



PANTEX QUARTERLY PROGRESS REPORT

Remedial Action Progress

3rd Quarter 2021

In support of Hazardous Waste Permit #50284 and

Pantex Plant Interagency Agreement

December 2021

Pantex Plant

FM 2373 and U.S. Highway 60

P.O. Box 30030

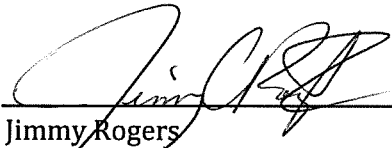
Amarillo, TX 79120



CERTIFICATION STATEMENT

3rd Quarter 2021 Remedial Action Progress Report Pantex Plant, December 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.

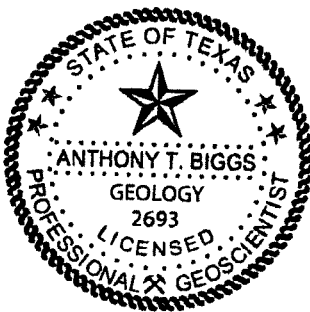

Jimmy Rogers
Acting Senior Director
Pantex Environment, Safety and Health
Consolidated Nuclear Security, LLC

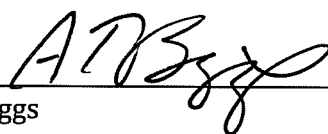
12/09/2021
Date

**Remedial Action Progress Report
3rd Quarter 2021
in Support of Hazardous Waste Permit #50284
and Pantex Plant Interagency Agreement
for the Pantex Plant, Amarillo, Texas
December 2021**

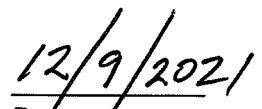
Prepared by
Consolidated Nuclear Security, LLC
Management and Operating Contractor
for the
Pantex Plant and Y-12 National Security Complex
under Contract No. DE-NA0001942
with the
U.S. Department of Energy
National Nuclear Security Administration

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
Environmental Projects
Consolidated Nuclear Security, LLC



Date

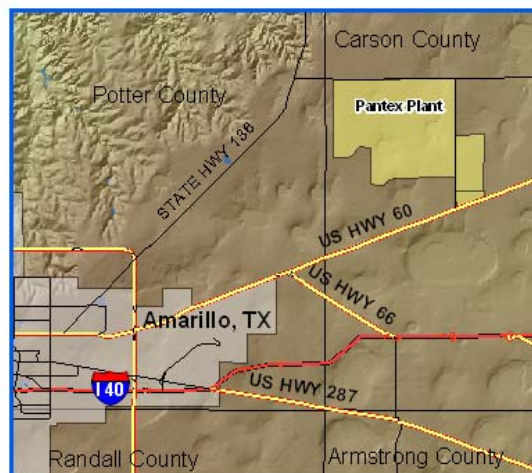
Project Team: Tony Biggs
Maeghan Brundrett
Michelle Jarrett

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 3rd 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 3rd Quarter 2021 Operation

Playa 1 Pump and Treat System (P1PTS)

Days Operated	4
% Operation Time	2%
Volume Water Treated (Mgal)	0.3
HE Mass Removal (lbs)	0.1
Beneficial Use of Water	0%

Southeast Pump and Treat System (SEPTS)

Days Operated	90
% Operation Time	98%
Volume Water Treated (Mgal)	30.6
HE Mass Removal (lbs)	115.8
Chromium Mass Removal (lbs)	15.1
Beneficial Use of Water	9.3%

*Value below operational goals

The subsurface 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 near completion on the communication interface and control module located in the pump house. A portion of the system is expected to be operational by end of 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 12 wells that required repair during the 3rd 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 the end of 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 31 million gallons (Mgal) during 3rd quarter.

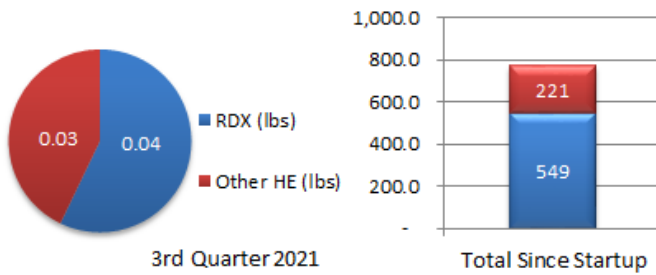


Figure 1. P1PTS Mass Removal

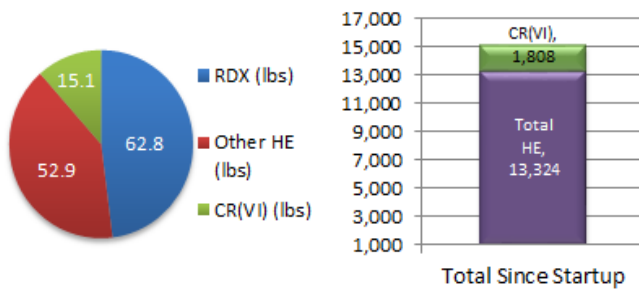


Figure 2. SEPTS Mass Removal

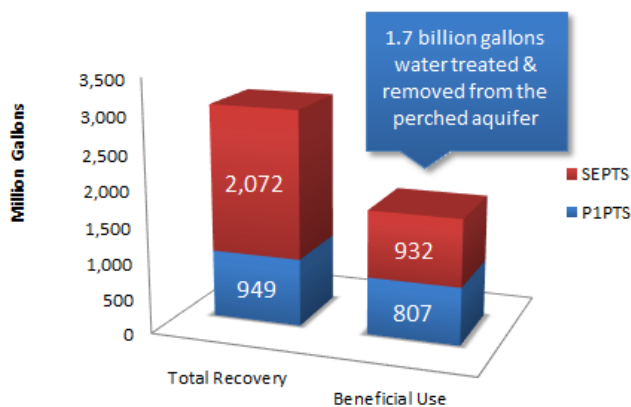


Figure 3. System Recovery and Use

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 3rd 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 15,900 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 3 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 on the system began in November 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 at the end 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 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 and is expected to be completed in early 2022. Construction is expected to be completed mid-2022.

ISB SYSTEMS

Four ISB systems (Zone 11 ISB, Southeast ISB, Southeast ISB Extension, and Offsite) are installed and operating at Pantex 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. Other systems will be evaluated during the following quarter. In the 3rd quarter, the Southeast ISB and Southeast ISB Extension systems were sampled completely.

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 \leq GWPS?	Degradation Products of COCs Reduced?
Southeast ISB	Very Mild to Strong	Yes	Yes	RDX in 2 of 4 wells Cr(VI) in 4 of 4 wells	Yes
Southeast ISB Extension	Strong	Yes	Yes	RDX in 2 of 4 wells	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.

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 early 2022.

Five injection wells and four downgradient ISPM wells were sampled at Southeast ISB in the 3rd 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 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 PTX06-1045, one of the downgradient wells that was 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. Pantex plans to inject the system in early 2022 with molasses, but further injections may be limited or unnecessary.

SOUTHEAST ISB EXTENSION

The Southeast ISB Extension was installed in 2017 as an extension of the chosen remedy for the 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 3rd quarter of 2021. Treatment zone data indicates strong reducing conditions are present for treatment of HEs. ORP was between -205 mV and -97 mV, nitrate was reduced in all wells, and sulfate values ranged from 1.4 to 32 µg/L. Soluble metals (arsenic and manganese) increased, indicating that reducing conditions are being established. 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 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 71% of the quarter (~ 1572 hours of operation). The SVE was shut down in December 2020 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 at the end of July 2021. Figure 4 shows mass removal calculated for the 3rd Quarter and since startup for VOCs that historically contribute to the total VOC concentration.

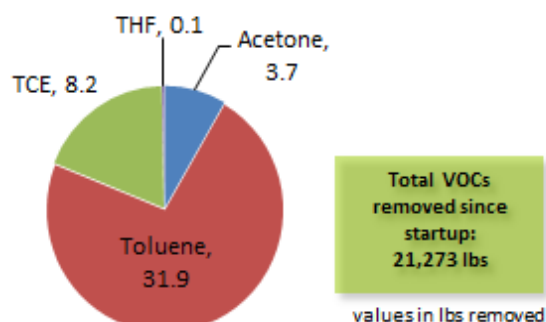


Figure 4. SVE Mass Removal

The system removed ~ 44 lbs of VOCs during the 3rd 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 95%. 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 3rd Quarter 2021. As total VOC concentrations continue to remain 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 1st quarter indicates unexpected conditions at one Ogallala Aquifer well, PTX06-1056. No detections exceeded the GWPS in Ogallala Aquifer uncertainty management/early detection wells sampled during the

3rd quarter. There were also no unexpected conditions at perched uncertainty management wells in the 3rd 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. 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 at the PQL.

Summary of Unexpected Ogallala Detections, 3rd Quarter 2021

Well ID	Sample Date	Analyte	Measured Value (µg/L)	PQL (µg/L)	GWPS (µg/L)
PTX06-1056	08/2/2021	4-amino-2,6-dinitrotoluene	0.723	0.259	1.2
	08/2/2021	1, 2 - Dichloroethane	1	1	5

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.

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 3rd 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:

- 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 at 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.
- The first injection into the new Offsite ISB began in June 2021 and was completed in October 2021.
- Construction of the new SEPTS injection well project near Playa 2 is complete. The project is expected to be operational by the end of 2021 and will provide a new outlet for up to 150 gpm (half of design capacity) of treated water from the SEPTS.

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 late 2021 or early 2022.
- 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 early 2022, with construction starting in 2022.
- Pantex awarded a contract 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. Design is expected to be completed by the early 2022, with construction starting in Spring 2022.
- 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 construction began in October 2021.
- Injections into the Zone 11 ISB started in June and is scheduled to finish in November.
- Phase 3 infrastructure for the Offsite System is currently being designed. Construction is scheduled to commence in early 2022.
- As of this quarter, well maintenance activities have begun at the Southeast ISB Extension in preparation for the second injection event of 2021.

The following items are upcoming work to be completed by Pantex:

- The Southeast ISB system will be injected starting in early 2022.
- Pantex is preparing to contract for the Phase 3 drilling at the Offsite System. Drilling is expected to begin in spring 2022.

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 is 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 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.

Pantex continues to progress toward cleanup of the southeast lobe of perched groundwater. The 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. 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).

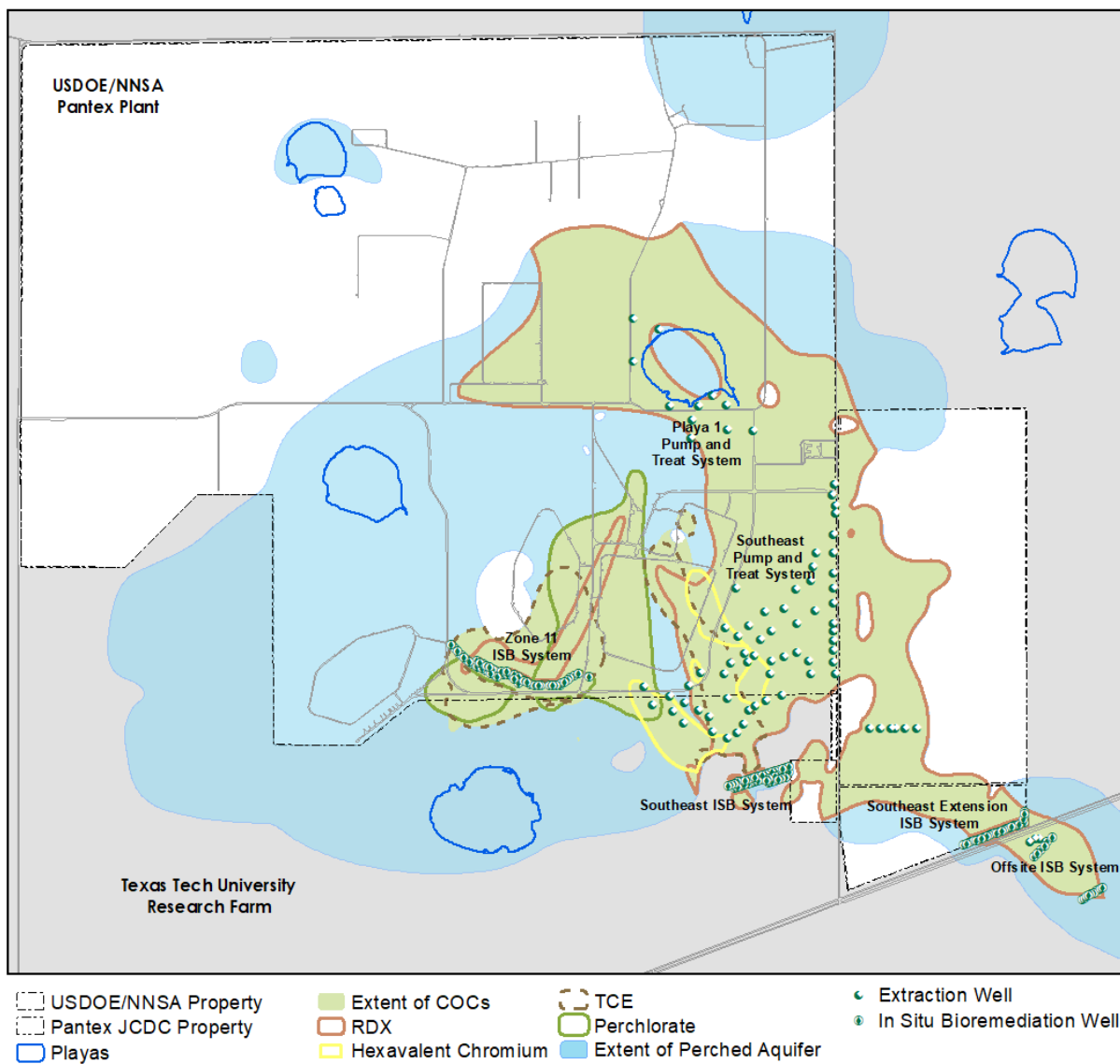
A new ISB system (Offsite ISB) was designed to address HE contamination found on neighboring properties. Installation of infrastructure for Phase 1 and 2 of the Offsite ISB is complete and the 1st injection into the system was completed in October 2021. Phase 3 construction will begin in early 2022, 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.

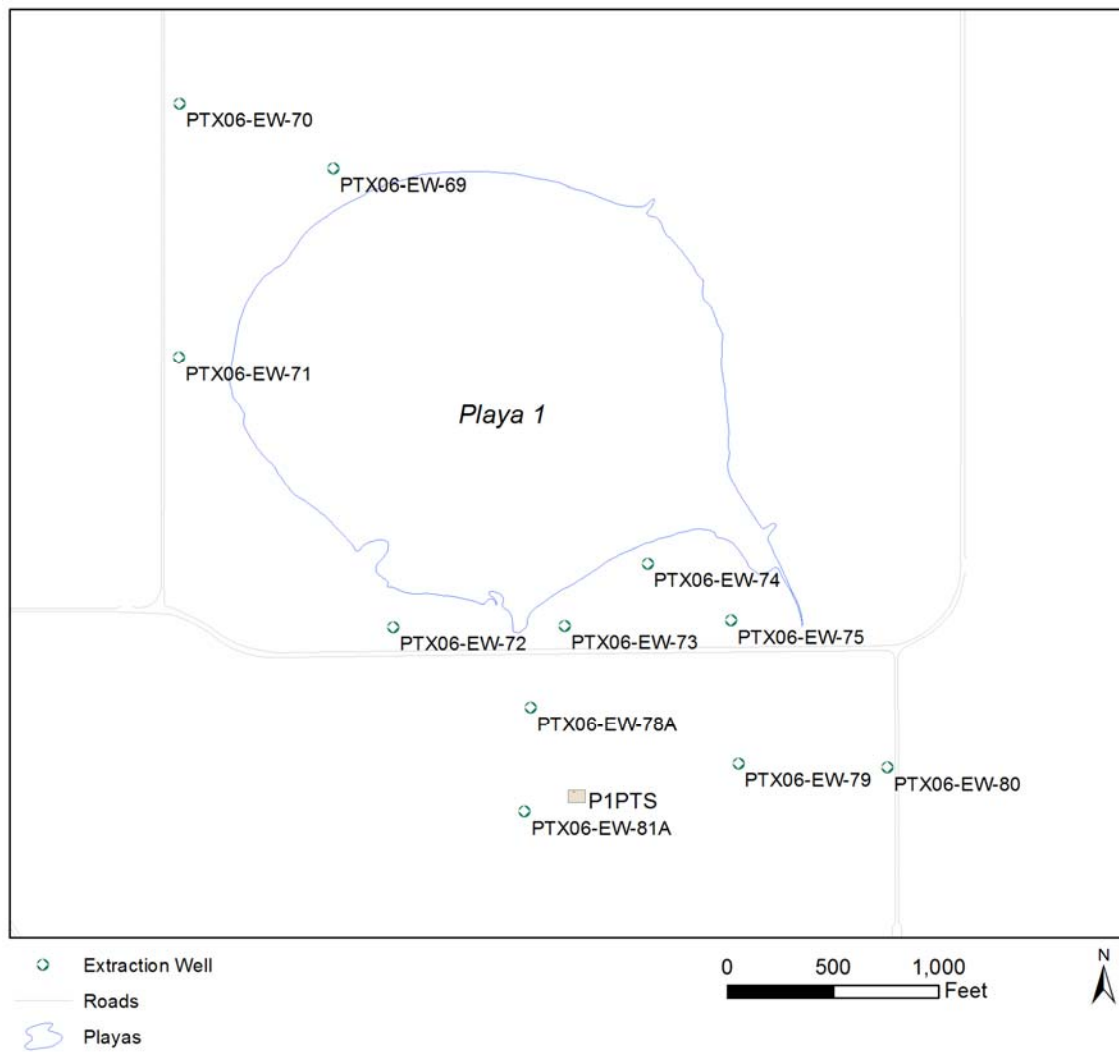
The groundwater remedies are considered to be protected for the short-term, as untreated perched groundwater use is controlled to prevent human contact and monitoring data continue to indicate that the remedial actions remain protective of the Ogallala Aquifer.

Appendix A

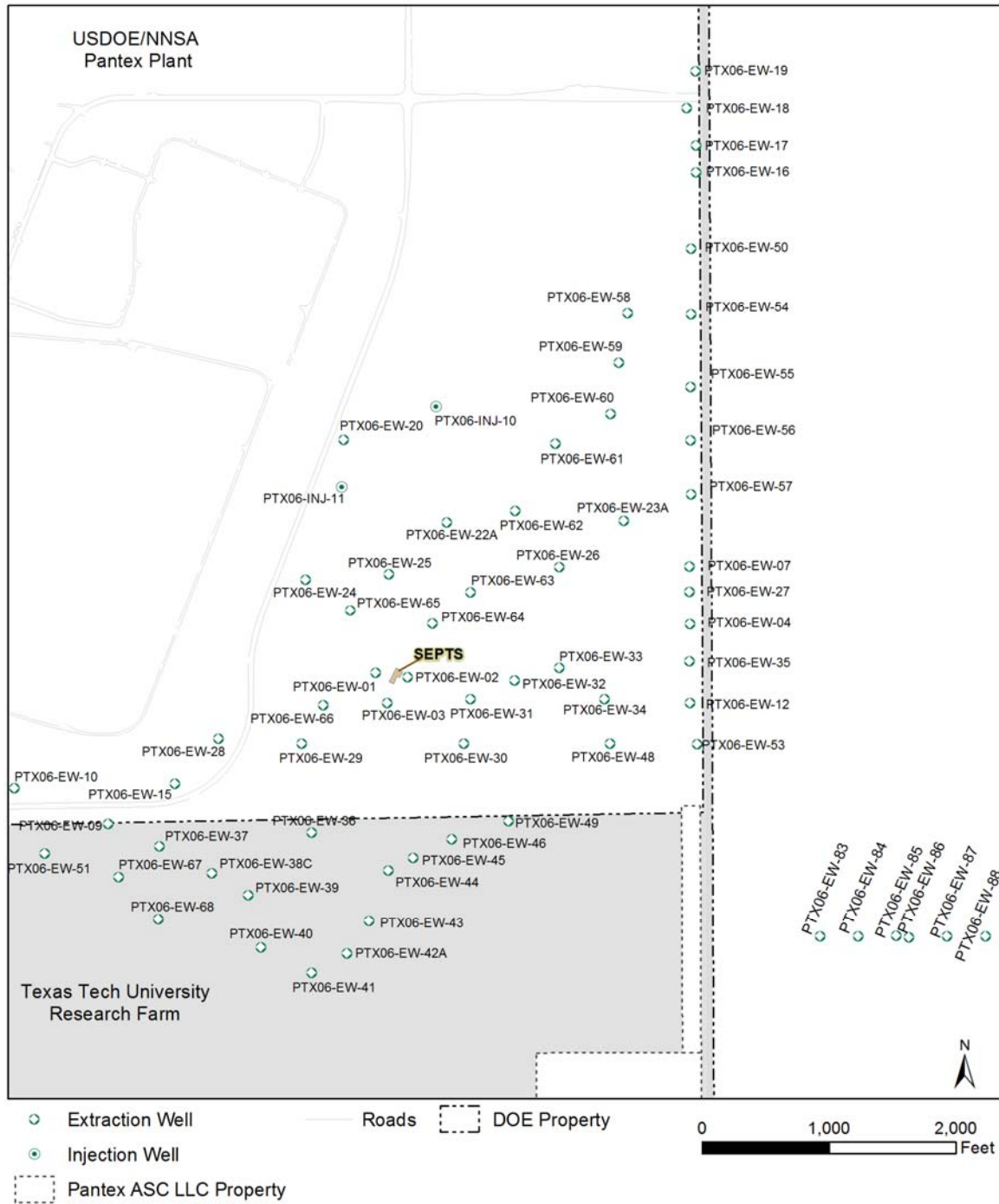
Maps



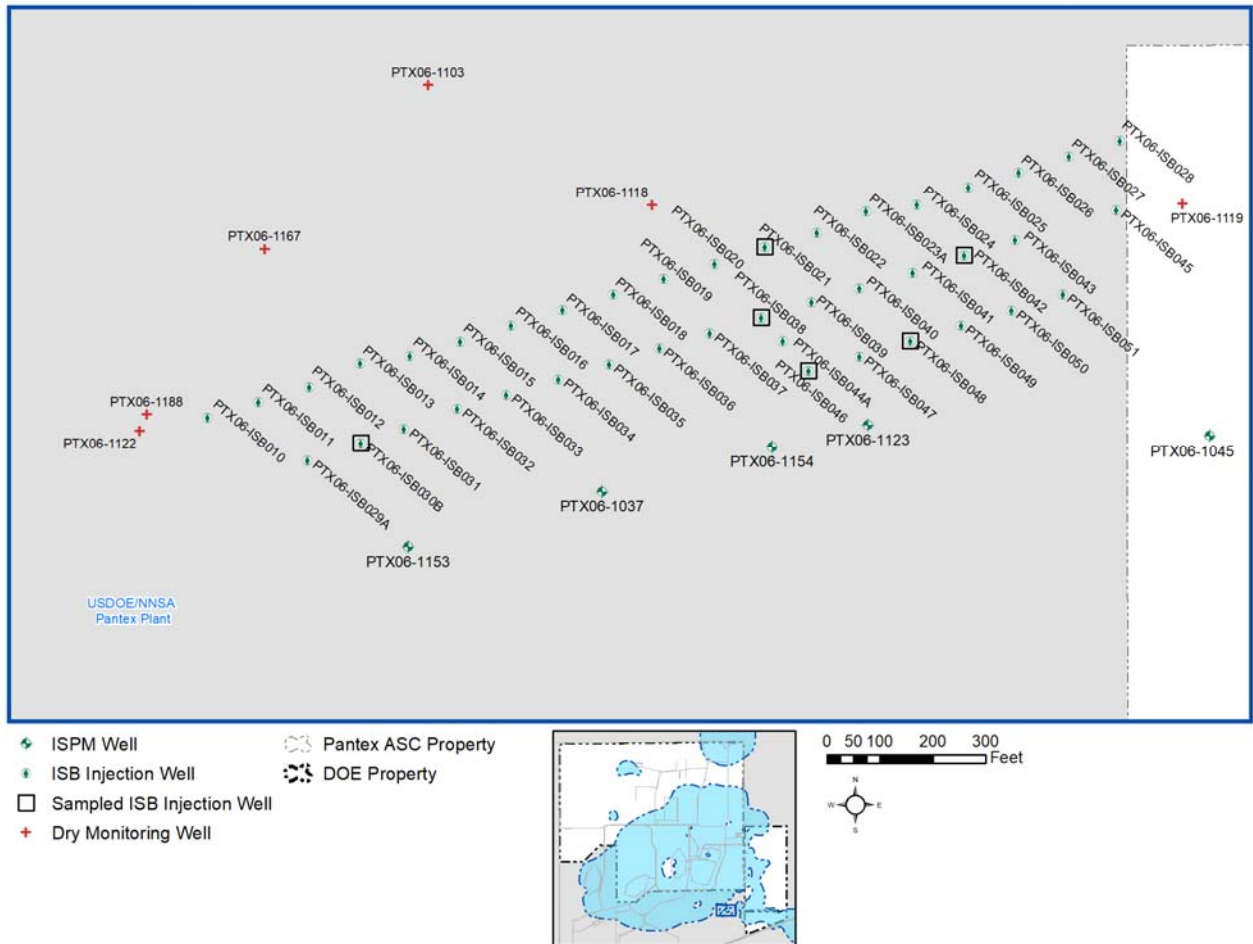
Extent of Perched Groundwater and Contaminant Plumes



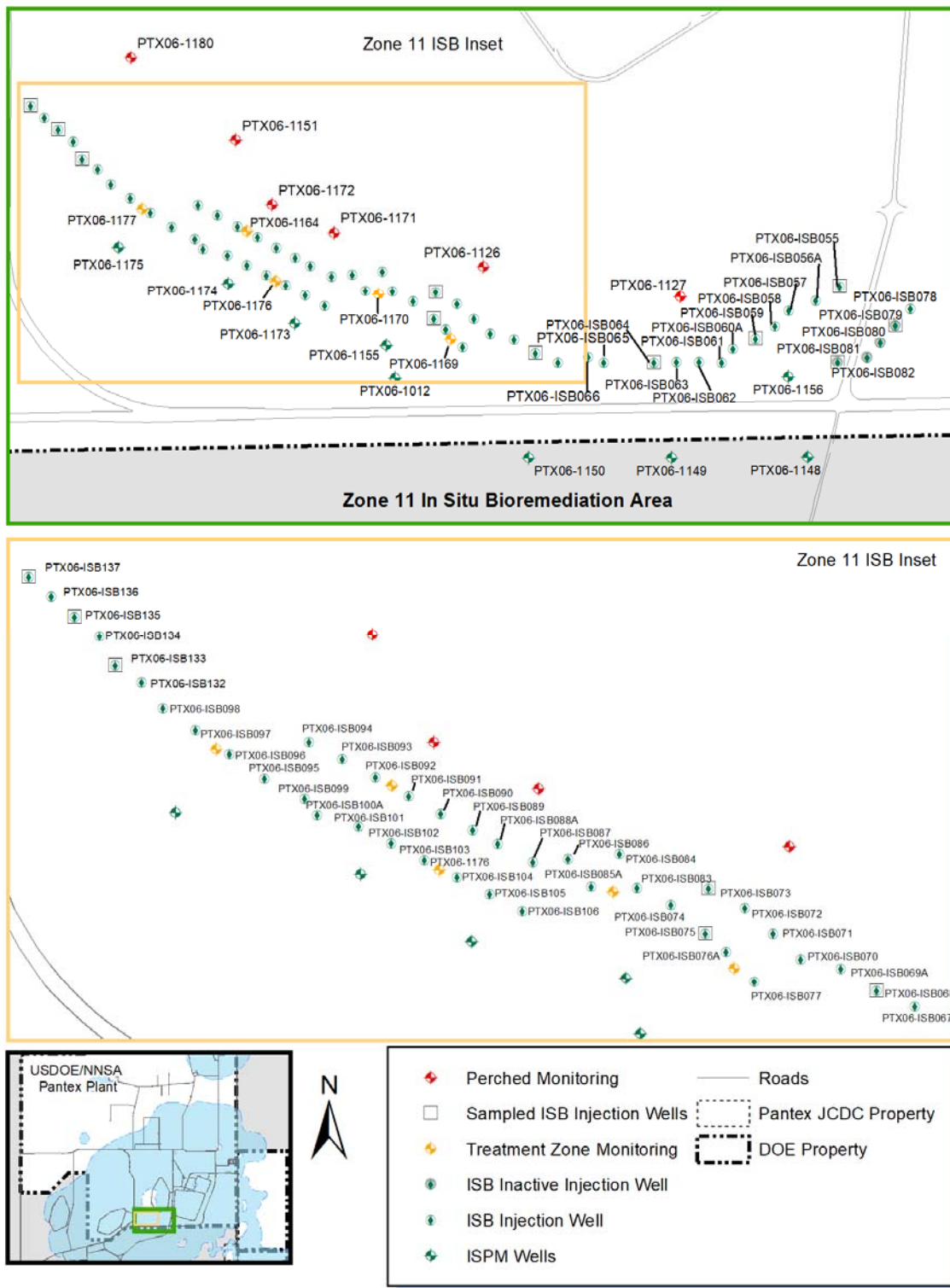
Playa 1 Pump and Treat System Wells



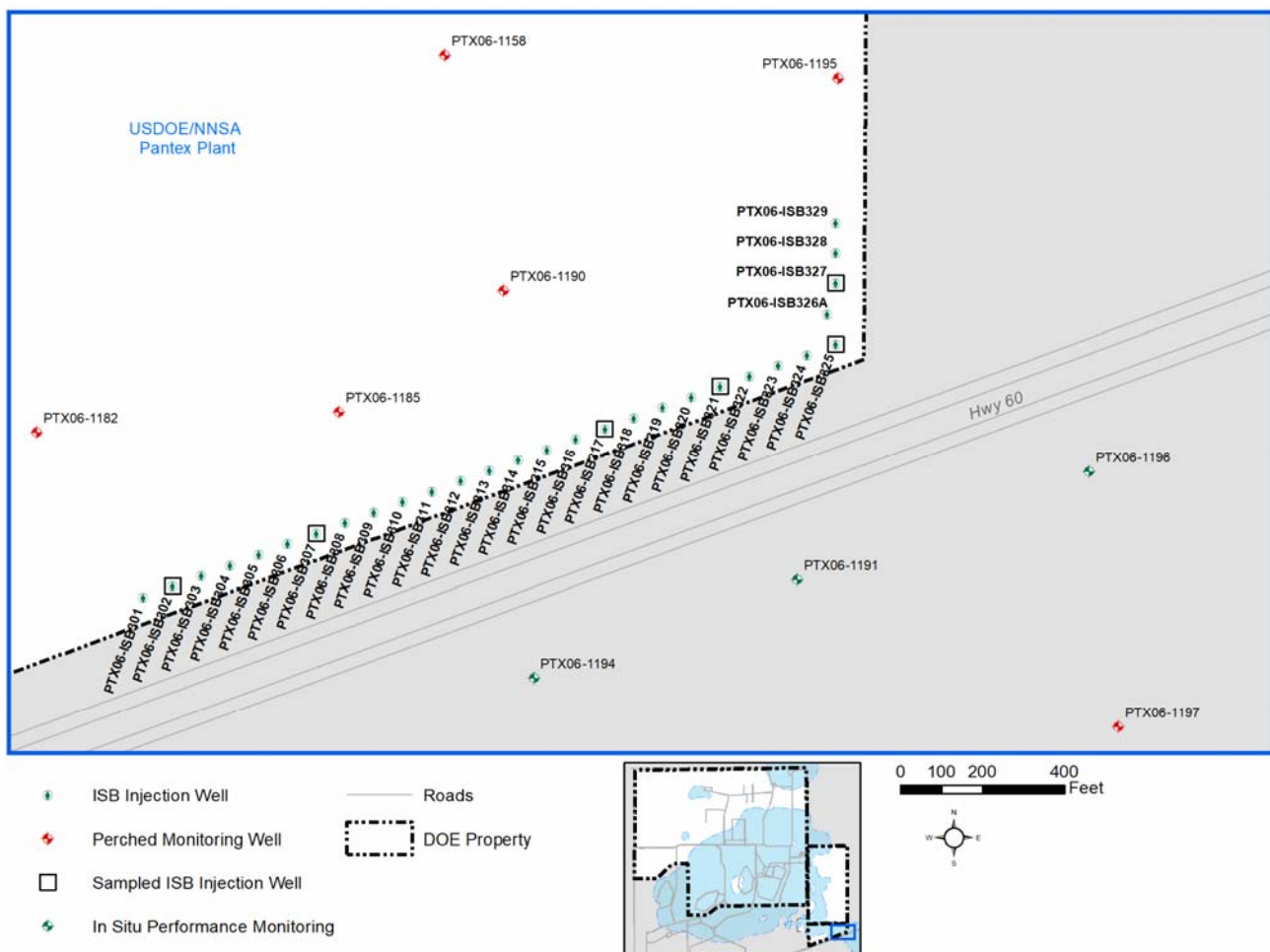
Southeast Pump and Treat System Wells



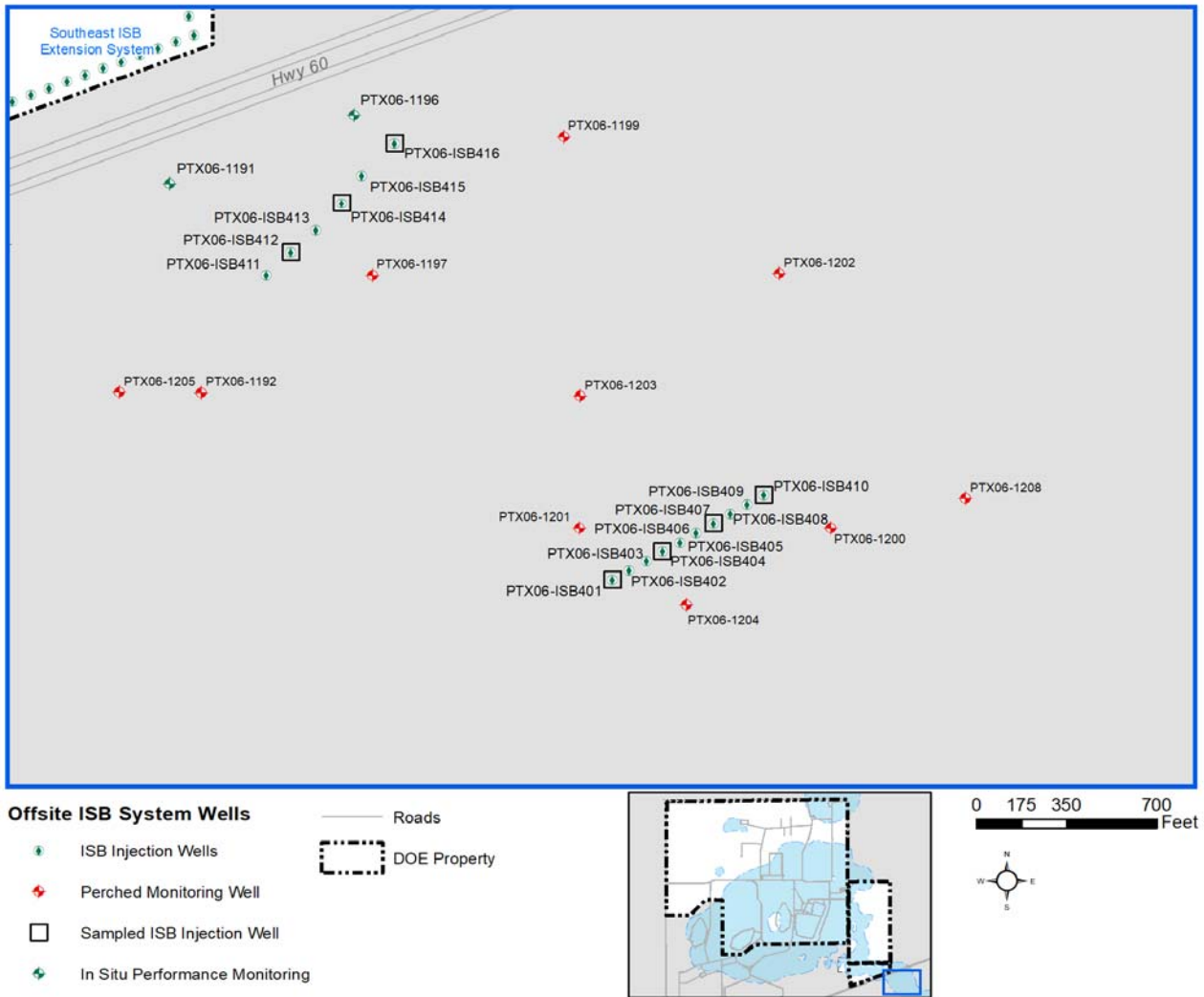
Southeast ISB Wells and Sampling Locations



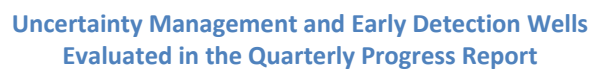
Zone 11 ISB Wells and Sampling Locations



Southeast ISB Extension Wells and Sampling Locations



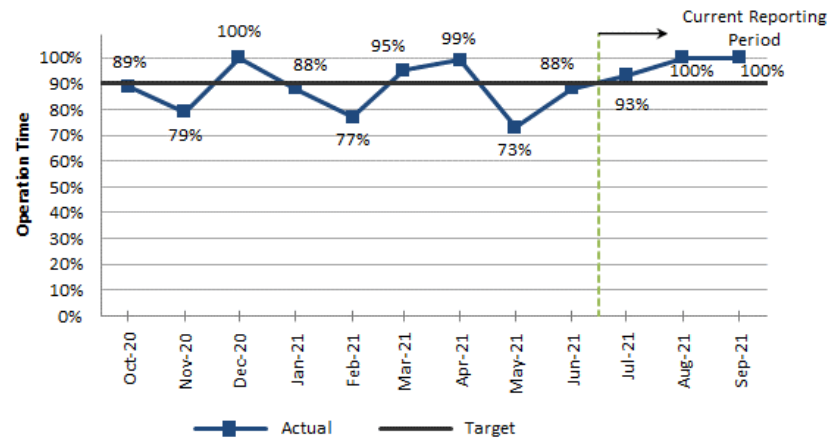
Offsite ISB Wells and Sampling Locations



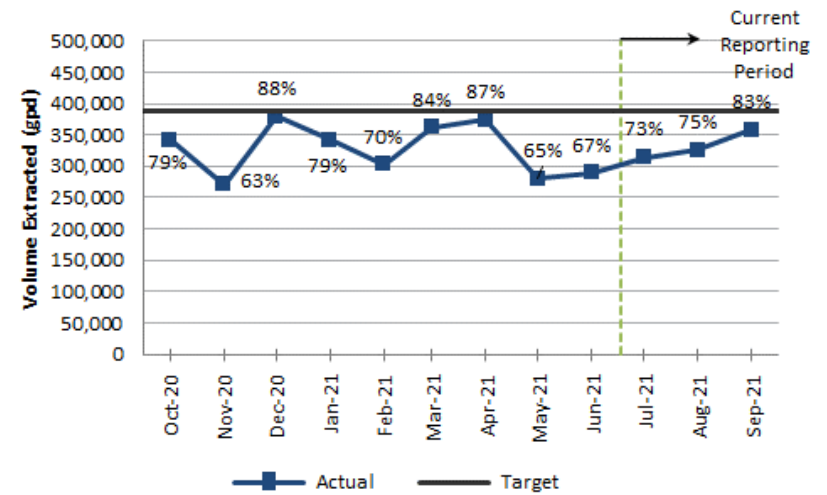
Appendix B

Pump and Treat System Graphs

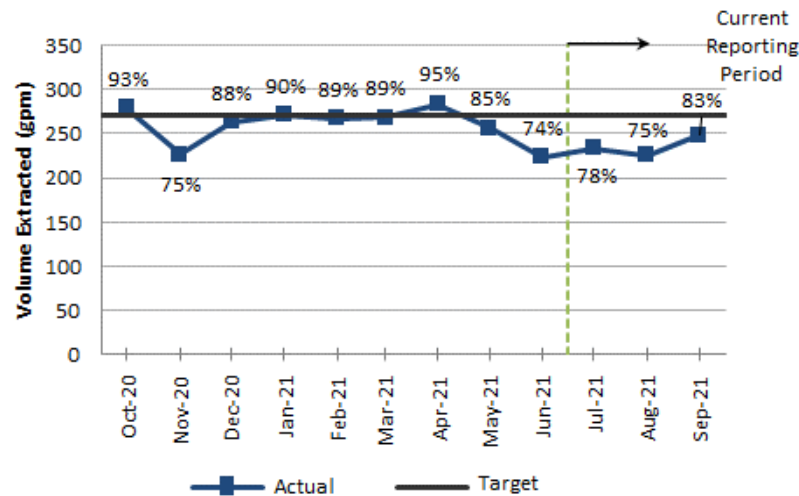
Southeast Pump and Treat System Graphs



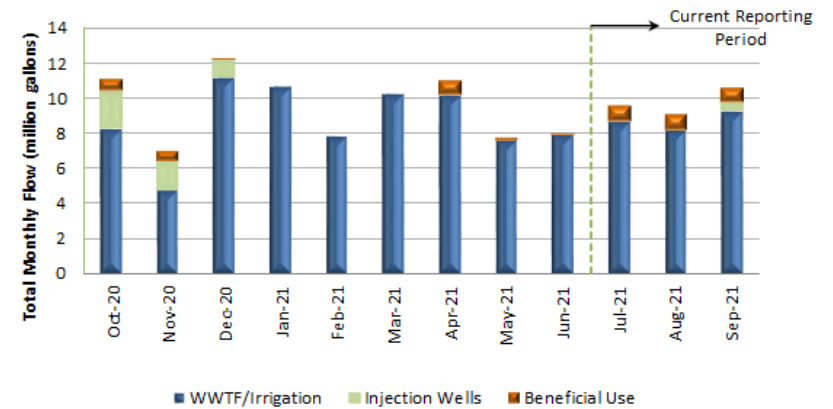
SEPTS Operation Time vs Target



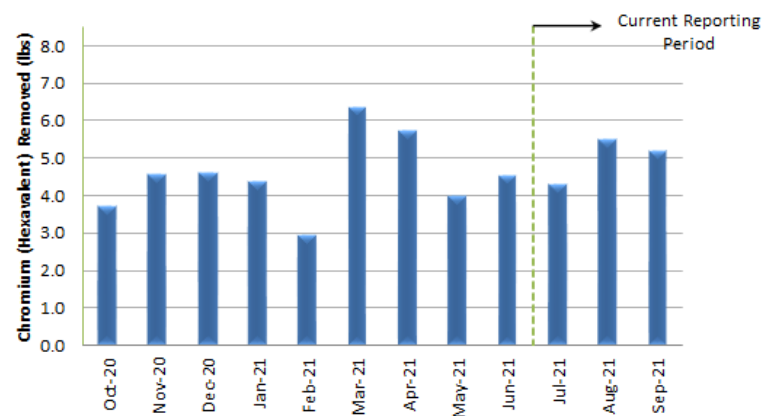
SEPTS GPD and % Capacity



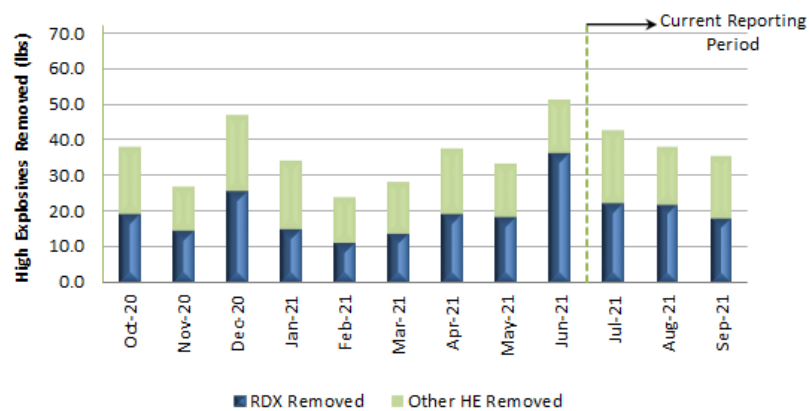
SEPTS Average GPM and % Capacity



SEPTS Monthly Total Flow

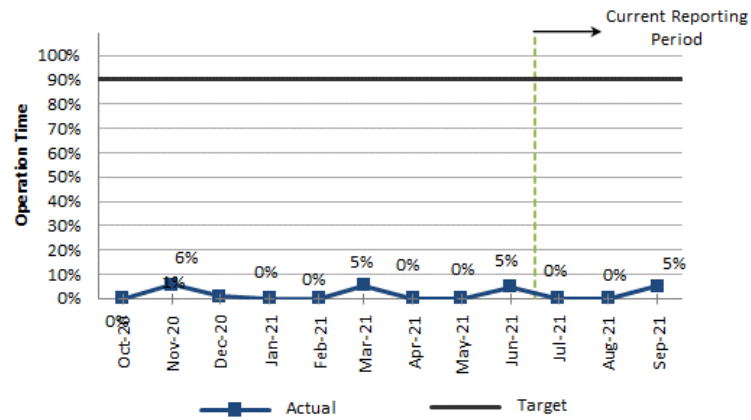


SEPTS Chromium Mass Removal by Month

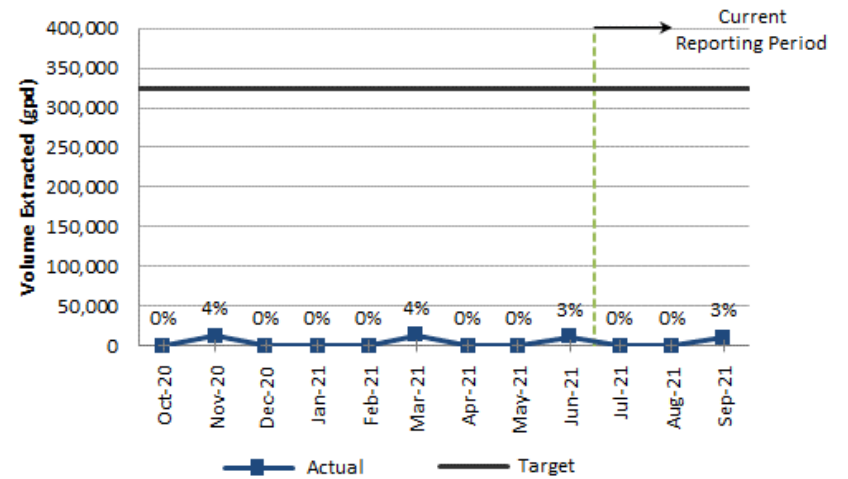


SEPTS HE Mass Removal by Month

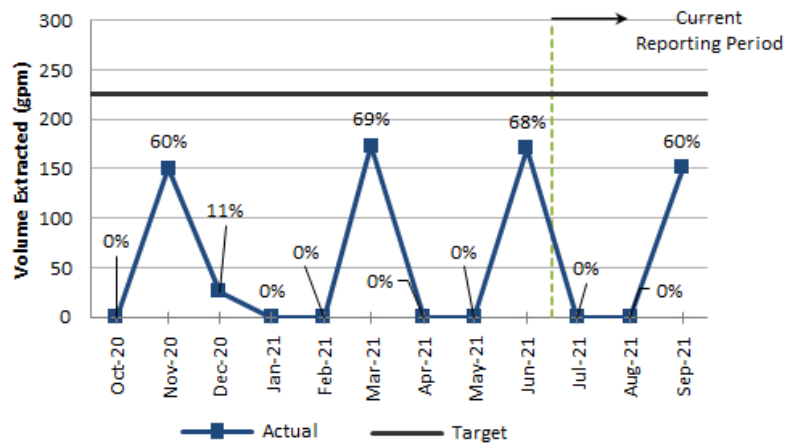
Playa 1 Pump and Treat System Graphs



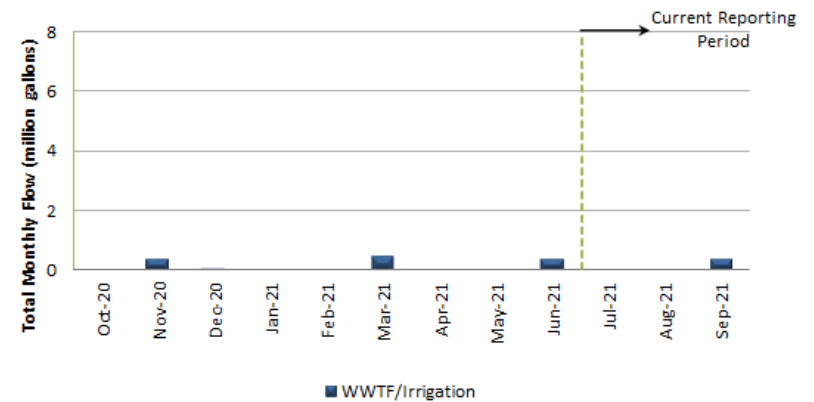
P1PTS Operational Time Vs Target



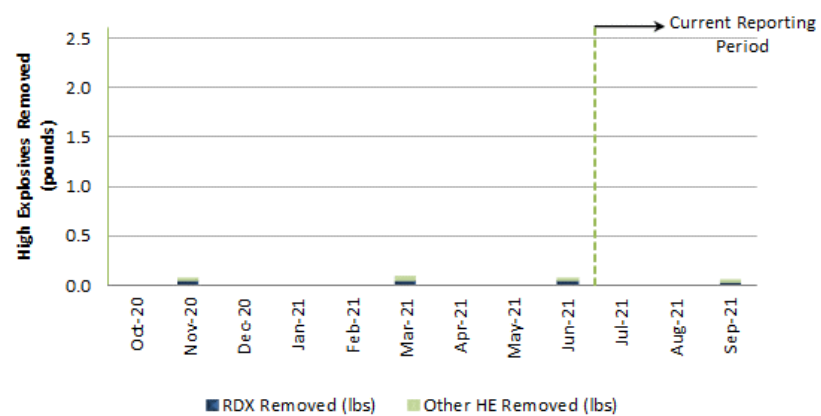
P1PTS Average GPD and % Capacity



P1PTS Average GPM and % Capacity



P1PTS Monthly System Total Flow



P1PTS HE Mass Removal by Month

Appendix B Glossary

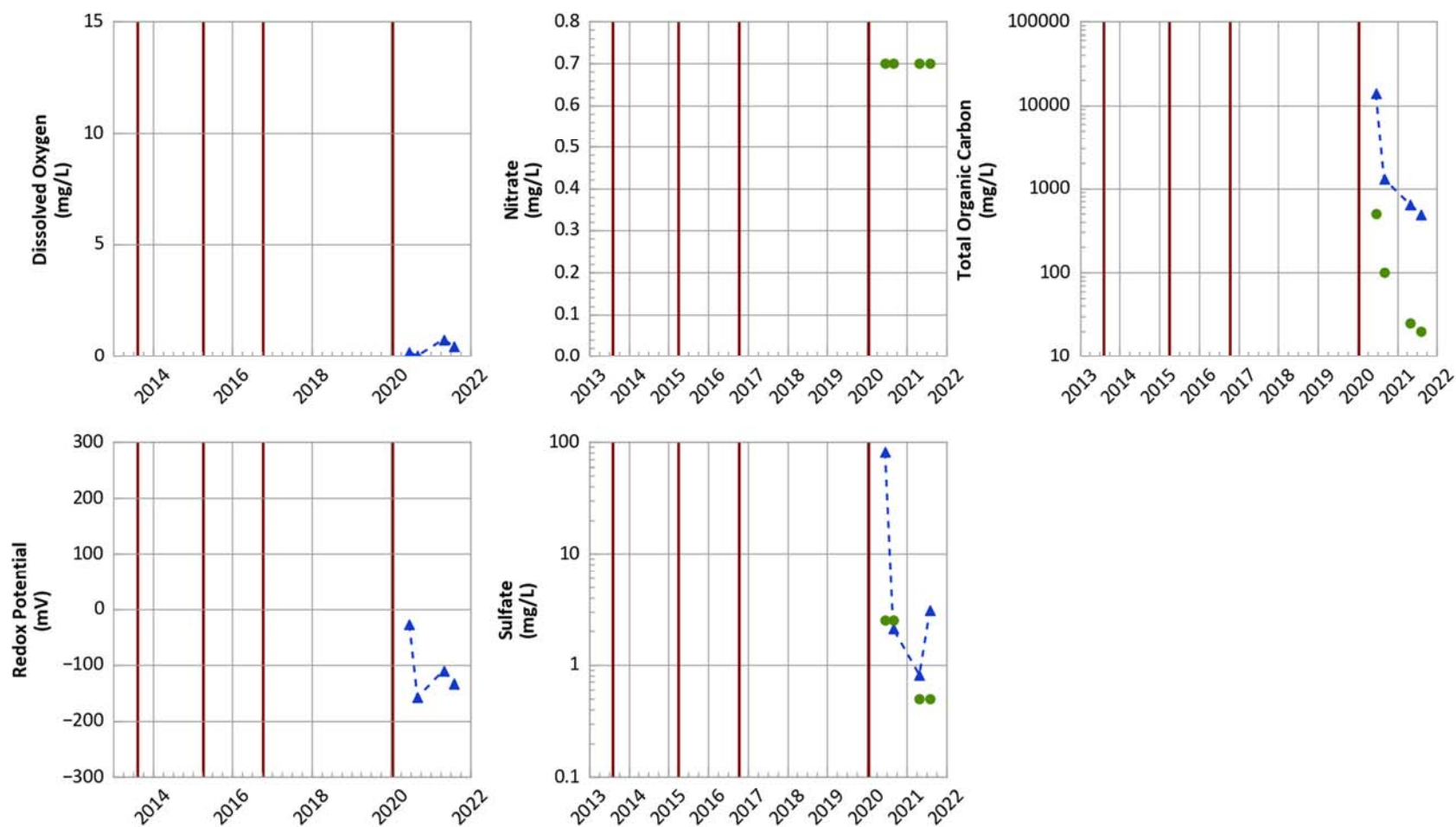
Operation Time	Operation time represents the percentage of the total number of hours the system was actually operated vs. the total possible hours the system could have operated on a monthly basis.
GPM Extraction	The gallons per minute (GPM) extraction rate represents the extraction rate from the well 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.

Appendix C

ISB Graphs

Southeast ISB Graphs

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



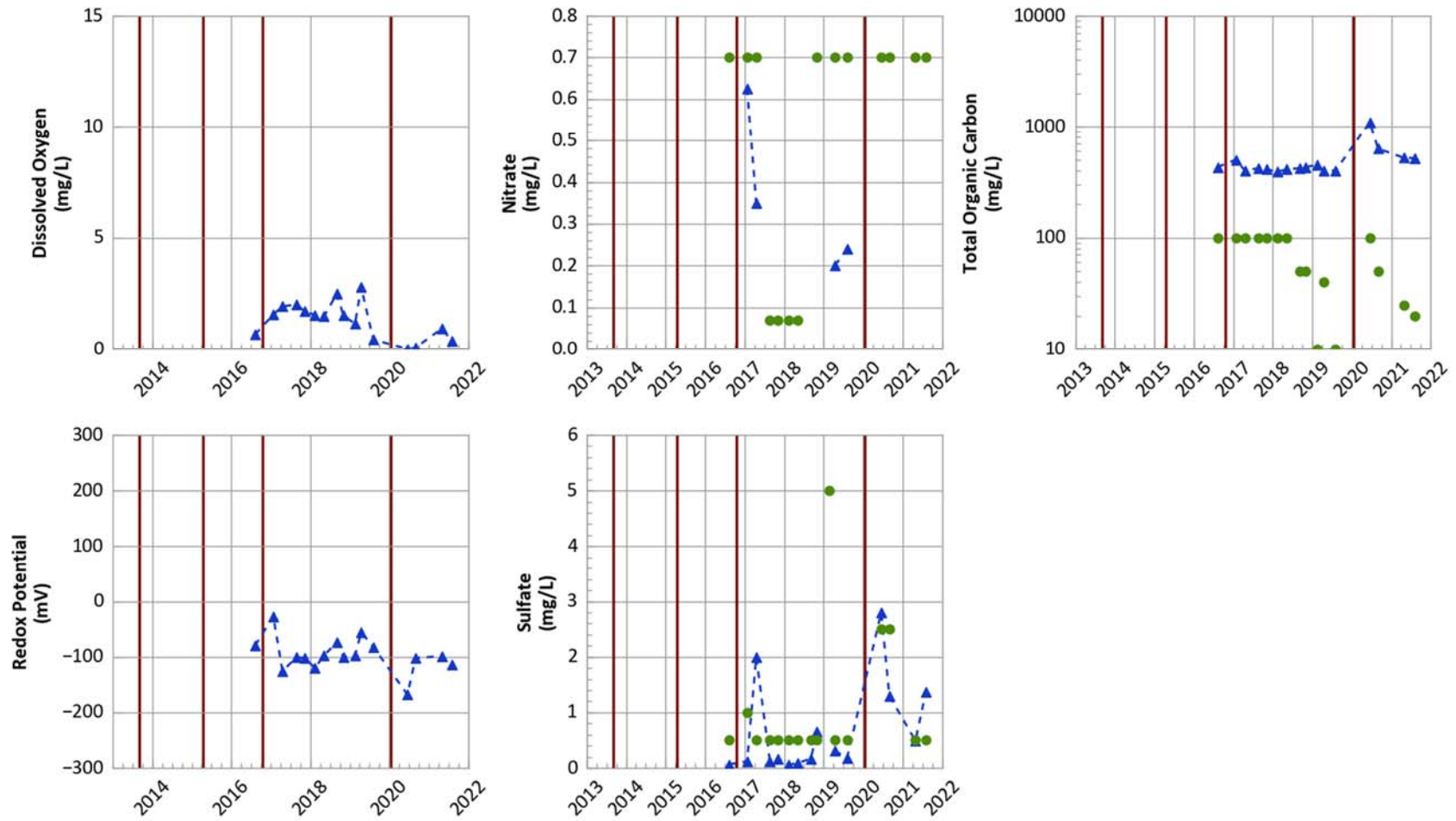
Typical Baseline Concentrations in Perched Groundwater

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



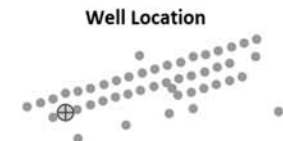
**PTX06-ISB030B Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



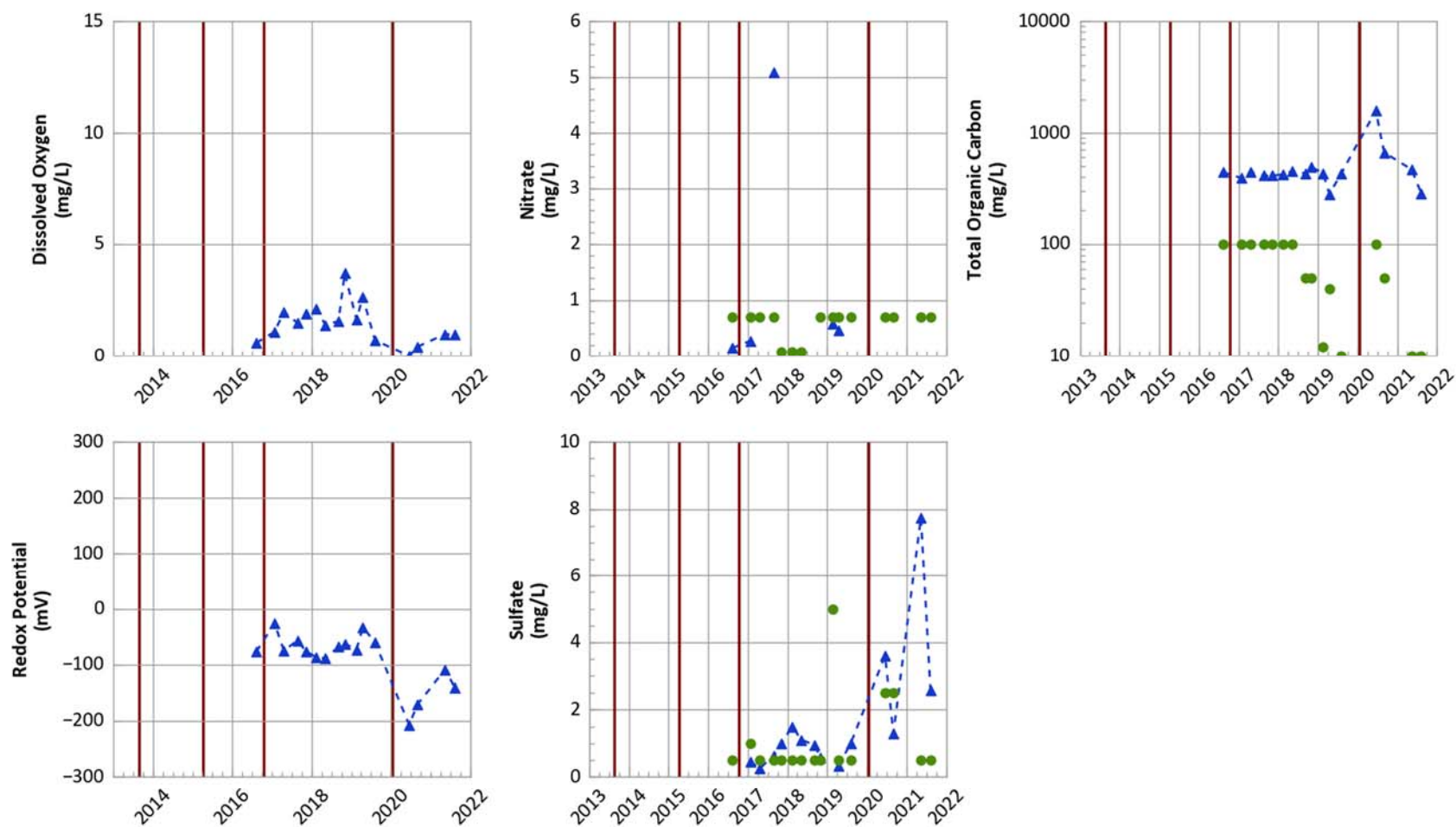
Typical Baseline Concentrations in Perched Groundwater

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

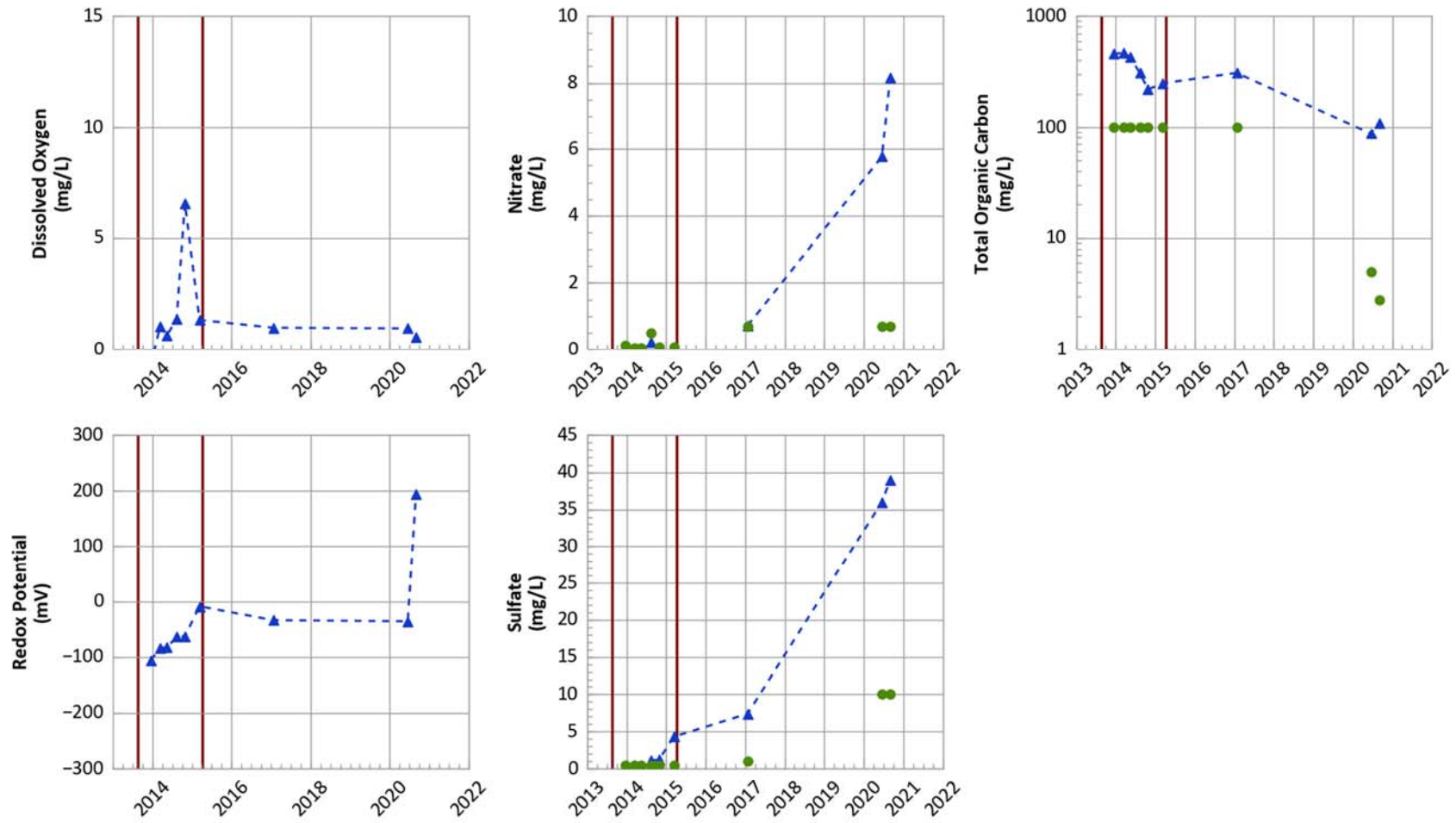


Typical Baseline Concentrations in Perched Groundwater

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



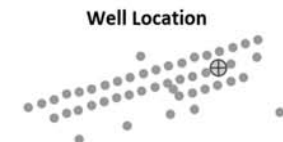
**PTX06-ISB042 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



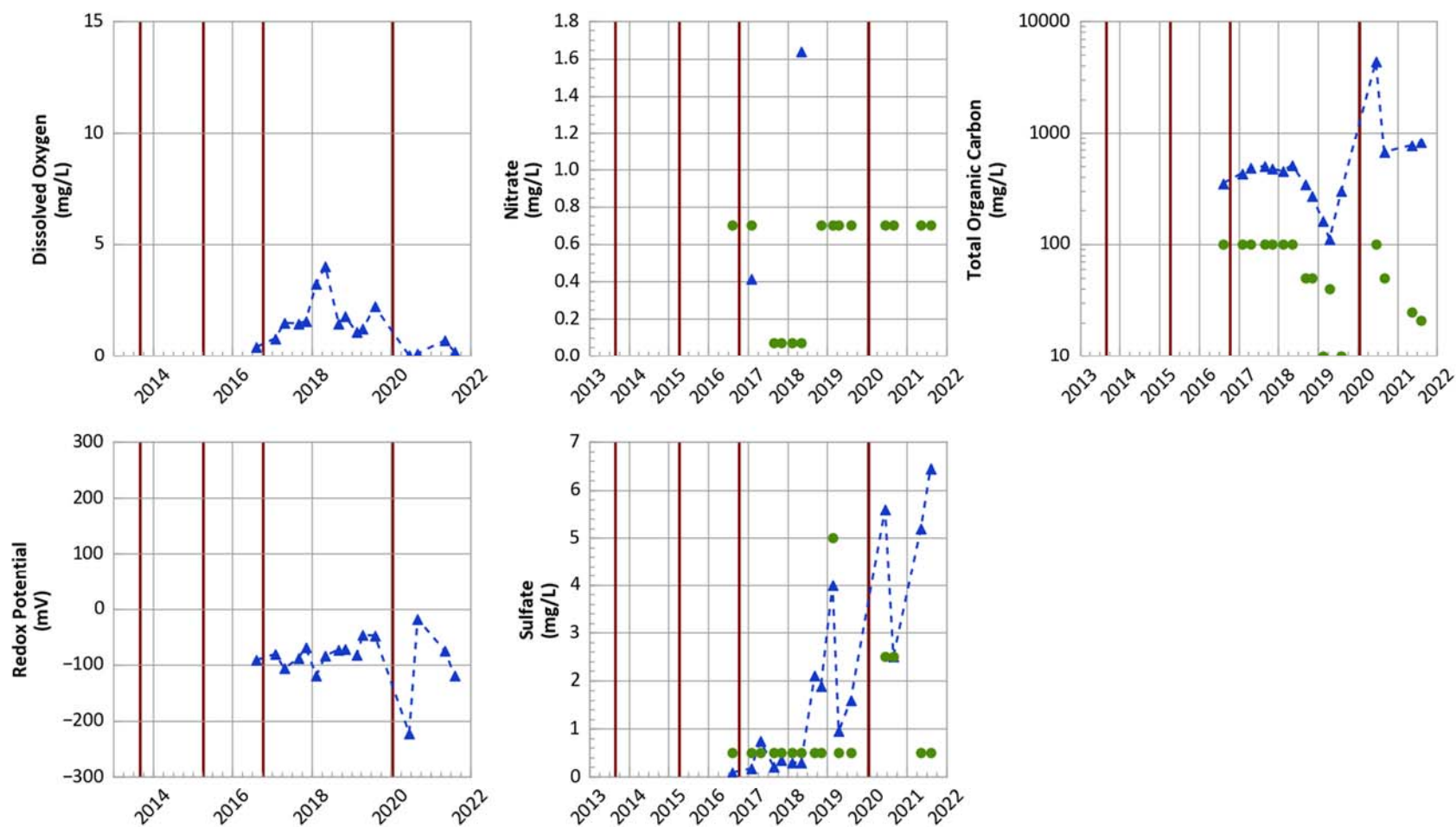
Typical Baseline Concentrations in Perched Groundwater

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

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



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

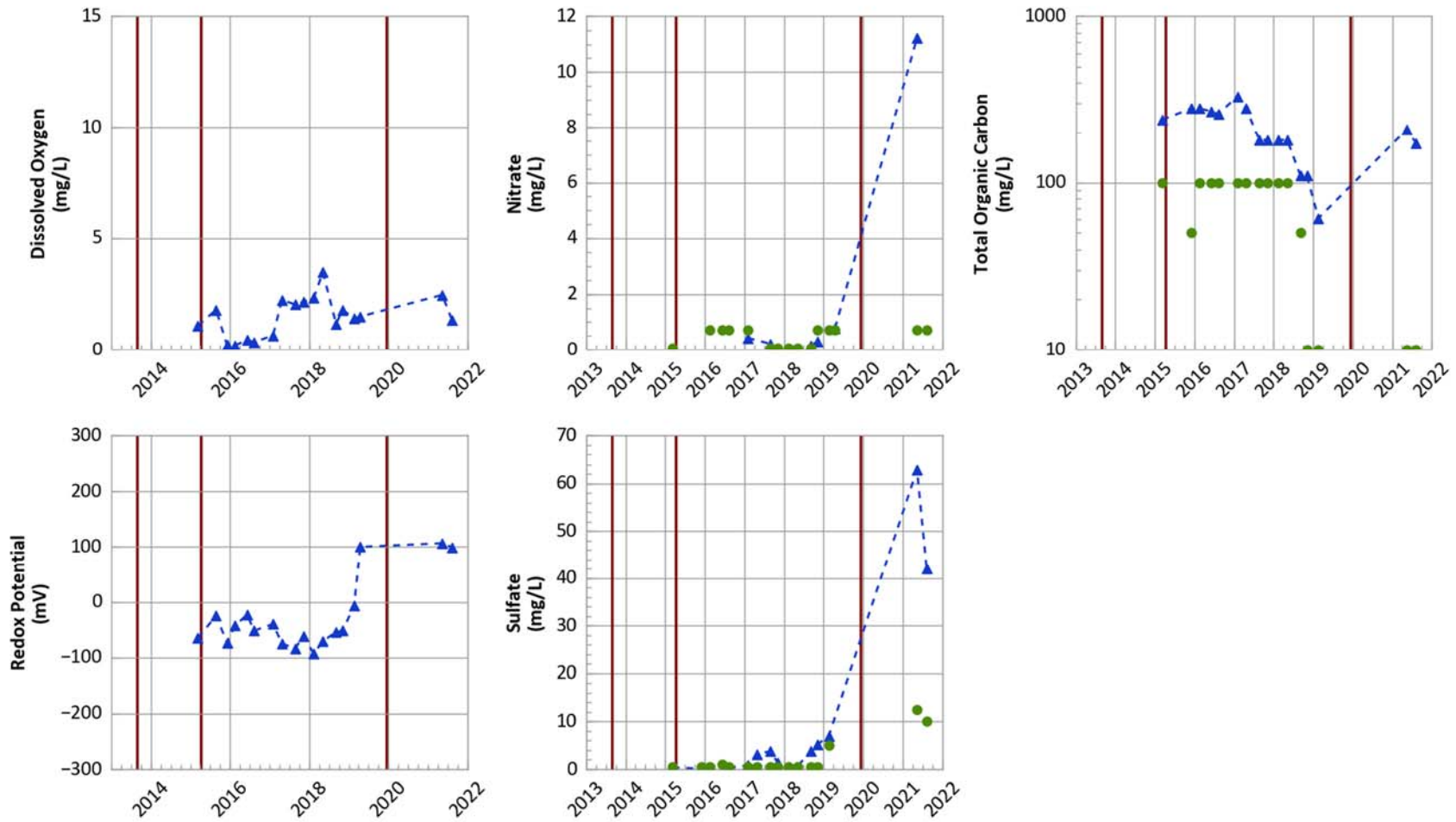


Typical Baseline Concentrations in Perched Groundwater

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**



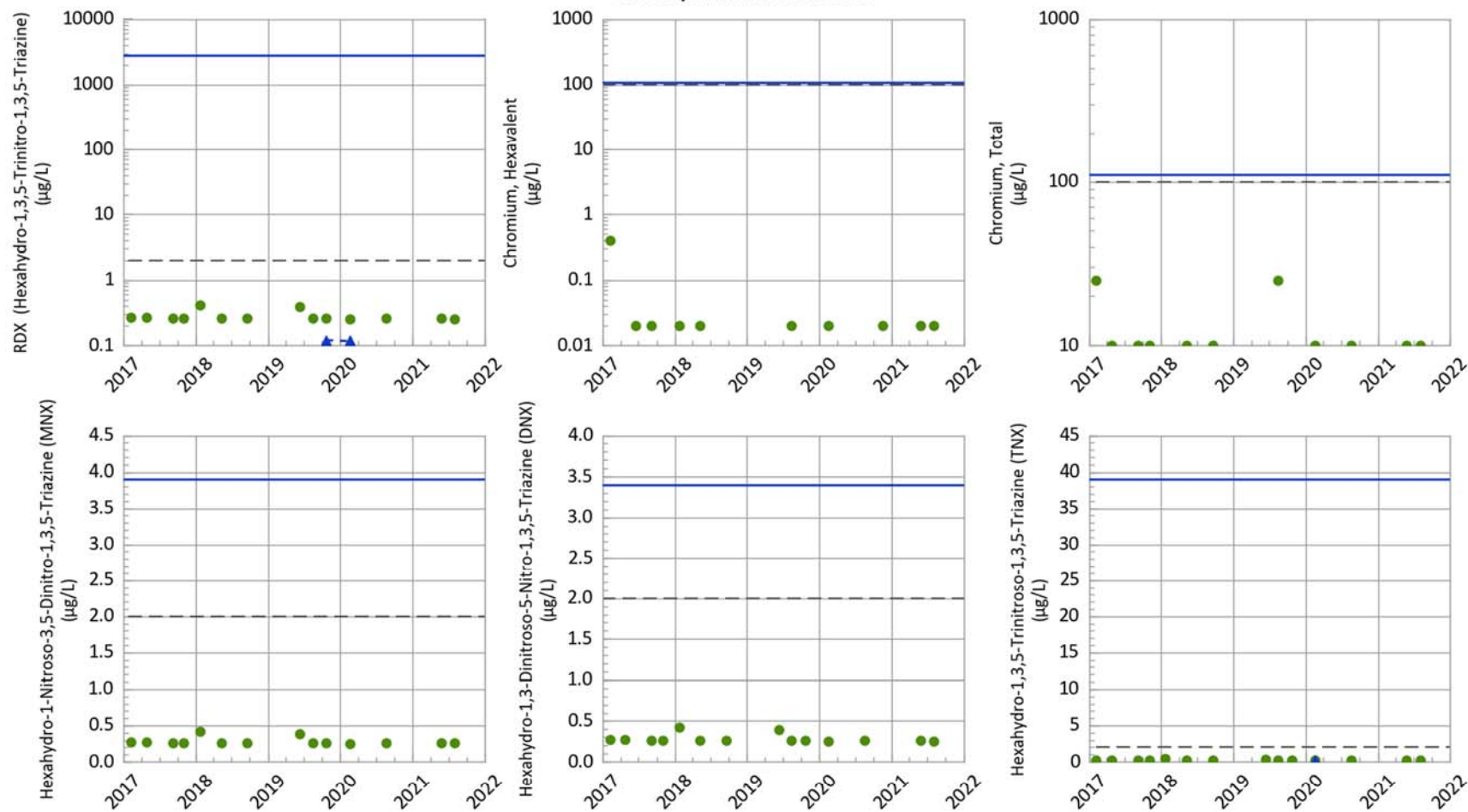
Typical Baseline Concentrations in Perched Groundwater

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

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



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



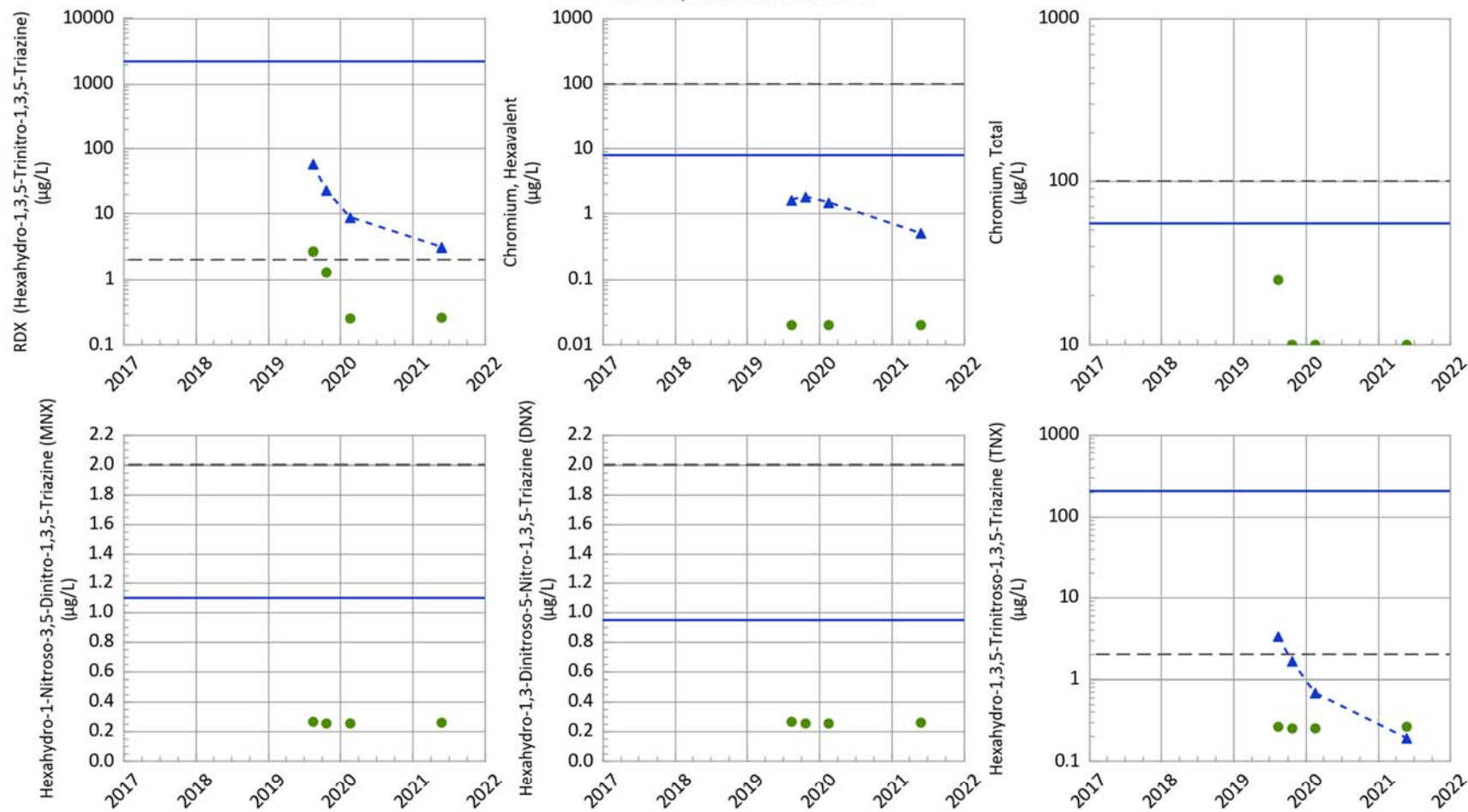
Most Recent Measured COC Concentrations (Feb 18, 2020)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
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**



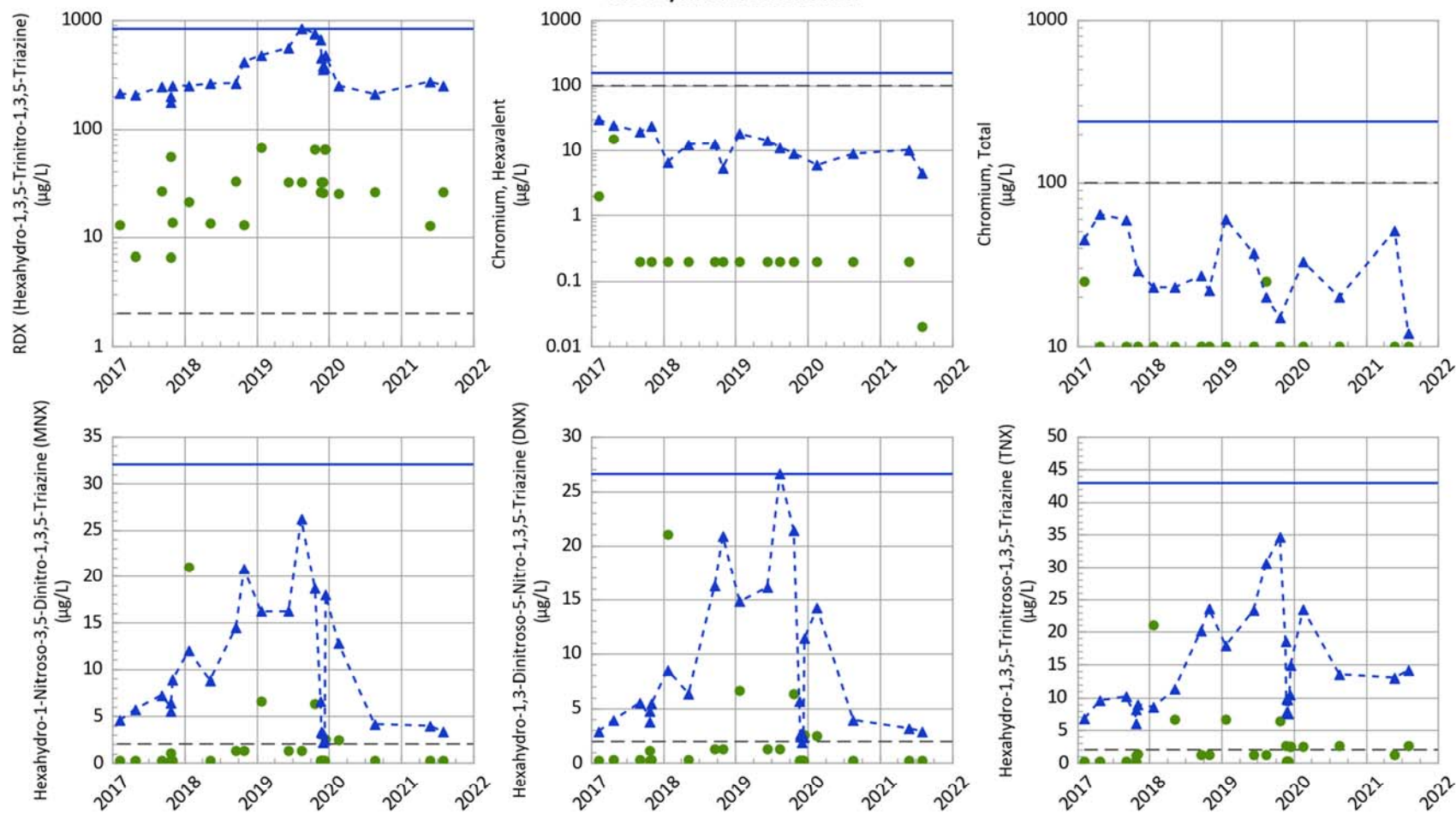
Most Recent Measured COC Concentrations (May 26, 2021)

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

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



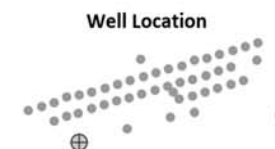
**PTX06-1153 Downgradient Performance Indicators
Southeast In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



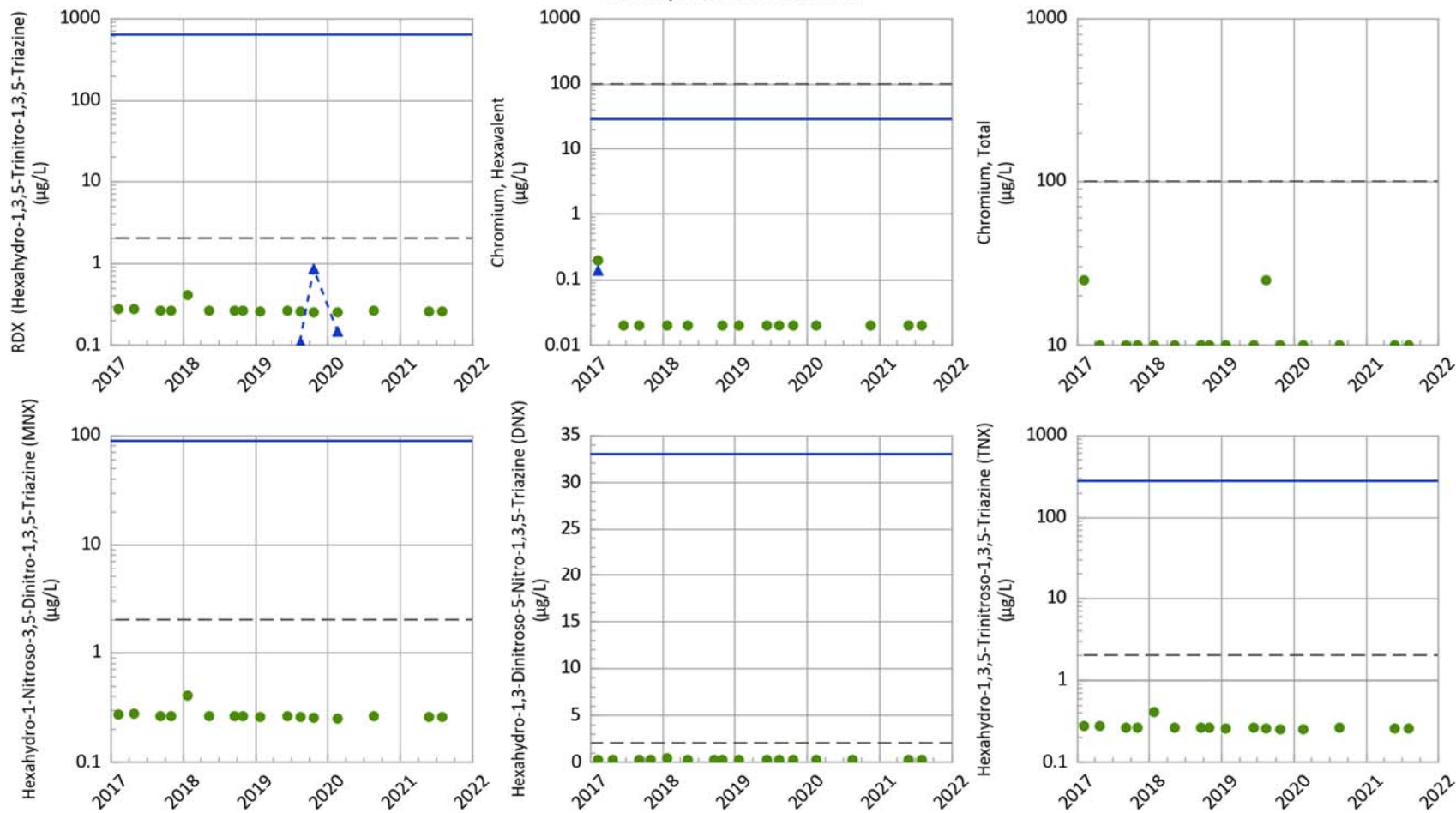
Most Recent Measured COC Concentrations (Aug 03, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
RDX	252.0	2.0
MNX	3.35	2.0
CR-6	4.39	100.0
DNX	2.91	2.0
CR	12.0	100.0
TNX	14.1	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 03, 2021)

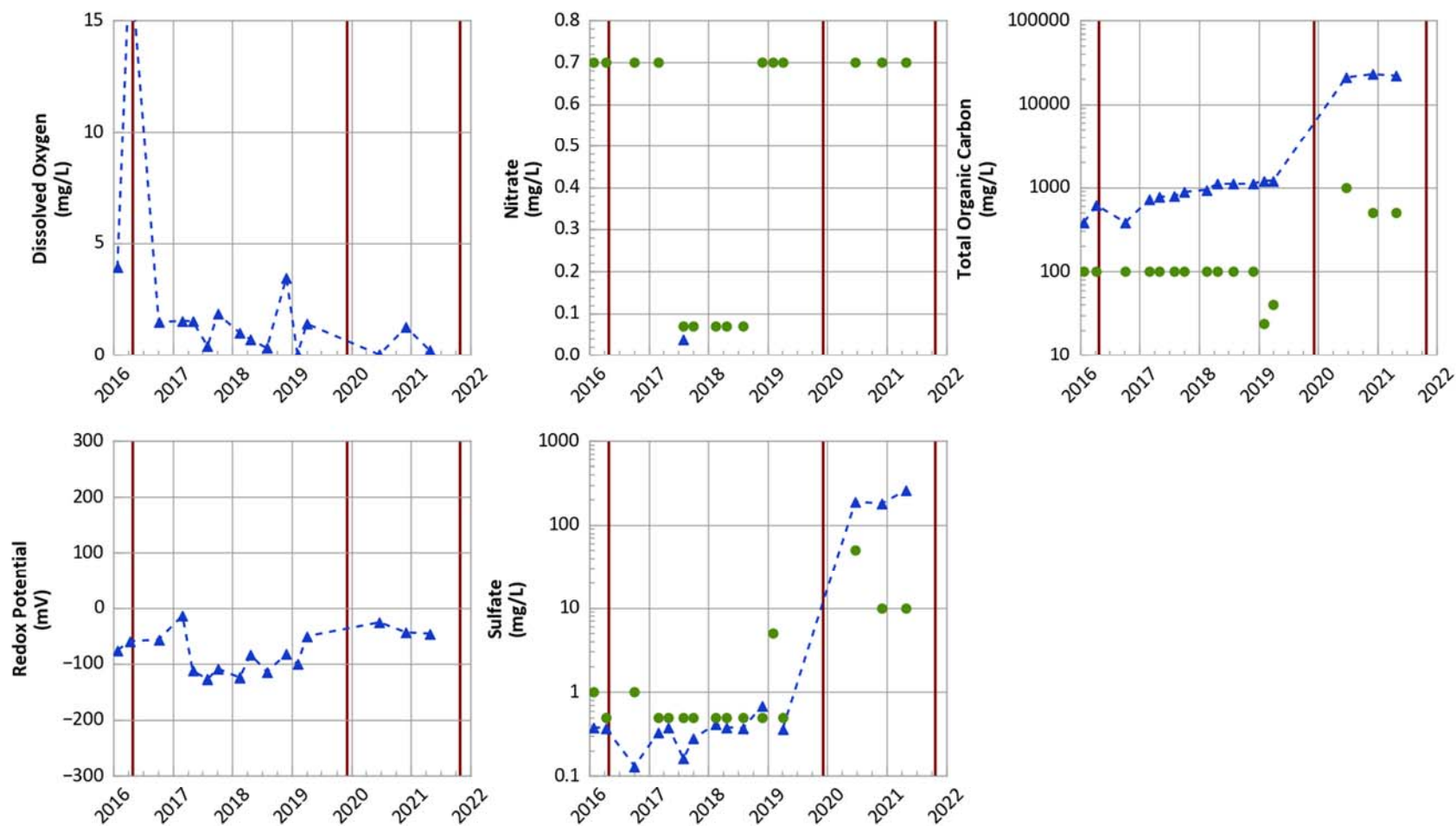
COC	Concentration (µg/L)	GWPS (µg/L)
RDX	Non-Detect	2.0
MNX	Non-Detect	2.0
CR-6	Non-Detect	100.0
DNX	Non-Detect	2.0
CR	Non-Detect	100.0
TNX	Non-Detect	2.0

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



Zone 11 ISB Graphs

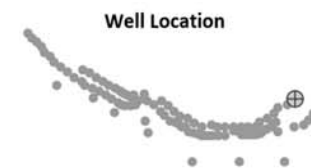
**PTX06-ISB055 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



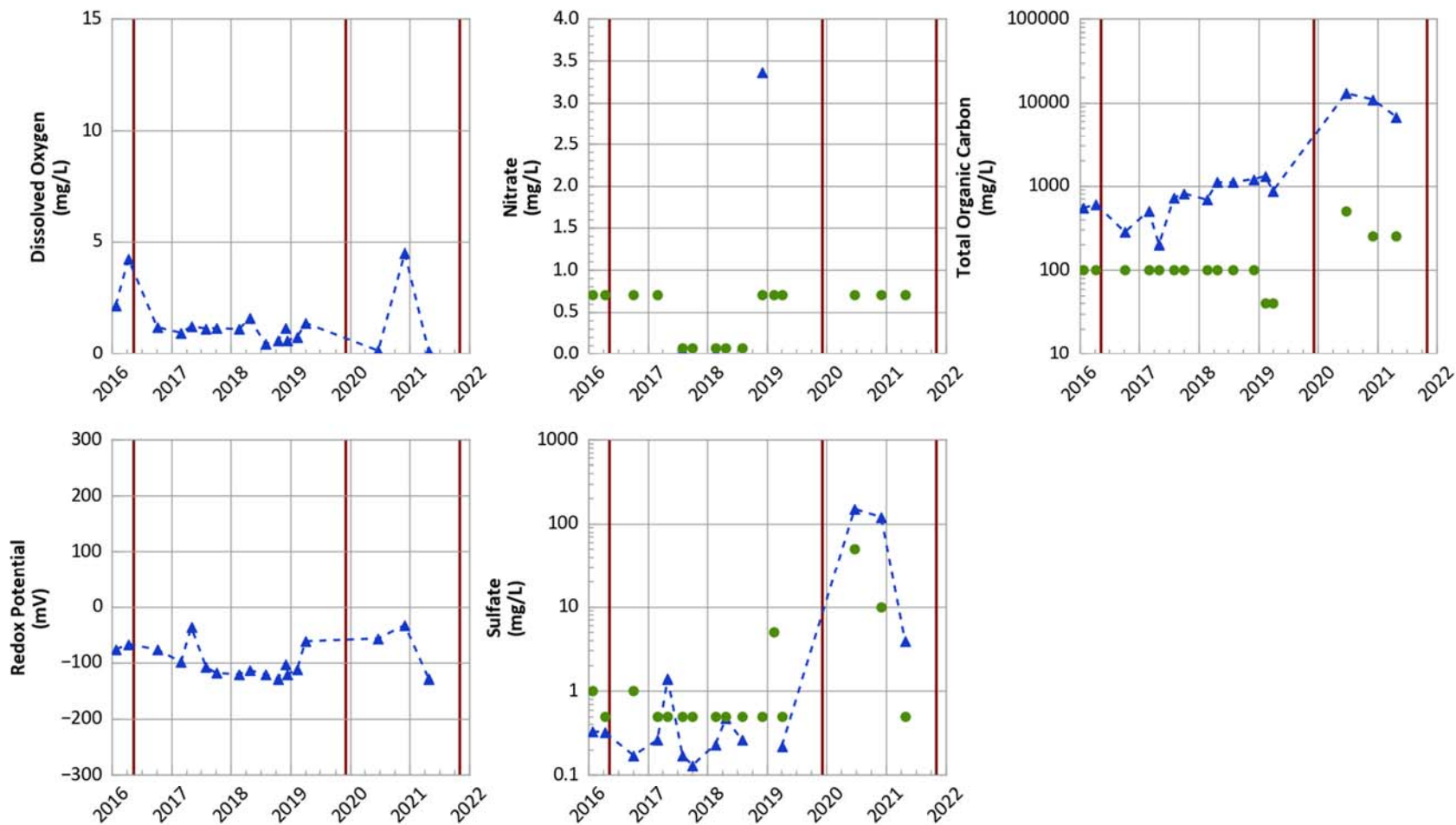
Typical Baseline Concentrations in Perched Groundwater

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

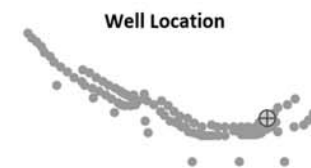


**PTX06-ISB059 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**

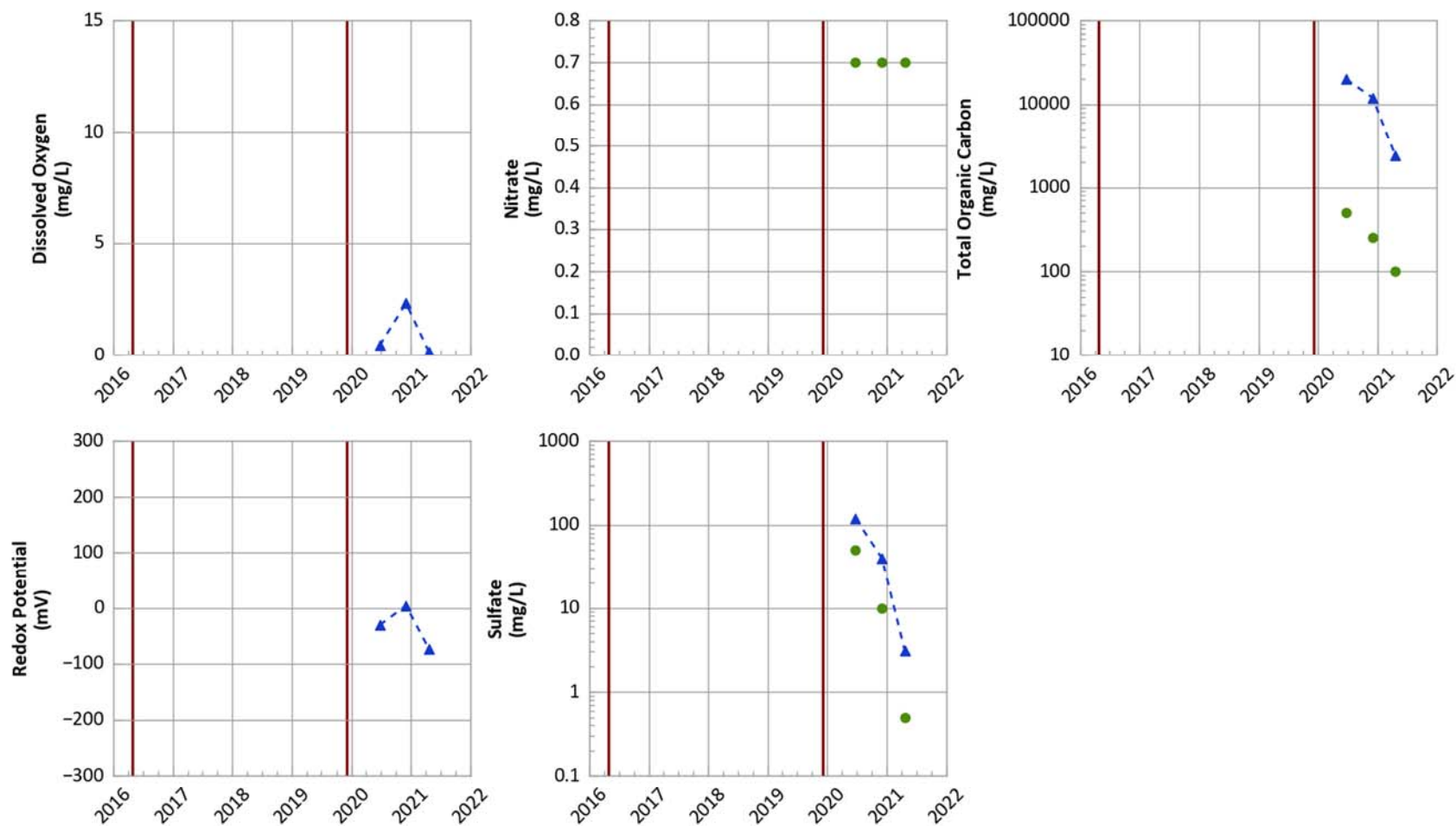


Typical Baseline Concentrations in Perched Groundwater

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



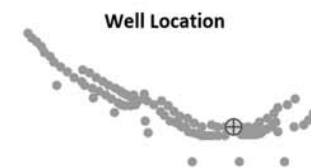
PTX06-ISB064 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



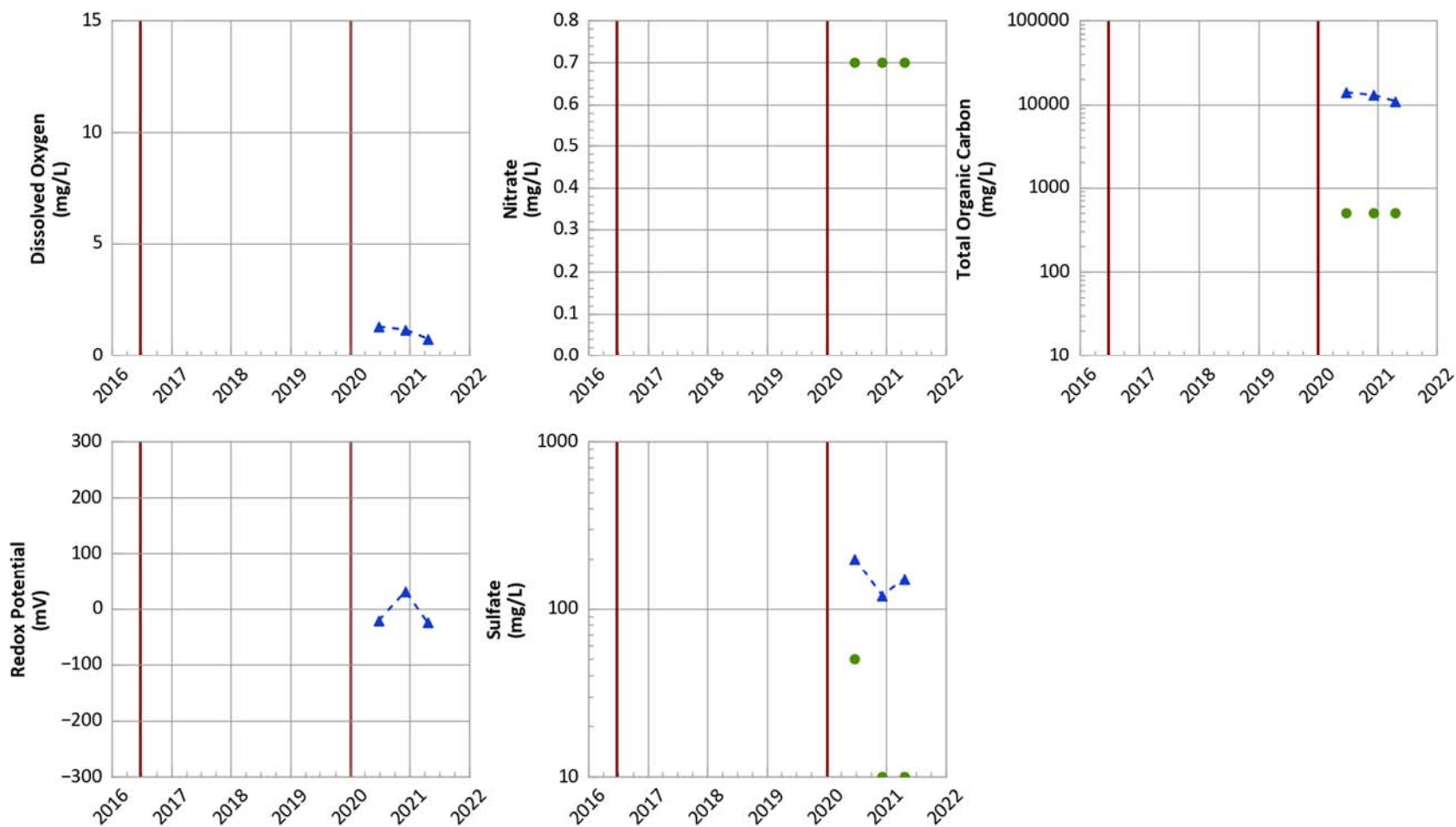
Typical Baseline Concentrations in Perched Groundwater

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



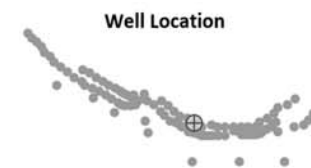
**PTX06-ISB068 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



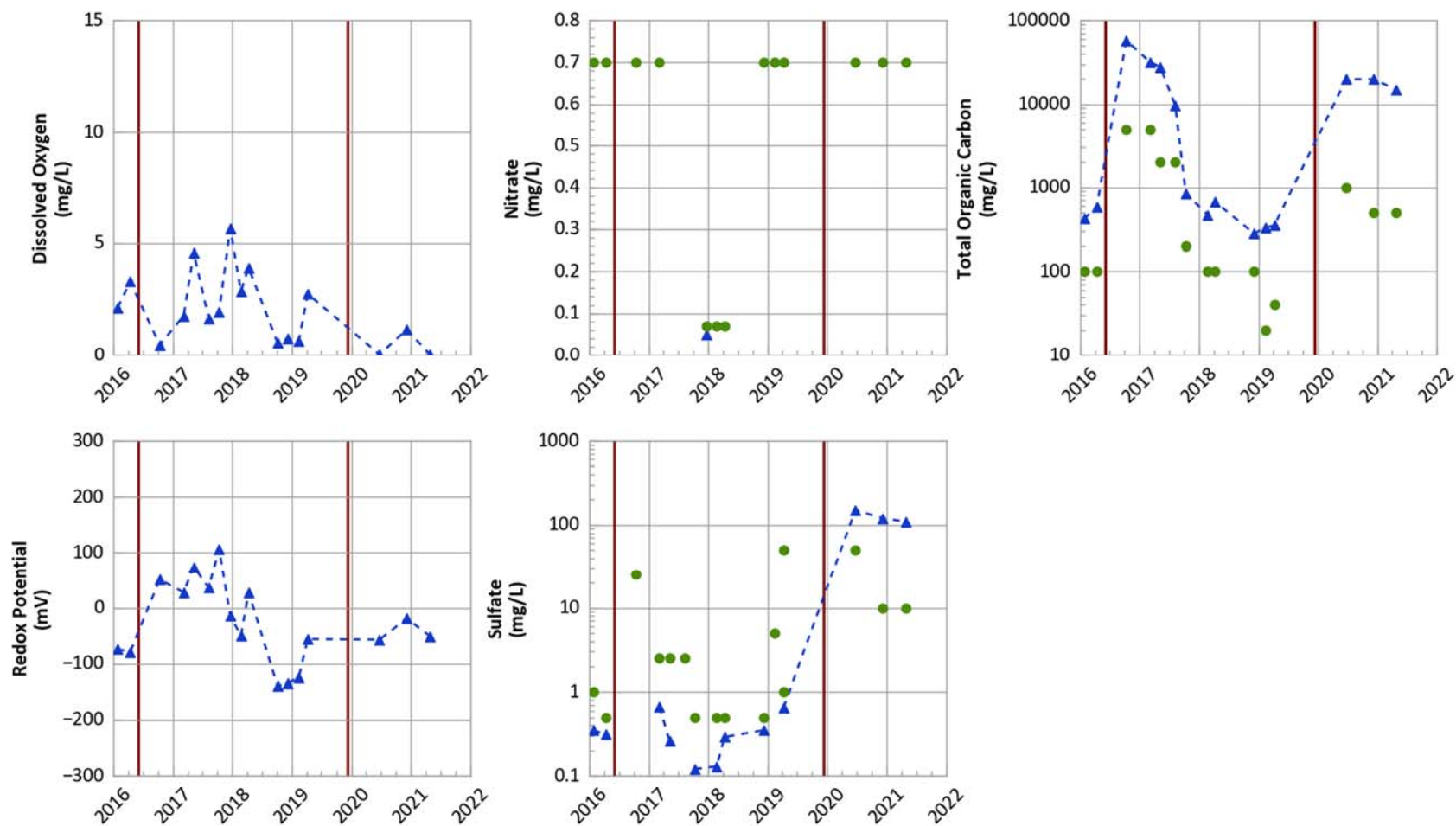
Typical Baseline Concentrations in Perched Groundwater

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**

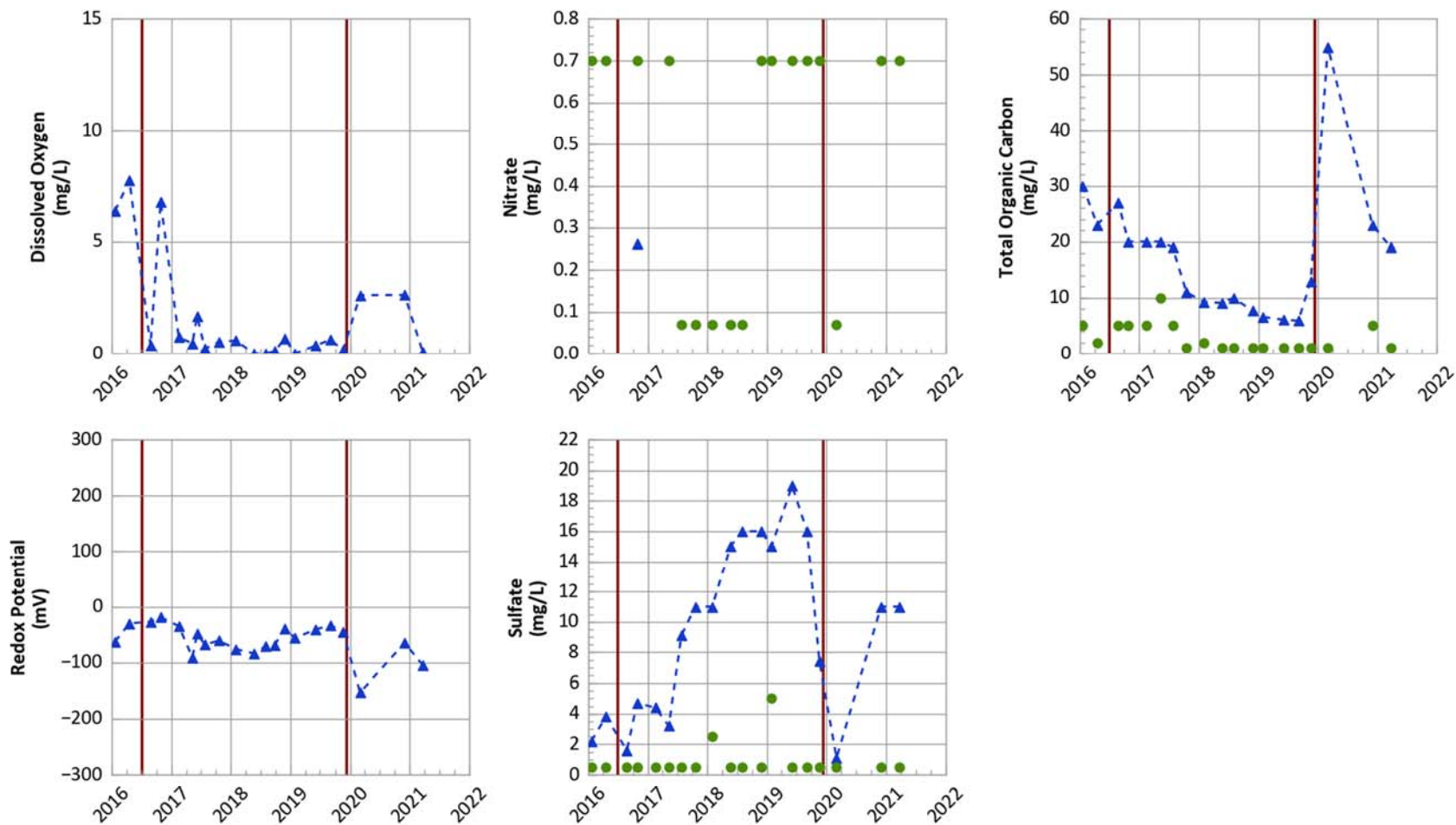


Typical Baseline Concentrations in Perched Groundwater

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



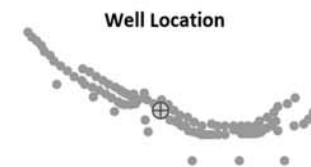
**PTX06-ISB075 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



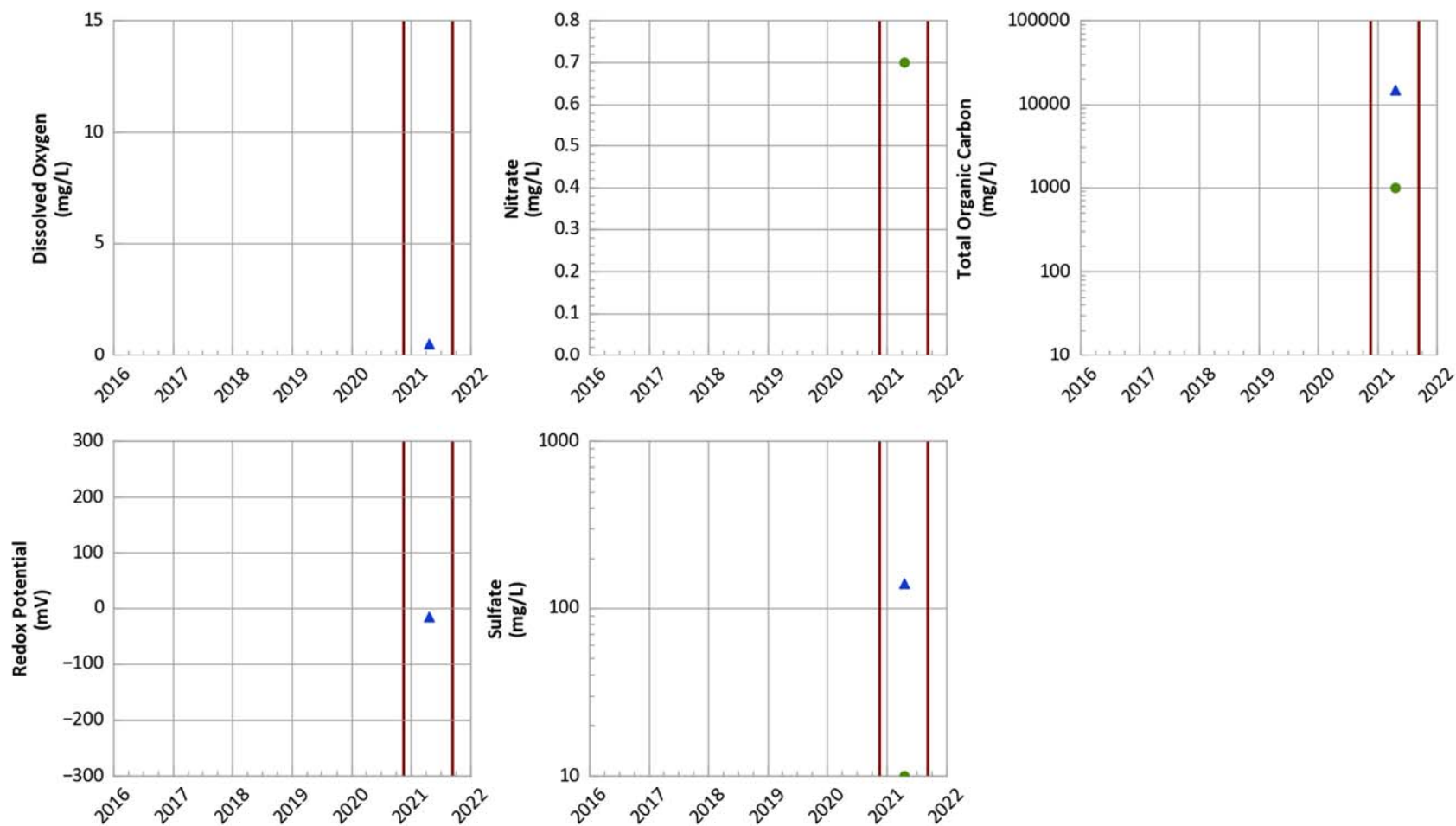
Typical Baseline Concentrations in Perched Groundwater

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



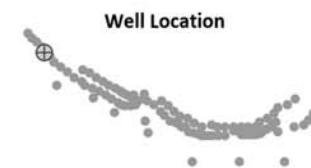
**PTX06-ISB133 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



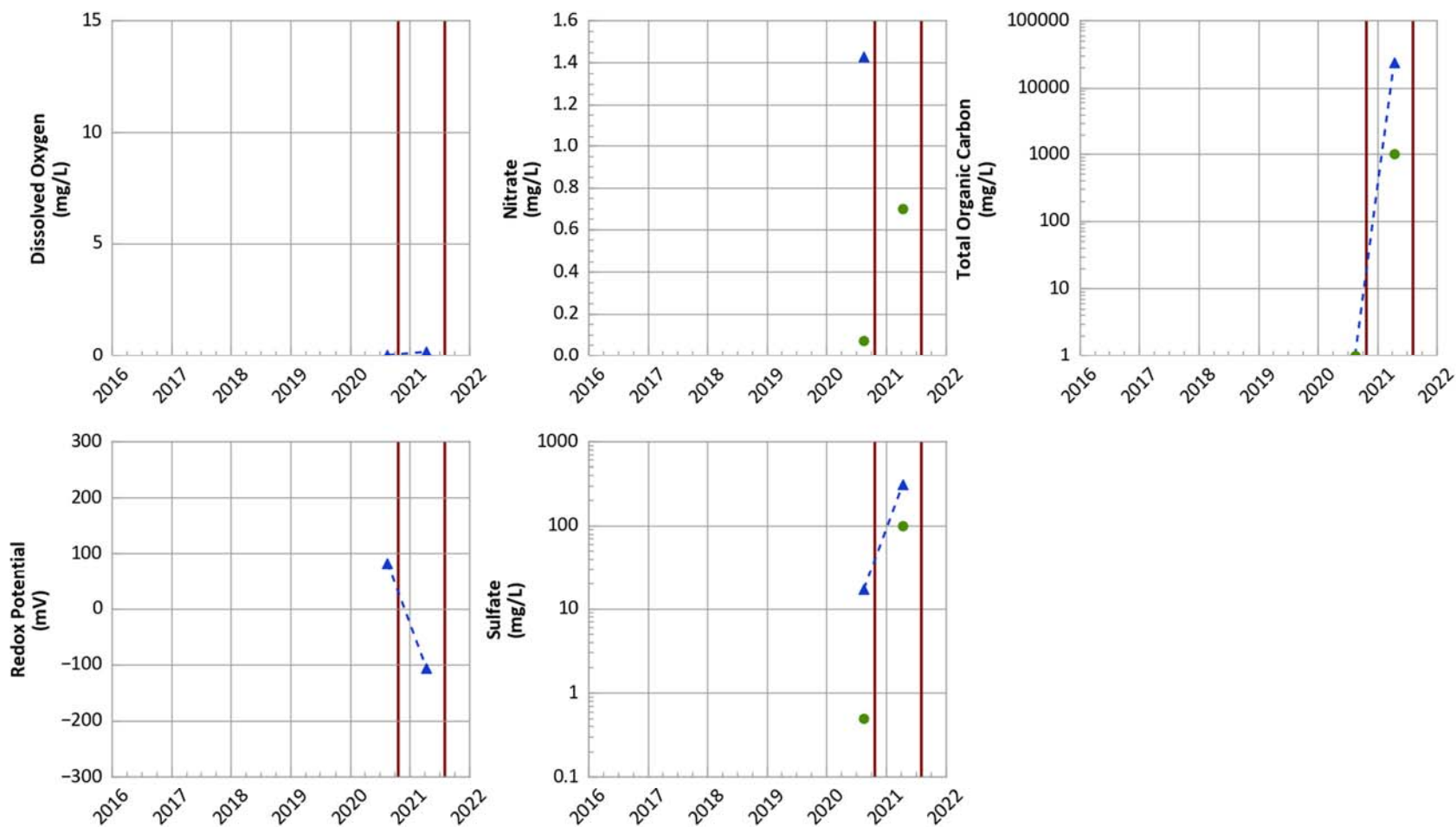
Typical Baseline Concentrations in Perched Groundwater

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



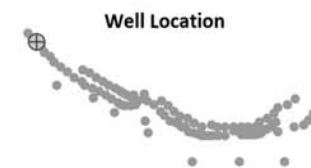
PTX06-ISB135 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



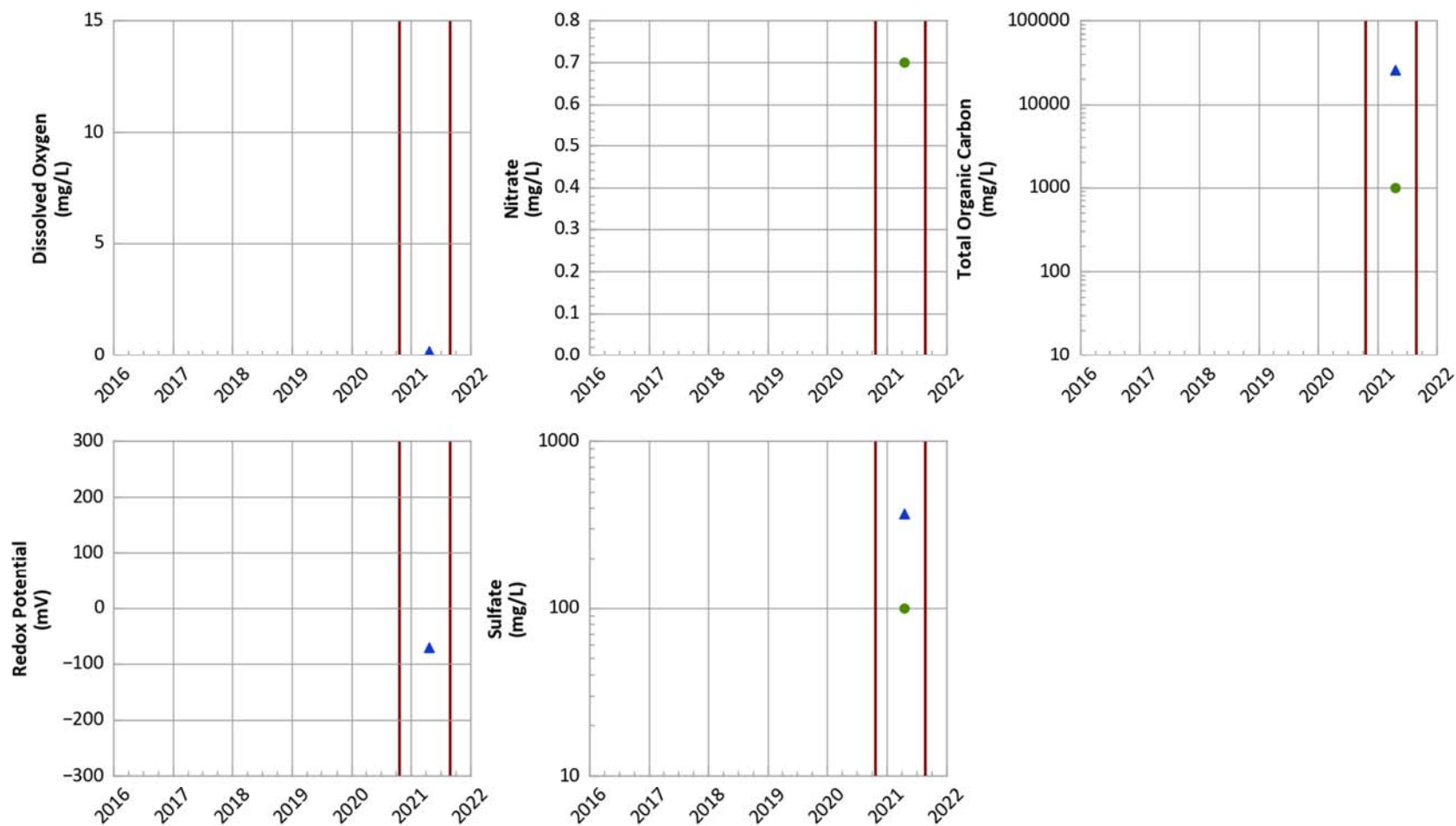
Typical Baseline Concentrations in Perched Groundwater

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



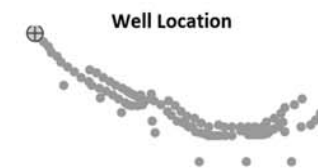
PTX06-ISB137 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



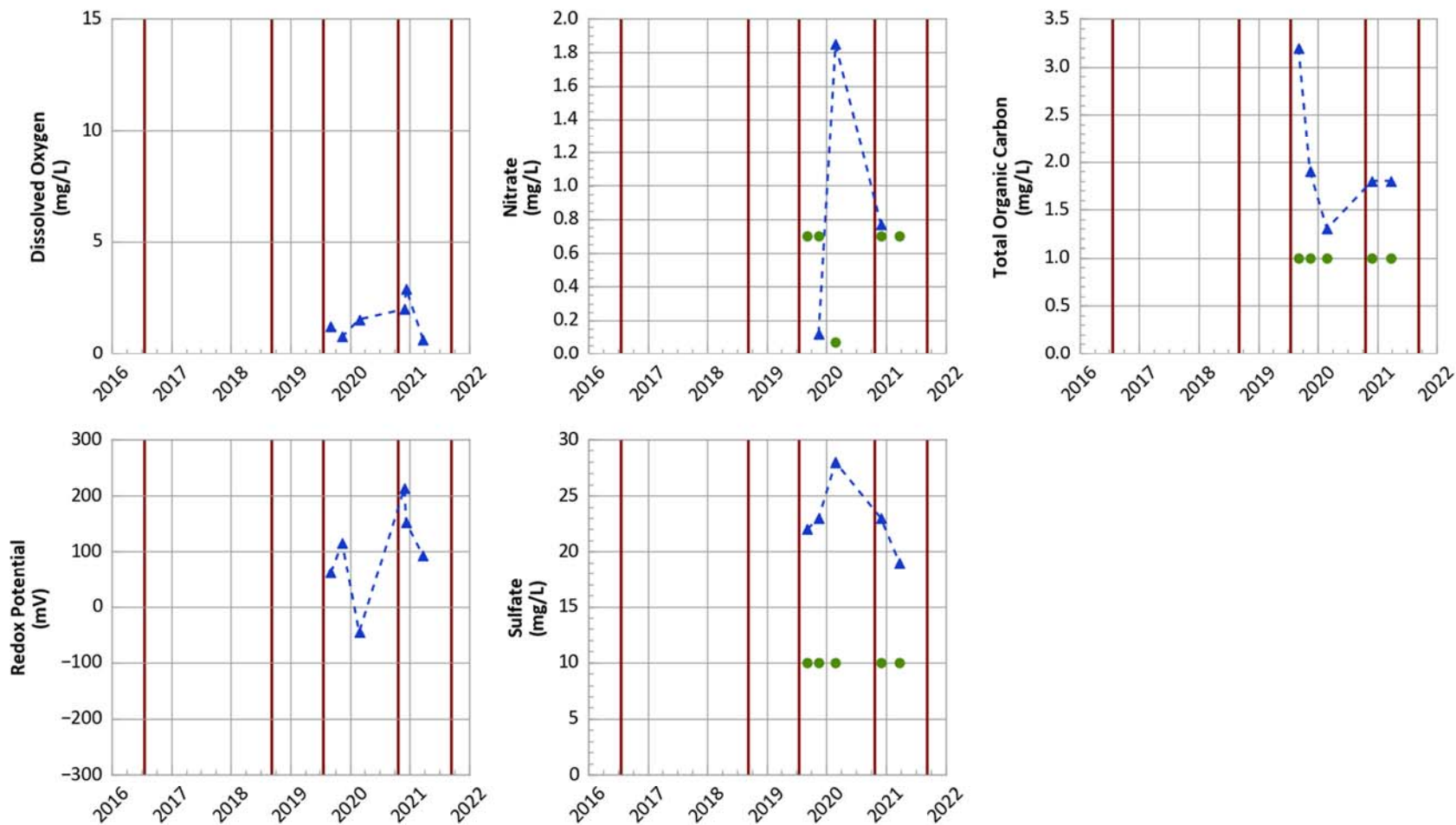
Typical Baseline Concentrations in Perched Groundwater

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



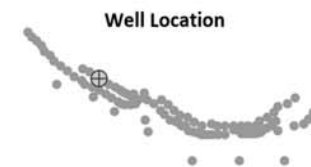
**PTX06-1164 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



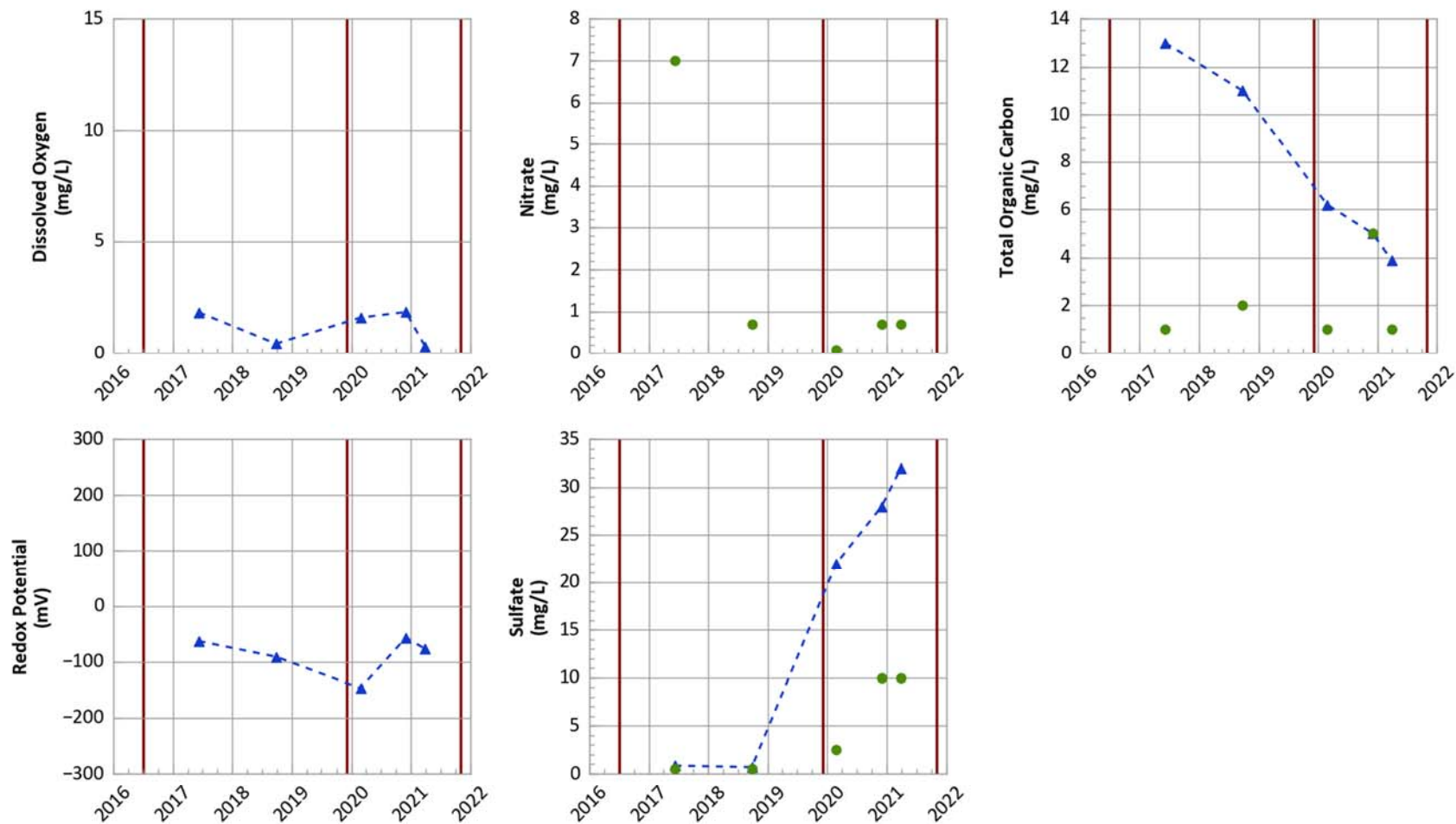
Typical Baseline Concentrations in Perched Groundwater

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



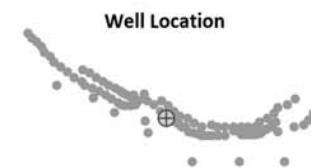
PTX06-1169 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



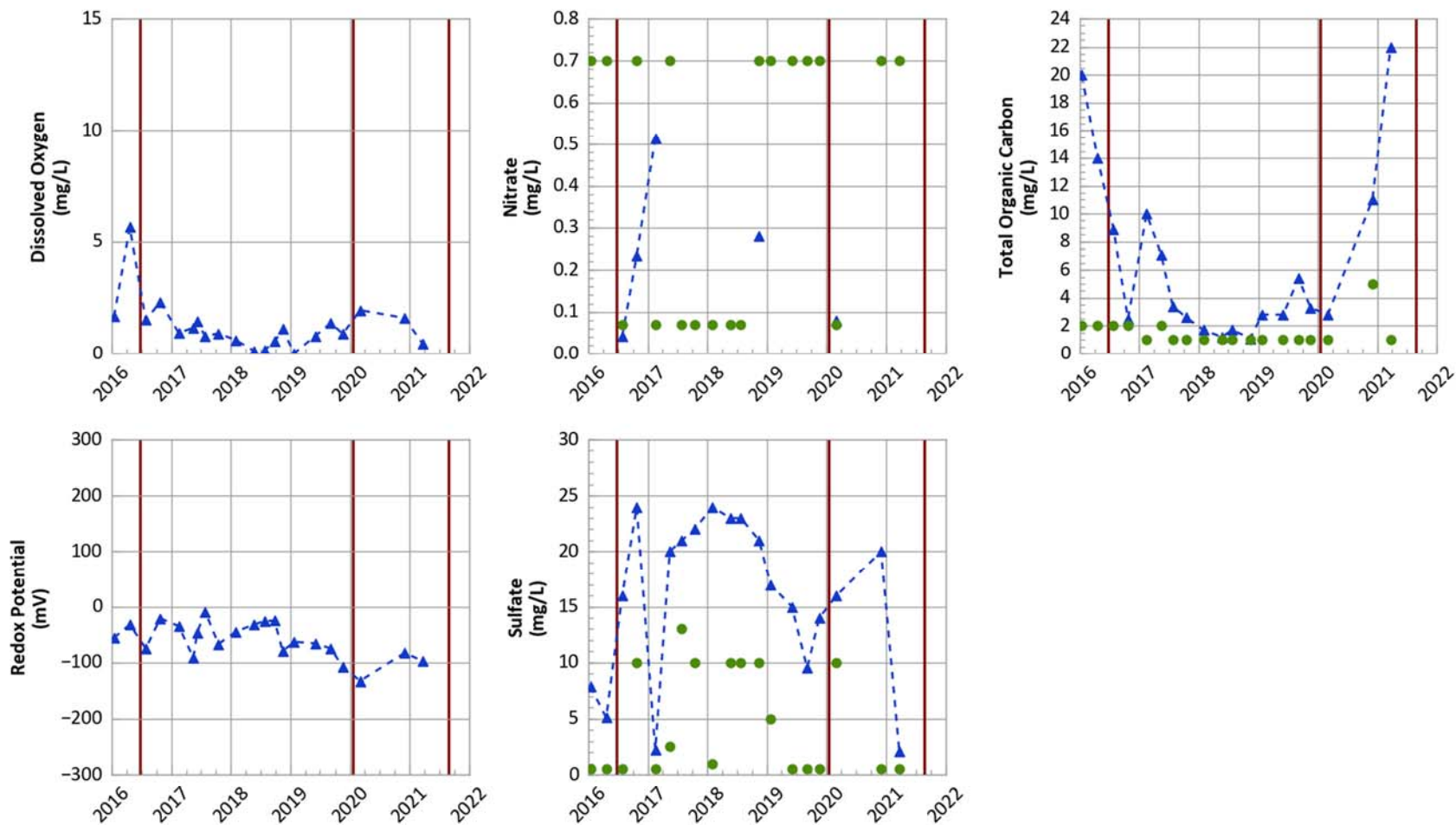
Typical Baseline Concentrations in Perched Groundwater

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



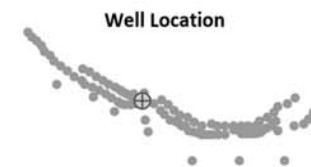
**PTX06-1170 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



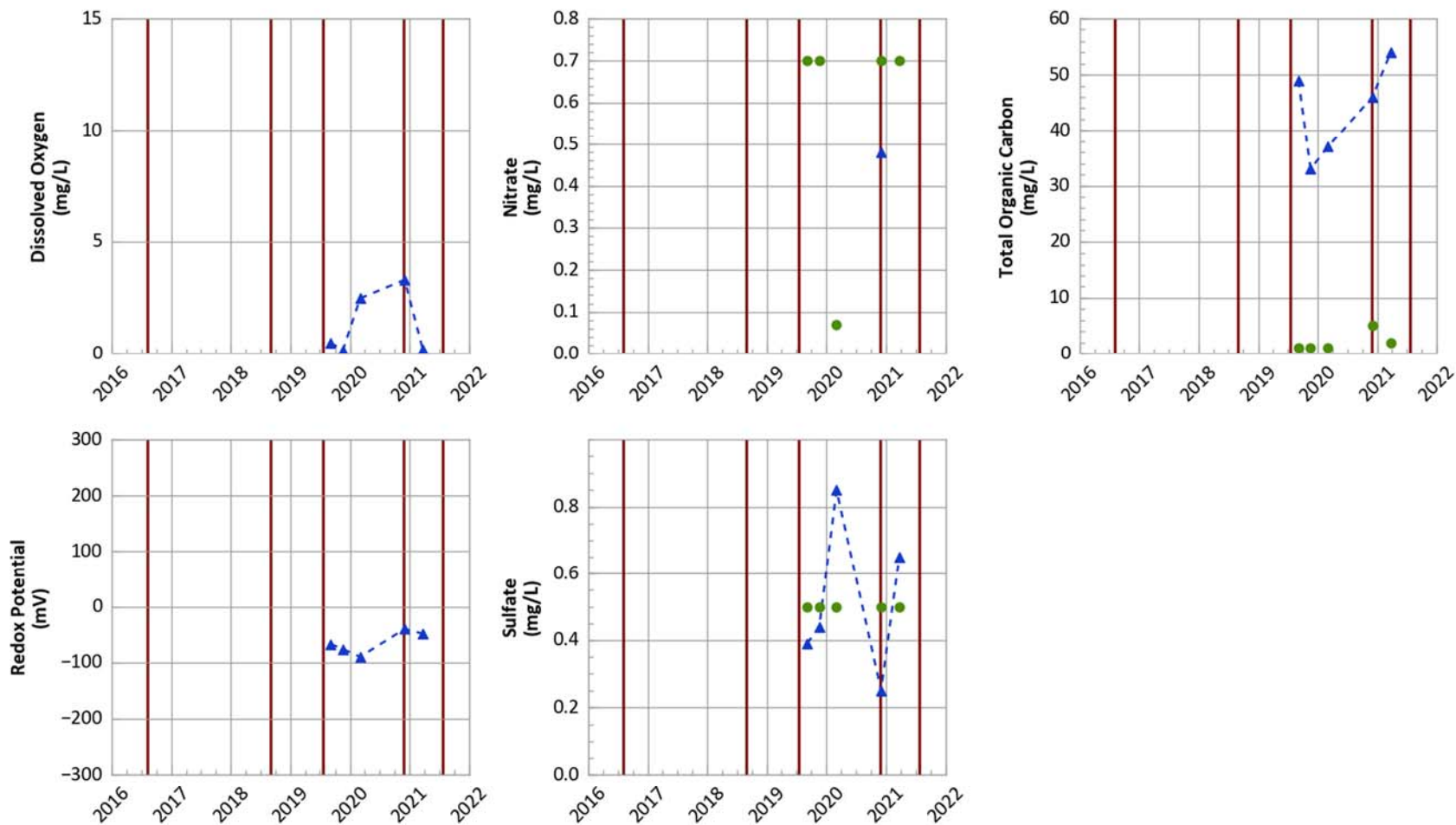
Typical Baseline Concentrations in Perched Groundwater

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



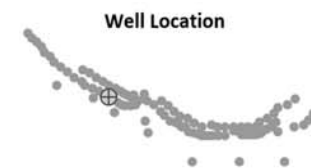
PTX06-1176 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



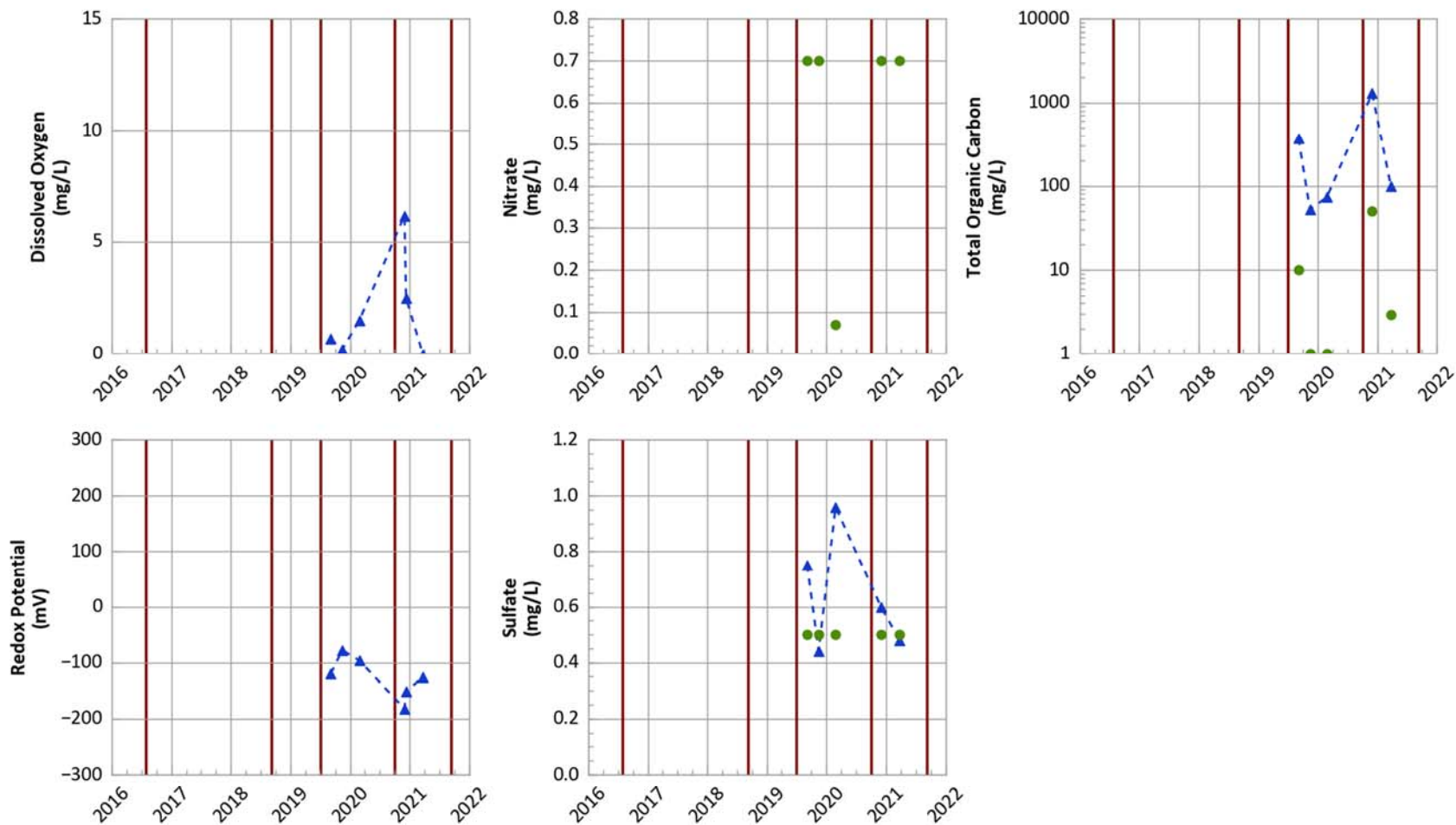
Typical Baseline Concentrations in Perched Groundwater

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



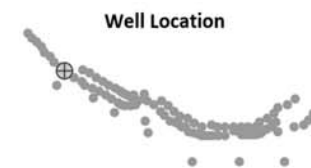
PTX06-1177 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



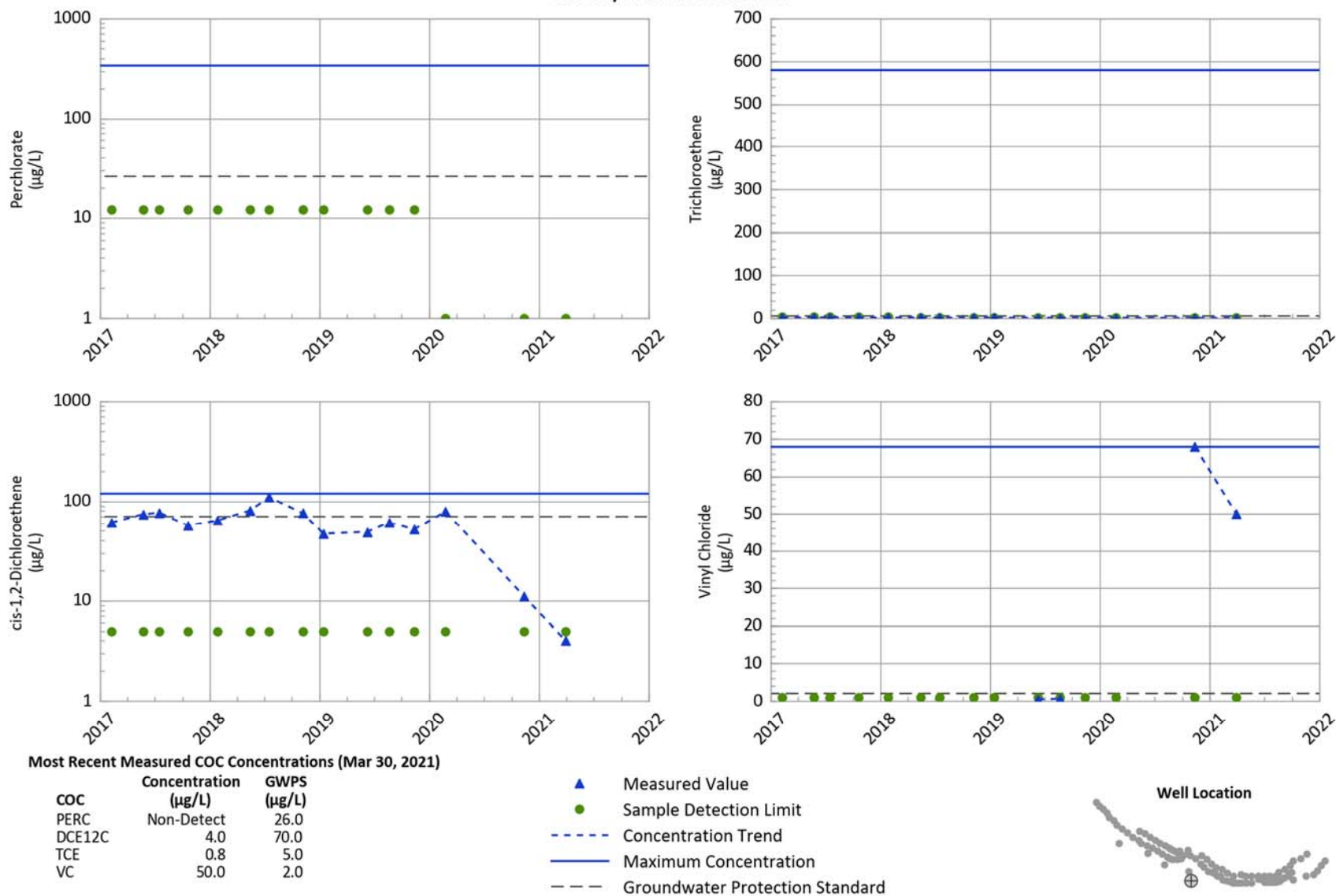
Typical Baseline Concentrations in Perched Groundwater

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

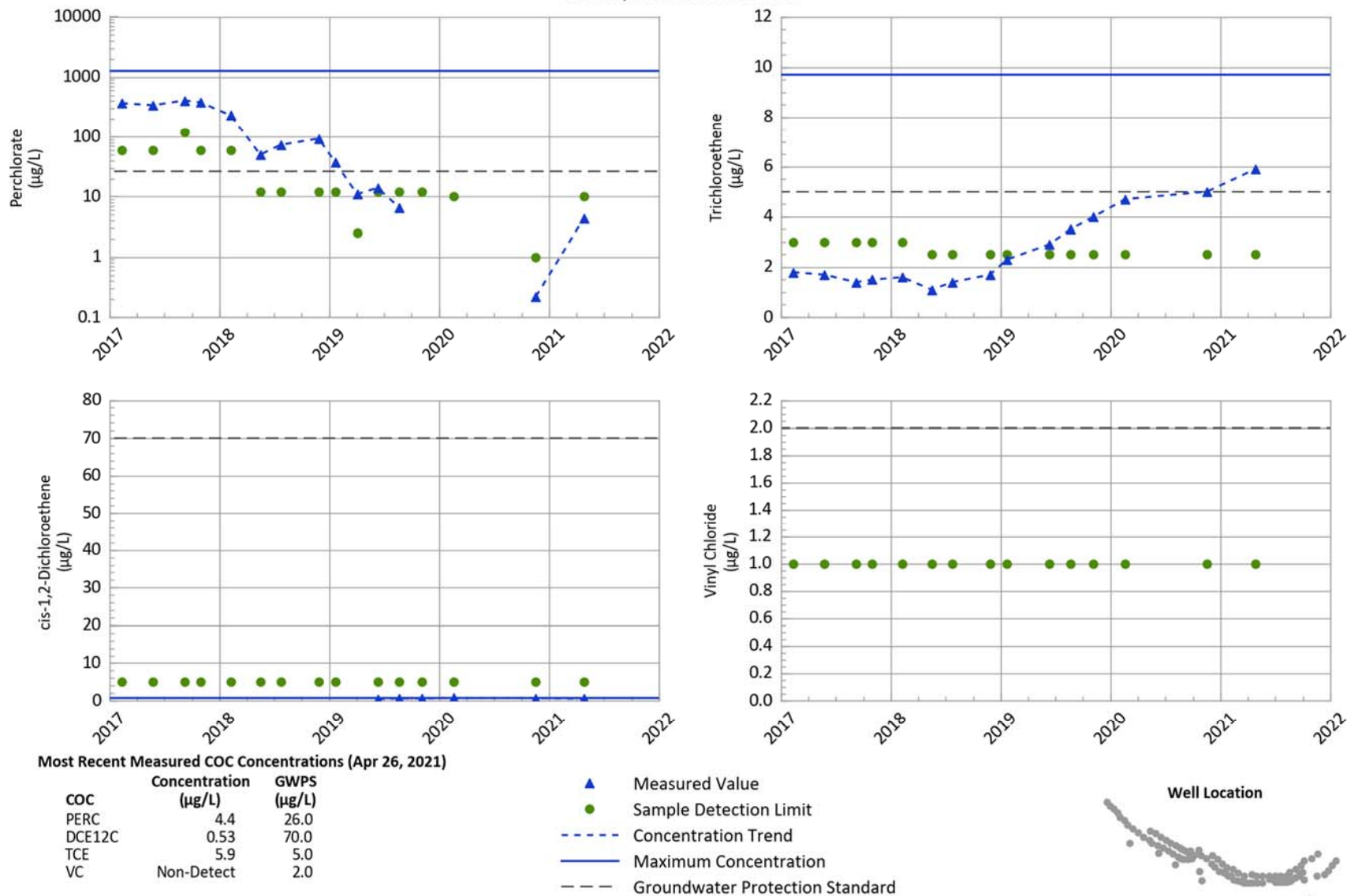
- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Injection Dates



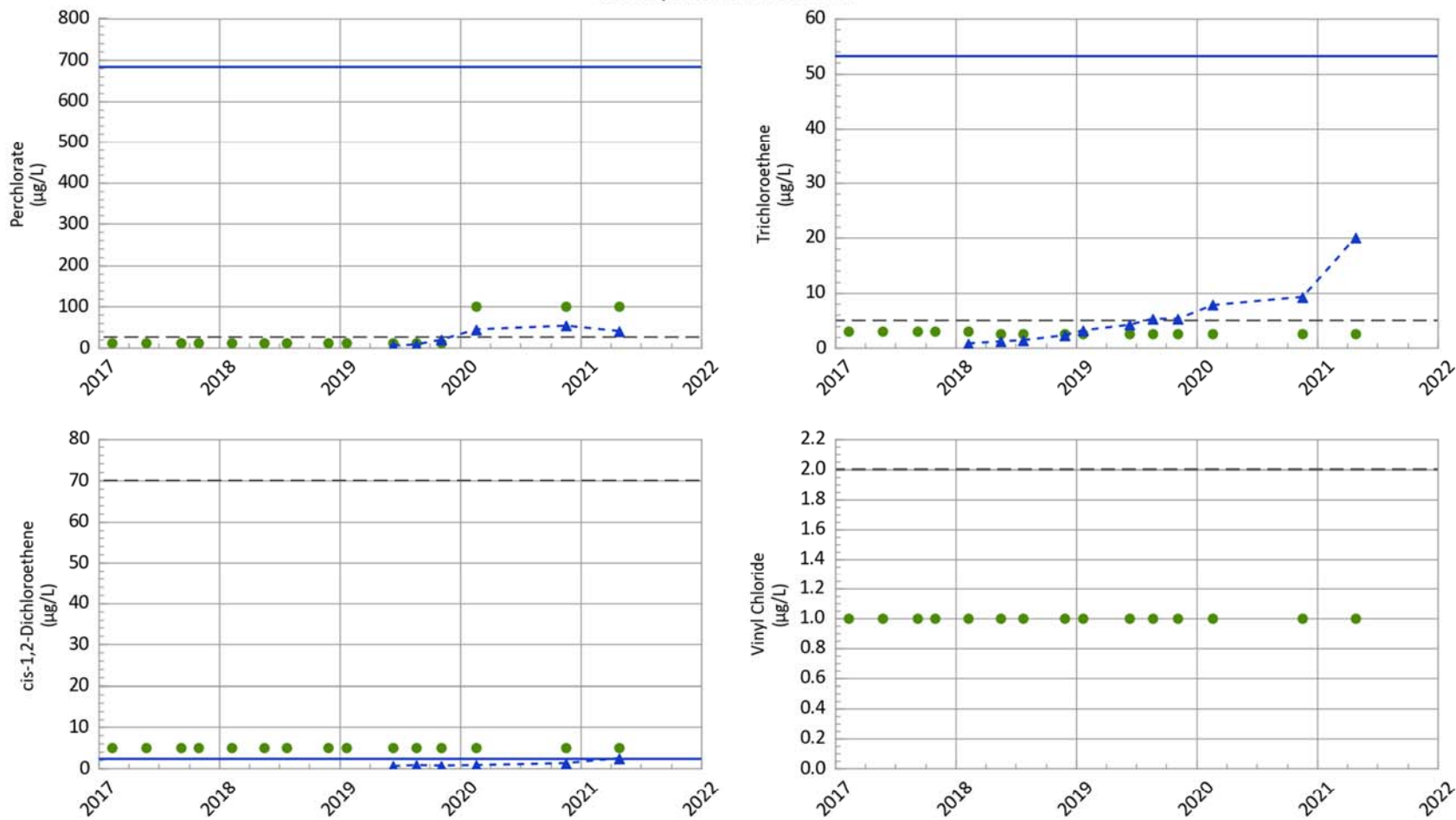
**PTX06-1012 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



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



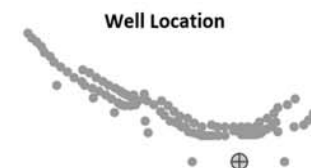
**PTX06-1149 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



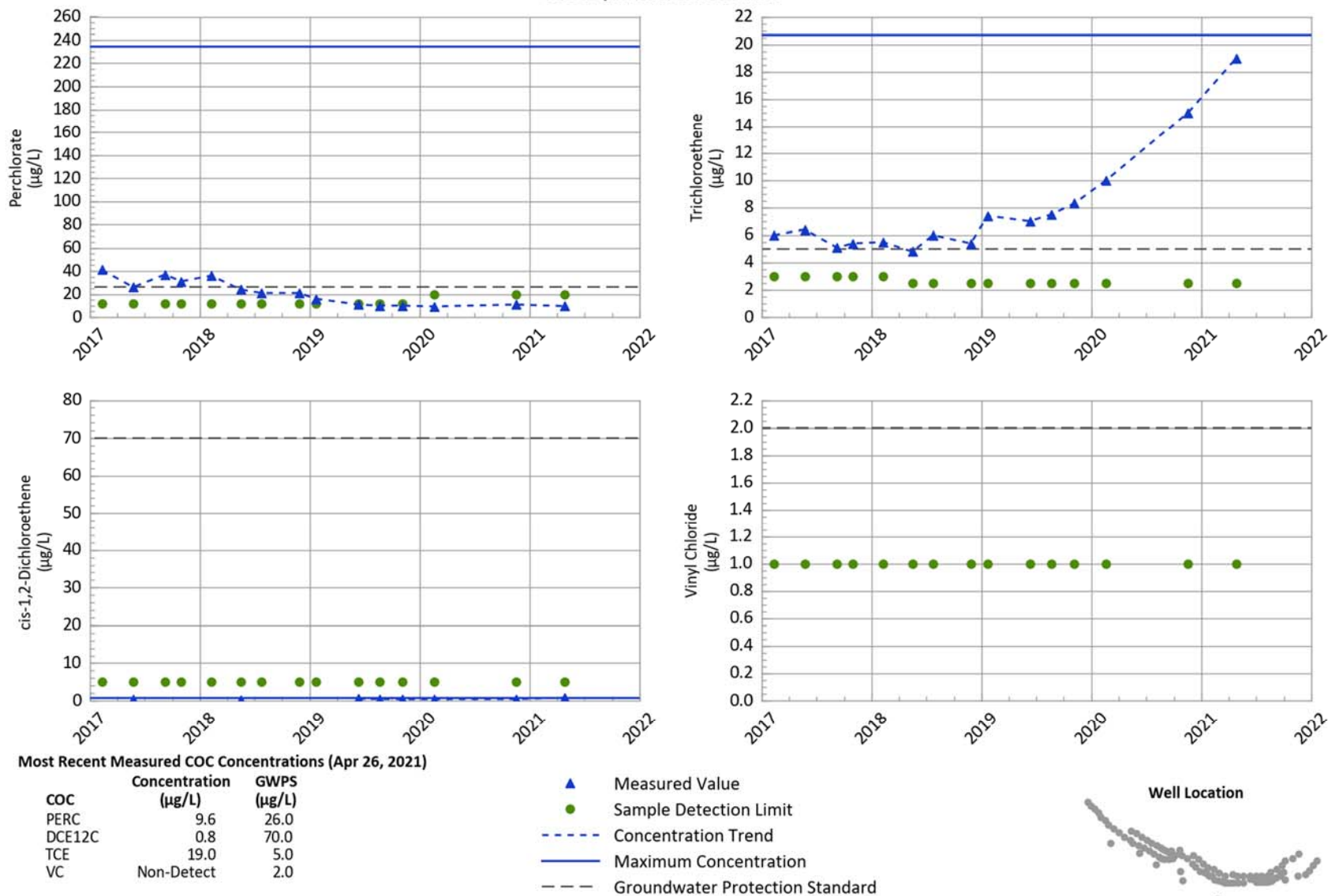
Most Recent Measured COC Concentrations (Apr 26, 2021)

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

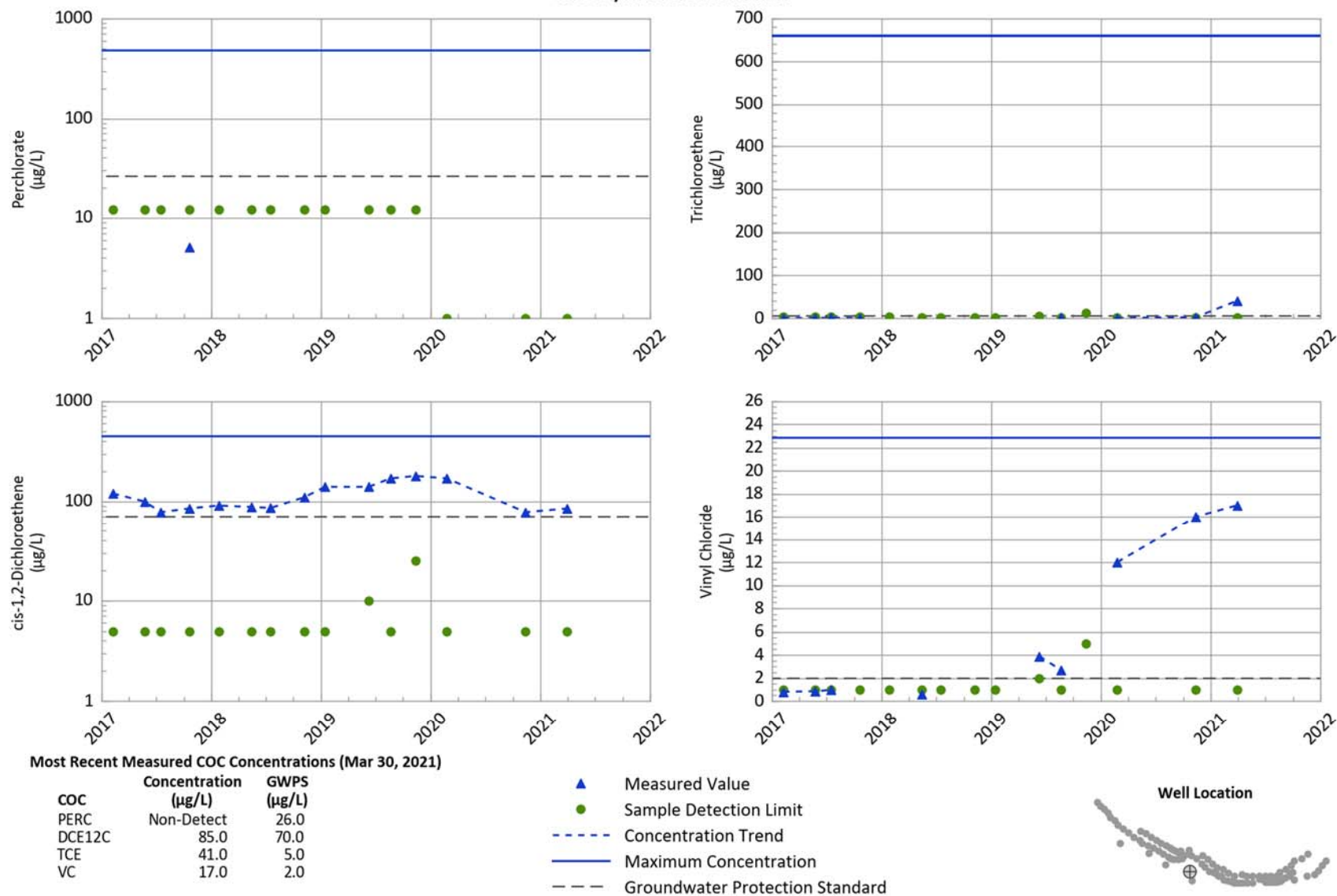
- ▲ Measured Value
- Sample Detection Limit
- - - Concentration Trend
- Maximum Concentration
- - - Groundwater Protection Standard



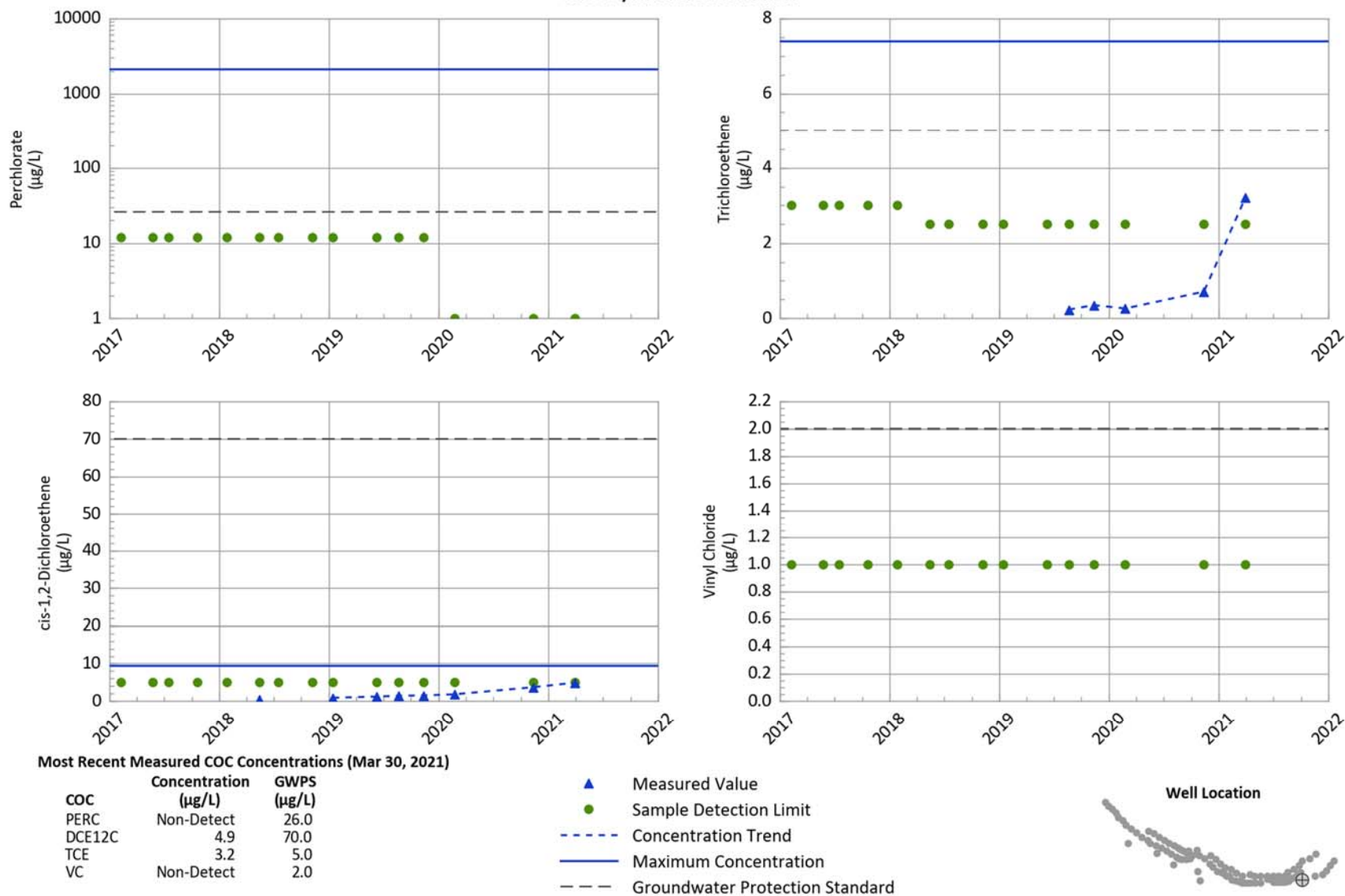
**PTX06-1150 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



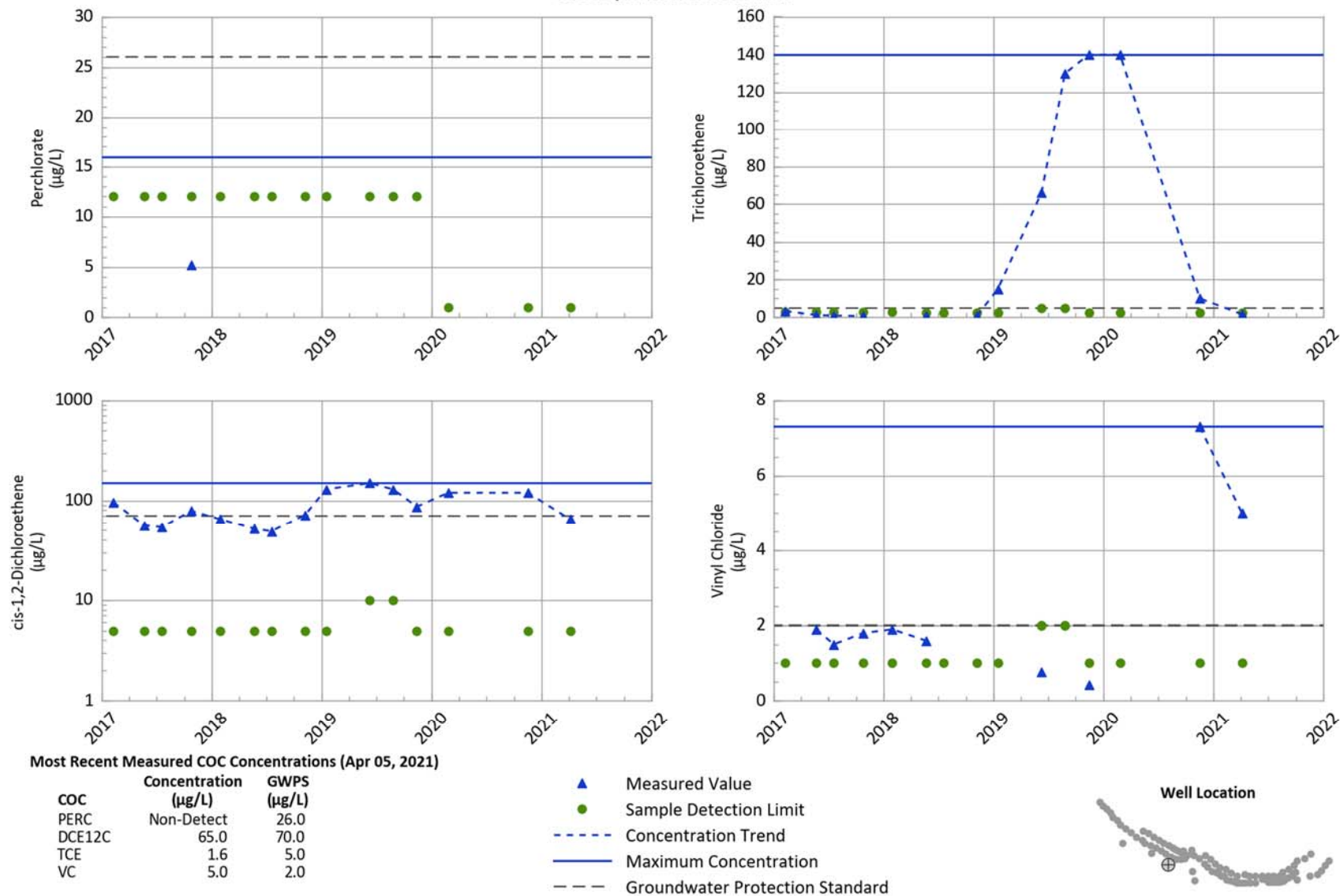
**PTX06-1155 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



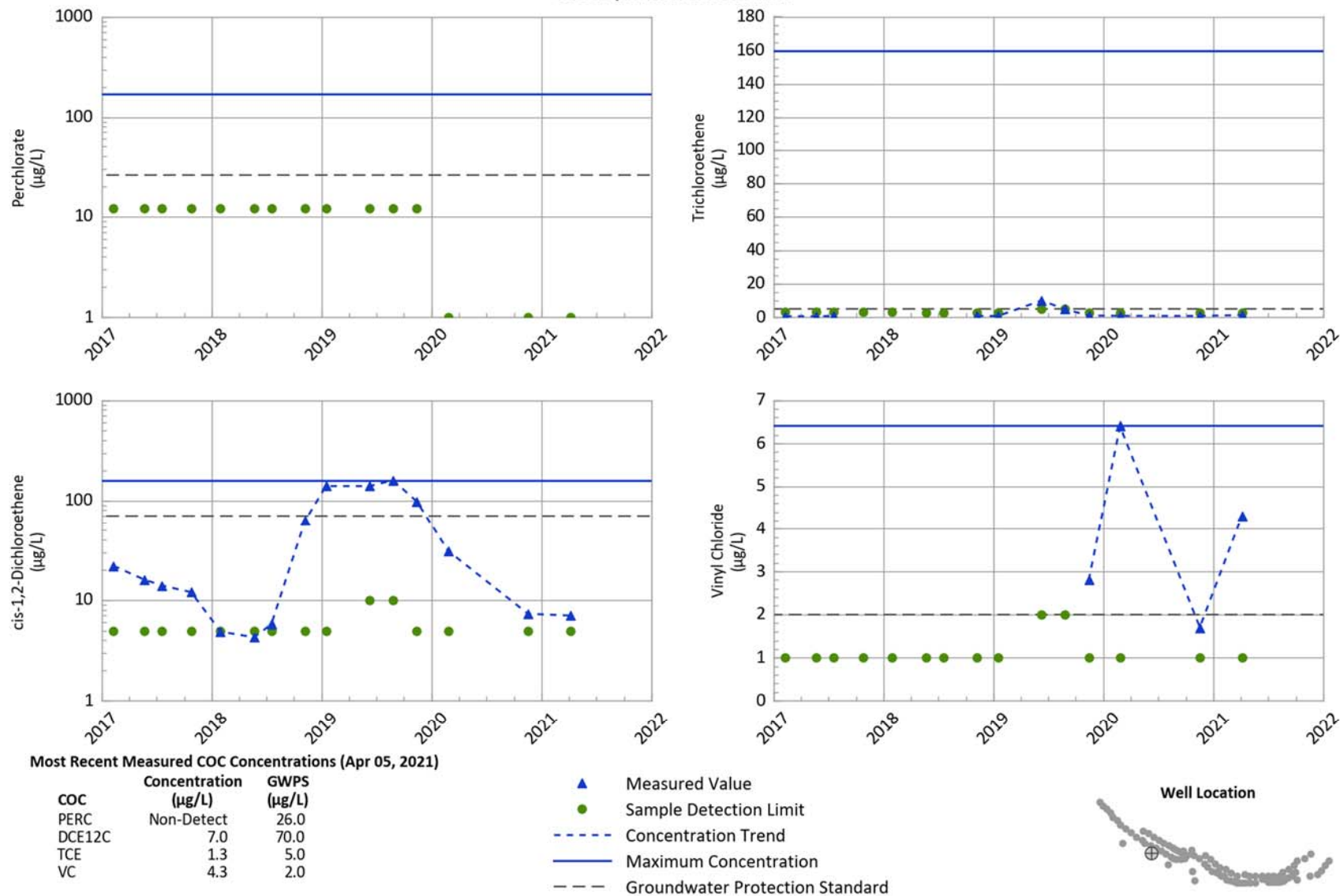
**PTX06-1156 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



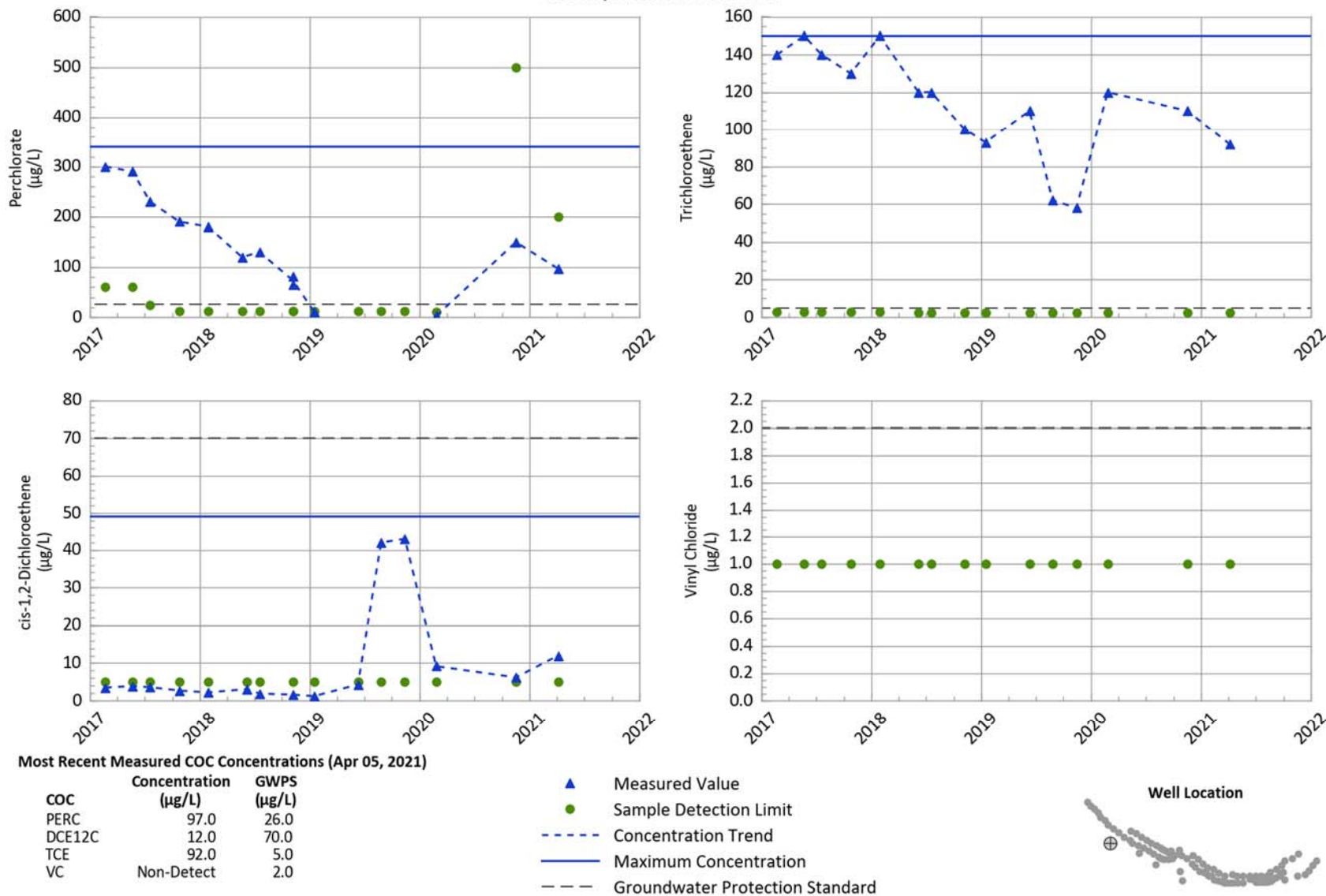
**PTX06-1173 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



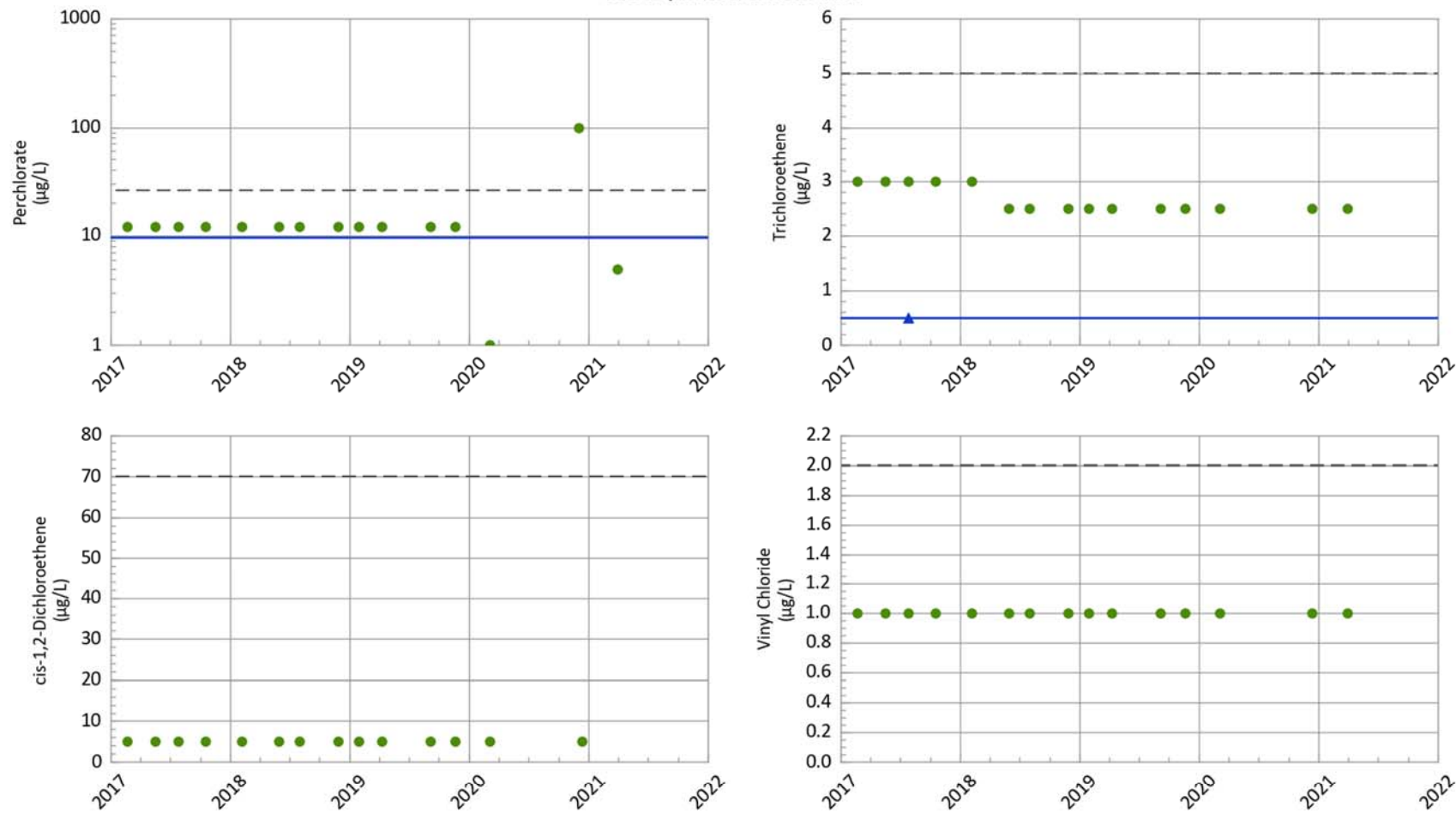
**PTX06-1174 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



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



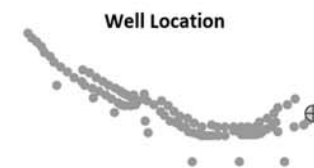
**PTX06-ISB079 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



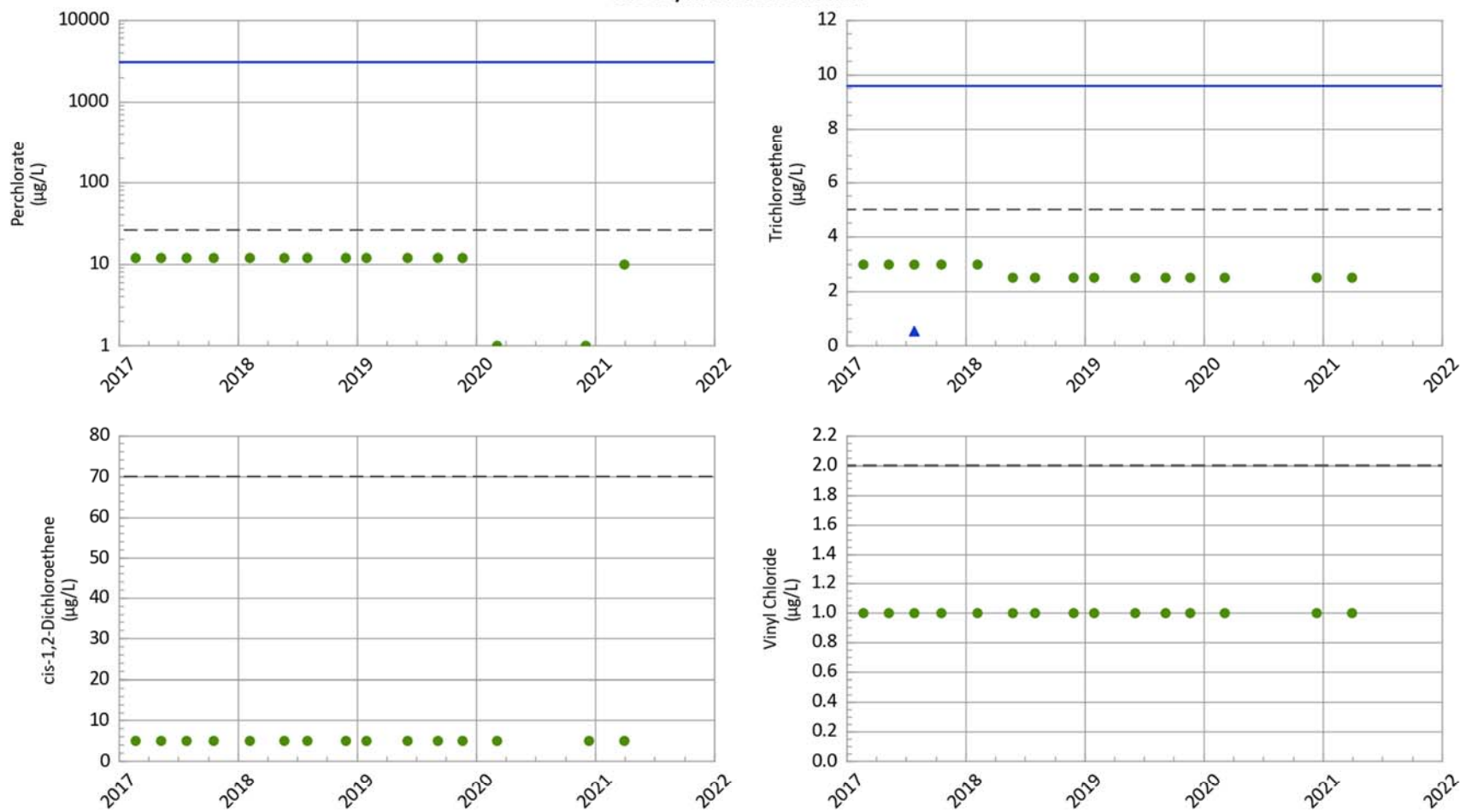
Most Recent Measured COC Concentrations (Mar 29, 2021)

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



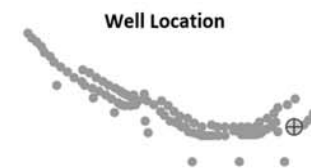
**PTX06-ISB082 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



Most Recent Measured COC Concentrations (Mar 29, 2021)

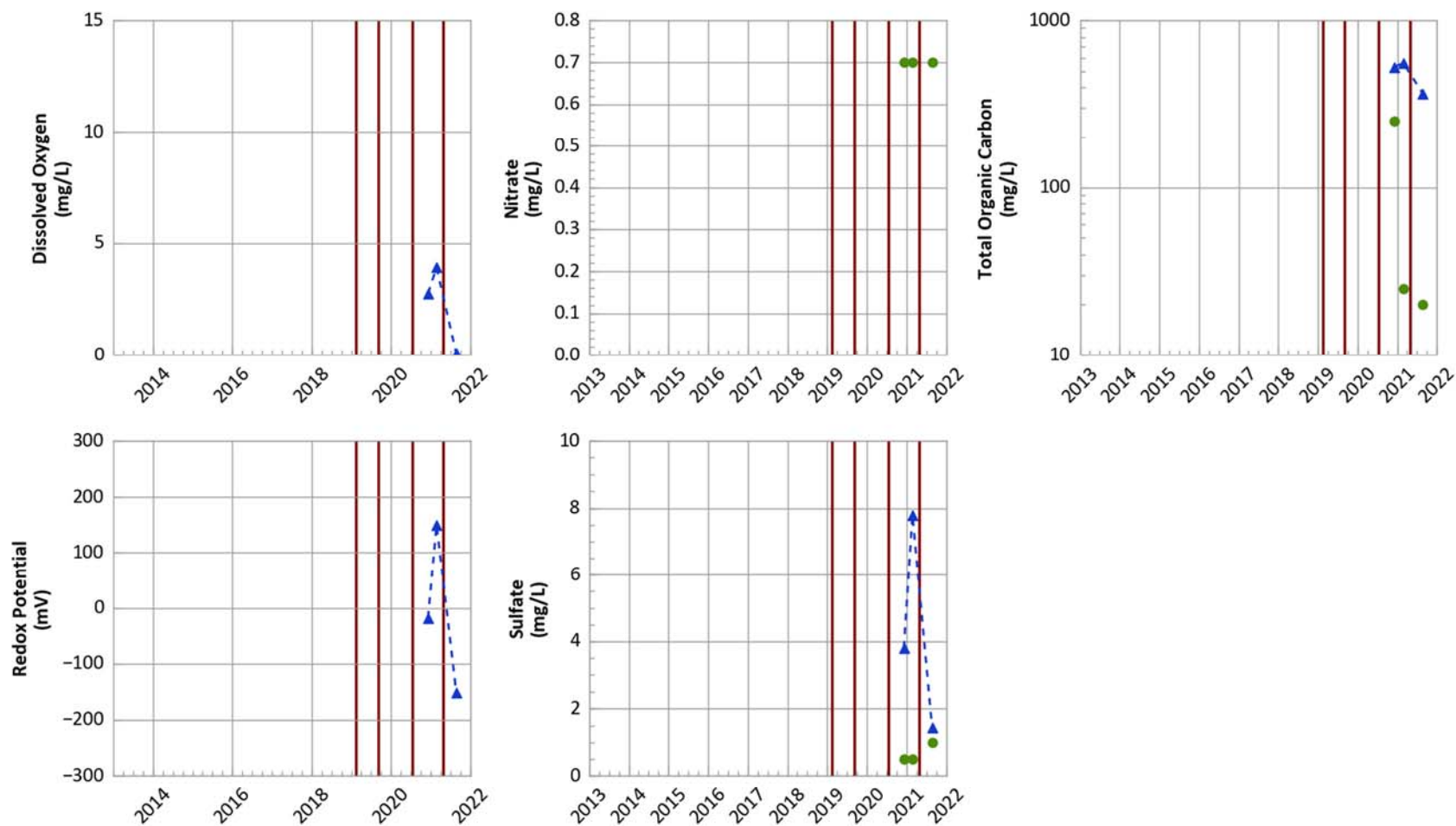
COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
PERC	Non-Detect	26.0
DCE12C	Non-Detect	70.0
TCE	Non-Detect	5.0
VC	Non-Detect	2.0

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



Southeast ISB Extension

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



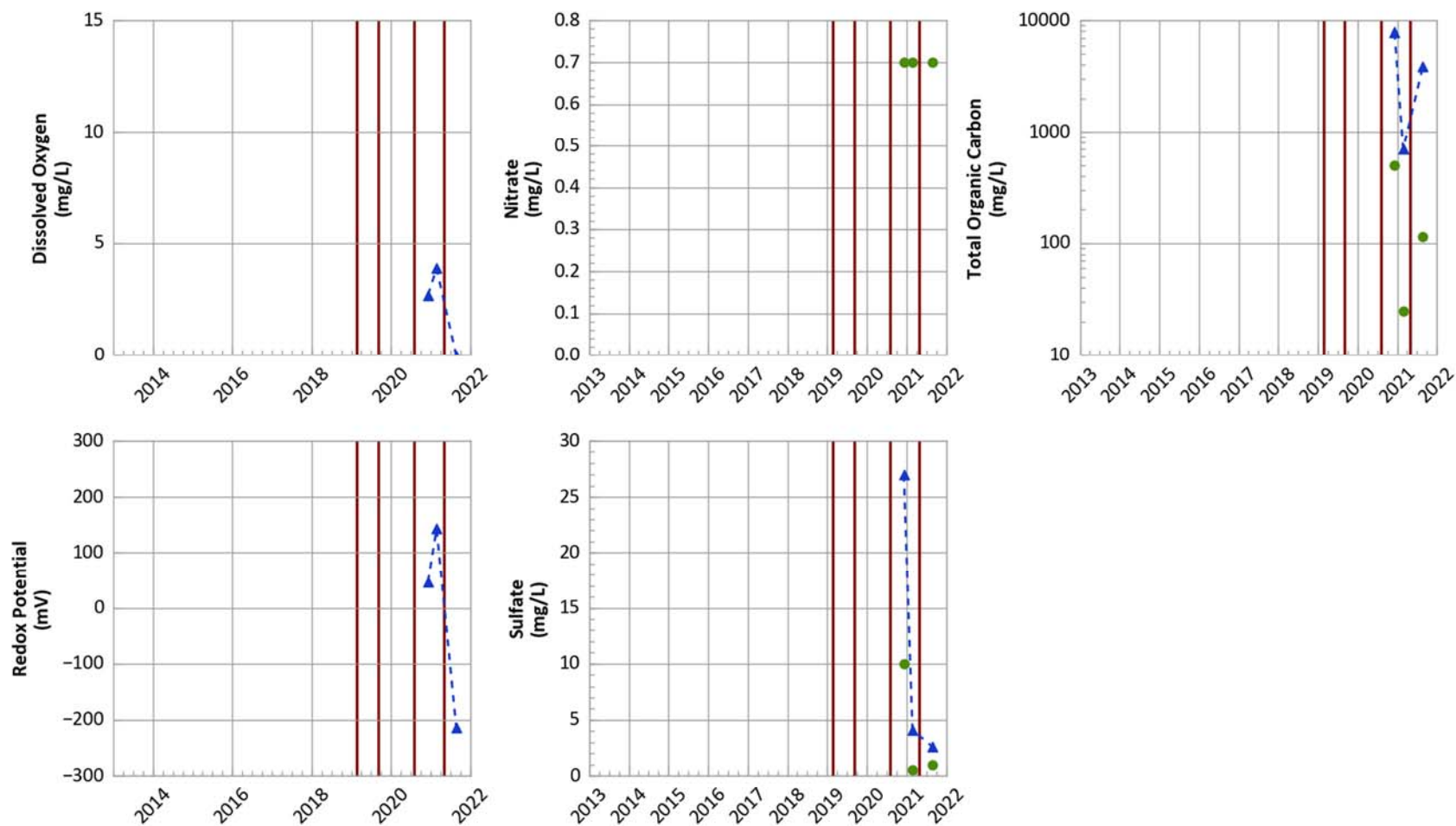
Typical Baseline Concentrations in Perched Groundwater

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



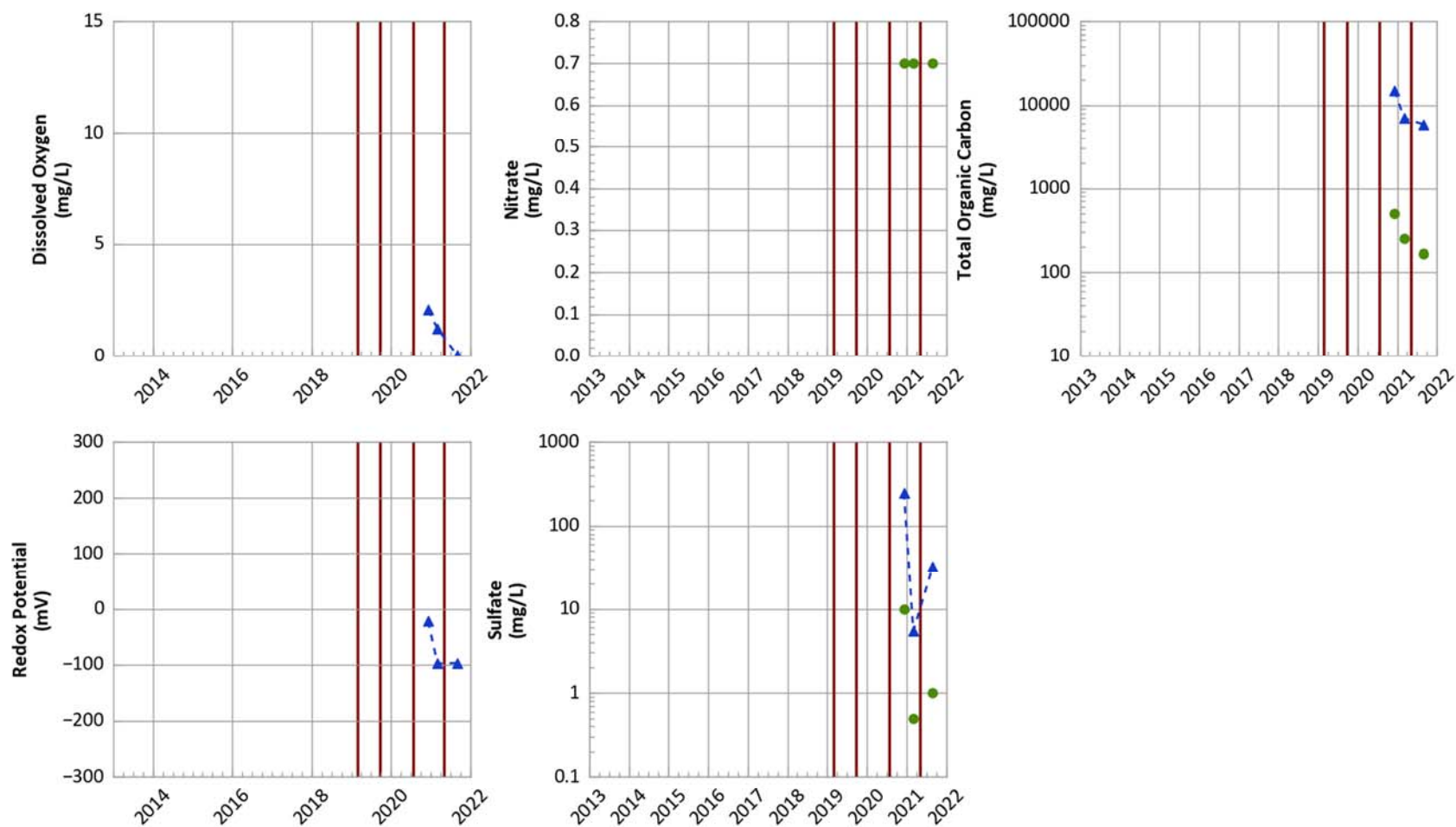
Typical Baseline Concentrations in Perched Groundwater

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



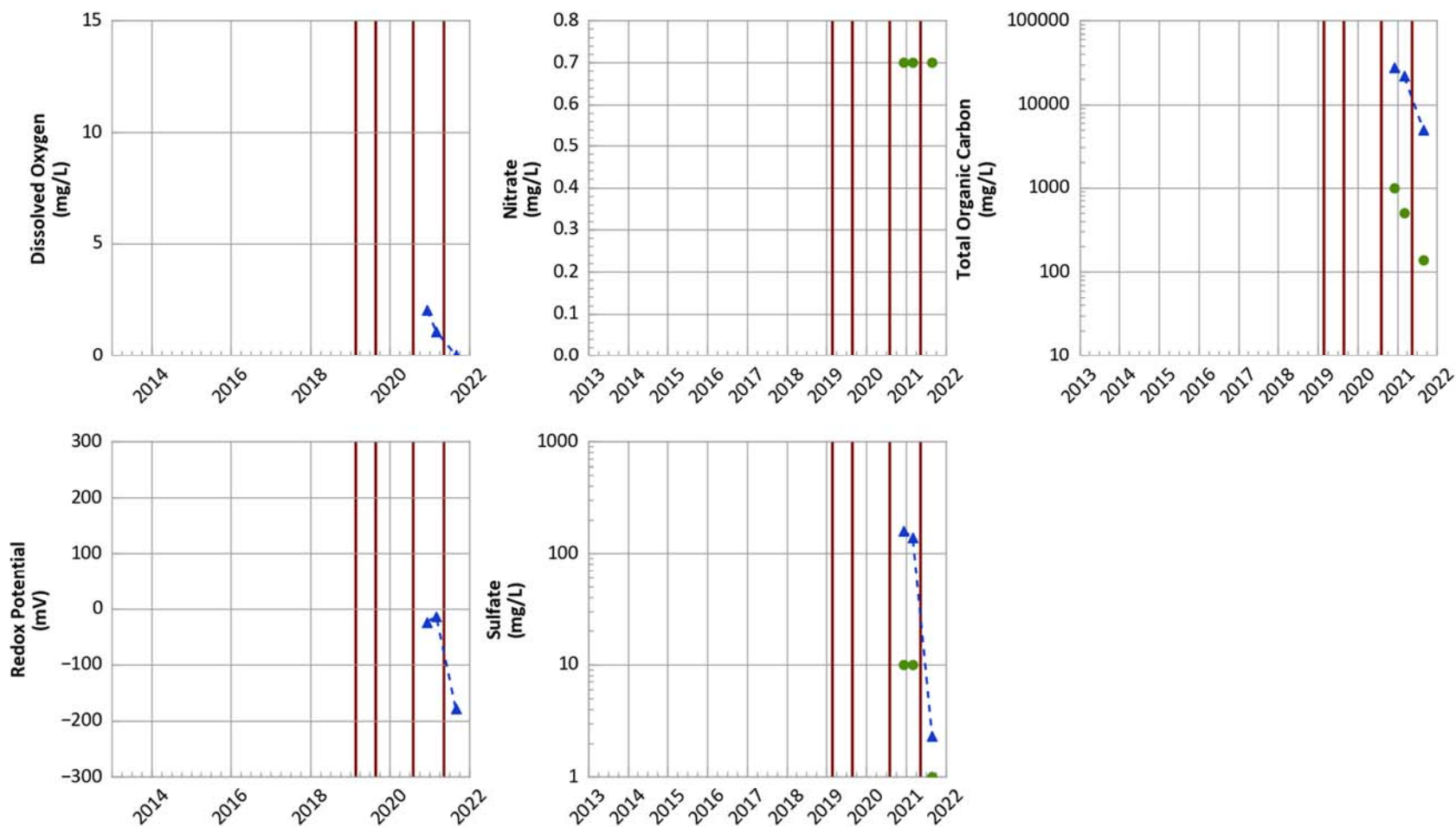
Typical Baseline Concentrations in Perched Groundwater

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



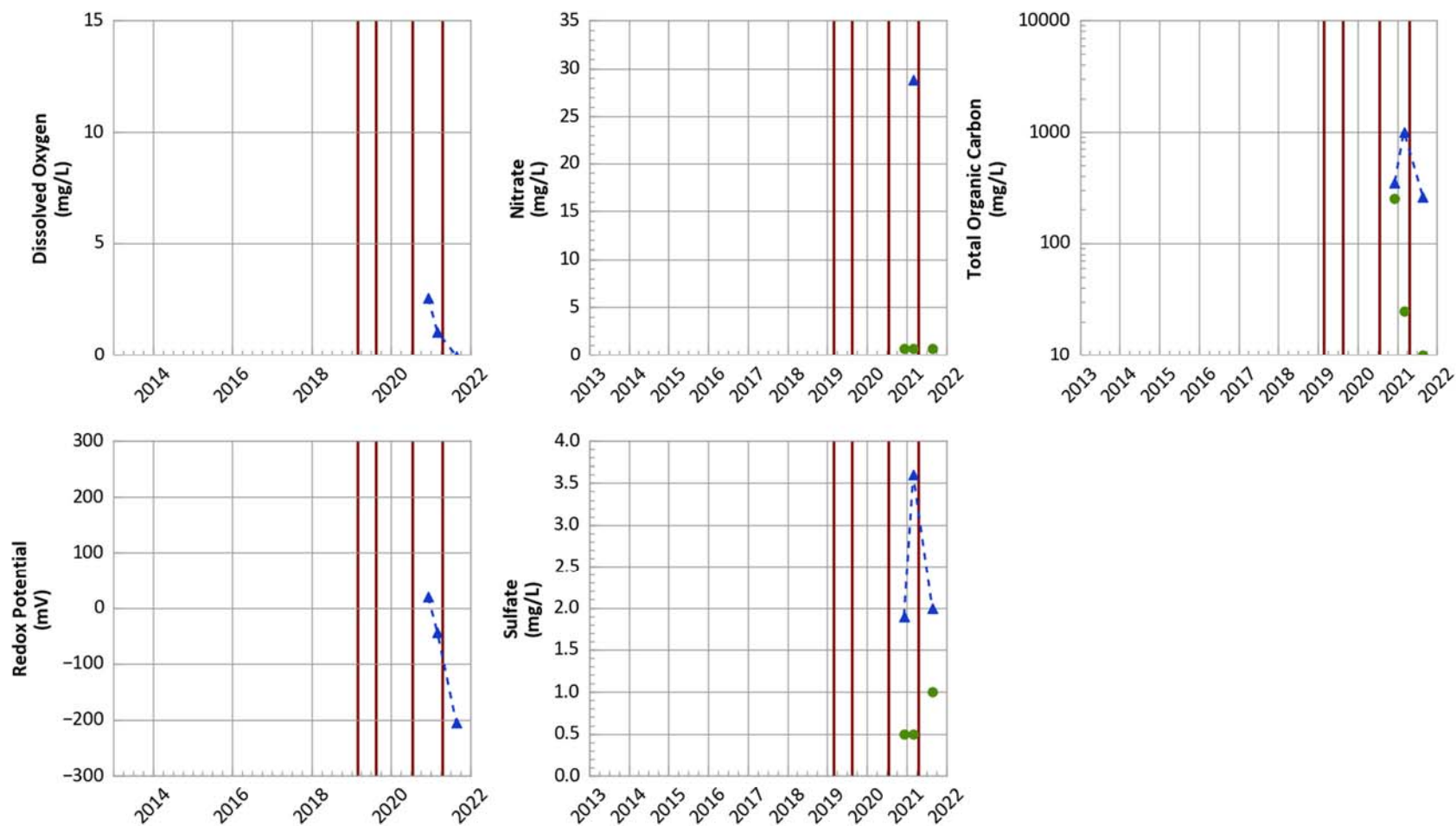
Typical Baseline Concentrations in Perched Groundwater

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



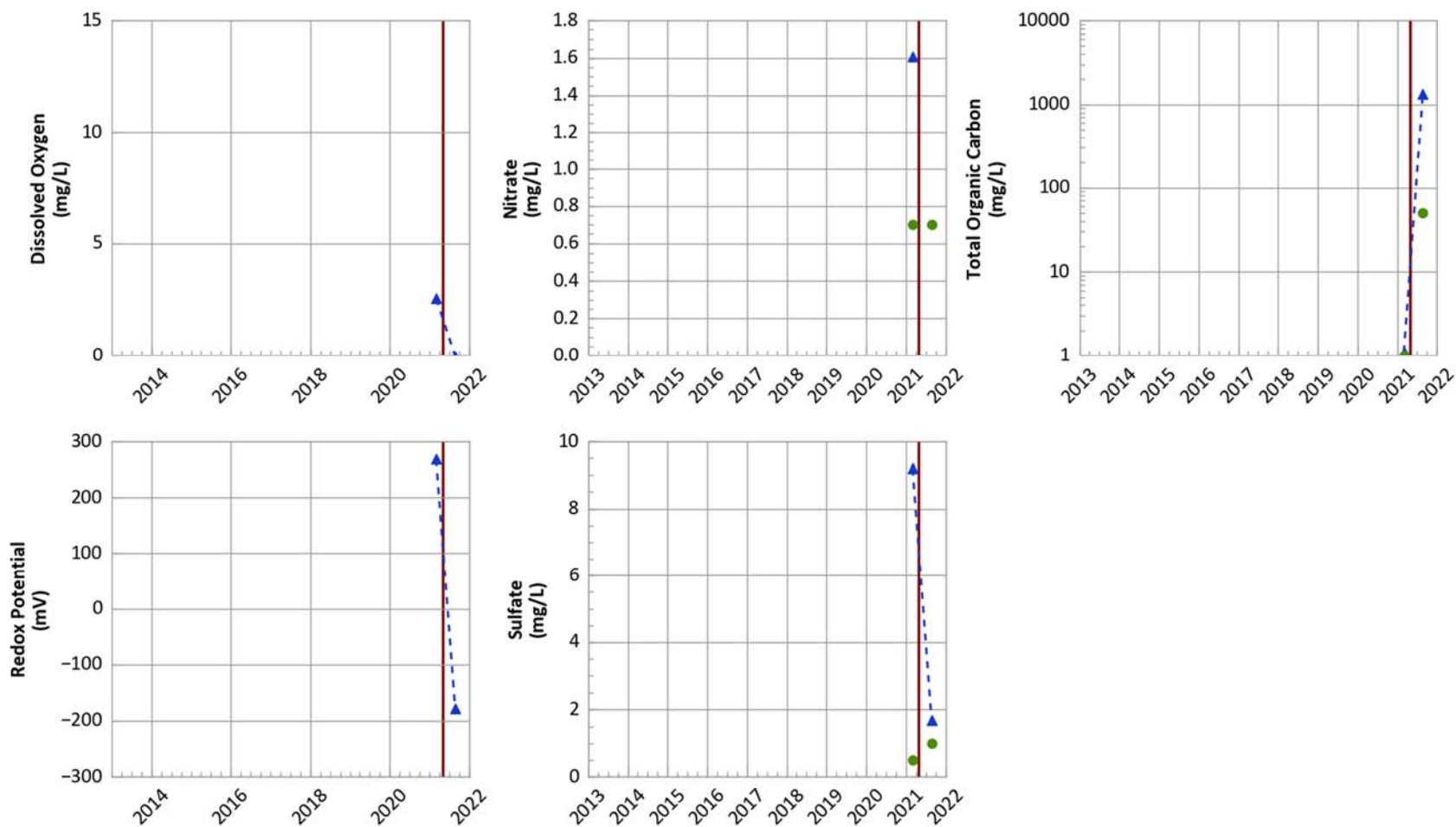
Typical Baseline Concentrations in Perched Groundwater

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



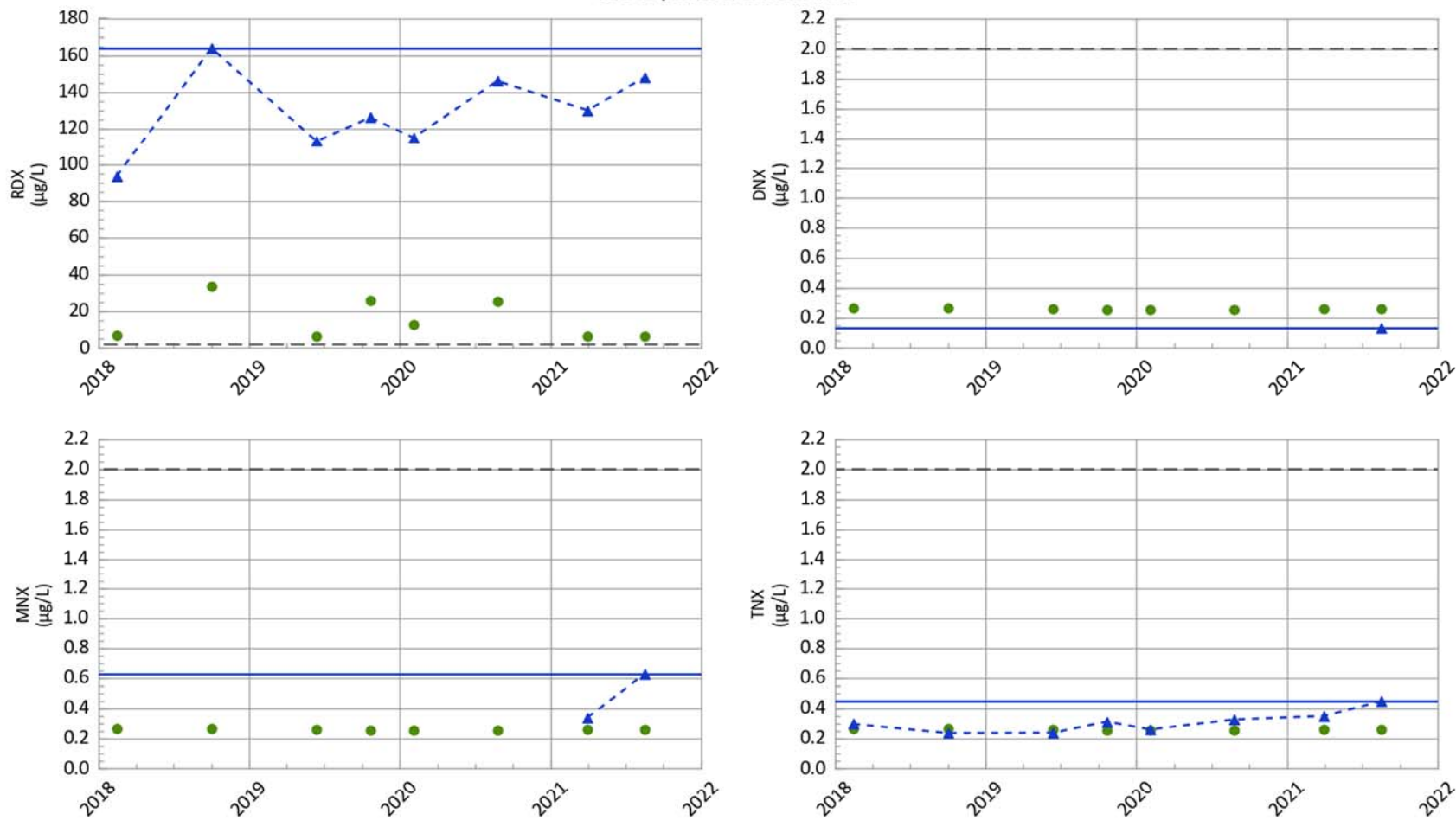
Typical Baseline Concentrations in Perched Groundwater

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



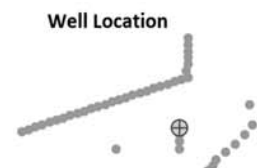
**PTX06-1191 Downgradient Performance Indicators
Southeast Ext In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



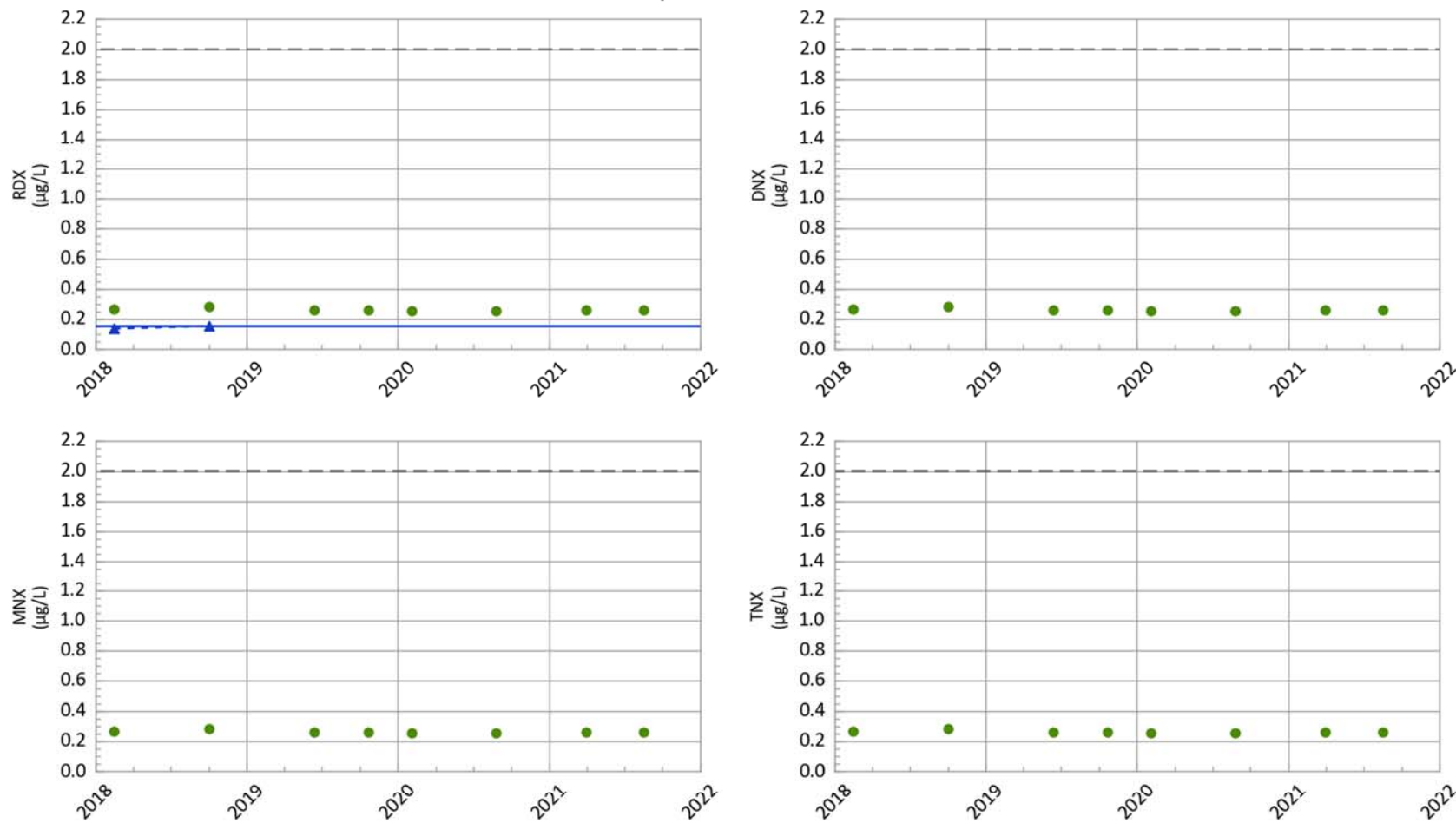
Most Recent Measured COC Concentrations (Aug 16, 2021)

COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
RDX	148.0	2.0
MNX	0.628	2.0
DNX	0.134	2.0
TNX	0.448	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**



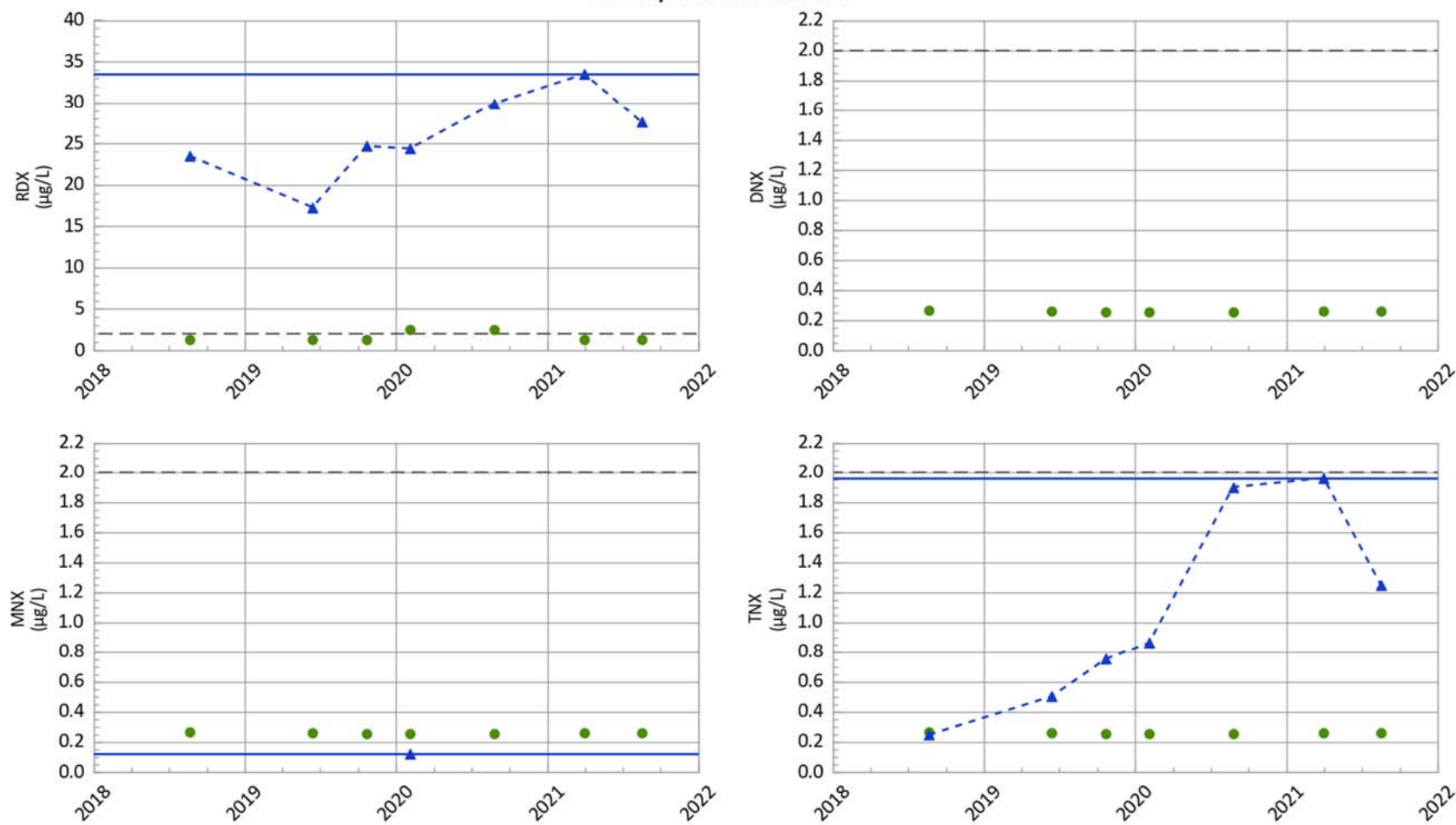
Most Recent Measured COC Concentrations (Aug 16, 2021)

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



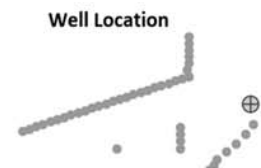
**PTX06-1196 Downgradient Performance Indicators
Southeast Ext In Situ Bioremediation System
USDOE/NNSA Pantex Plant**



Most Recent Measured COC Concentrations (Aug 16, 2021)

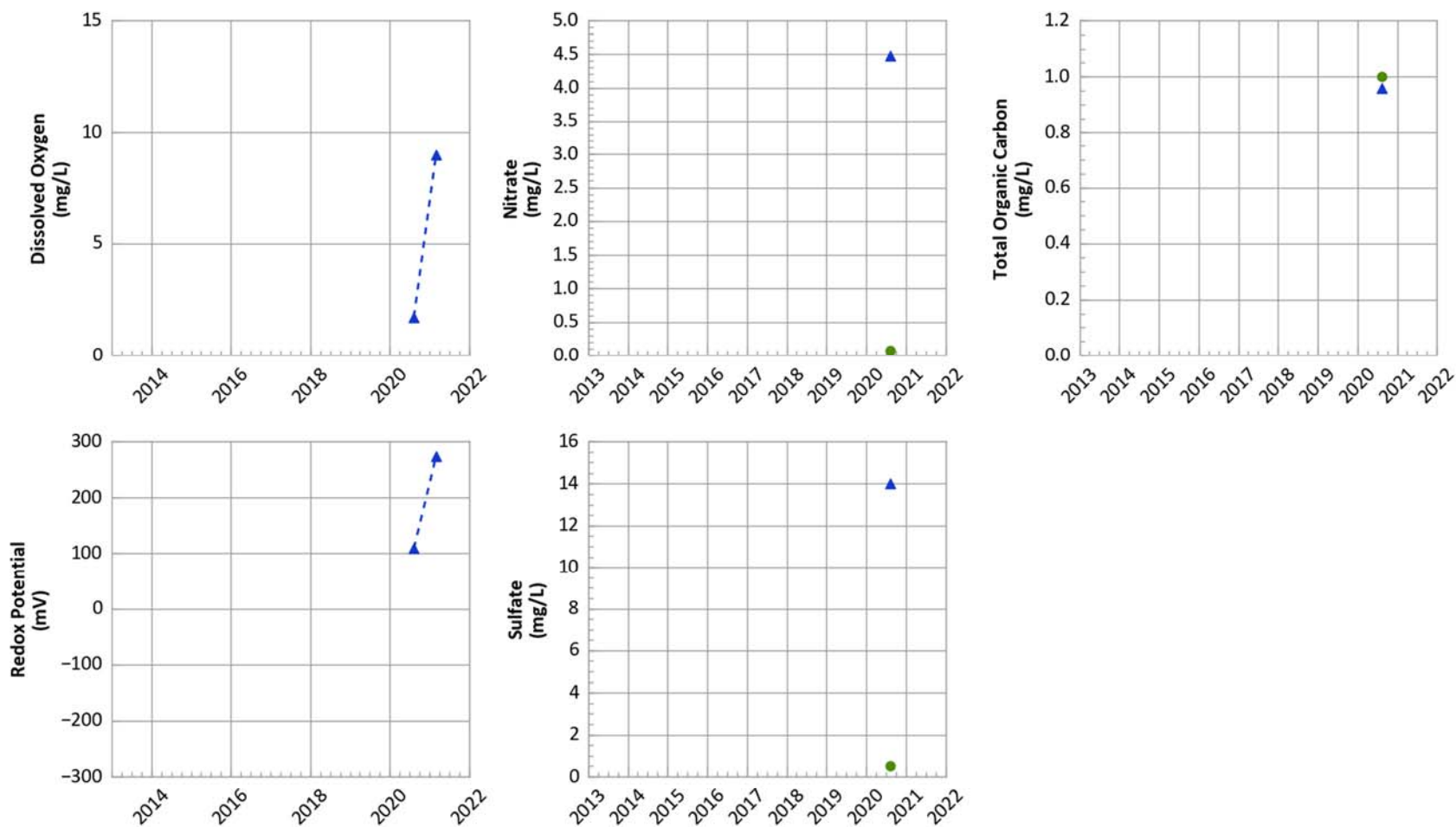
COC	Concentration ($\mu\text{g/L}$)	GWPS ($\mu\text{g/L}$)
RDX	27.6	2.0
MNX	Non-Detect	2.0
DNX	Non-Detect	2.0
TNX	1.25	2.0

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



Offsite ISB System

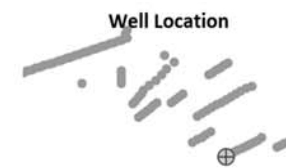
**PTX06-ISB401 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



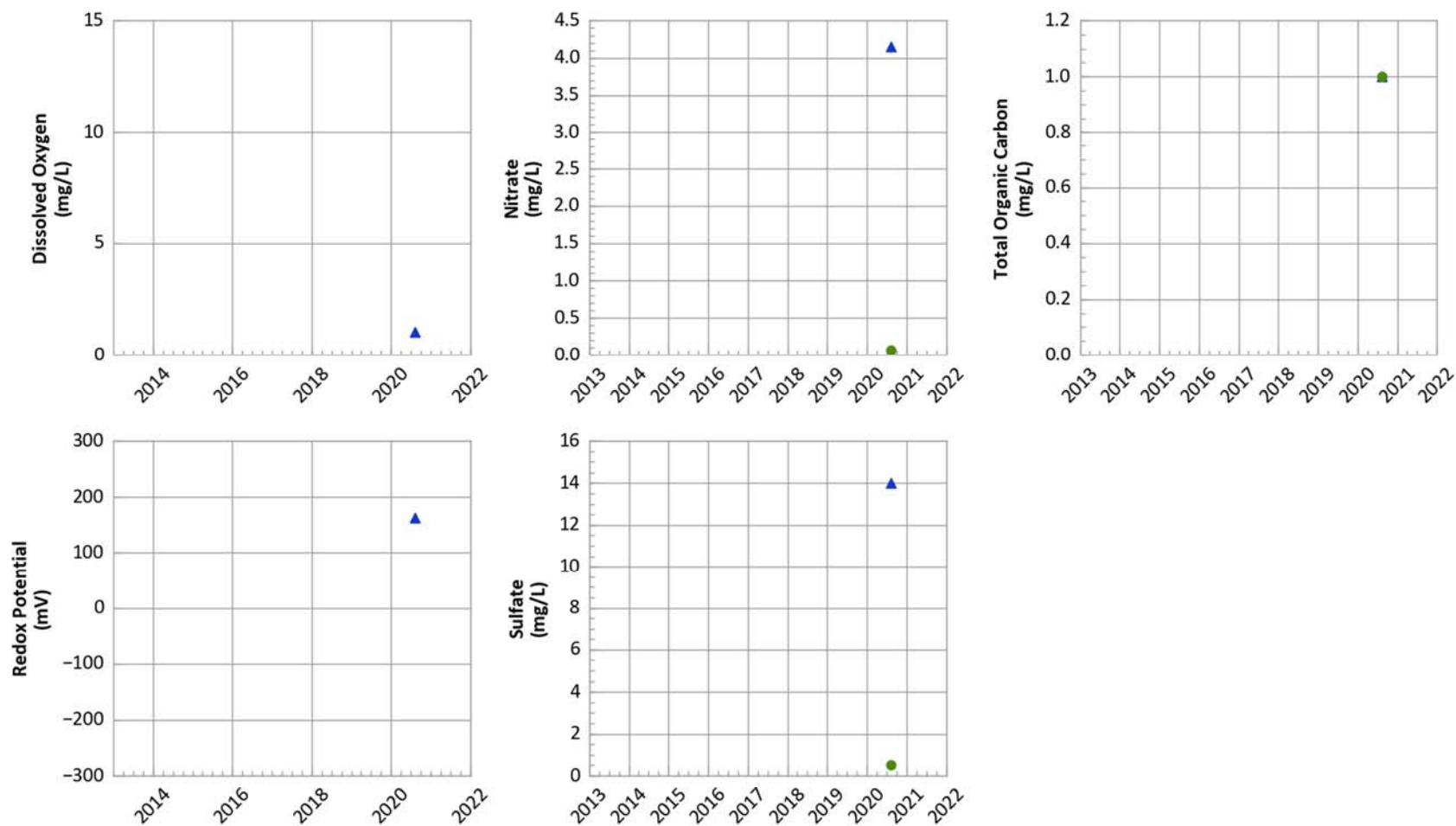
Typical Baseline Concentrations in Perched Groundwater

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



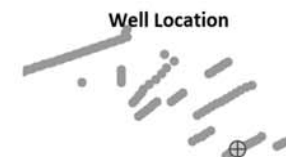
**PTX06-ISB404 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



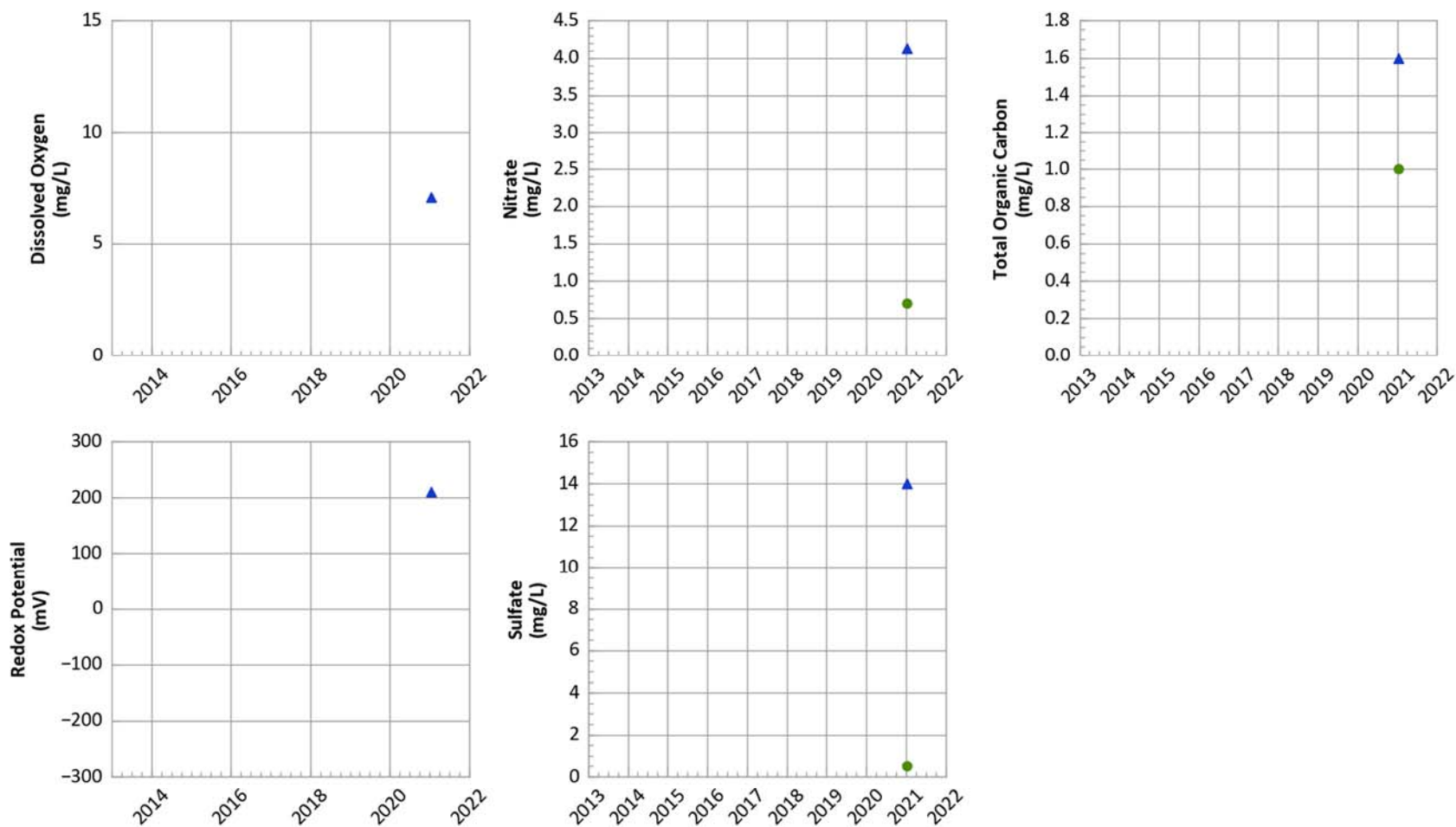
Typical Baseline Concentrations in Perched Groundwater

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



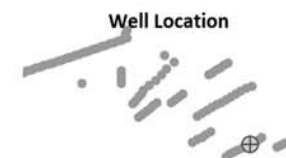
PTX06-ISB407 Treatment Zone Performance Indicators USDOE/NNSA Pantex Plant



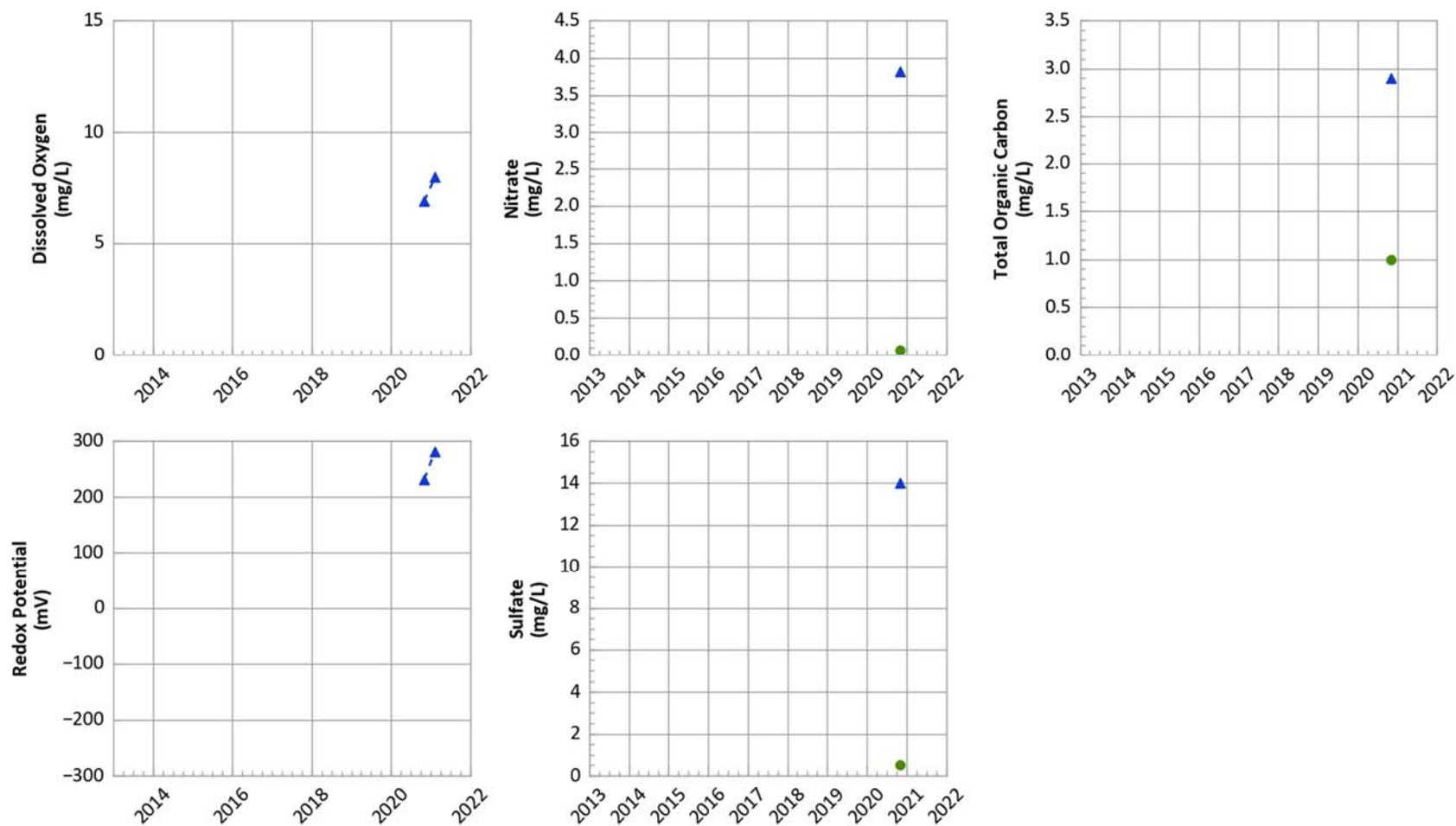
Typical Baseline Concentrations in Perched Groundwater

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



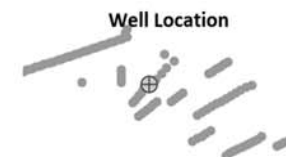
PTX06-ISB412 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



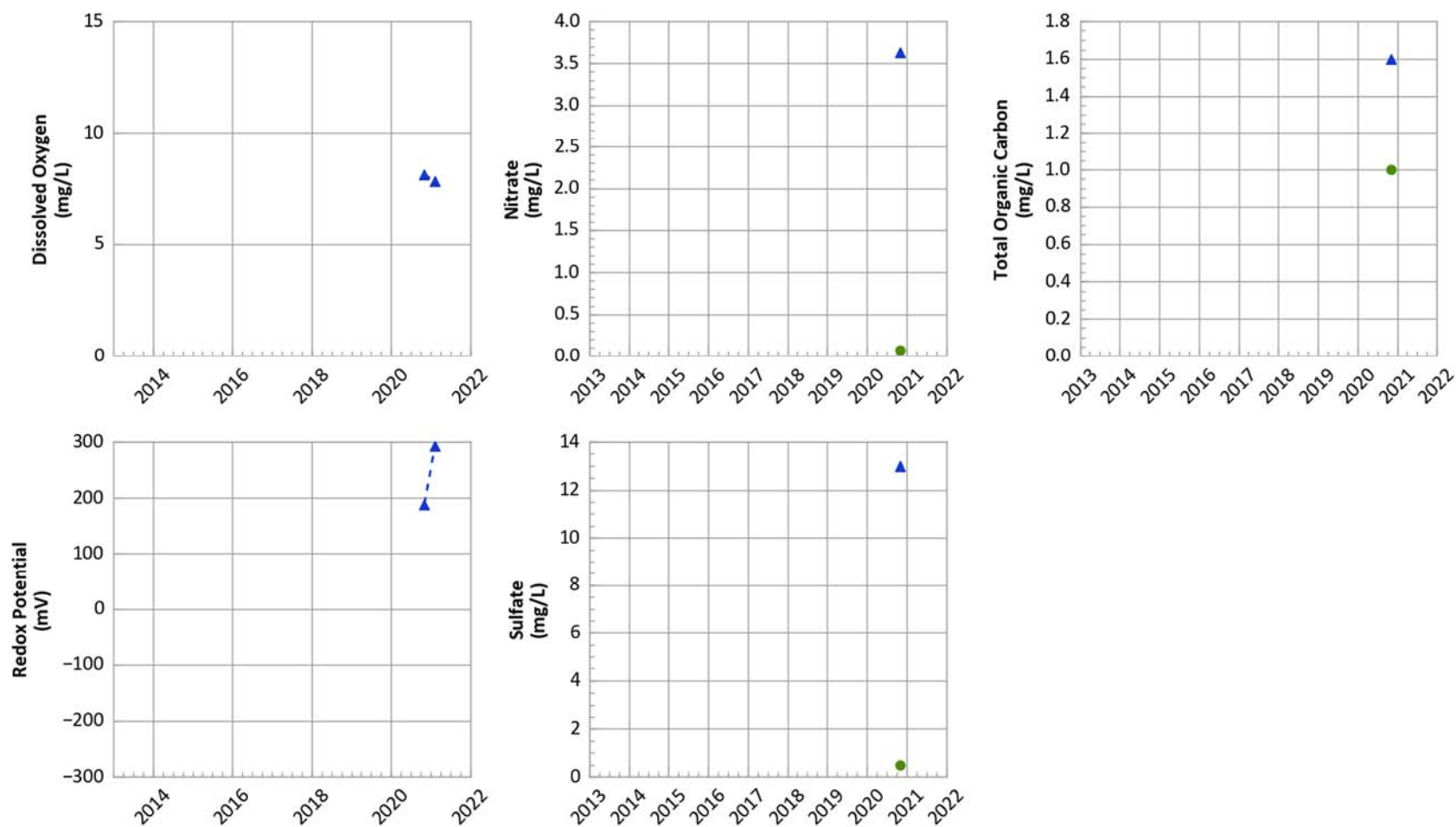
Typical Baseline Concentrations in Perched Groundwater

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



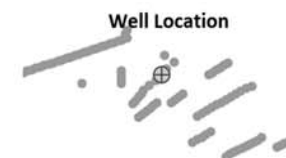
**PTX06-ISB414 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant**



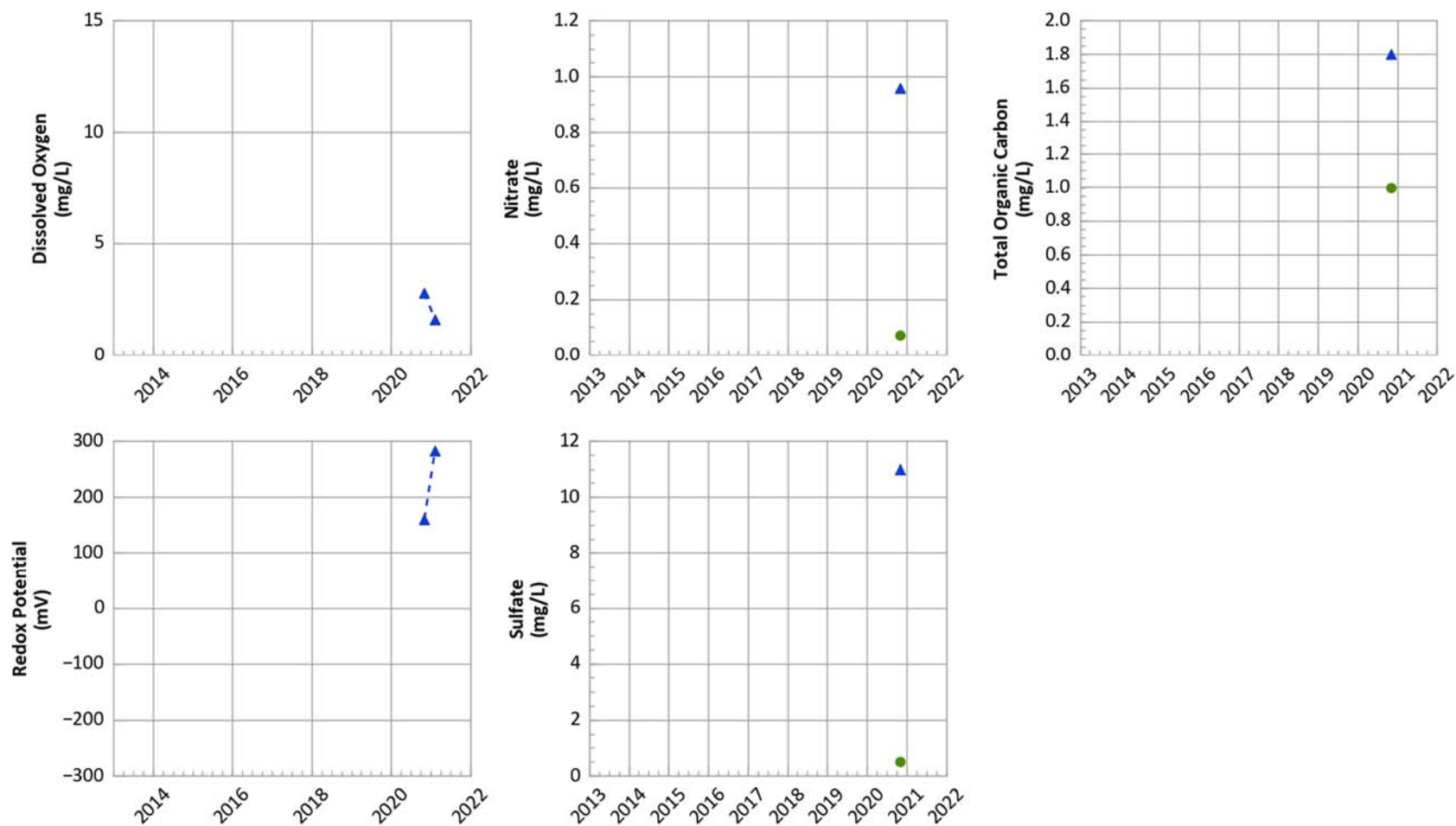
Typical Baseline Concentrations in Perched Groundwater

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

