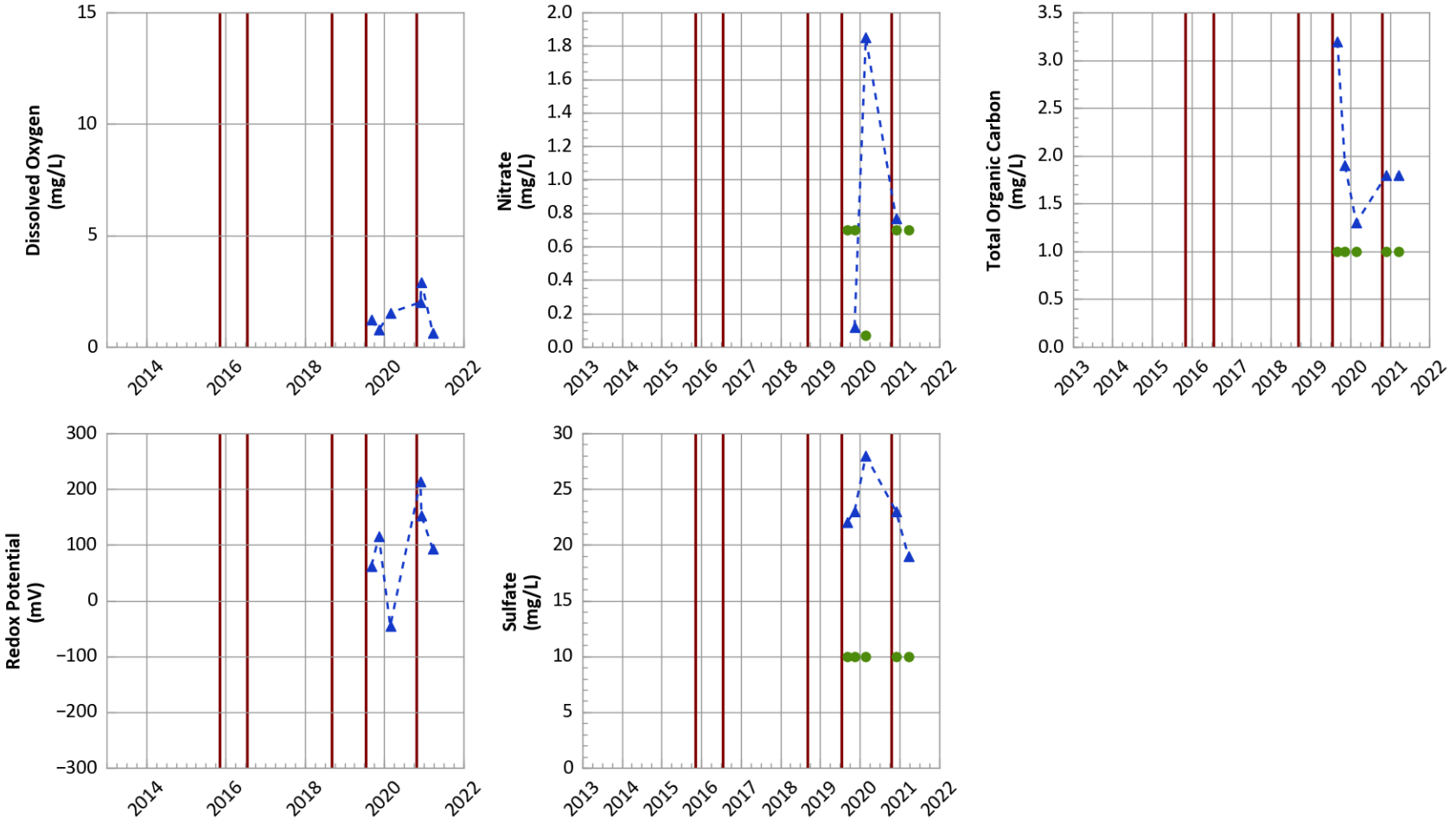


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

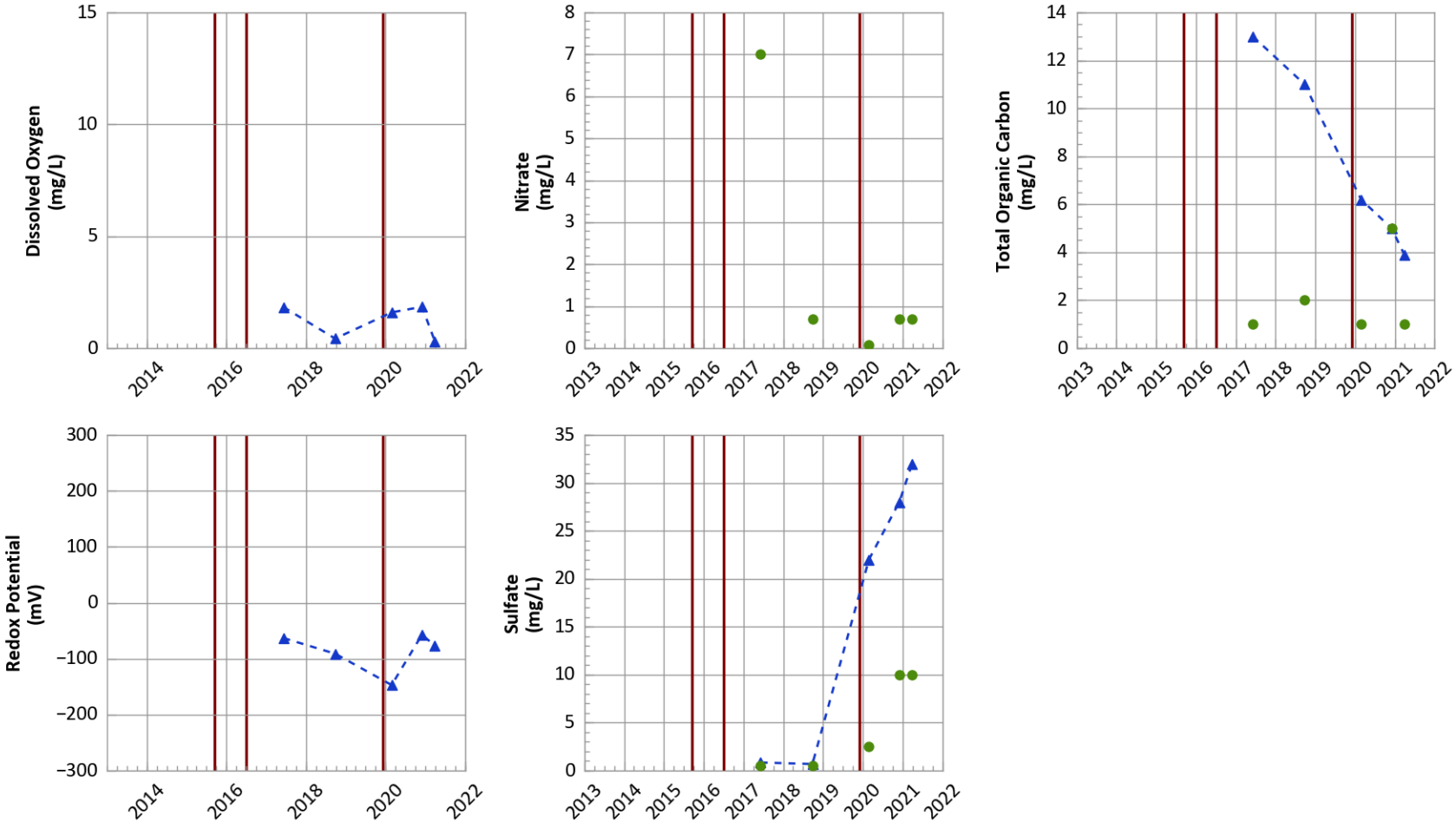
Well Location

PTX06-1164 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

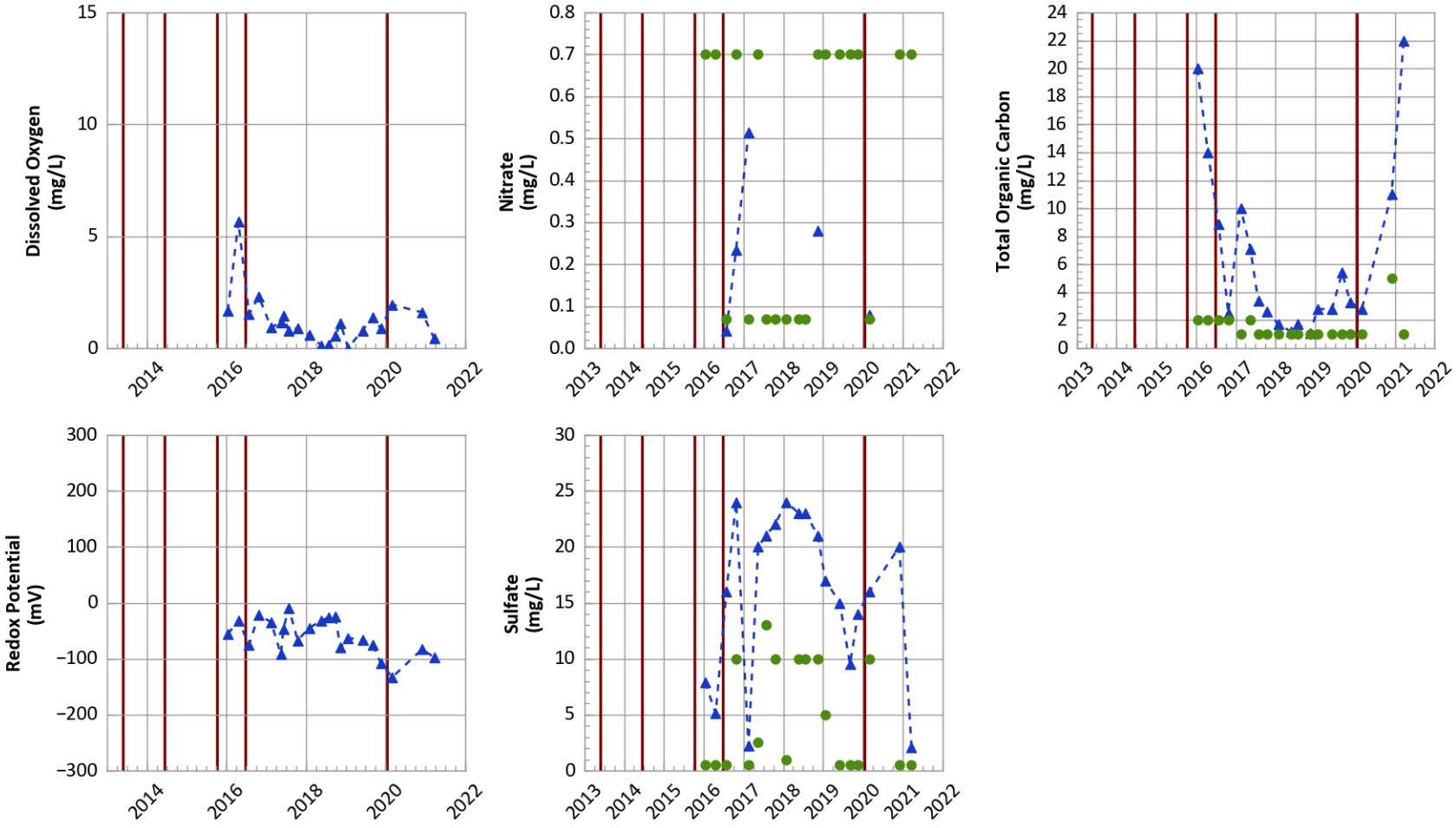
PTX06-1169 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



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

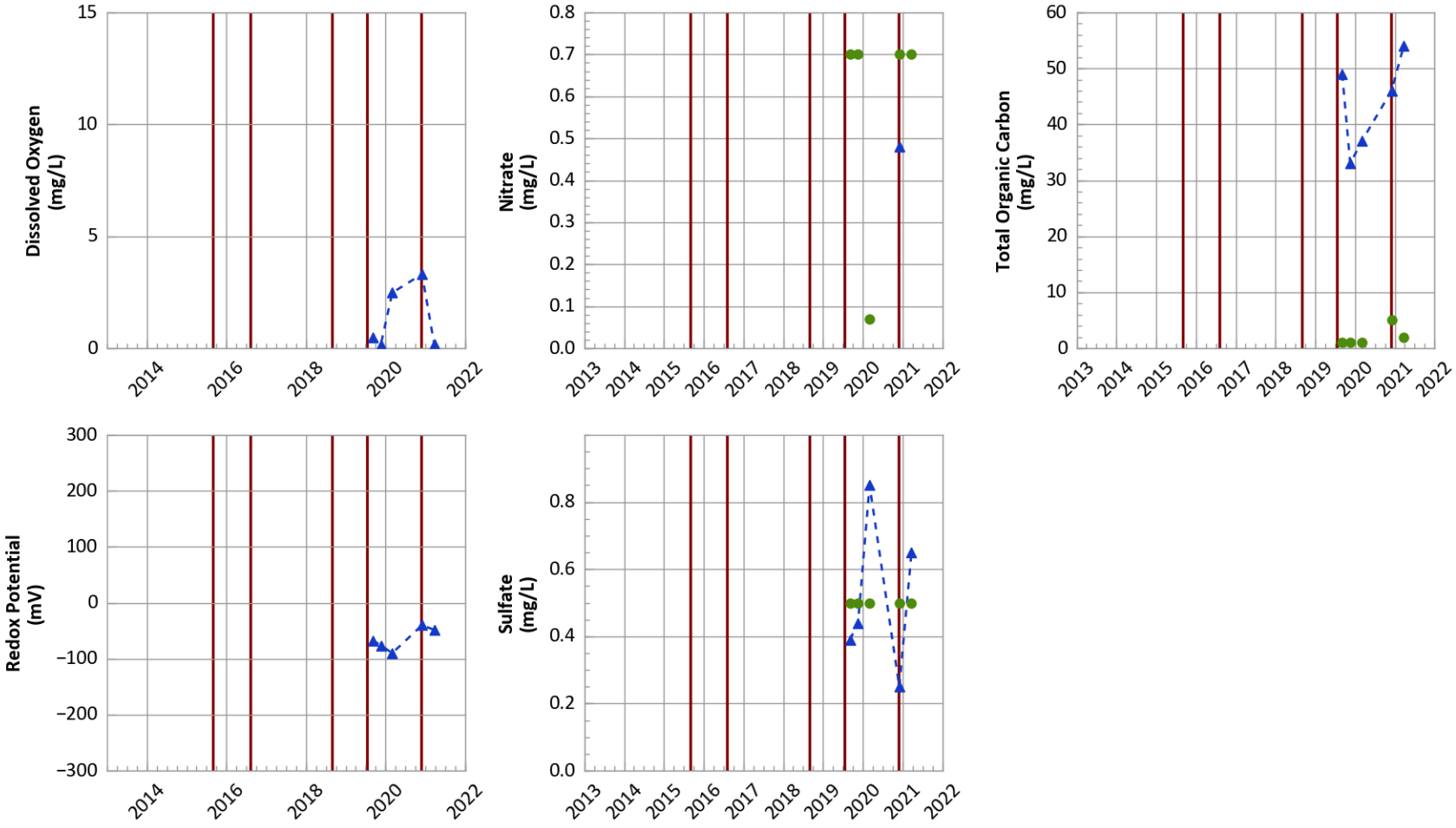
Well Location

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



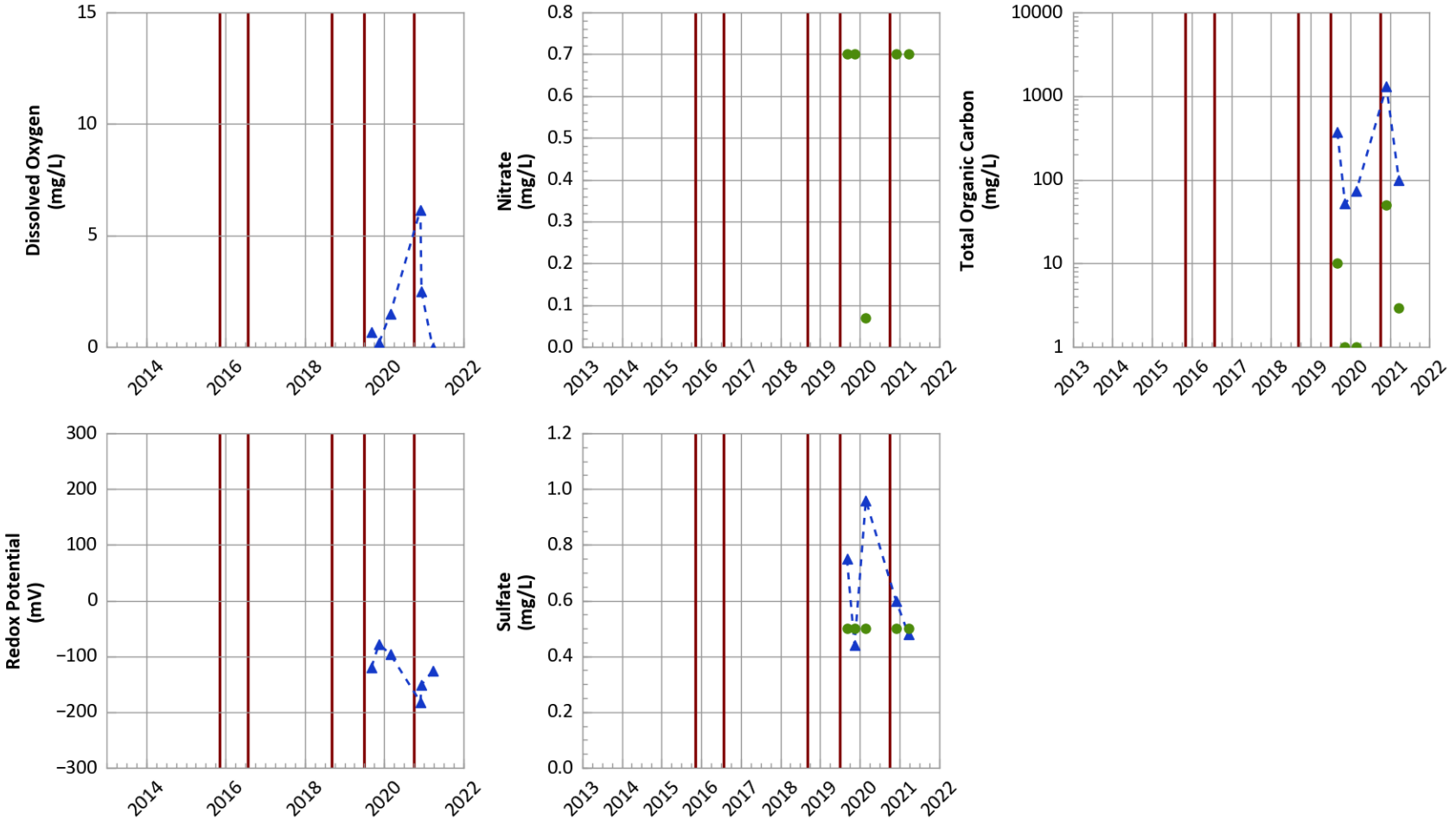
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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



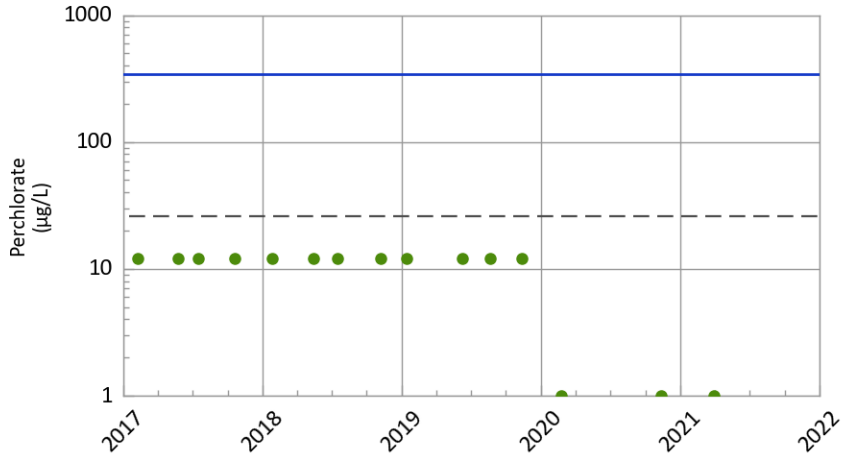
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

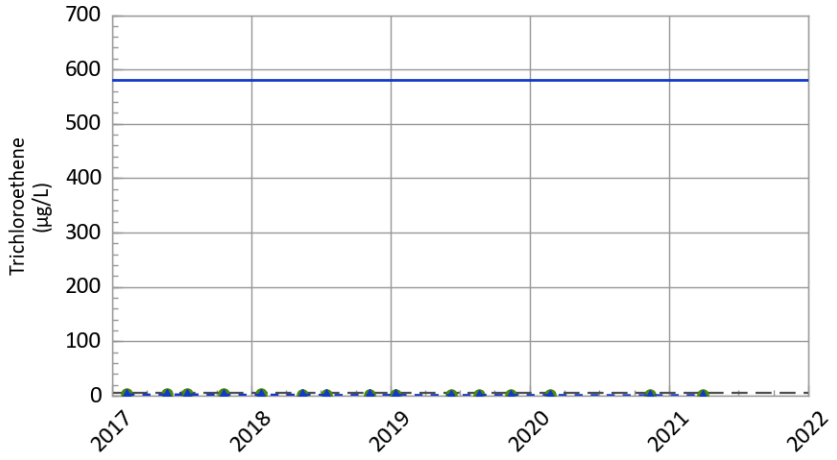
PTX06-1177 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

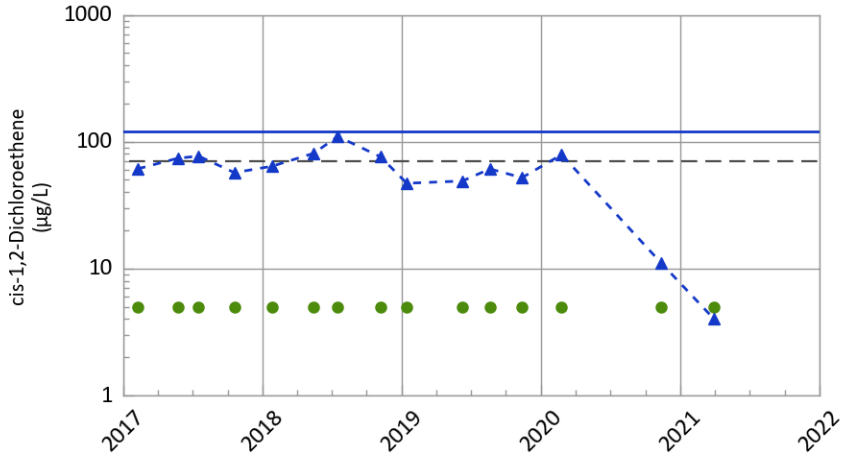


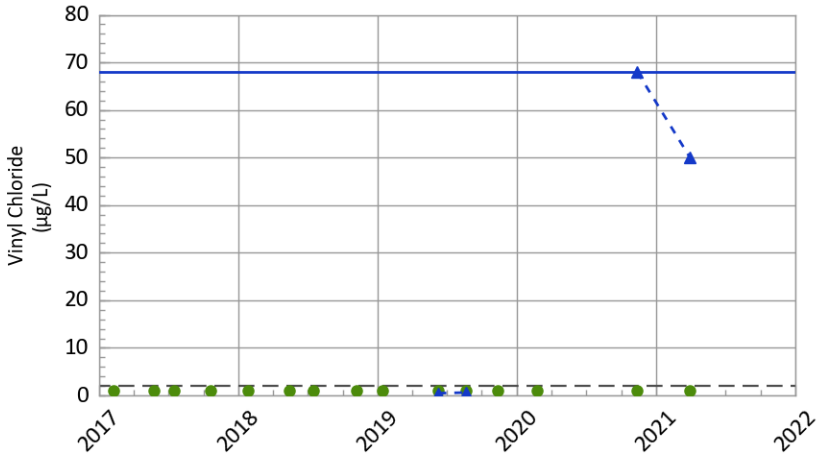
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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



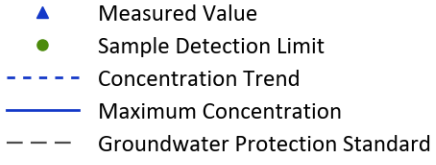




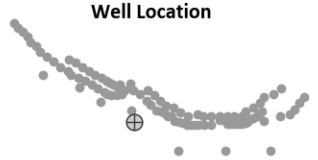


Most Recent Measured COC Concentrations (Mar 30, 2021)

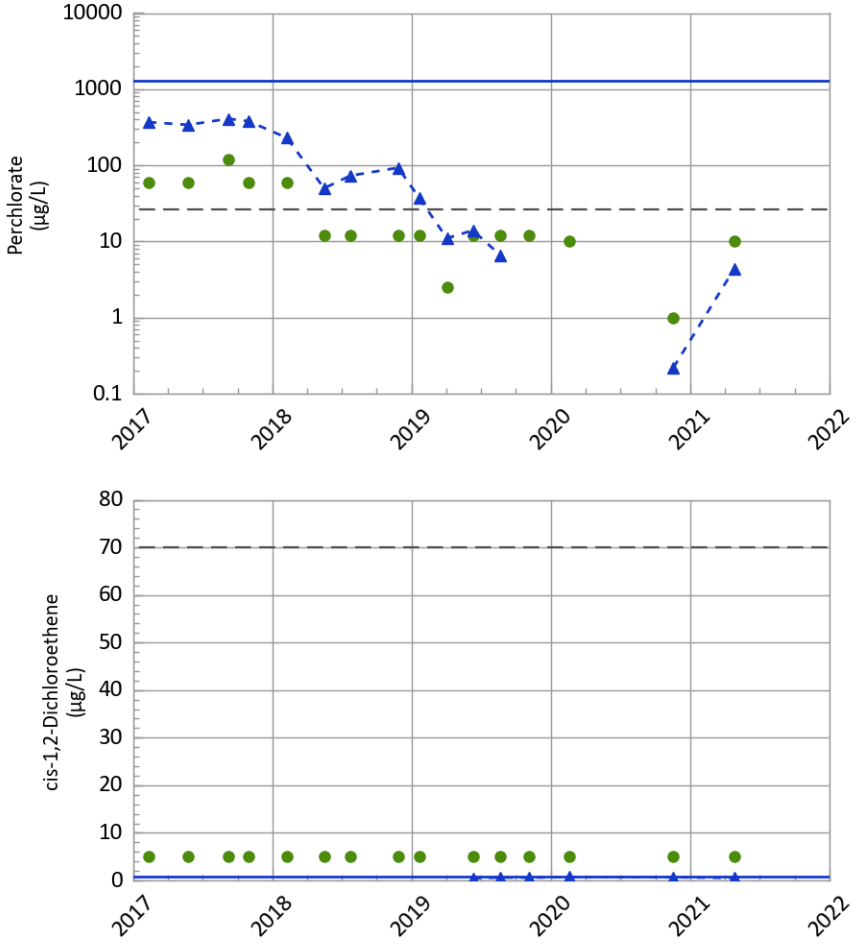
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	4.0	70.0
TCE	0.8	5.0
VC	50.0	2.0

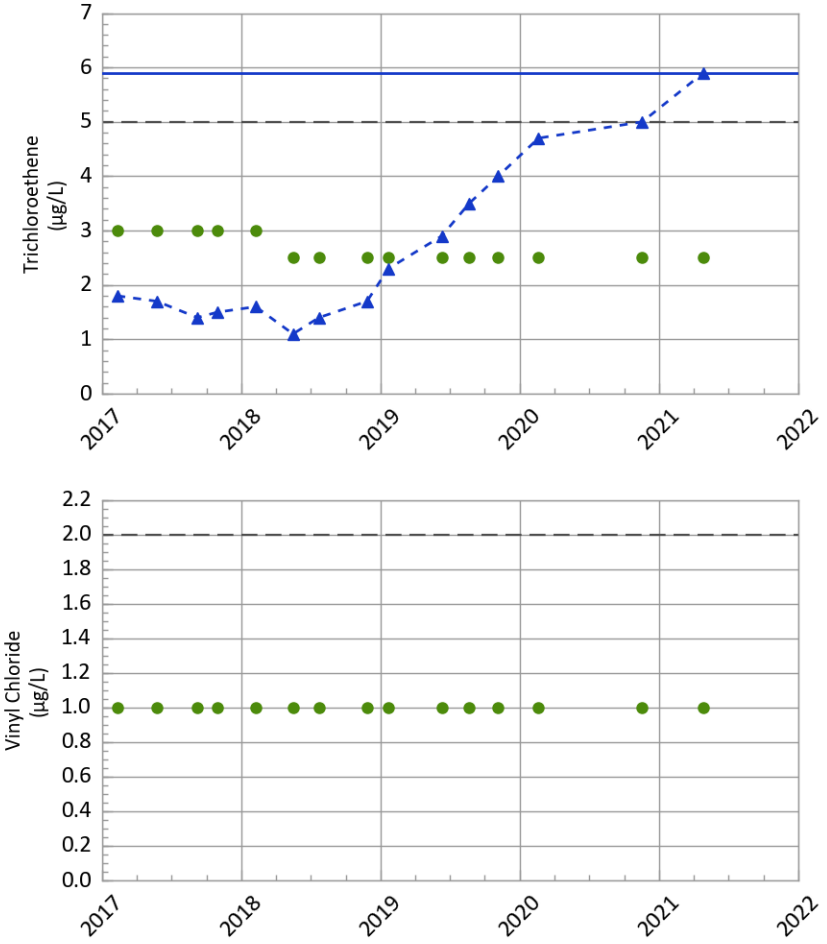


Well Location



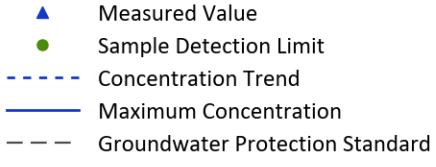
PTX06-1148 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant

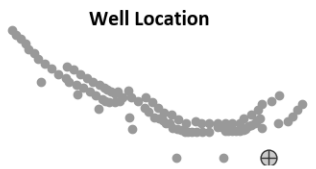




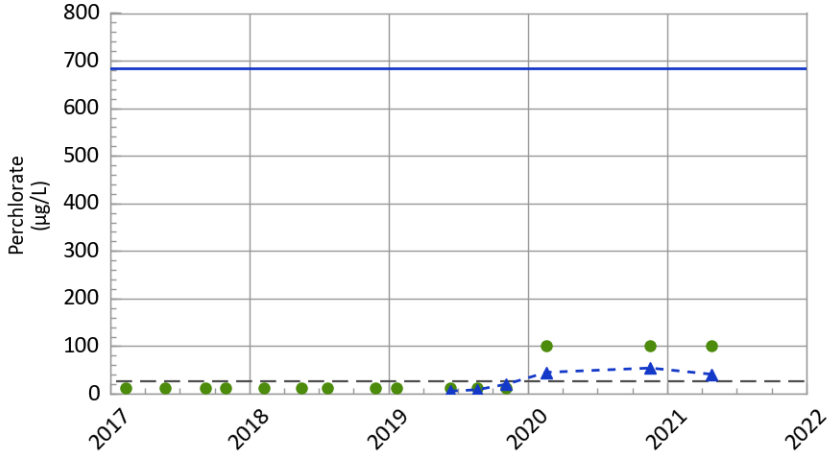
Most Recent Measured COC Concentrations (Apr 26, 2021)

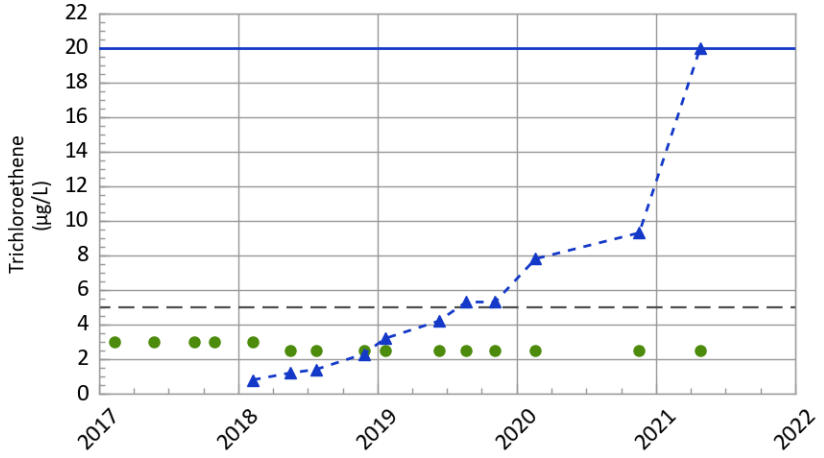
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	4.4	26.0
DCE12C	0.53	70.0
TCE	5.9	5.0
VC	Non-Detect	2.0

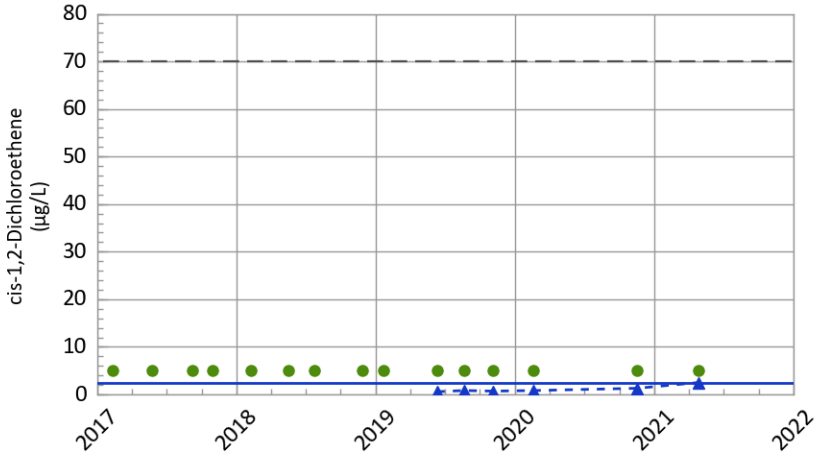


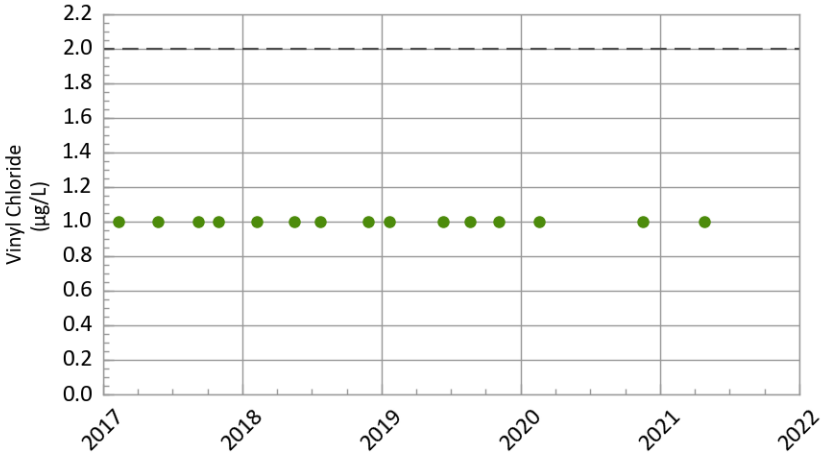


PTX06-1149 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



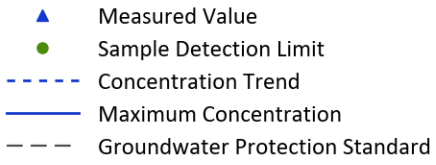




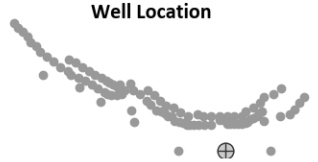


Most Recent Measured COC Concentrations (Apr 26, 2021)

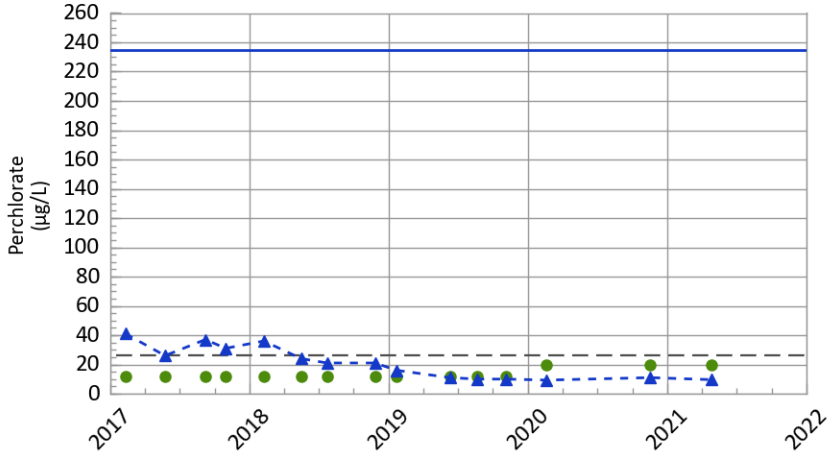
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	41.0	26.0
DCE12C	2.5	70.0
TCE	20.0	5.0
VC	Non-Detect	2.0

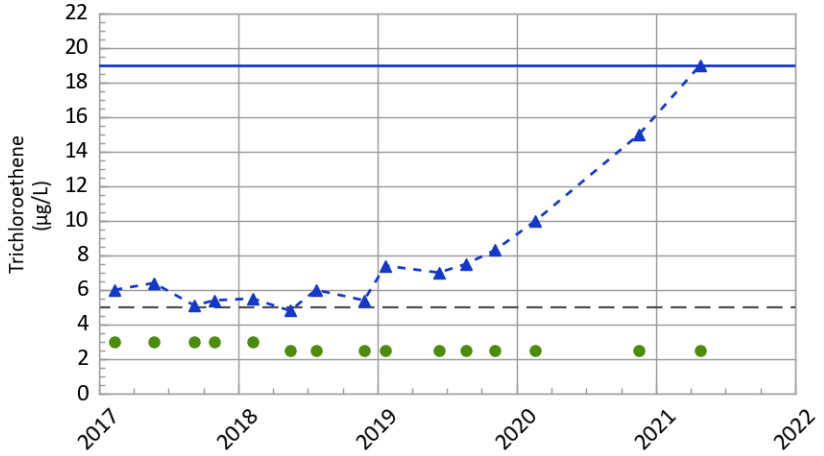


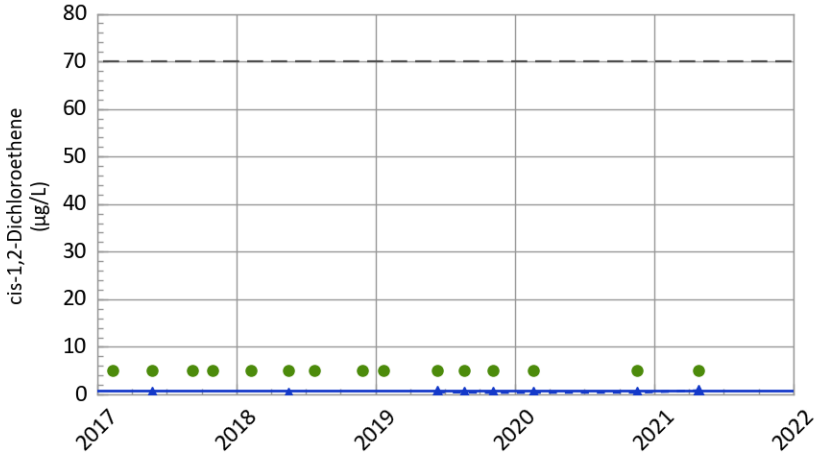
Well Location

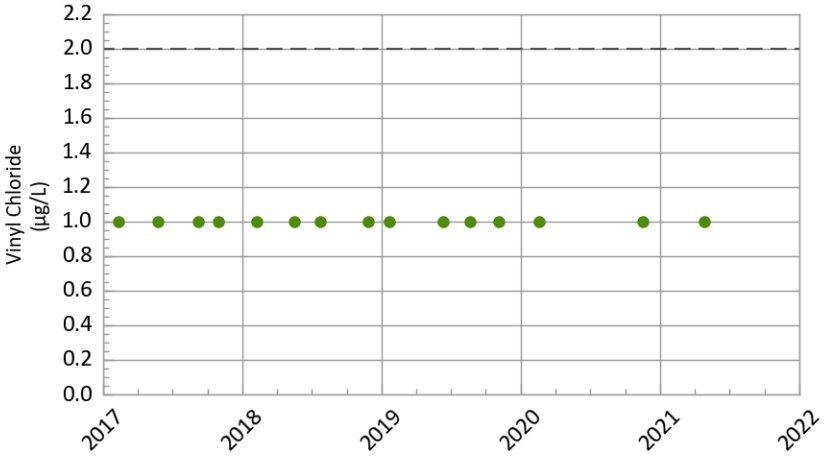


PTX06-1150 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



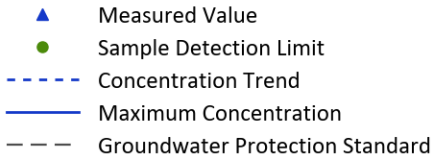


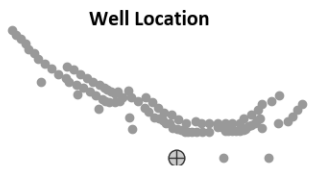




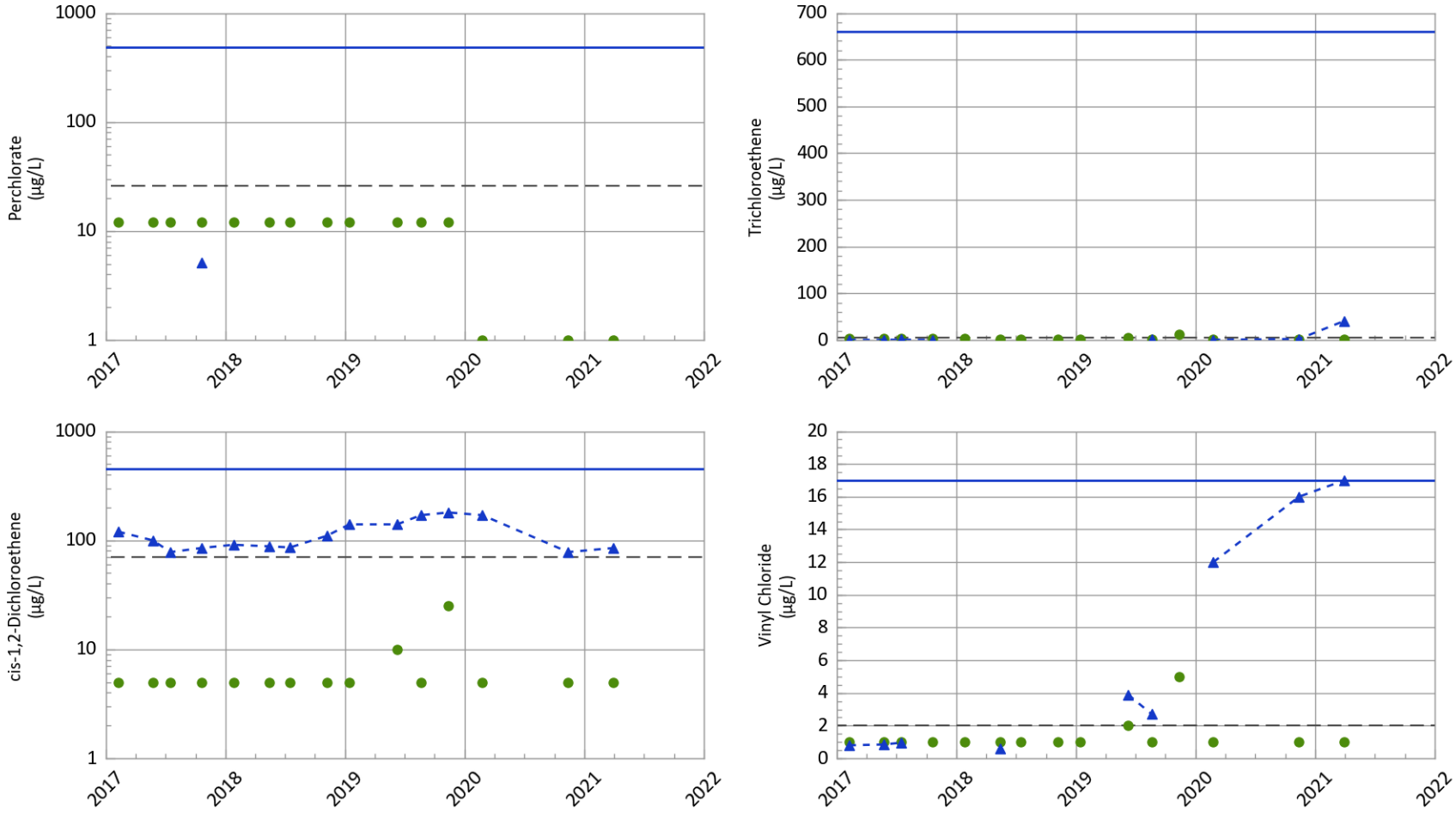
Most Recent Measured COC Concentrations (Apr 26, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	9.6	26.0
DCE12C	0.8	70.0
TCE	19.0	5.0
VC	Non-Detect	2.0



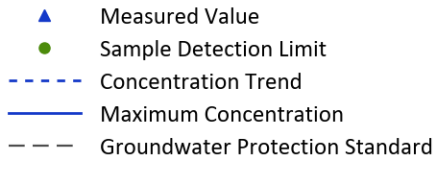


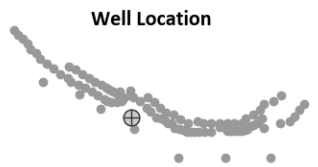
PTX06-1155 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



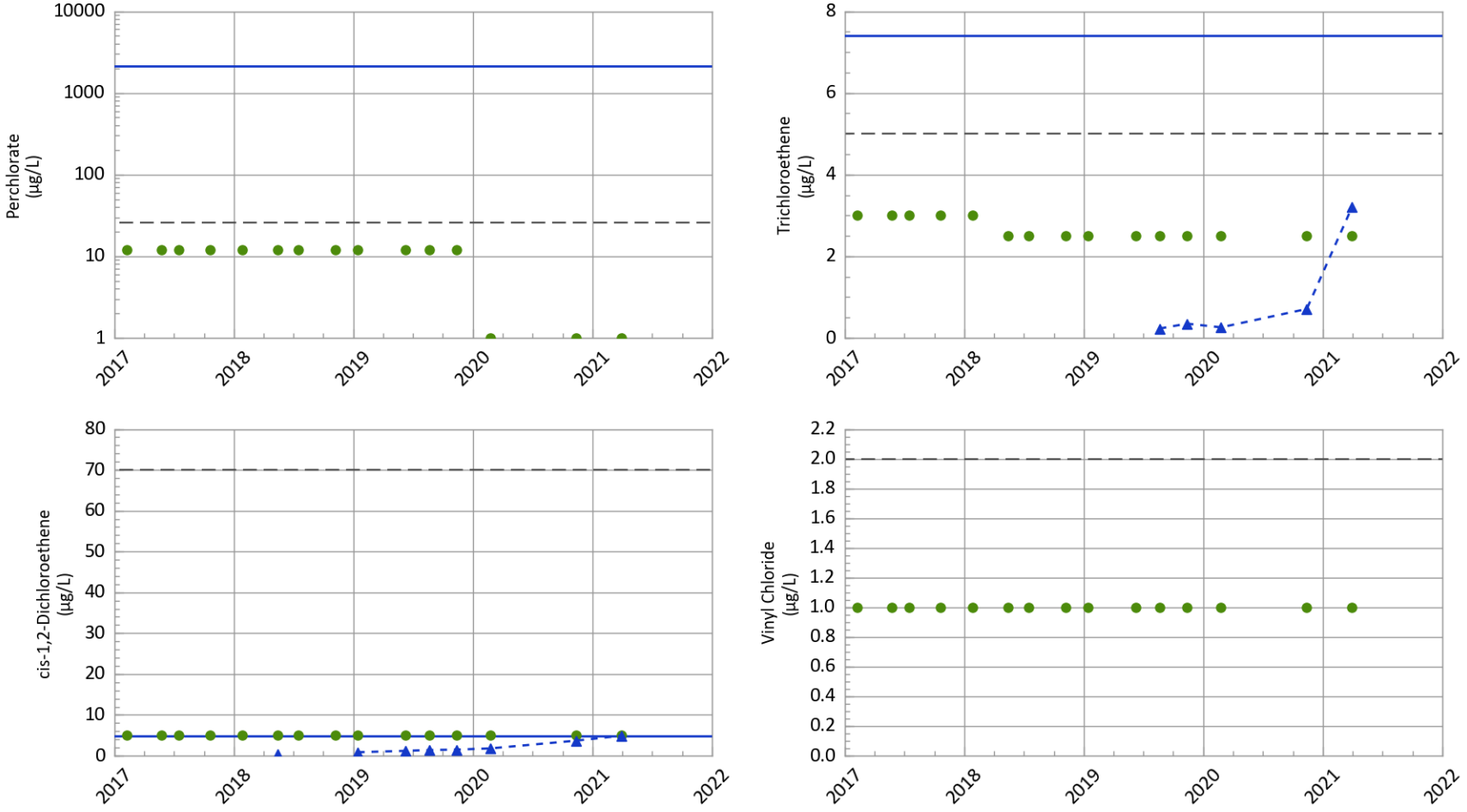
Most Recent Measured COC Concentrations (Mar 30, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	85.0	70.0
TCE	41.0	5.0
VC	17.0	2.0



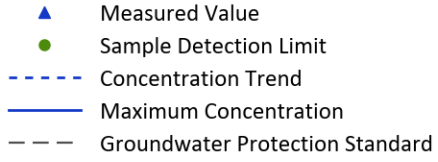


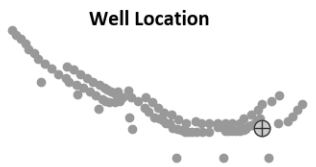
PTX06-1156 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



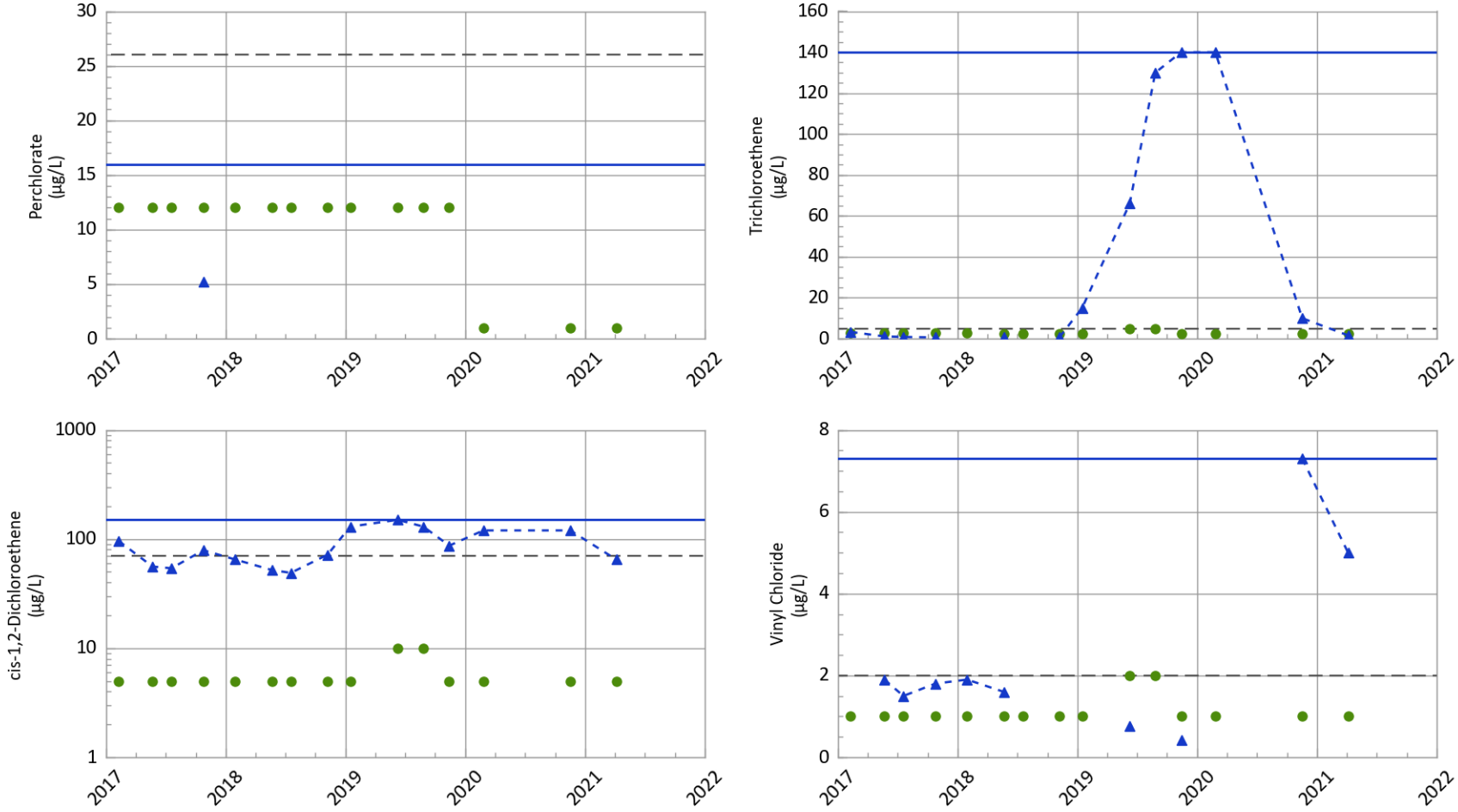
Most Recent Measured COC Concentrations (Mar 30, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	4.9	70.0
TCE	3.2	5.0
VC	Non-Detect	2.0





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

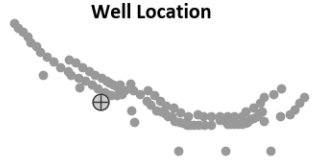


Most Recent Measured COC Concentrations (Apr 05, 2021)

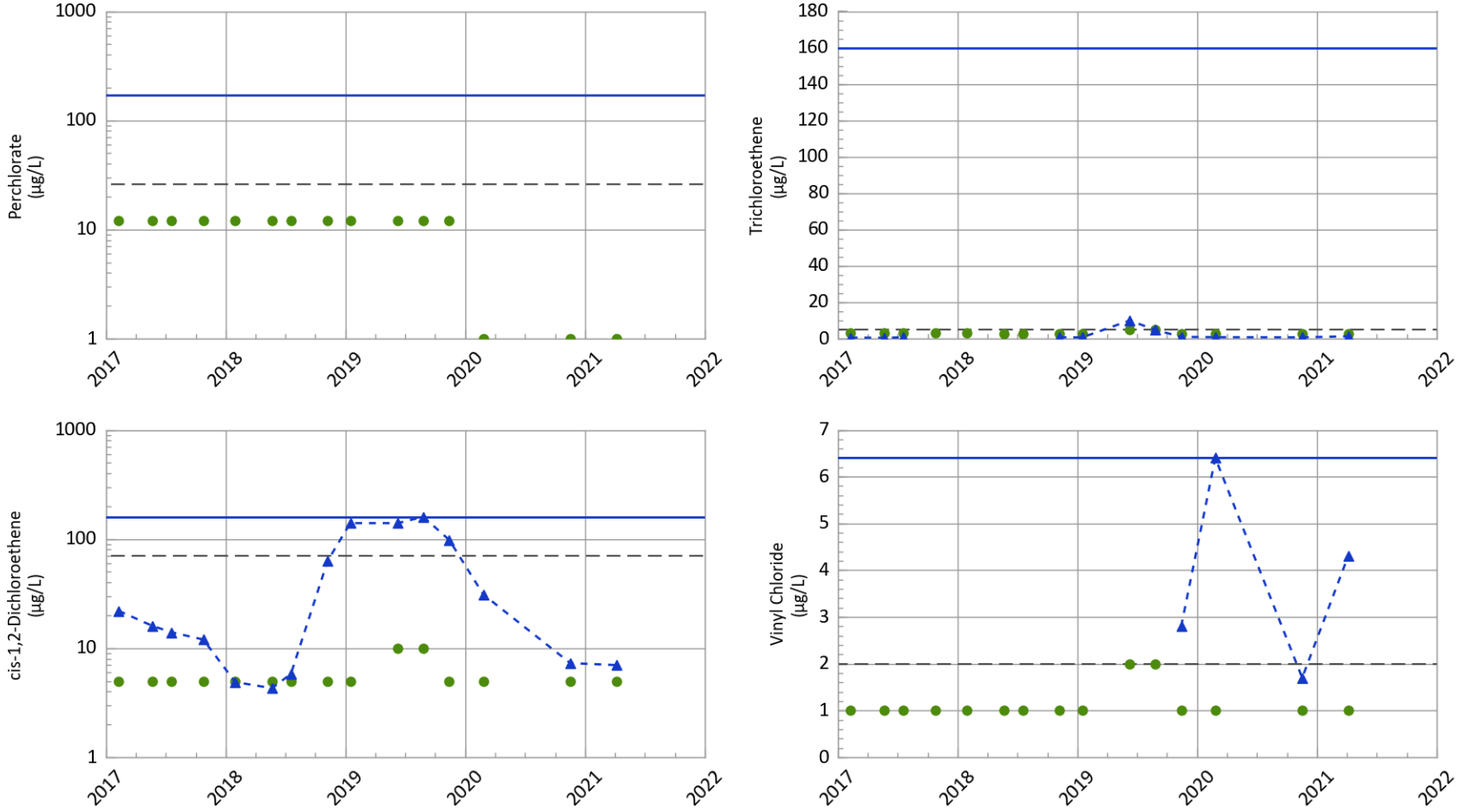
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	65.0	70.0
TCE	1.6	5.0
VC	5.0	2.0

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

Well Location

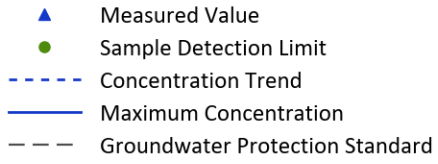


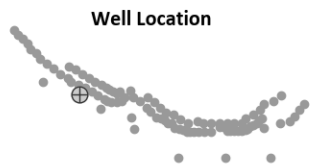
PTX06-1174 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



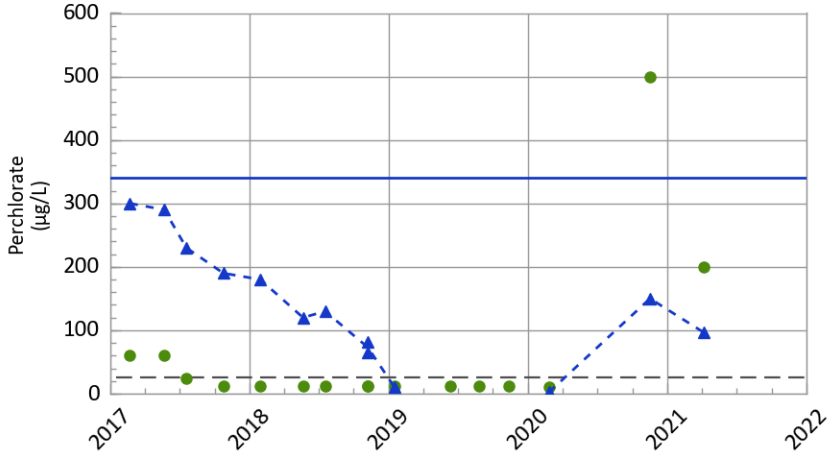
Most Recent Measured COC Concentrations (Apr 05, 2021)

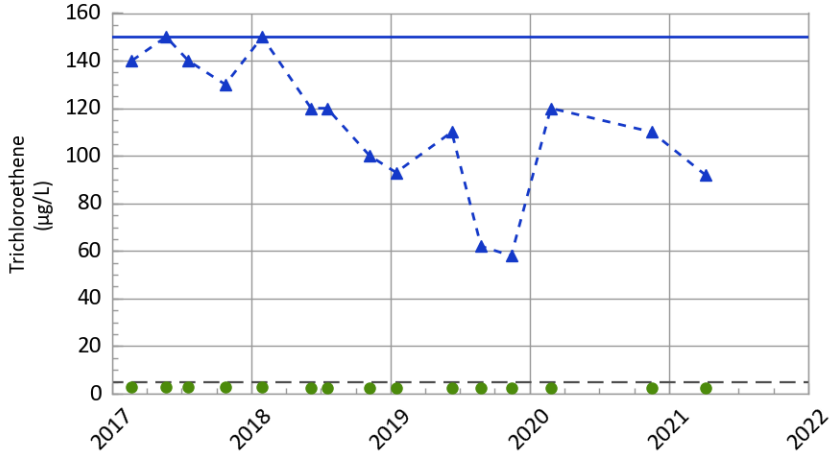
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	7.0	70.0
TCE	1.3	5.0
VC	4.3	2.0

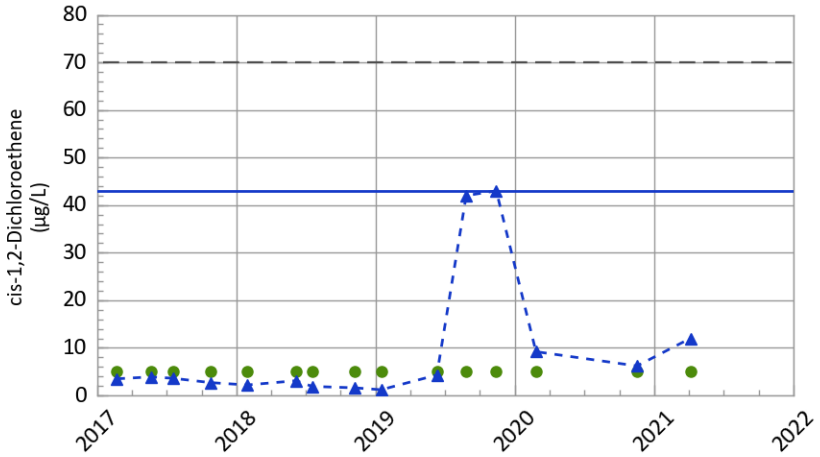


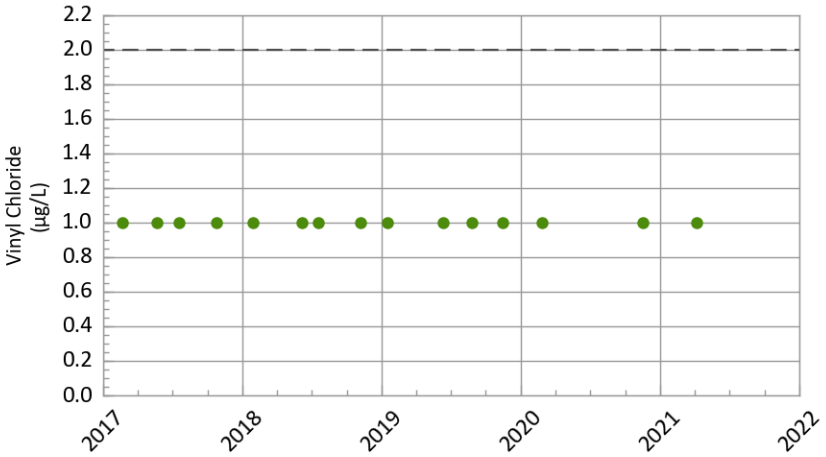


PTX06-1175 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



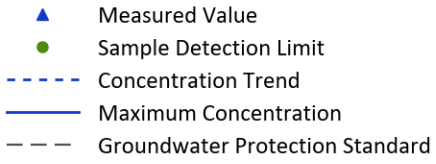


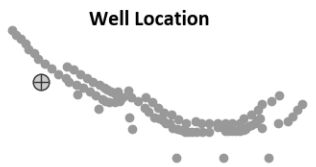




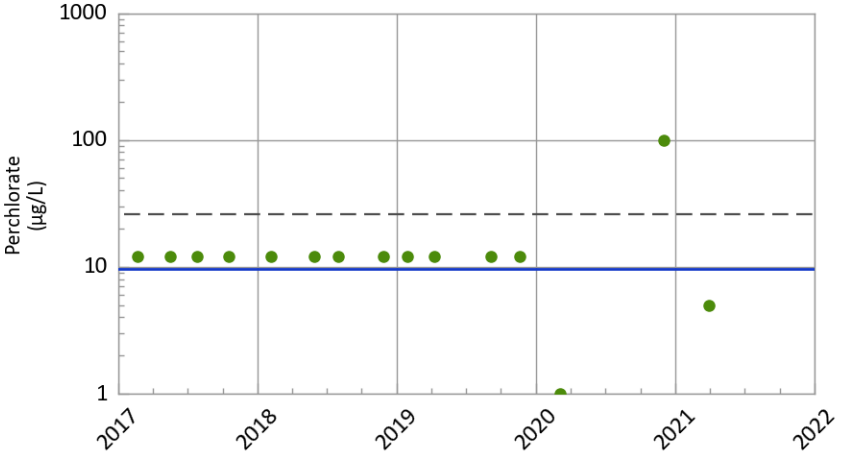
Most Recent Measured COC Concentrations (Apr 05, 2021)

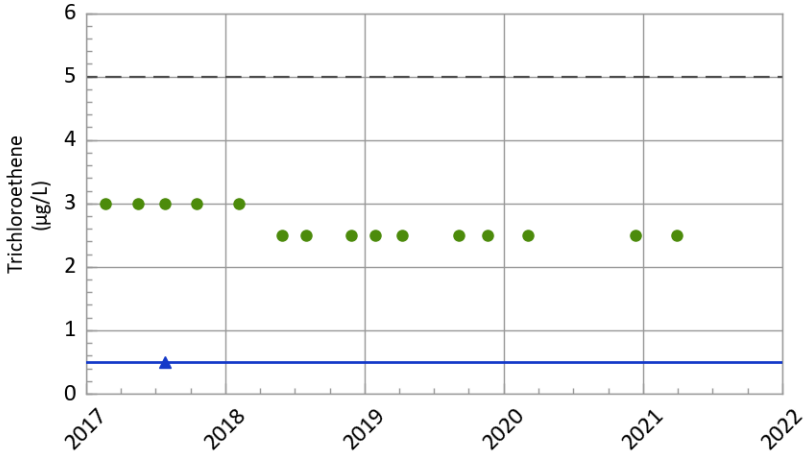
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	97.0	26.0
DCE12C	12.0	70.0
TCE	92.0	5.0
VC	Non-Detect	2.0

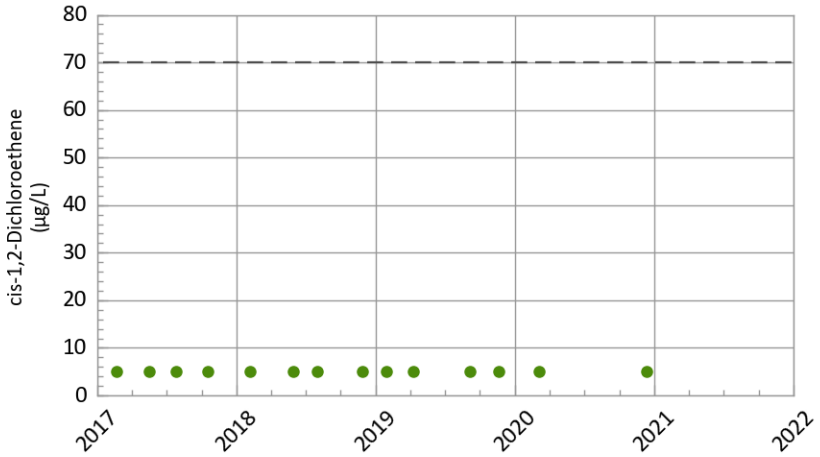


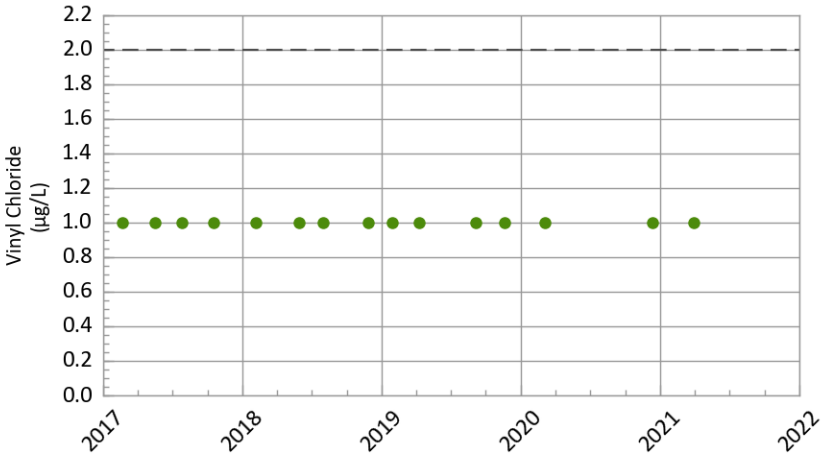


PTX06-ISB079 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



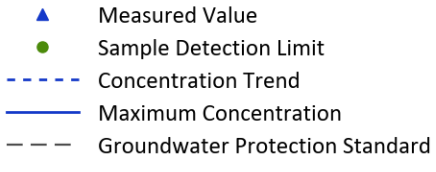


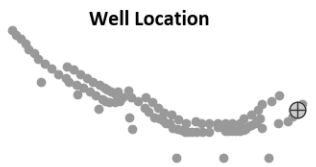




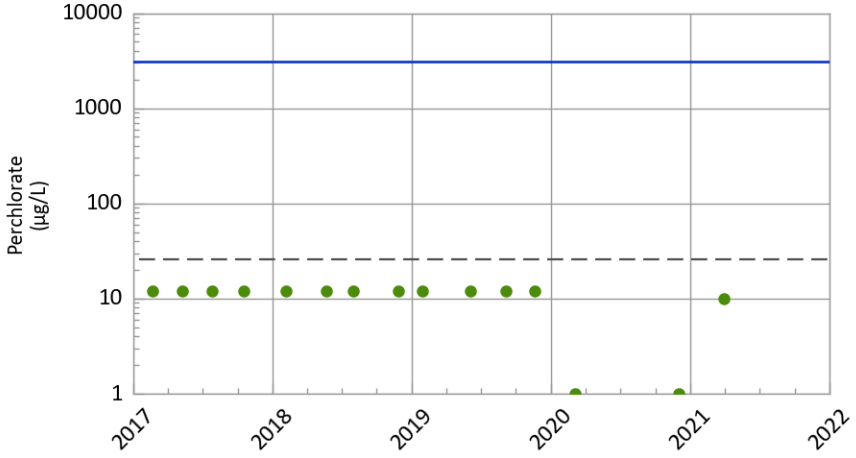
Most Recent Measured COC Concentrations (Mar 29, 2021)

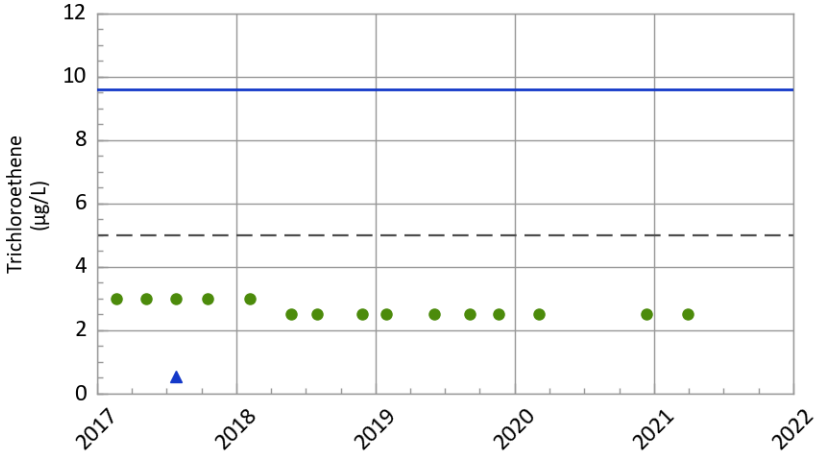
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	Non-Detect	70.0
TCE	Non-Detect	5.0
VC	Non-Detect	2.0

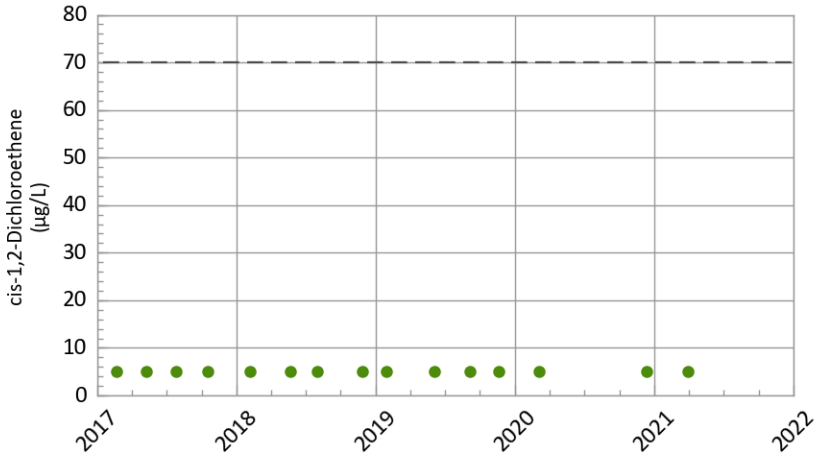


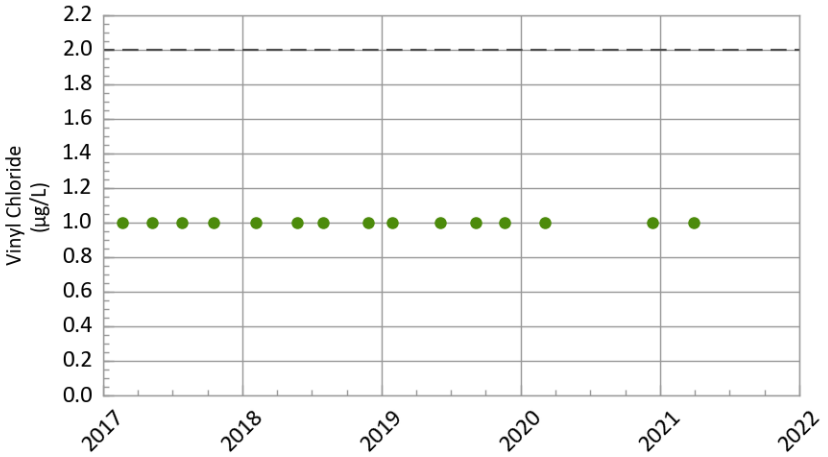


PTX06-ISB082 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



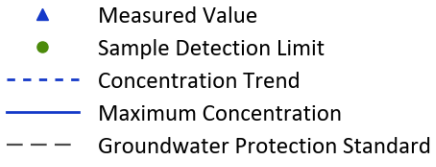


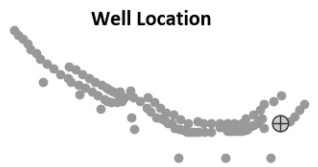




Most Recent Measured COC Concentrations (Mar 29, 2021)

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





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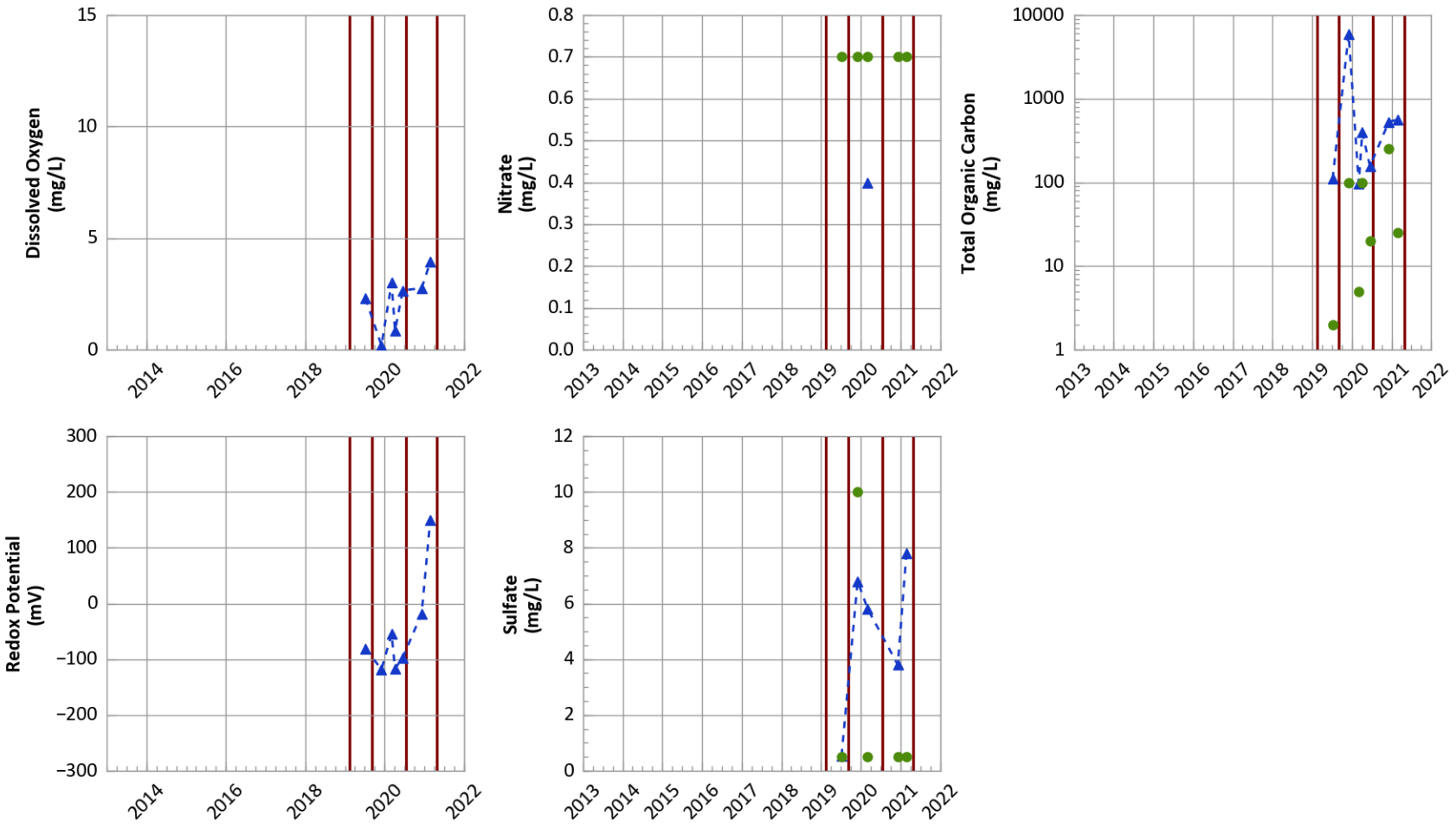
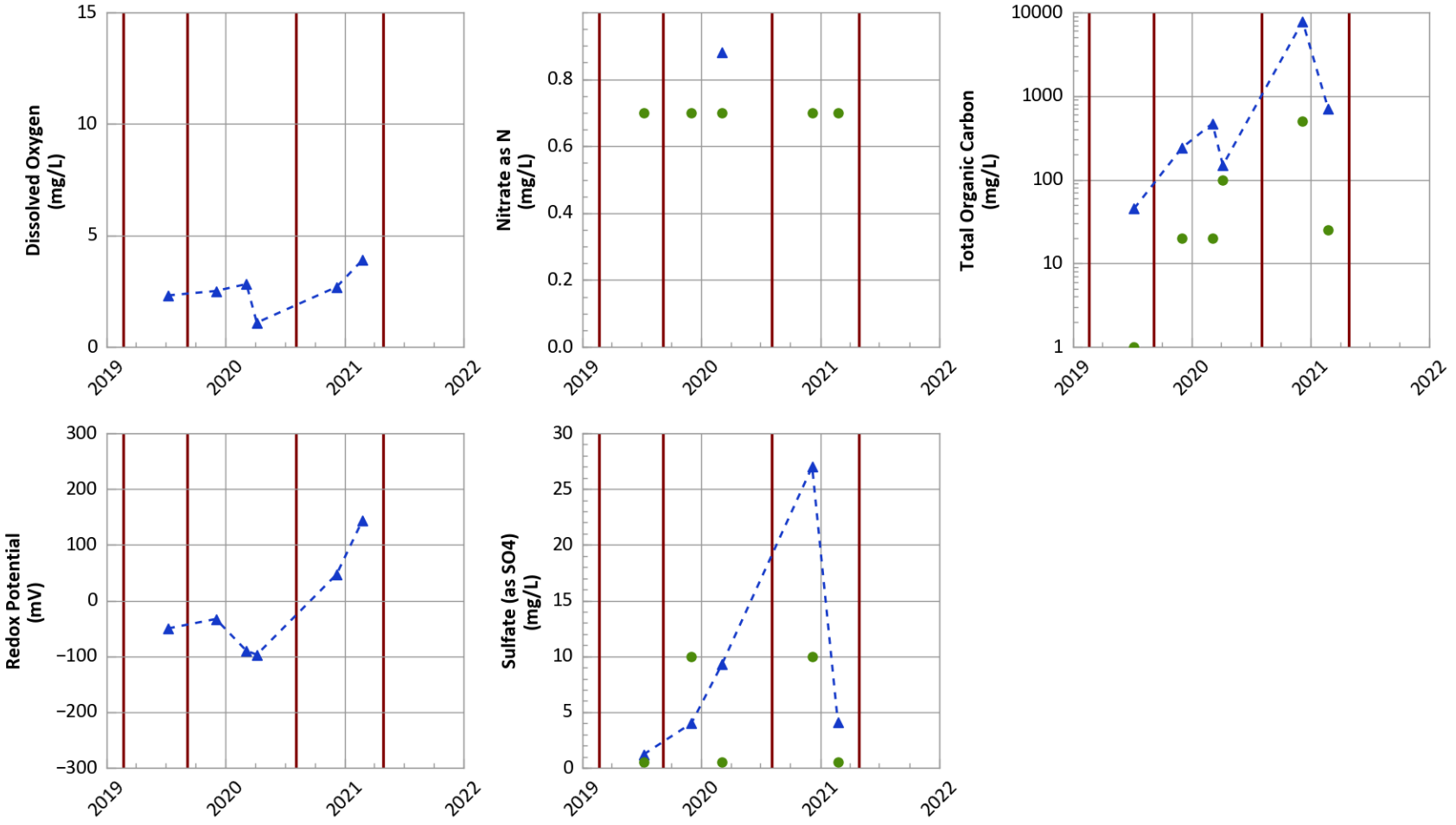
Southeast ISB Extension

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

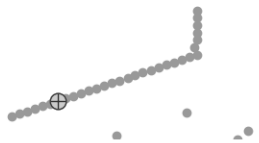
PTX06-ISB307 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



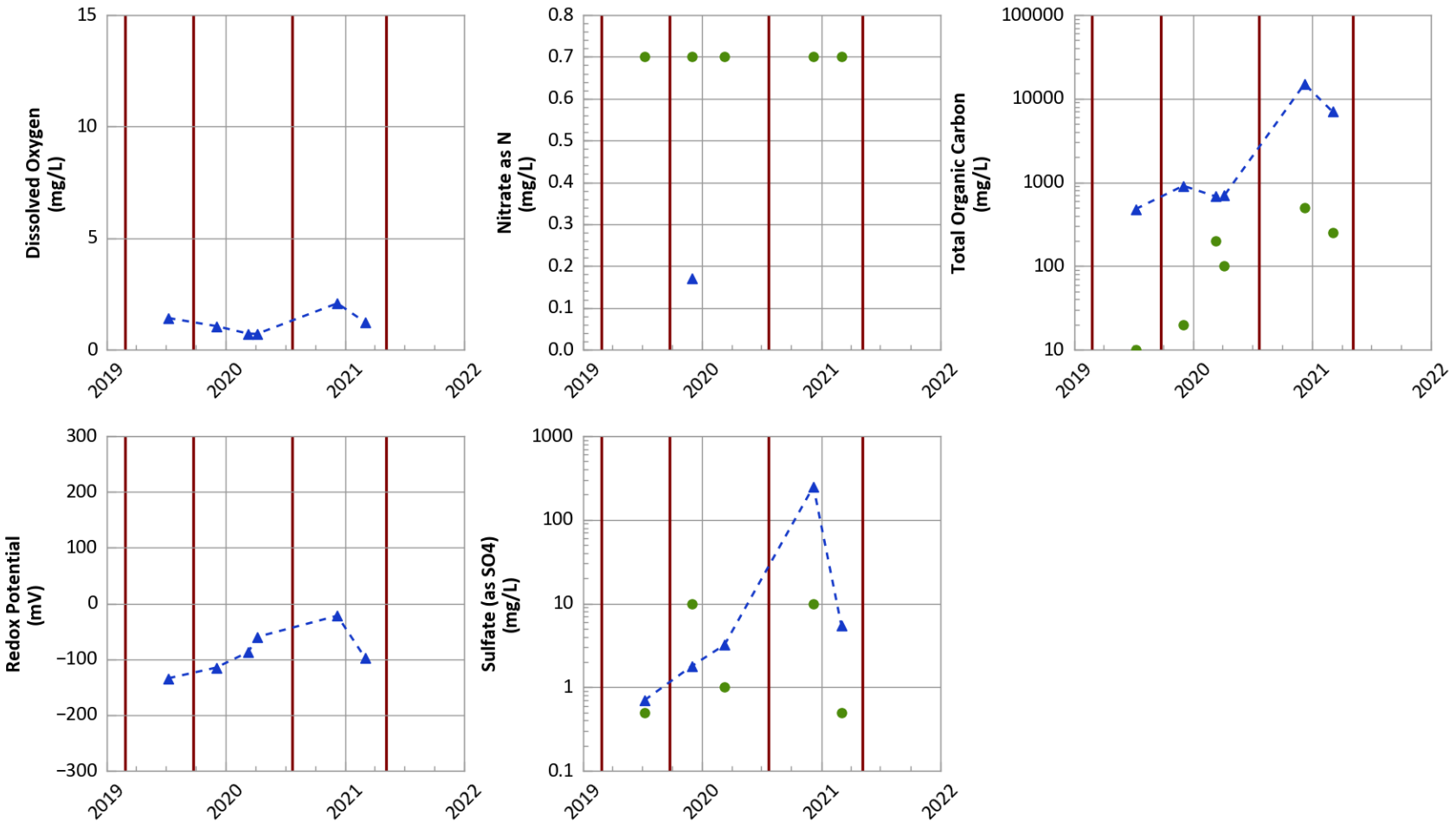
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location



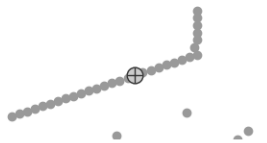
PTX06-ISB317 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



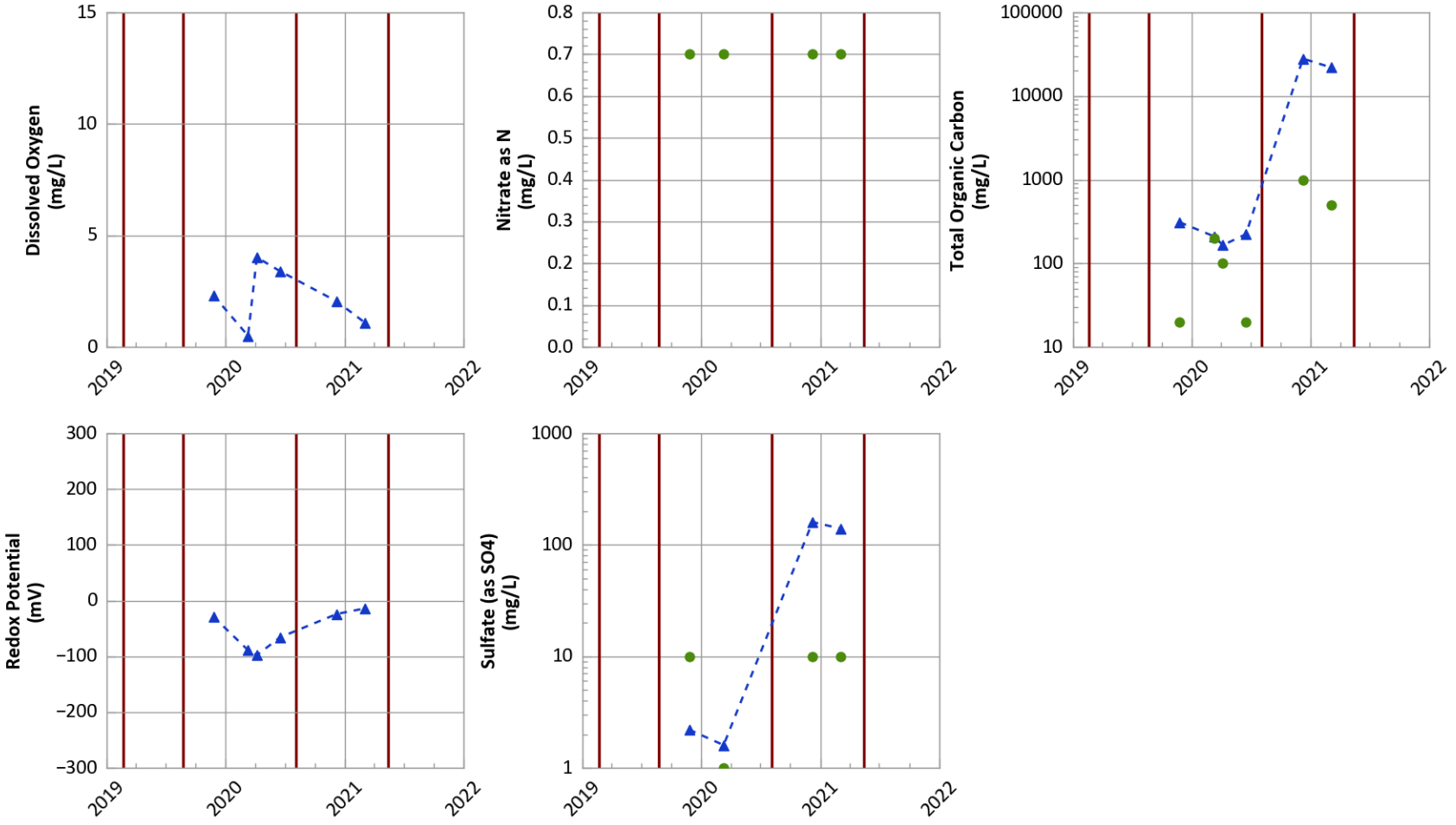
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location



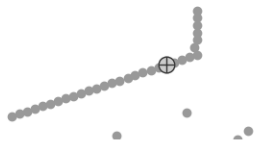
PTX06-ISB321 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



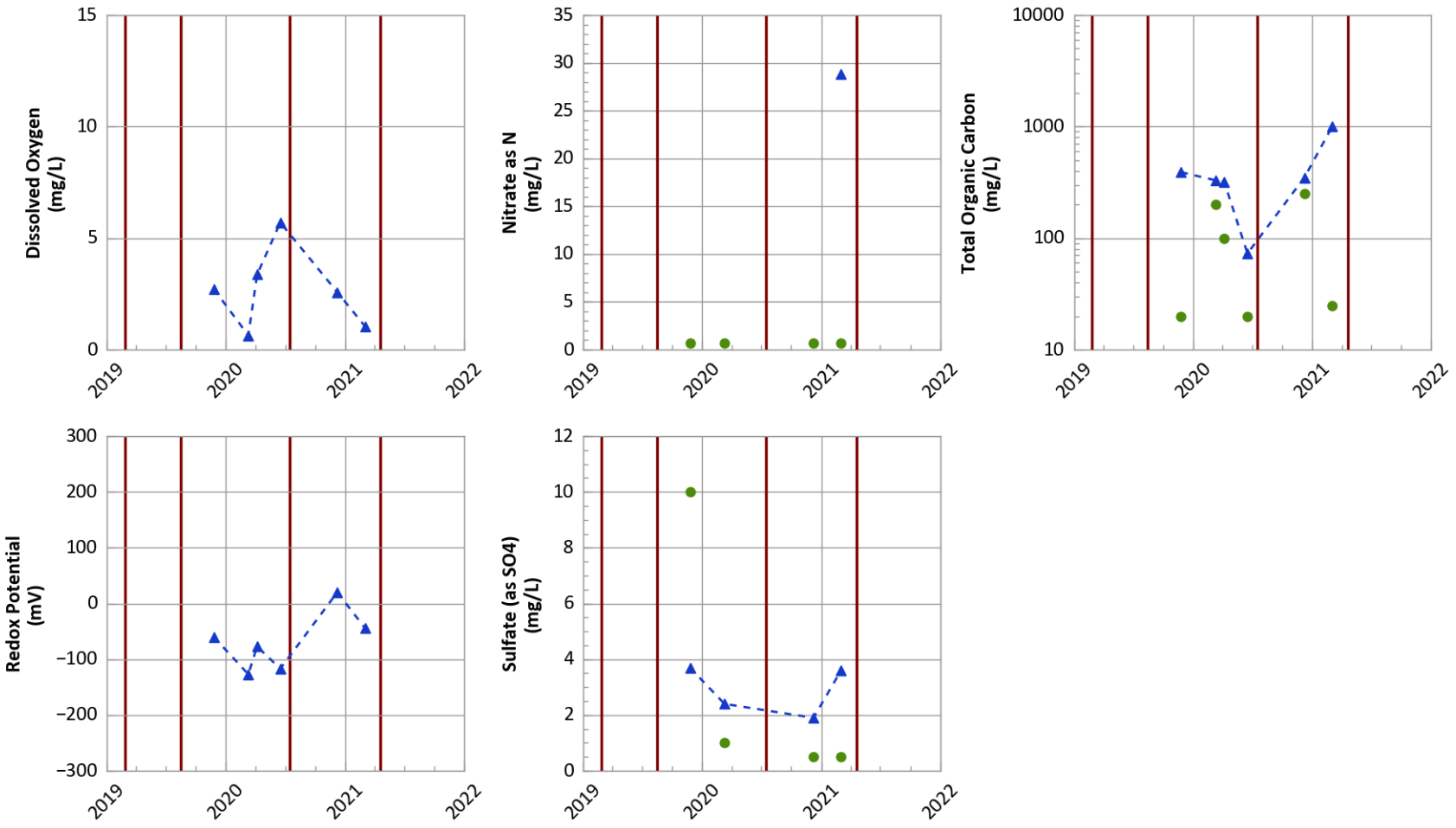
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location



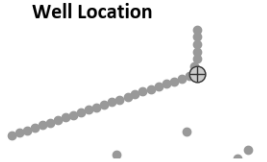
PTX06-ISB325 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



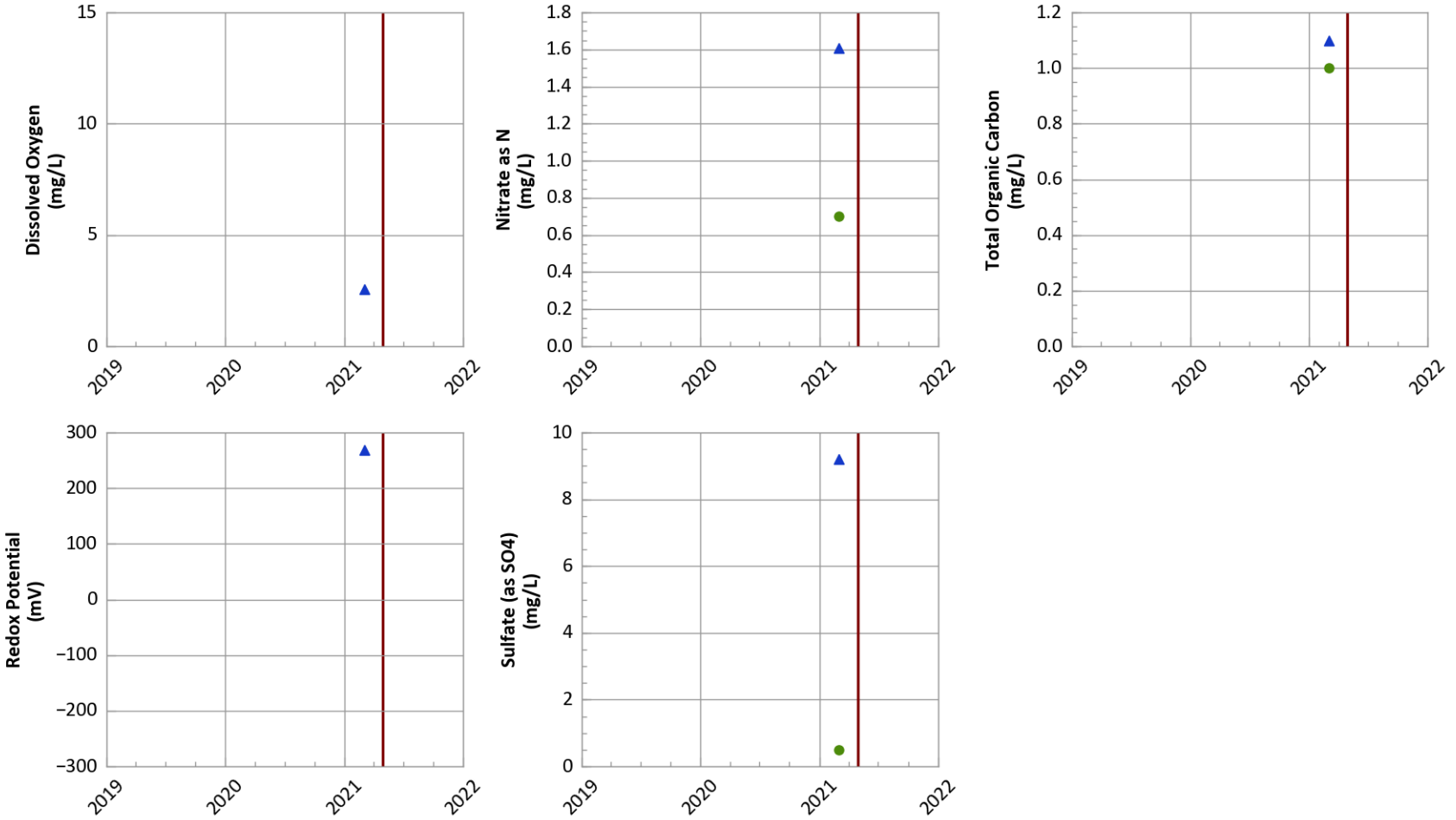
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location

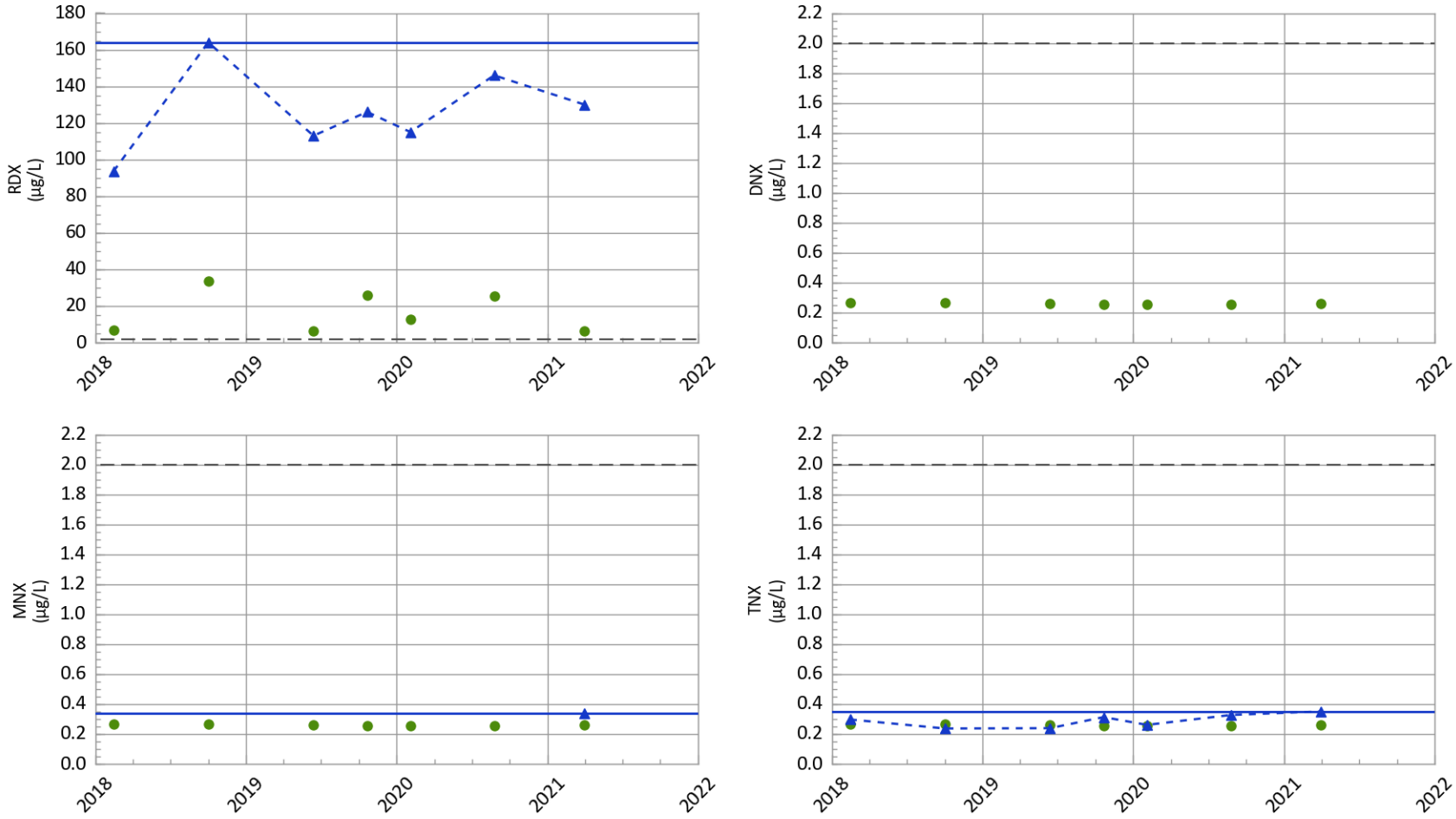


PTX06-ISB329 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



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

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

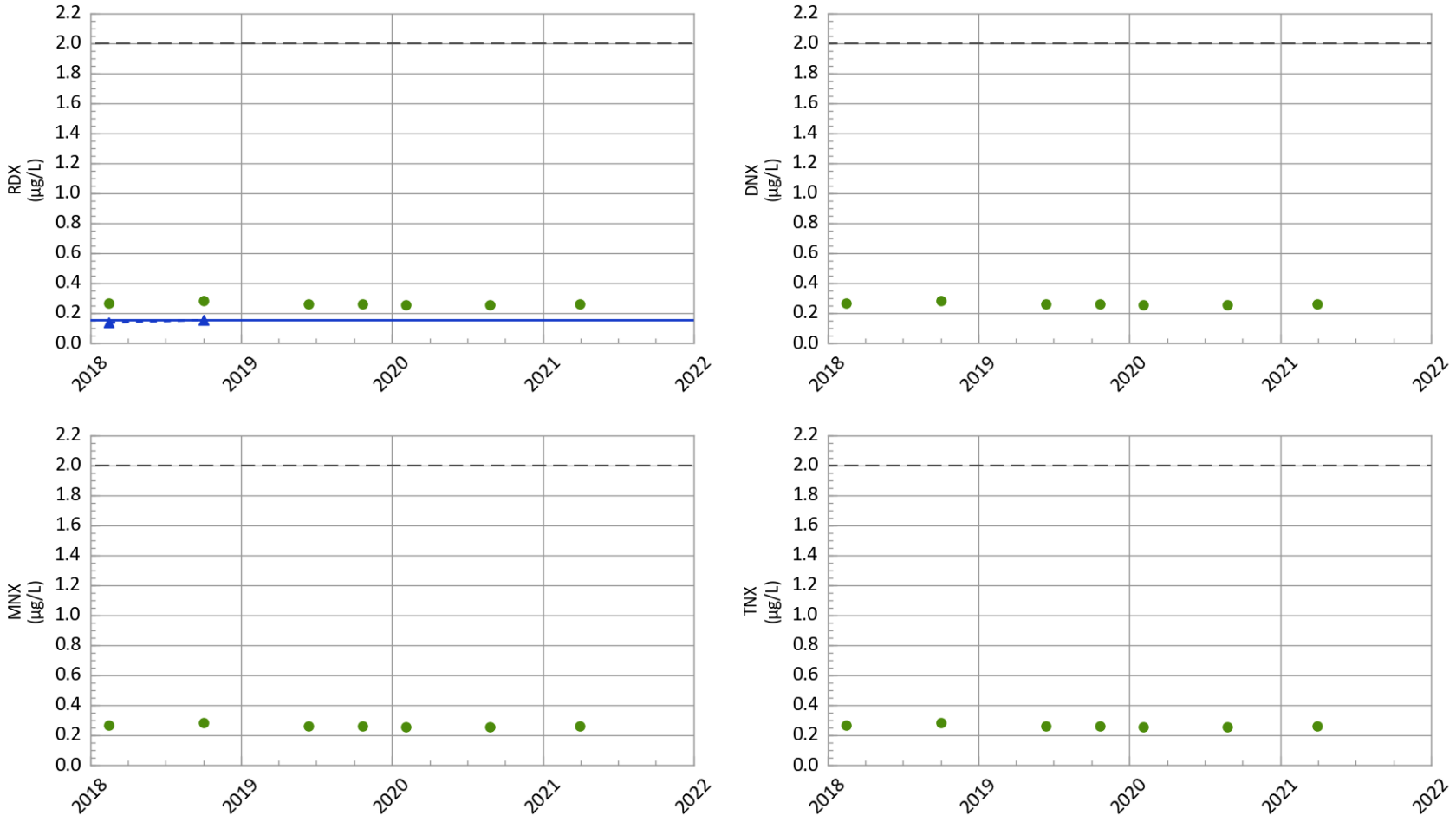


Most Recent Measured COC Concentrations (Mar 31, 2021)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	130.0	2.0
MNX	0.341	2.0
DNX	Non-Detect	2.0
TNX	0.351	2.0

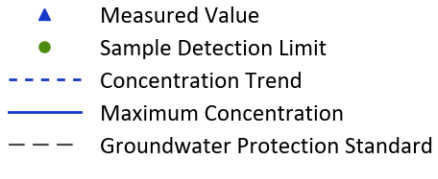
Measured Value
Sample Detection Limit
Concentration Trend
Maximum Concentration
Groundwater Protection Standard

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

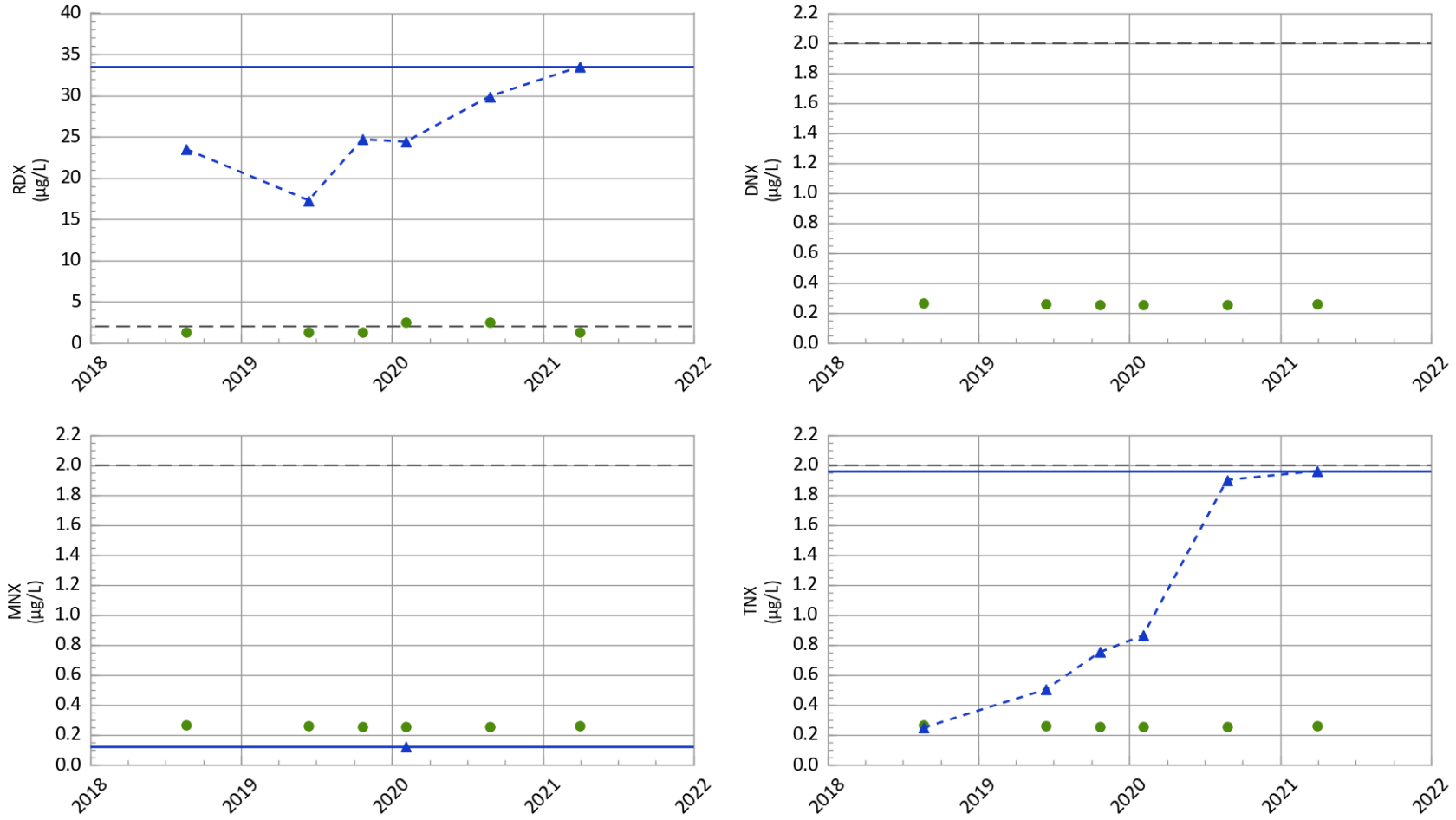


Most Recent Measured COC Concentrations (Mar 31, 2021)

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



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

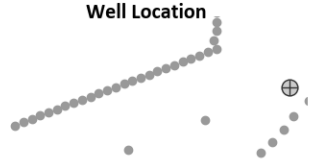


Most Recent Measured COC Concentrations (Mar 31, 2021)

COC	Concentration (µg/L)	GWPS (µg/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

Well Location



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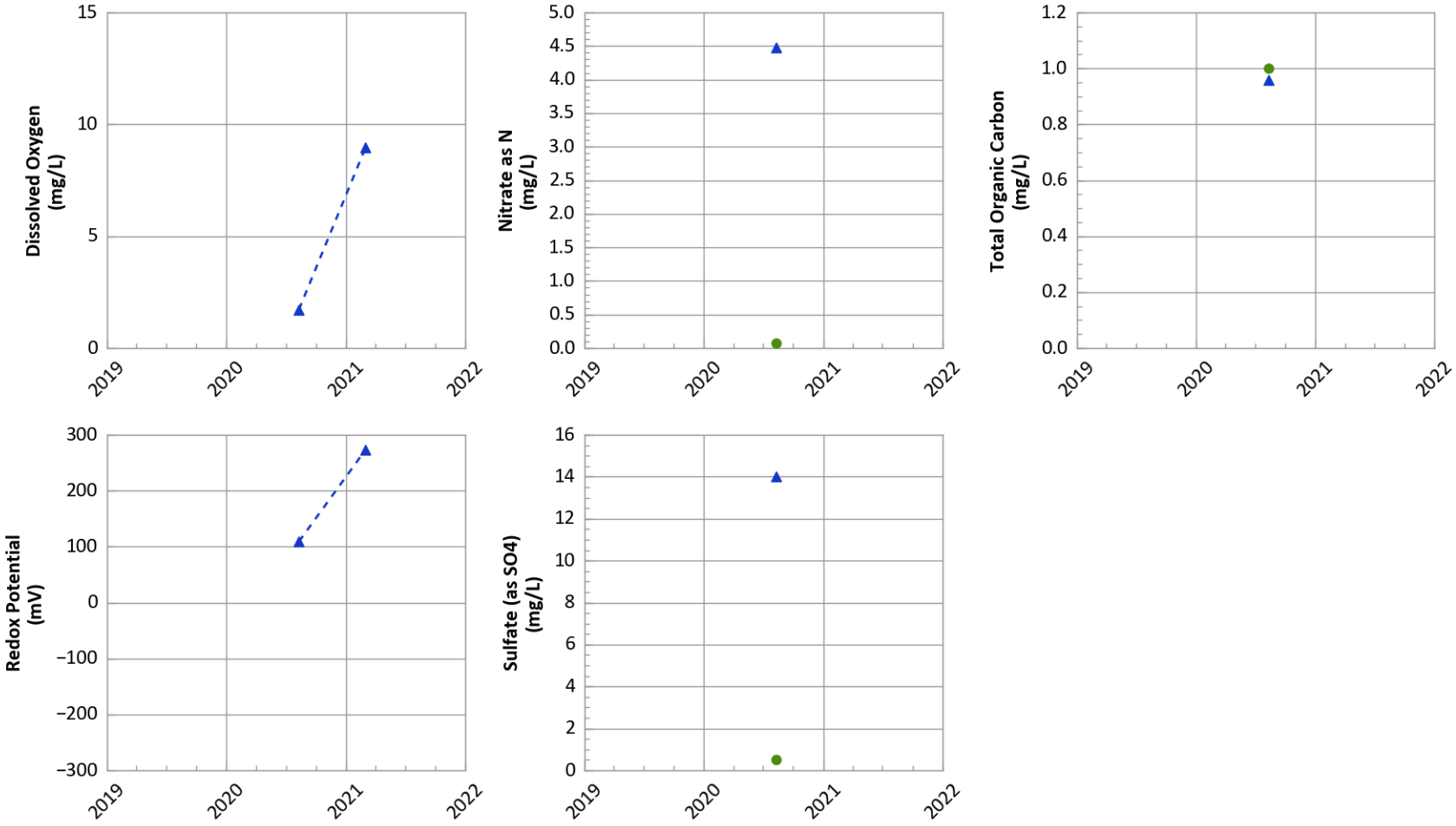
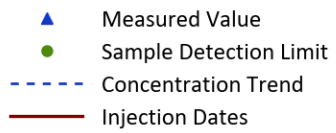
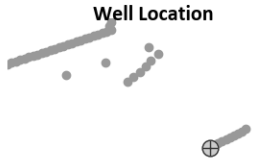
Offsite ISB System

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

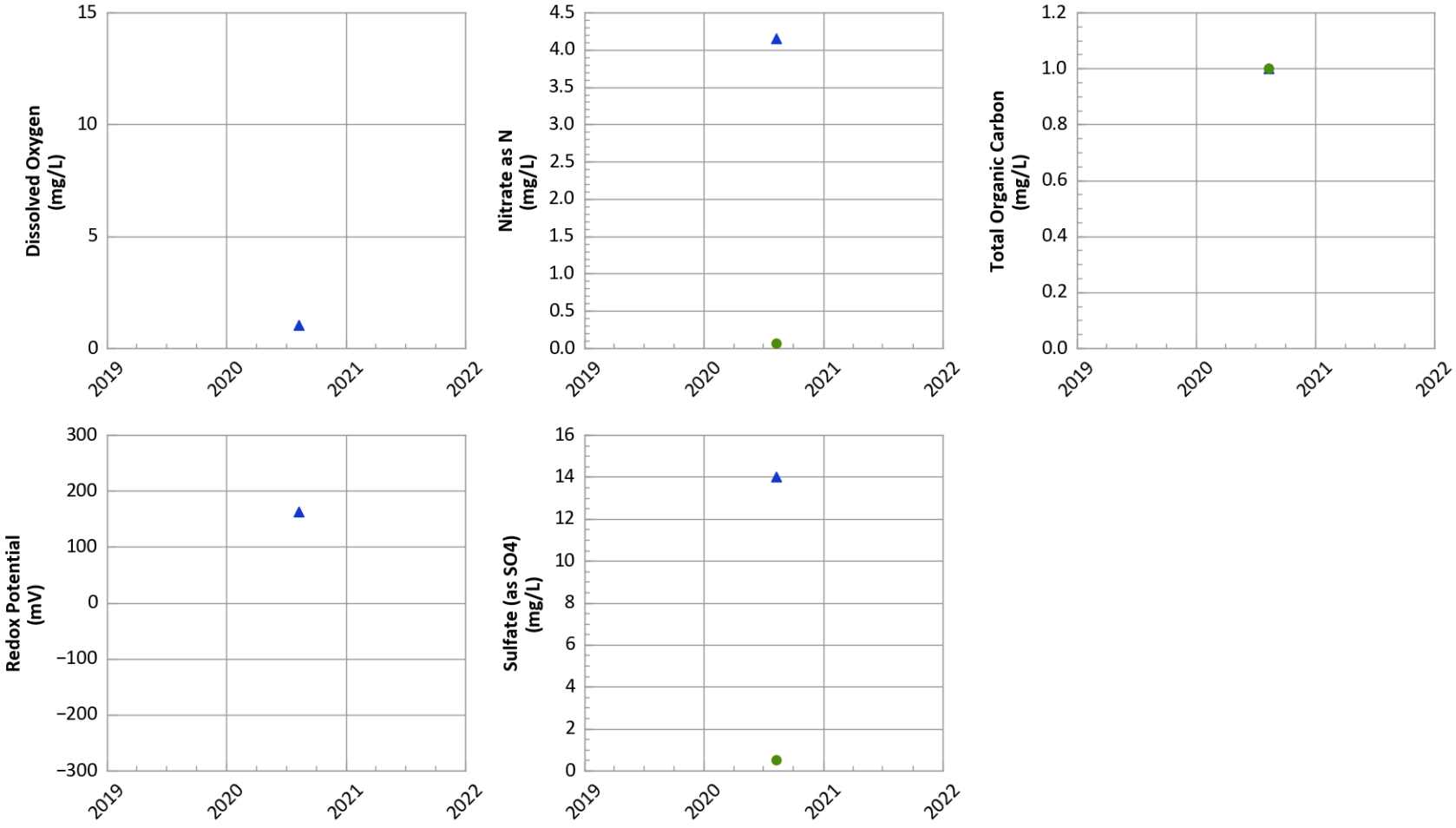


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected



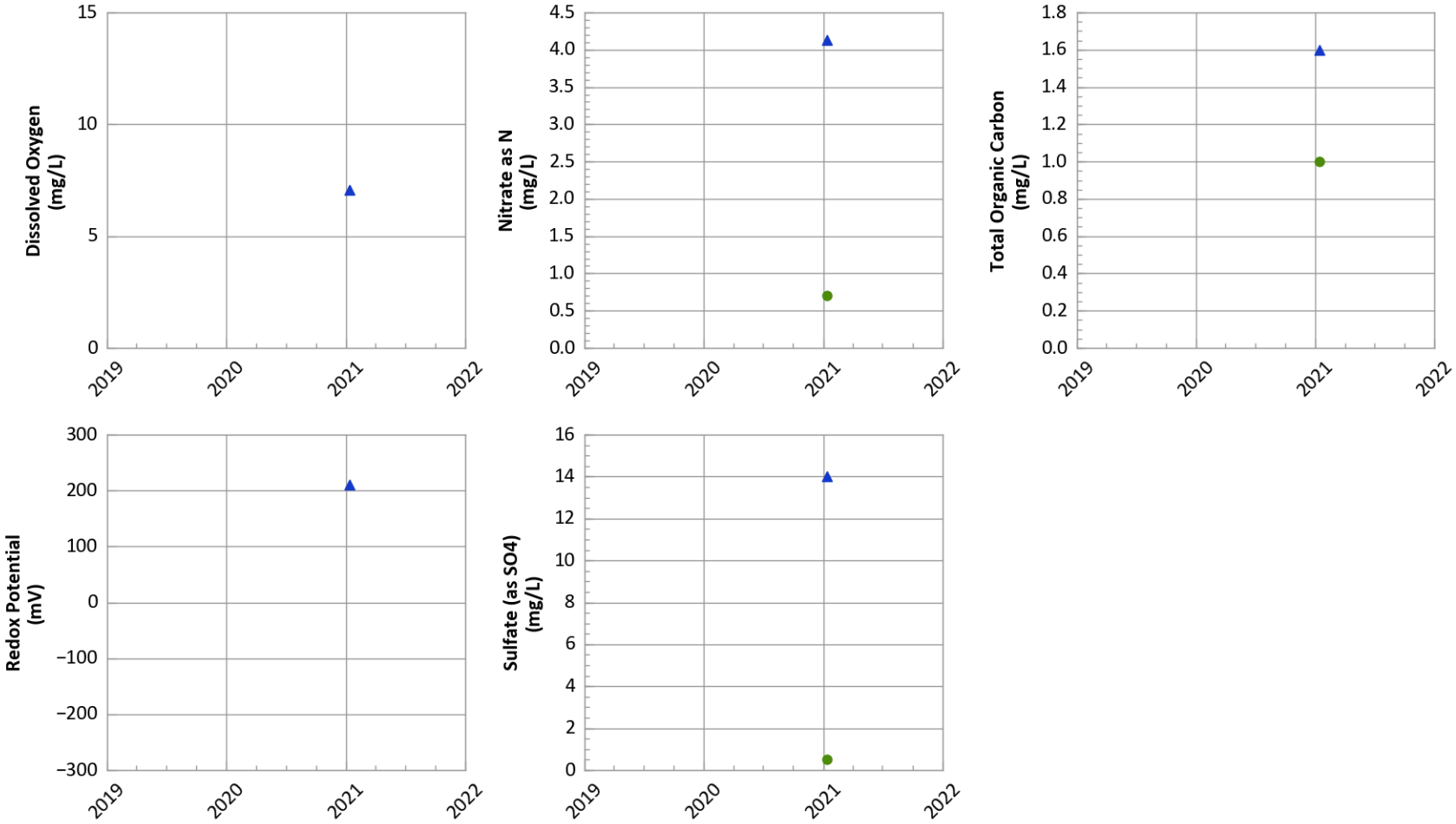


PTX06-ISB404 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



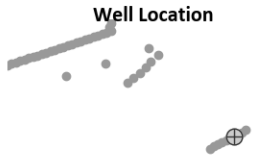
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

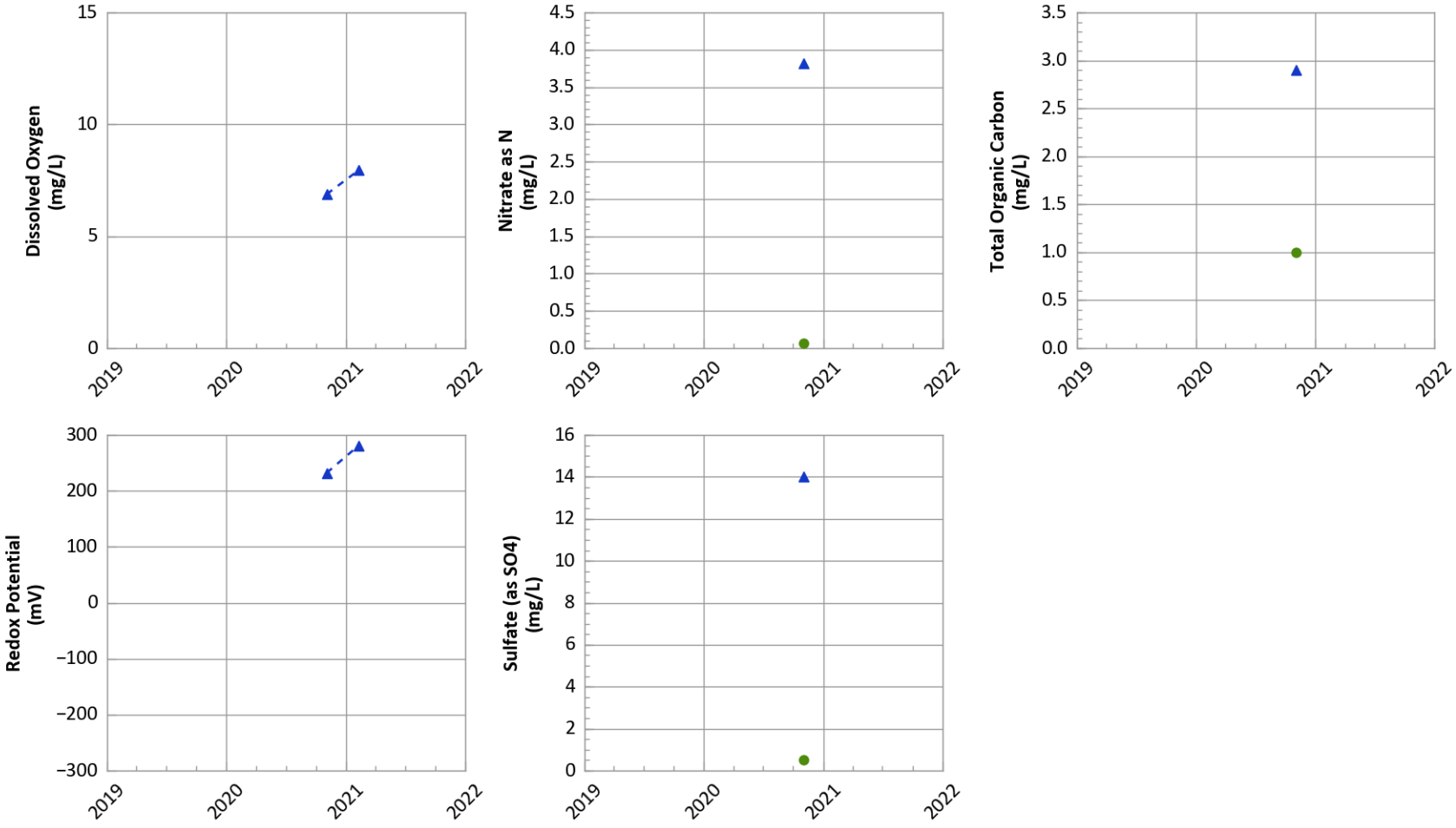


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

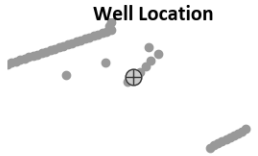


PTX06-ISB412 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

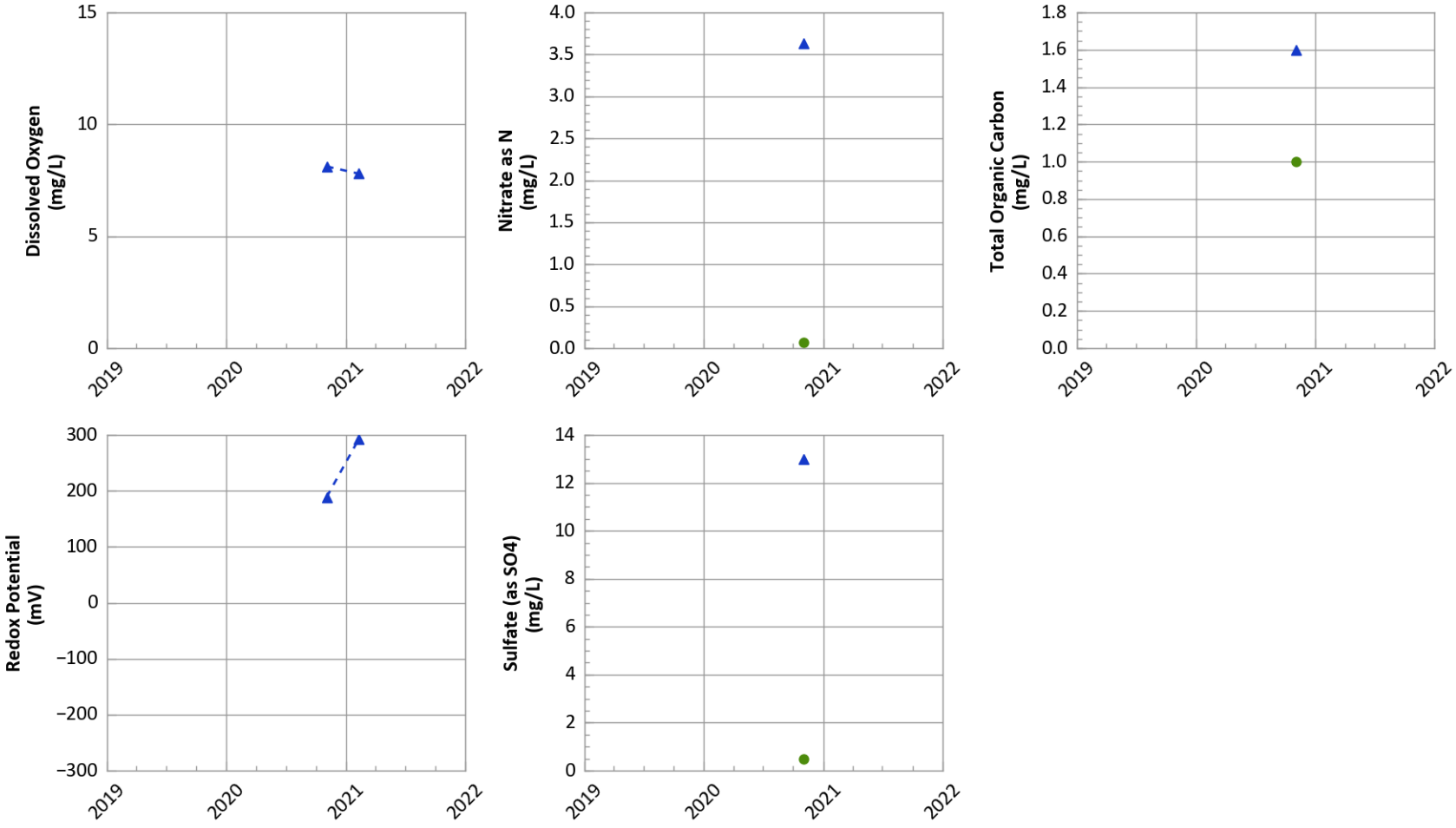


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

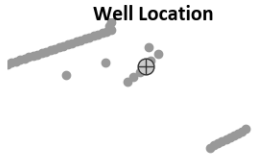


PTX06-ISB414 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

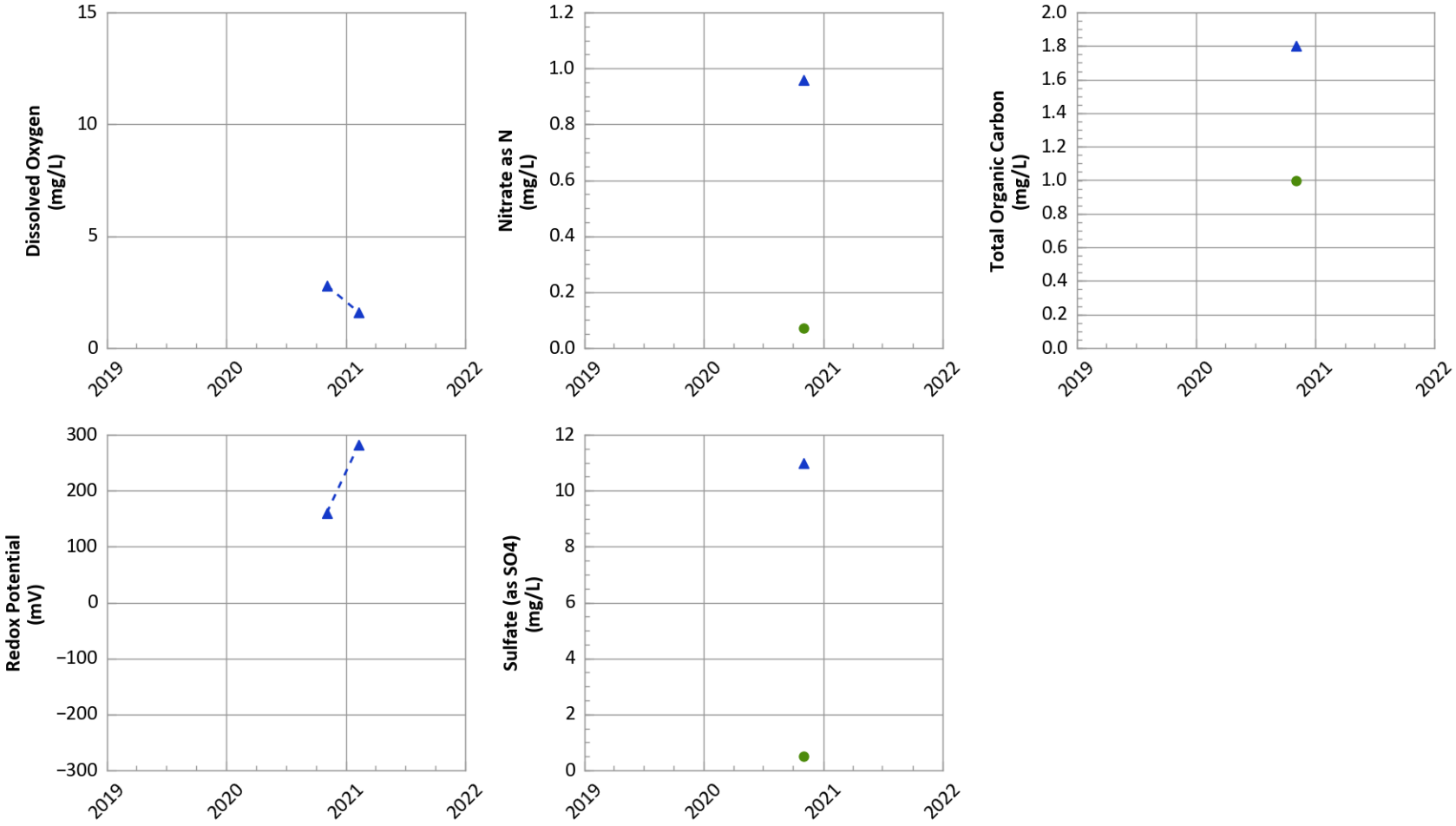


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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



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