PANTEX QUARTERLY PROGRESS REPORT

Remedial Action Progress

4th Quarter 2020

In support of Hazardous Waste Permit #50284 and

Pantex Plant Interagency Agreement

March 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

4th Quarter 2020 Remedial Action Progress Report
Pantex Plant, March 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.

3.22.2021

Kenny Steward
Acting Senior Director
Pantex Environment, Safety and Health
Consolidated Nuclear Security, LLC

Date

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Quarterly Progress Report
4th Quarter 2020
in Support of Hazardous Waste Permit #50284
and Pantex Plant Interagency Agreement
for the Pantex Plant, Amarillo, Texas
March 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
ClO^{4-}	perchlorate
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
TZM	treatment zone monitoring
VOC	volatile organic compound
WWTF	wastewater treatment facility

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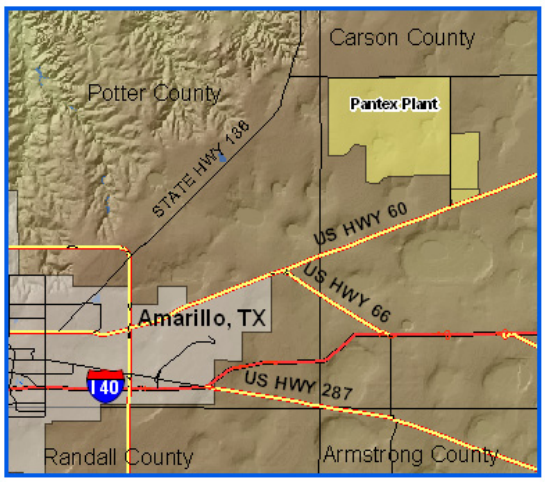
INTRODUCTION

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 three 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 4th quarter 2020.



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
4th Quarter 2020 Operation

Playa 1 Pump and Treat System (P1PTS)	
Days Operated	7
% 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	84
% Operation Time	90%
Volume Water Treated (Mgal)	31.7
HE Mass Removal (lbs)	112
Chromium Mass Removal (lbs)	12.9
Beneficial Use of Water	4%

*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. A portion of the system is expected to be operational by spring 2021. Meanwhile, Pantex continues to release all WWTF water to Playa 1 as approved in the Texas Commission of Environmental Quality wastewater permit (WQ0002296000).

Current and future operations of both pump and treat systems will be impaired by the permitted restricted flow to Playa 1 until the irrigation system is operational. The SEPTS system has operated at a higher capacity using injection, release to Playa 1, and intermittent shutdowns of P1PTS. Pantex continued to run P1PTS one week per quarter in the 2020 calendar year based on technical evaluations of Pantex's current overall system requirements. Reduction of operational time at P1PTS allowed SEPTS to fully operate and support capture of water along the FM 2373 fence line and at the highest plume concentrations to the south on Texas Tech property. When P1PTS is operational, SEPTS is operated at a lower capacity to meet permit requirements.

SEPTS operation and throughput was impacted in the 4th quarter due to a winter storm. SEPTS was shut down on October 28th during the duration of the storm, but due to a power outage across the plant, operations did not restart until November 2nd. Regulators were notified of the interruption in operation.

The SEPTS wellfield had more than 15 wells that required repair during the 4th 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 spring 2021. Most wells were operable at P1PTS. Graphs of monthly operation and throughput are included in Appendix B. About 96% of the treated water was either released to Playa 1 or injected into perched injection wells, with the remainder used for ISB injection. Both systems treated about 32 million gallons (Mgal) during 4th quarter.

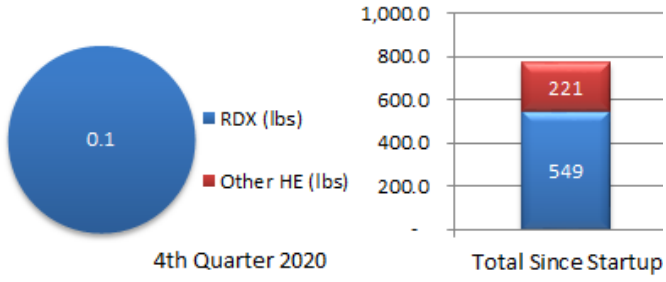


Figure 1. P1PTS Mass Removal

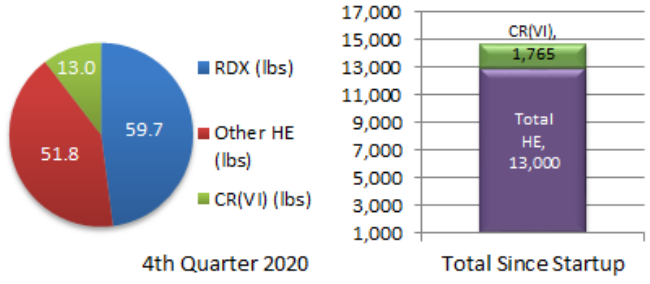


Figure 2. SEPTS Mass Removal

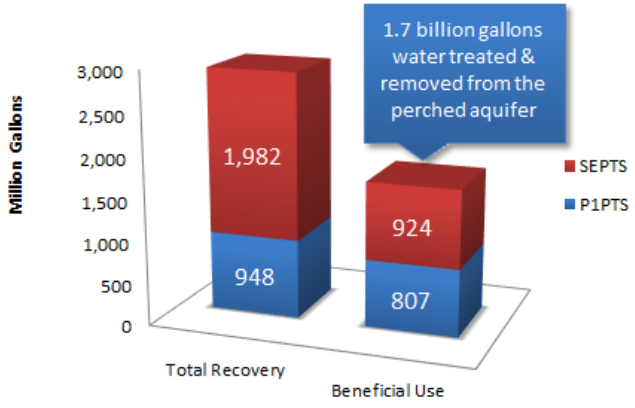


Figure 3. System Recovery and Use

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 4th 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 15,500 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 has been requested in fiscal year (FY) 2021 to design and construct infrastructure for irrigation of land east of FM 2373 using center pivot sprinklers. Pantex has contracted the design of the new irrigation system with completion expected in spring 2021. Construction is expected to begin in late FY21, after contracting is complete. Pantex also identified funding to design and construct three new perched injection wells to the east of Playa 2 and northwest of the Zone 11 ISB. Construction of the injection wells and infrastructure is underway, with the project scheduled to be complete in early 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.

Pantex has not observed any current issues with the movement of plumes due to the continued injection of water from the SEPTS, nor due to the shutdown caused by COVID-19. Changes in the plume have been observed, but changes appear to be related to the reduced extraction from the system. Pantex expects to continue injection at SEPTS in the near future, as repairs to the current irrigation system will be limited to two 100-acre plots. Once the three new injection wells are installed near Playa 2 and a new irrigation system east of FM 2373 is designed and constructed, the systems will be able to operate consistently at or near capacity.

ISB Systems

Three ISB systems (Zone 11 ISB, Southeast ISB, and Southeast ISB Extension) are installed and operating at Pantex. 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 is RDX.

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. Table 1 also summarizes ISB system performance.

Note sampling has been reduced to a semi-annual frequency at the ISB systems. Data are not always available for quarterly evaluation. When current data are not available, assumptions about overall system performance are based on historical data.

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 5 of 9 wells	No [1]
Southeast ISB[5,6]	Very Mild to Strong	Yes	Yes	RDX in 2 of 4 wells[2] Cr(VI) in 4 of 4 wells[2]	No [3]
Southeast ISB Extension[6]	Mild	Yes	Yes	RDX in 1 of 3 wells[4]	Yes[4]

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] cis-1, 2-Dichloroethene (DCE) concentrations remain above GWPS in two downgradient wells. Vinyl chloride is now detected at higher concentrations at three wells, indicating improved reducing conditions for TCE.

[2] Five downgradient wells are scheduled for sampling at this system. However, one of the wells (PTX06-1123) continues to demonstrate low water conditions and can no longer be sampled. This well had demonstrated complete treatment of HEs and Cr(VI) from October 2012 to August 2015. PTX06-1045 was not sampled in the 4th quarter; therefore, evaluations are based on 1st quarter results.

[3] PTX06-1153 is currently demonstrating partial treatment. Therefore, the degradation products of RDX are now observed above the GWPS.

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

[5] During 4th quarter 2020, treatment zone wells were not sampled. Values and conditions reported are based on most recent reported results.

[6] ISPM wells were not sampled in 4th quarter. Evaluations are based most recent reported results.

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 tenth injection event for the ISB was completed in January 2020. 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 entire system underwent injection beginning in 4th quarter 2019 and

completed in January 2020. The northwest portion of the system was undergoing well rehabilitation and injection starting in 3rd quarter 2020 and completed in December.

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 expansion area have received more than three injections, so deeper reducing conditions are likely established at the injection wells. Six new wells installed in 2019 were injected for the first time starting in 3rd quarter 2020, so reducing conditions are not expected at those wells. Five injected wells and six treatment zone monitoring (TZM) wells were sampled in the Zone 11 ISB system in the 4th quarter.

Evaluation of data in the treatment zone indicates very mild to strong reducing conditions ([ORP ranging from -182 to 152 and sulfate from 0.6 to 180 µg/L) across the Zone 11 ISB. Monitored conditions inside the treatment zone indicate that sulfate was reduced in two of eleven wells, nitrate was reduced at all eleven wells and negative ORP was measured in all but three 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 seven monitored wells inside of the treatment zone and cis-1,2-DCE present at concentrations below the GWPS in nine of the eleven monitored wells. The presence of TCE and cis-1,2-DCE continues to indicate partial treatment in three of six non-injected treatment zone wells, as TCE concentrations tend to be higher in the non-injected 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 of 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 4th quarter. TCE concentrations are at or below the GWPS in five of nine ISPM wells. The first breakdown product of TCE, cis-1,2-DCE, was below the GWPS in seven 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 quarter. This well is downgradient of a single row of injection wells. PTX06-1149 had demonstrated complete treatment of perchlorate until early in 2020. This could be due to problems with injection in upgradient ISB wells. Pantex is planning to add an additional row of injection wells upgradient of this location to ensure treatment of TCE. Addition of the new row of injection wells will also ensure treatment of perchlorate.

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 the low concentrations of TCE that occur on the eastern side are treated below GWPS or to 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 2021.

No wells were sampled at Southeast ISB in the 4th quarter. Historical data indicate that reducing conditions continue at the treatment zone. Downgradient wells were not sampled this quarter, but past data indicate that complete treatment is occurring at all but one well, PTX06-1153. Pantex is continuing to evaluate impacts to PTX06-1153 from the molasses injection in 2019.

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 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 due to the use of 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. Three injection events have been completed for this system, with the latest injection completed in August 2020, and the first completed in early 2019. 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. This system was increased by four new injection wells in 4th quarter 2020 to encompass the plume to the east; however, injection will not occur in those wells until spring 2021.

The first post-injection treatment zone data were collected in 2nd quarter 2019. Five wells in the injected area of the ISB were sampled during the 4th quarter 2020. Treatment zone data indicates that mild reducing conditions are present for treatment of HEs. ORP was between -24 mV and 47 mV, nitrate was reduced in all wells, but sulfate values ranged from 1.9 to 250 µg/L. Soluble metals

(arsenic and manganese) increased, indicating that reducing conditions are establishing. Total organic carbon results indicate that a sufficient food source is available to continue to establish reducing conditions at the wells. Sampling results from the ISB wells indicate HEs are not detected. Downgradient wells were not sampled during this quarter, but past results indicate that treated water has not arrived. The downgradient wells in or near the faster moving core of the plume are expected to demonstrate treatment during 2021.

Burning Ground SVE

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

Overall, the system operated 70% of the quarter (~ 1540 hours of operation). The SVE was shut down the 2nd week of December as part of the pulsing plan for path to closure of the system. The shutdown will continue until March 2021. Figure 4 shows mass removal calculated for the 4th quarter and since startup for VOCs that historically contribute to the total VOC concentration.

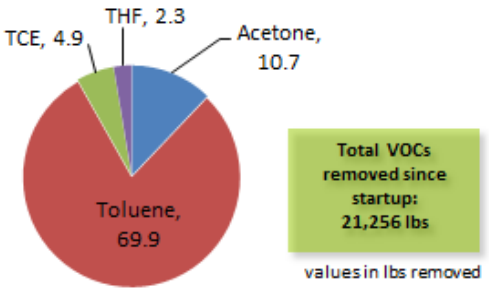


Figure 4. SVE Mass Removal

The system removed ~ 88 lbs of VOCs during the 4th 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%. 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 4th quarter 2020. 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 2019 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 4th quarter indicates unexpected conditions at two Ogallala Aquifer wells: PTX06-1056 and PTX06-1076. No detections exceeded the GWPS in the Ogallala Aquifer uncertainty management/early detection wells sampled during the 4th quarter. There were no unexpected conditions at perched uncertainty management wells in the 4th quarter.

Summary of Unexpected Ogallala Detections, 4th Quarter 2020

Well ID	Sample Date	Analyte	Measured Value (µg/L)	PQL (µg/L)	GWPS (µg/L)
PTX06-1056	11/17/2020	4-amino-2,6-dinitrotoluene	0.654	0.259	1.2
PTX06-1076	6/17/2020	4-amino-2,6-dinitrotoluene	0.093	0.266	1.2
PTX06-1076	10/20/2020	4-amino-2,6-dinitrotoluene	0.090	0.256	1.2

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 slightly 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.

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.

DNT4A was originally detected at PTX06-1076 in the 2nd quarter of 2020. At this time because the detections are below the PQL, sampling will continue as approved in the Sampling and Analysis Plan (SAP) and in accordance with the Pantex Groundwater Contingency Plan. Further actions will be determined based on future results of sampling and the Pantex Groundwater Contingency Plan.

Pantex is continuing to evaluate labs for HE analysis to ensure that sampling can be split between two labs when further confirmation of HE results is warranted. Currently, Pantex only has one lab that can contractually fulfill the HE analysis requirements. New HE analysis capability is expected to be available in early 2021.

Other Unexpected Conditions

Pantex routinely evaluates data as they come in from the laboratory to determine if data are off-trend, at an all-time high, or represent a new detection that may require further sampling or evaluation. Through the well maintenance program, Pantex also inspects wells at least every five years to ensure they are not silting in and to evaluate whether the well remains in contact with the formation. No unexpected conditions were noted in the 4th quarter.

Schedule Update

Pantex provided a detailed schedule of upcoming work in the 2019 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:

- Phase 2 well drilling for the Offsite Remediation System was accelerated and drilling of 13 offsite system wells and four new ISB injection wells at the SE ISB Extension were completed in October.
- Design of Phase 1 and 2 Offsite Remediation System infrastructure was completed in December 2020.

Pantex continues progress toward completion of the following items:

- Pantex began contracting for the design of the new irrigation system planned to be installed east of FM 2373. The contract was awarded in October and design will be completed in April 2021.
- Pantex continues to work with neighbors to obtain necessary deed restrictions to control drilling and use of groundwater beneath the properties where impacted perched groundwater is present. Pantex has obtained a Right of Entry agreement with one neighbor that includes appropriate restrictions and is currently pursuing deed restrictions with a second neighbor. As noted in the 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.
- In October 2020, work commenced for the optimization of the pump and treat systems and re-optimization of the Offsite Remediation System, and is scheduled for completion by the end of September 2021.
- The new SEPTS injection well project near Playa 2 is underway. The project is expected to be complete in early 2021 and will provide a new outlet for up to 150 gpm (half of design capacity) of treated water from the SEPTS.

- Phase 1 and 2 construction of the offsite infrastructure began in January 2021.

Upcoming work includes the following:

- Injection into the new Offsite ISB and the Southeast ISB Extension is expected to begin in April 2021.
- Drilling of the new row of Zone 11 ISB wells will commence in April 2021.
- Pantex will begin contracting actions to expand the SEPTS with a perchlorate pre-treatment for wells in the southwestern part of the system, where perchlorate has moved into the well field.
- Pantex will begin contracting actions to build mobile pump and treat systems that will be used at the Offsite Remediation System and in other areas (e.g., southwest of Zone 11) where plume control may be required.

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 the existing remediation systems. Pantex is also working to extend treated water injection and beneficial use to new areas to ensure consistent operation of the pump and treat systems.

The pump and treat systems continue to remove COC mass and water from critical areas in the perched aquifer; thus, decreasing head that drives vertical and lateral movement of perched groundwater. The systems have been impacted by the shutdown of the irrigation system, and Pantex is continuing to pursue other options for release or use of the treated water. Pantex will continue to inject and release water to Playa 1 until the irrigation system is repaired or other uses can be constructed. The system repairs were completed in February 2021, and startup testing is expected in March. Pantex is designing and installing perched injection wells east of the Playa 2 area, as previously recommended. These wells will help provide a consistent outlet for release of treated water from SEPTS when beneficial use is not possible. Pantex expects to inject up to 150 gpm of treated perched groundwater once construction is complete in early 2021. Pantex is also planning to design and construct a center pivot irrigation system east of FM 2373. Funding has been provided for that project in 2021, and the design for the project is scheduled for completion in March 2021.

Monitoring results for areas downgradient of the established ISB systems continue to demonstrate that system treatment has been generally effective. The new 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).

Historical COC concentrations meet the GWPS at the Southeast ISB at three downgradient wells. One downgradient well (PTX06-1153) for the Southeast ISB is not responding to treatment as well as the others. Pantex injected molasses during the recent injection event to attempt better distribution of the amendment and will 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. A couple of wells indicate 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. Early 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. It will take two or more years to evaluate the results downgradient of the system. 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 also plans to move toward drilling 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.

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. Recent data indicate a decline in the mass removal rate as well as a drop in influent gas concentrations below 100 ppmv. Pantex is actively working the plan to pulse the system to evaluate final closure of the system. Pantex will provide further recommendations based on review of influent SVE data over time.

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

Pantex continues to progress toward cleanup of the southeast lobe of perched groundwater. As recommended in the 2016 Annual Progress Report, Pantex has completed extending the SEPTS operation to that area to address the continued plume movement to the south. Pantex also extended the Southeast ISB to the southeast boundary of the site to prevent further offsite movement of contamination. Wells drilled on a neighboring property in early 2019 indicate that extent of contamination has been found. Pantex has updated the perched groundwater conceptual site model and fate and transport model. Fate and transport modeling has been used to conceptually design a remedial action to address the offsite contamination. Further optimization will be conducted in 2021 to address the changes found during drilling of the Phase 1 and 2 wells at the offsite area. Phase 1 system installation began in April 2020 and drilling was completed in August. Phase 2 well drilling was accelerated and those wells were completed in October. Injection is planned in the new wells in April 2021, after construction of essential infrastructure is finished.

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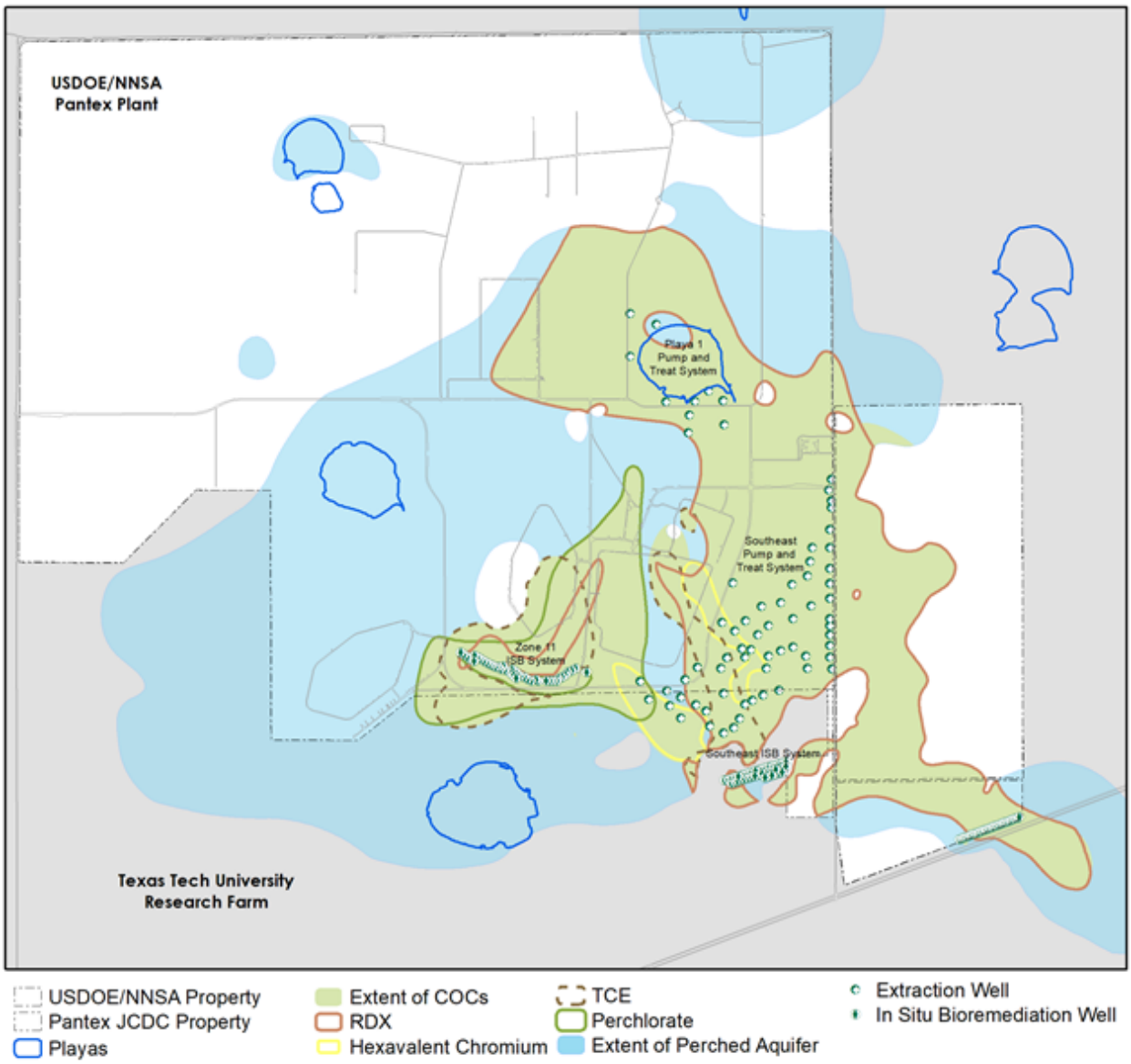
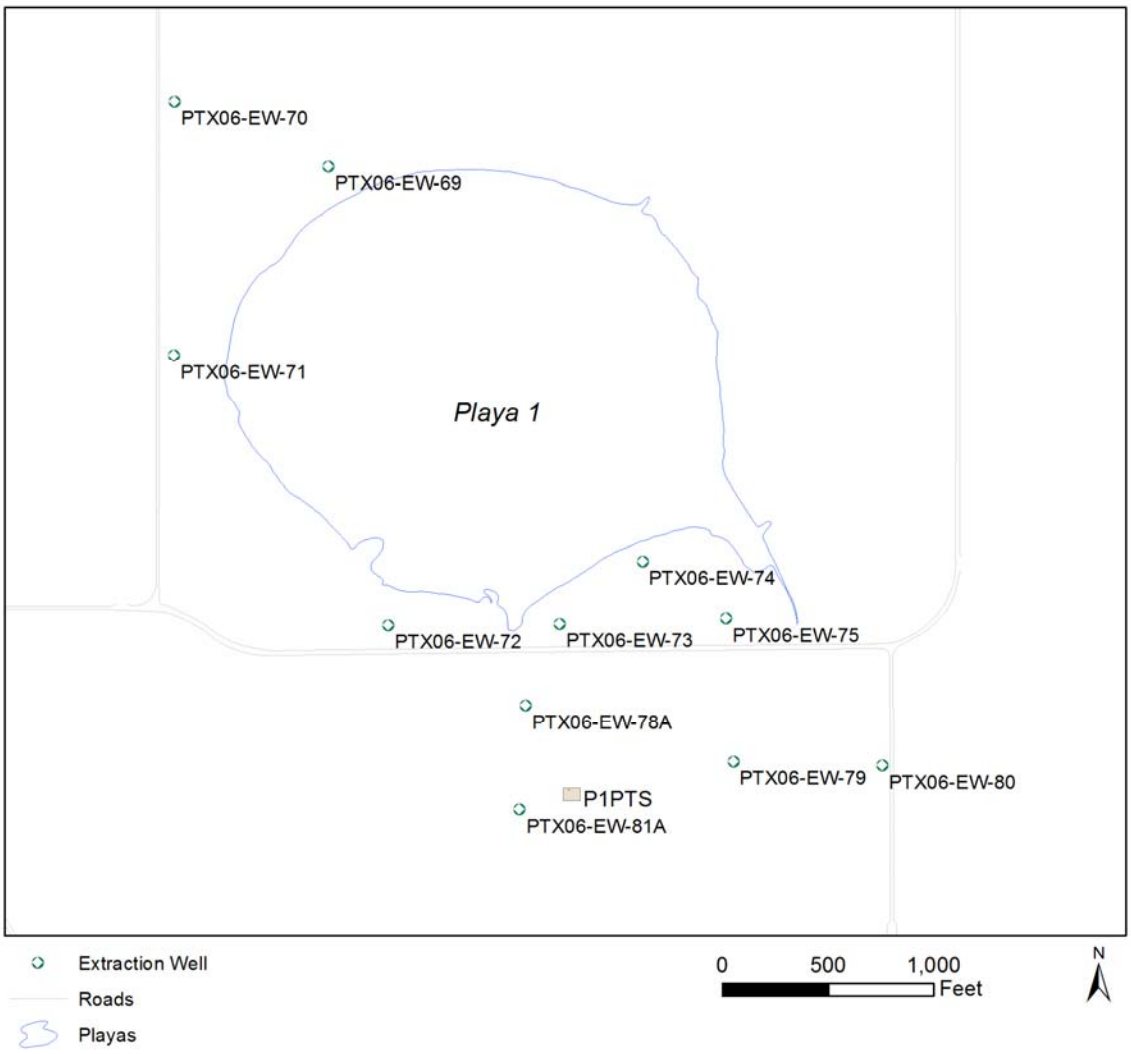
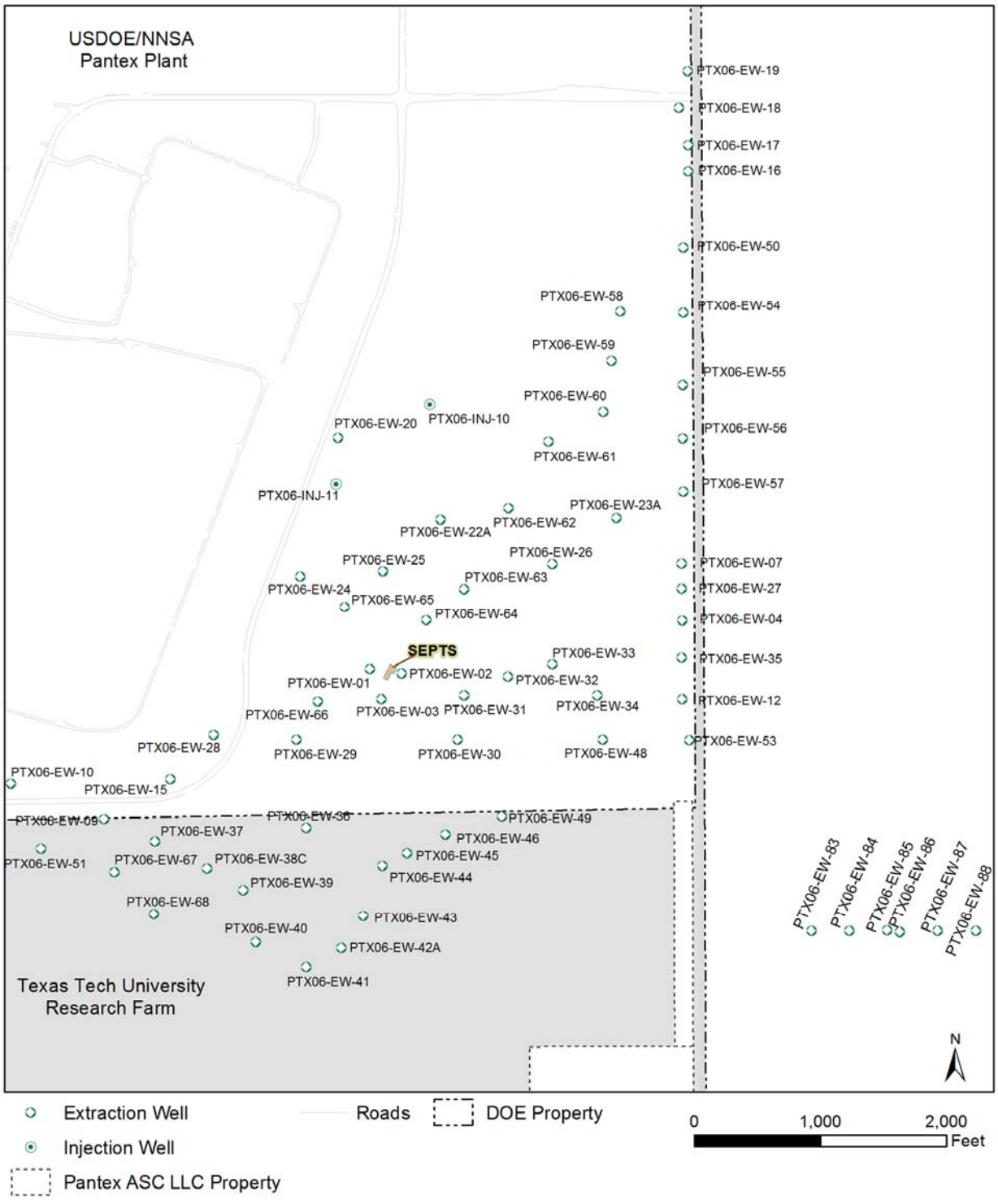
Appendix A
Maps



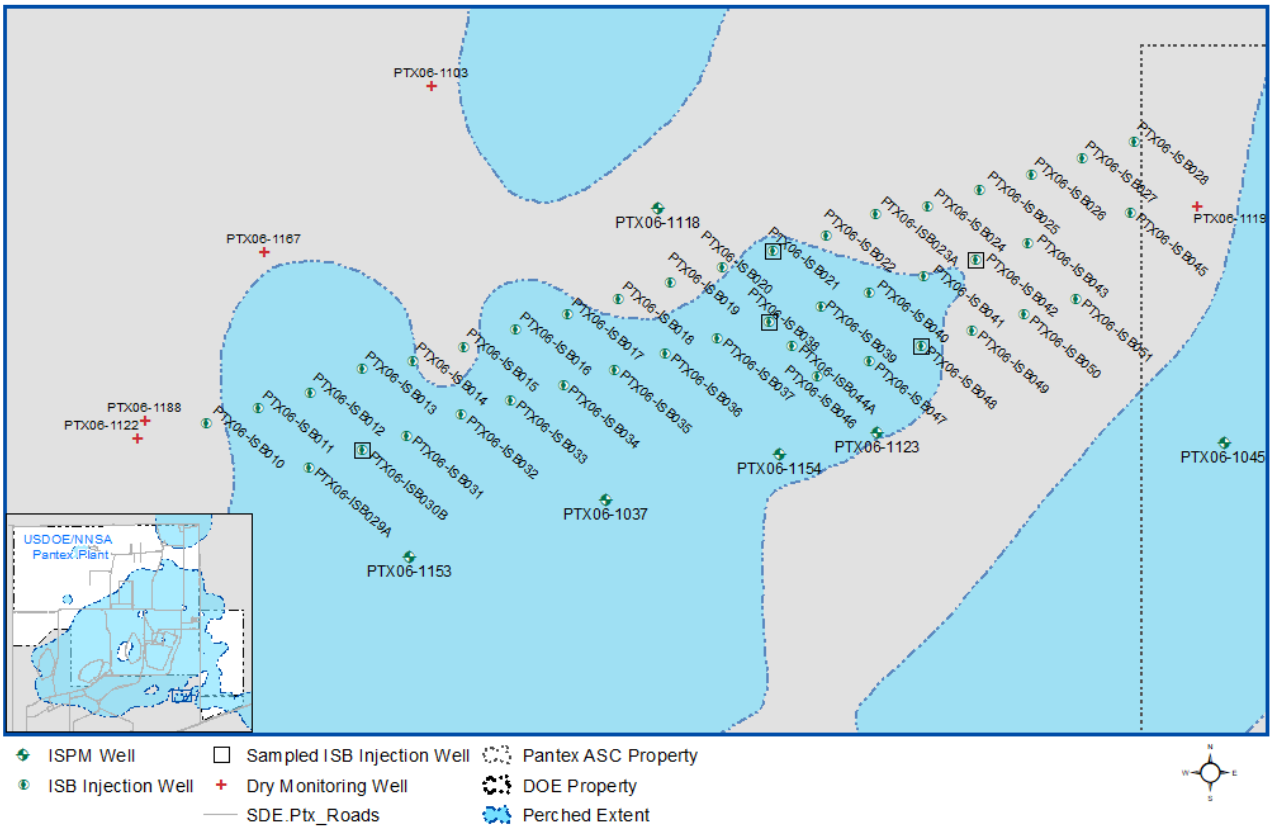
Extent of Perched Groundwater and Contaminant Plumes



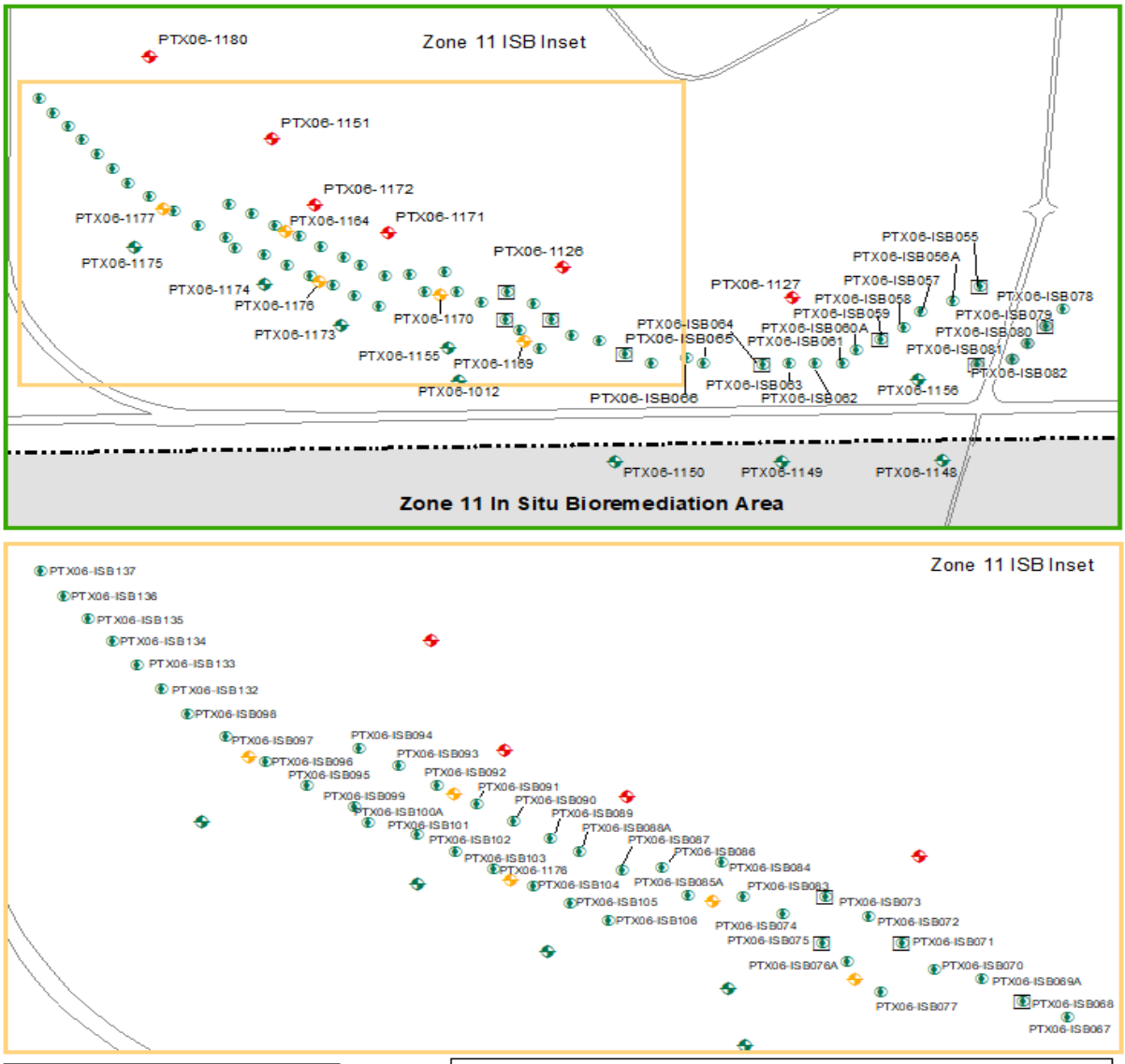
Playa 1 Pump and Treat System Wells



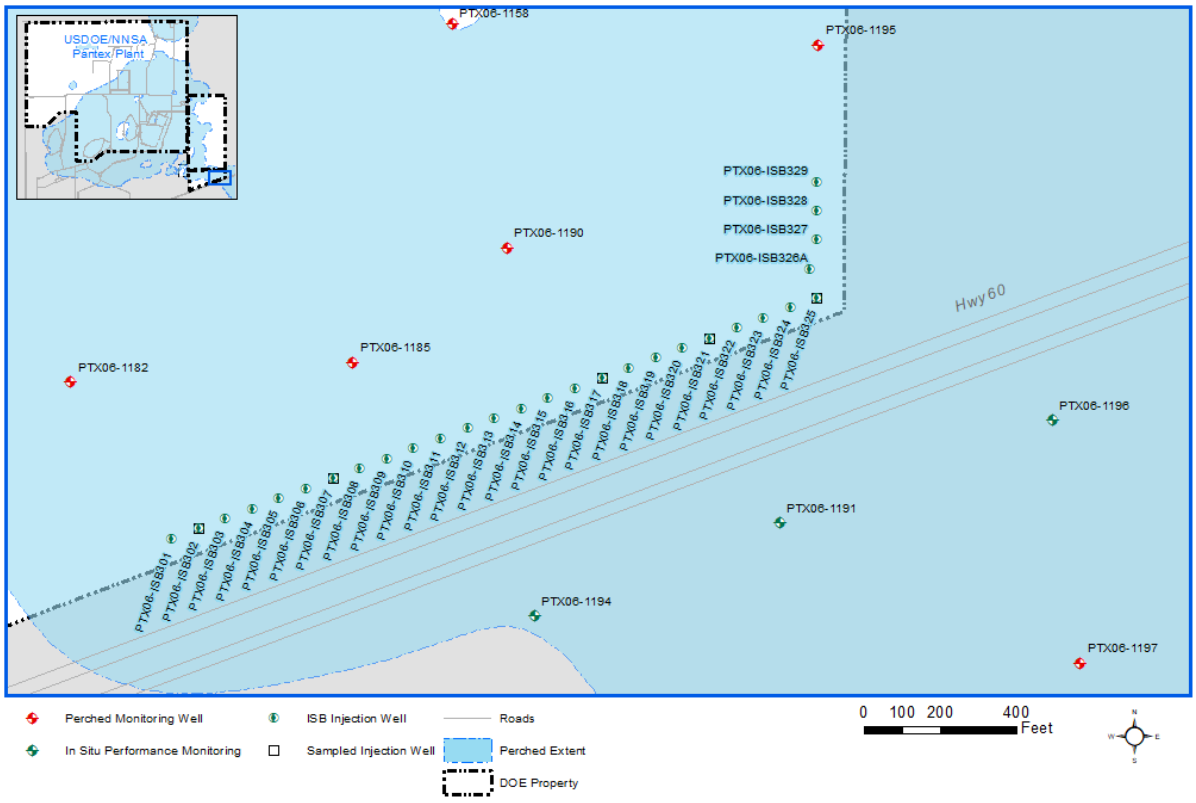
Southeast Pump and Treat System Wells



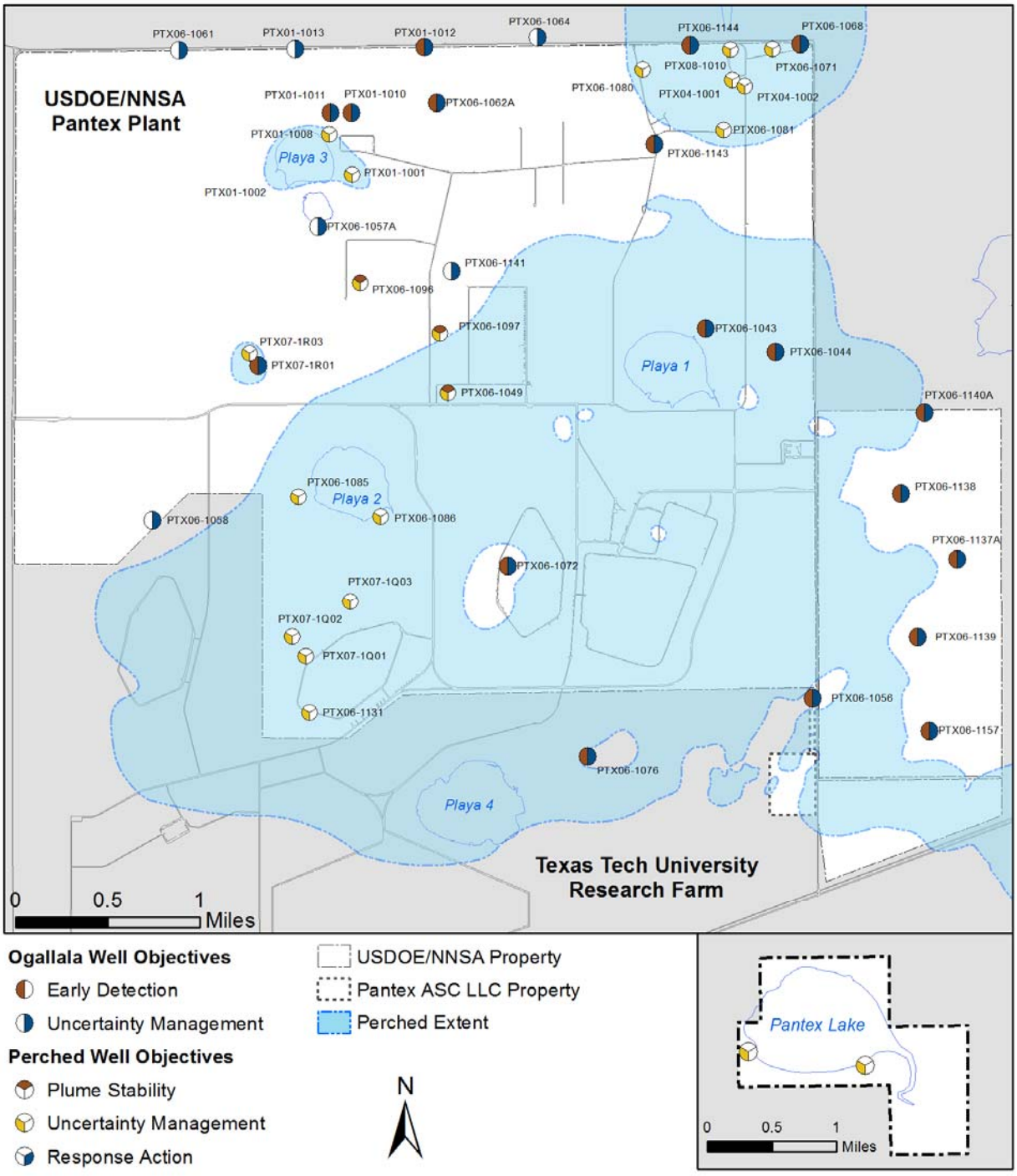
Southeast ISB Wells and Sampling Locations



Zone 11 ISB Wells and Sampling Locations



Southeast ISB Extension Wells and Sampling Locations



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

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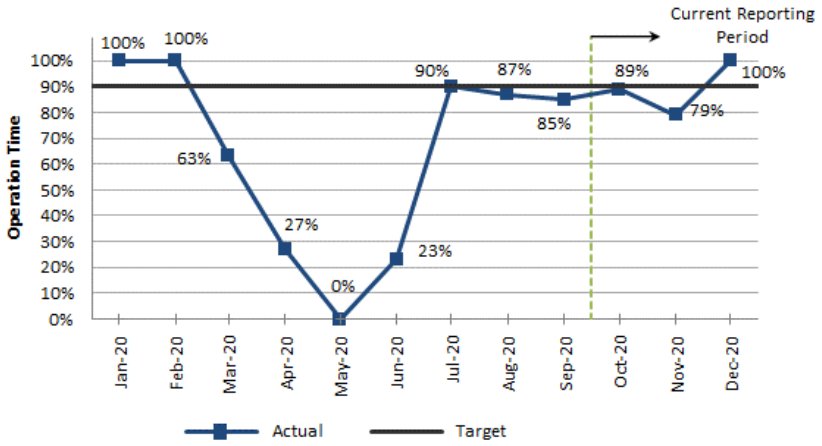
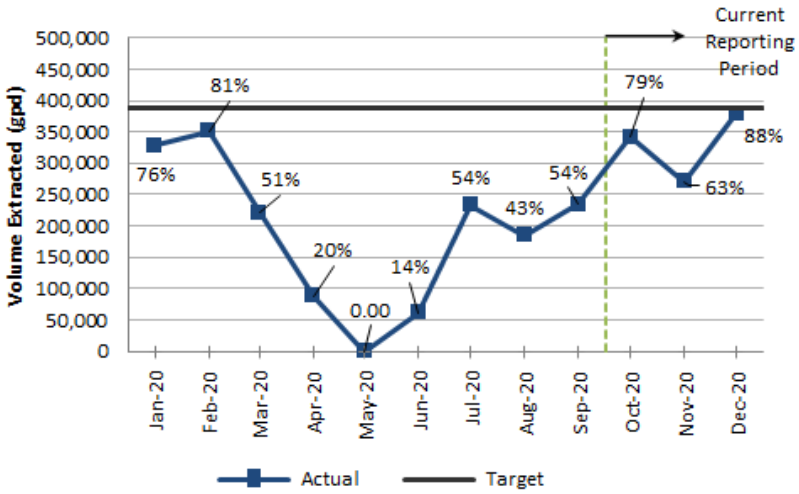
Appendix B
Pump and Treat System Graphs

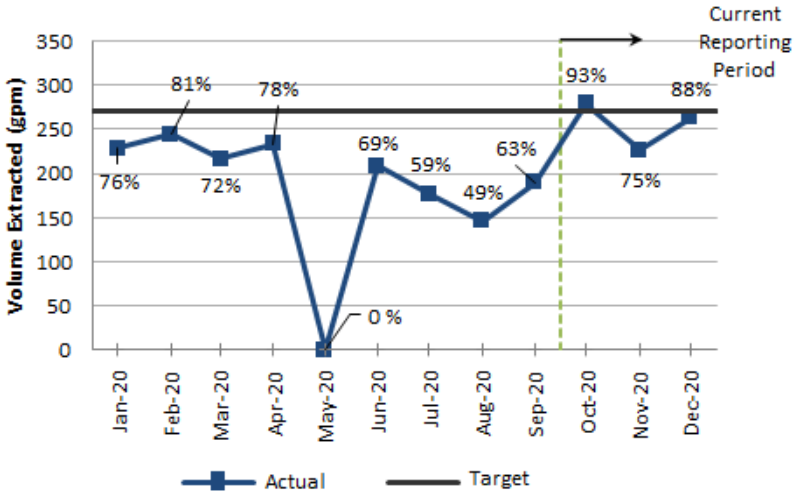
Southeast Pump and Treat System Graphs



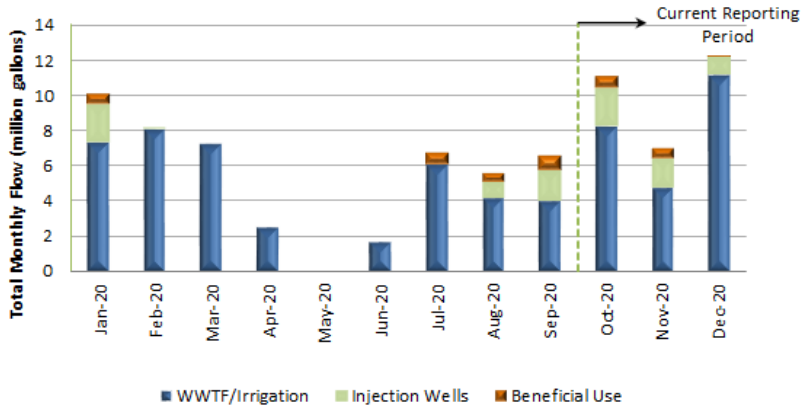
SEPTS Operation Time vs Target



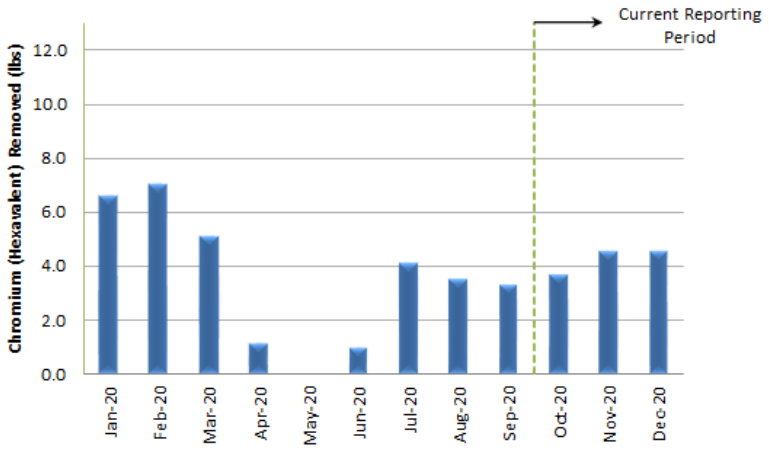
SEPTS GPD and % Capacity



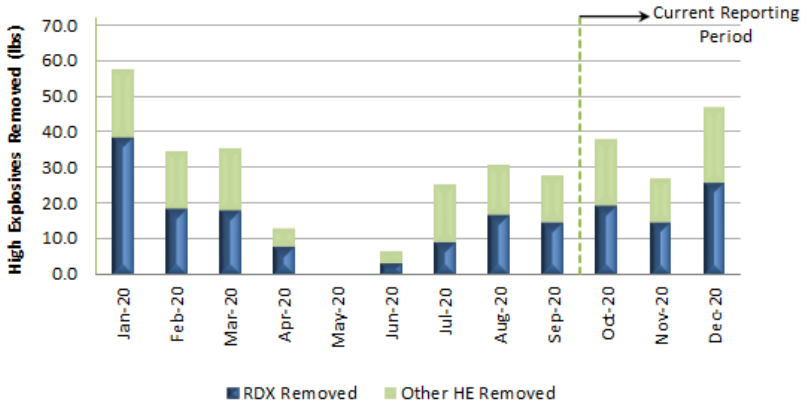
SEPTS Average GPM and % Capacity



SEPTS Monthly Total Flow

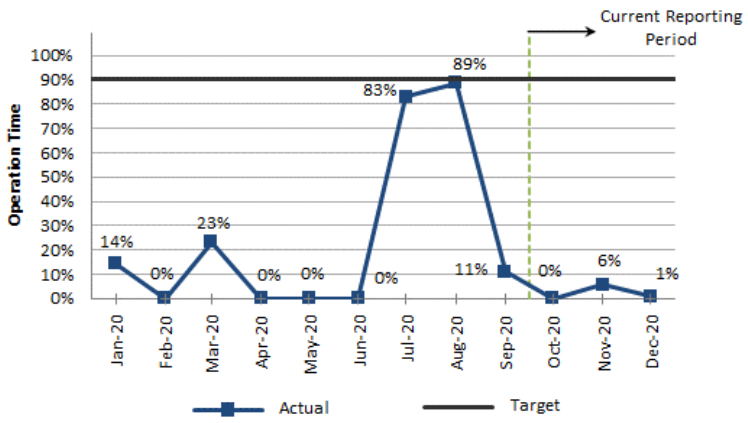


SEPTS Chromium Mass Removal by Month

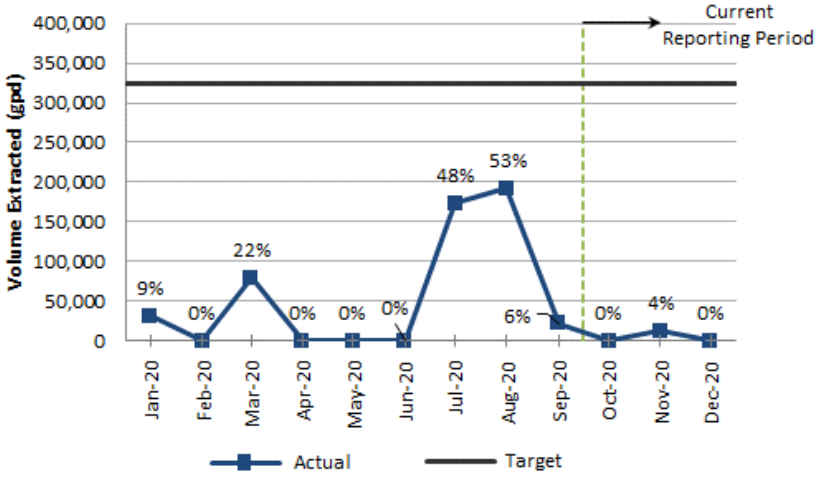


SEPTS HE Mass Removal by Month

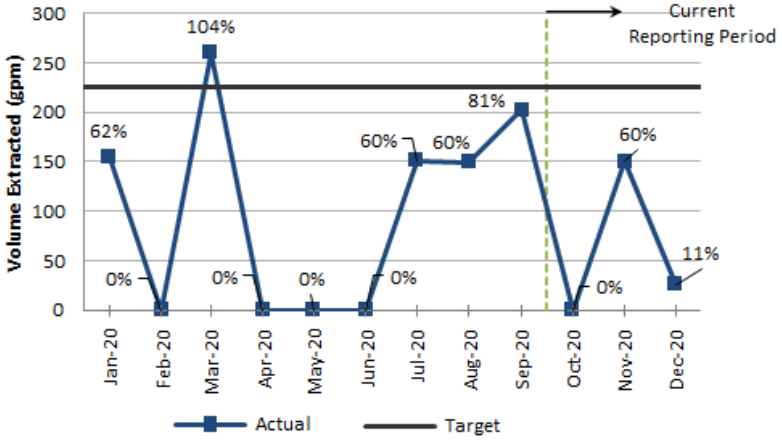
Playa 1 Pump and Treat System Graphs



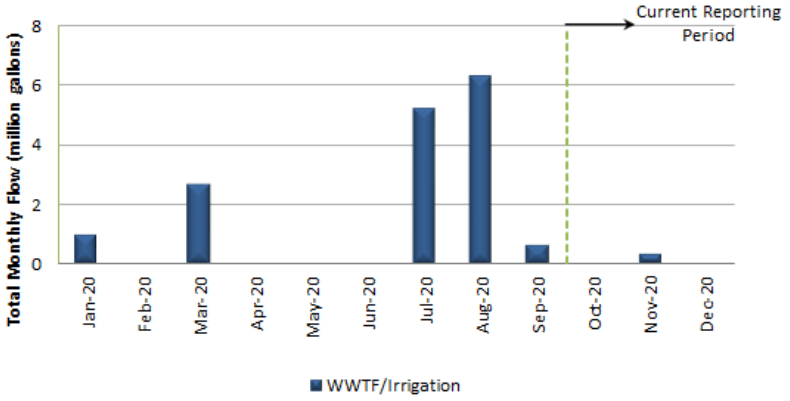
P1PTS Operational Time Vs Target



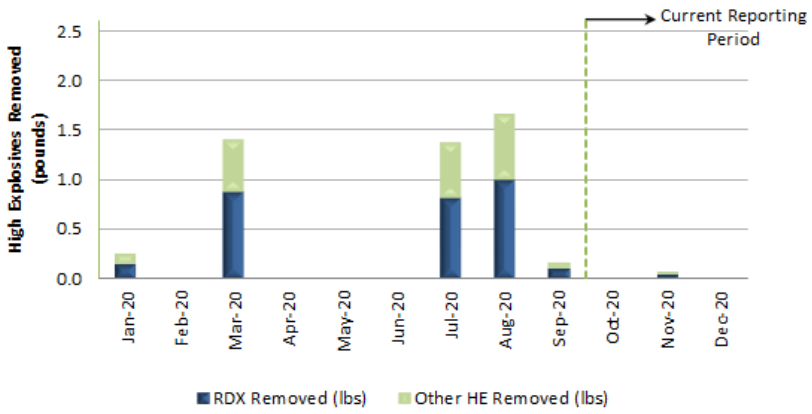
P1PTS Average GPD and % Capacity



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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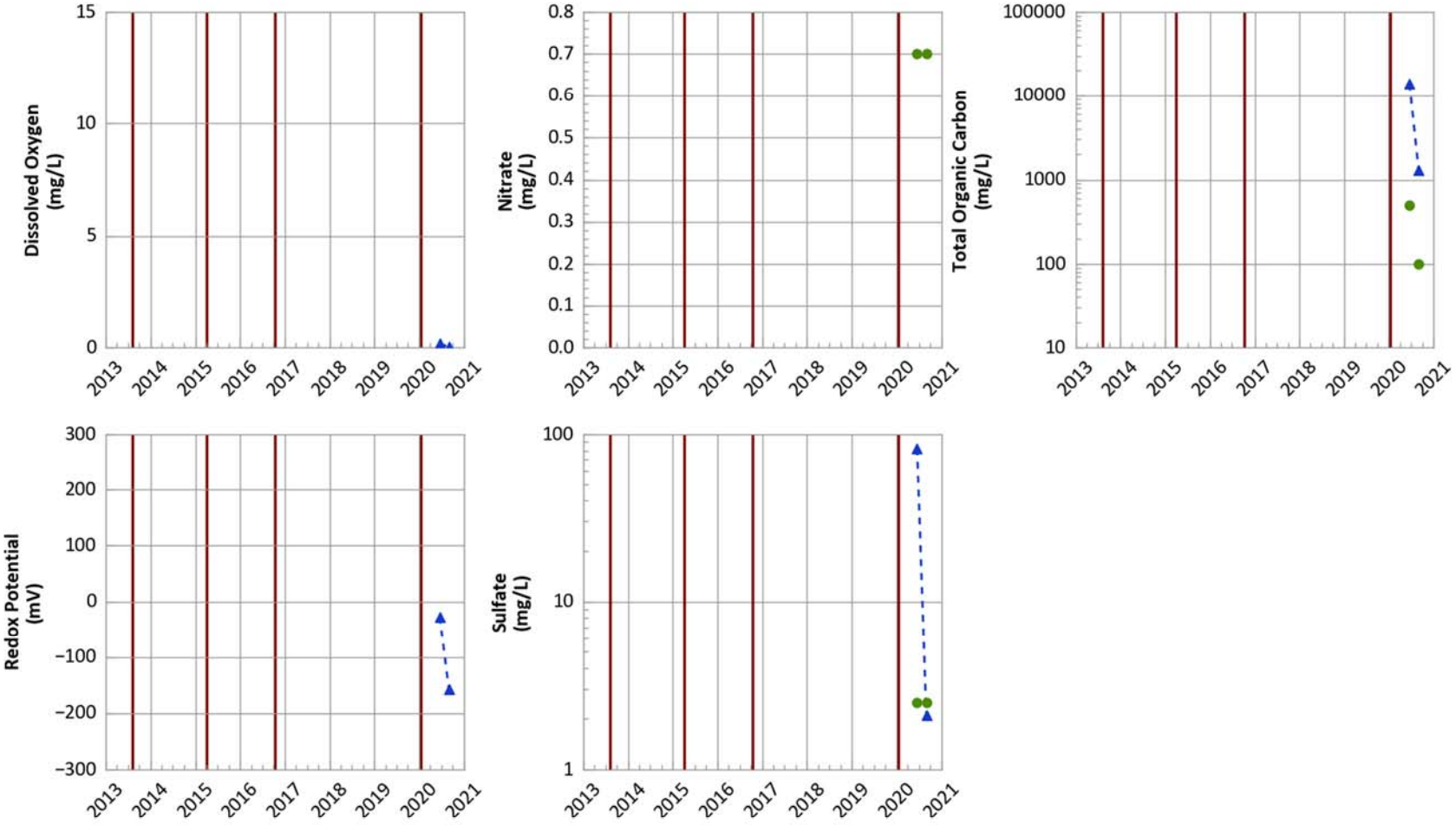
Appendix C
ISB Graphs

Southeast ISB Graphs

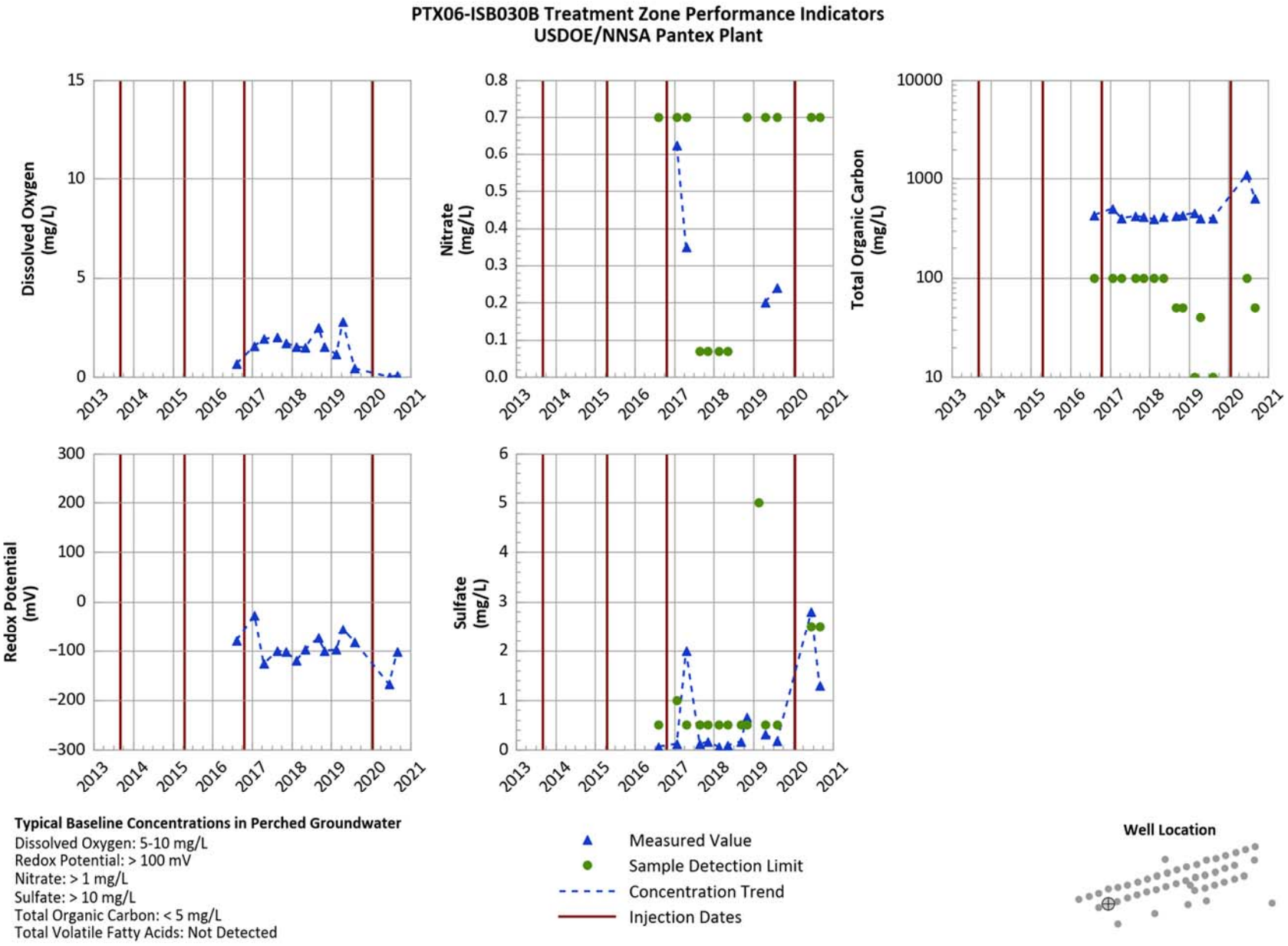
PTX06-ISB021 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



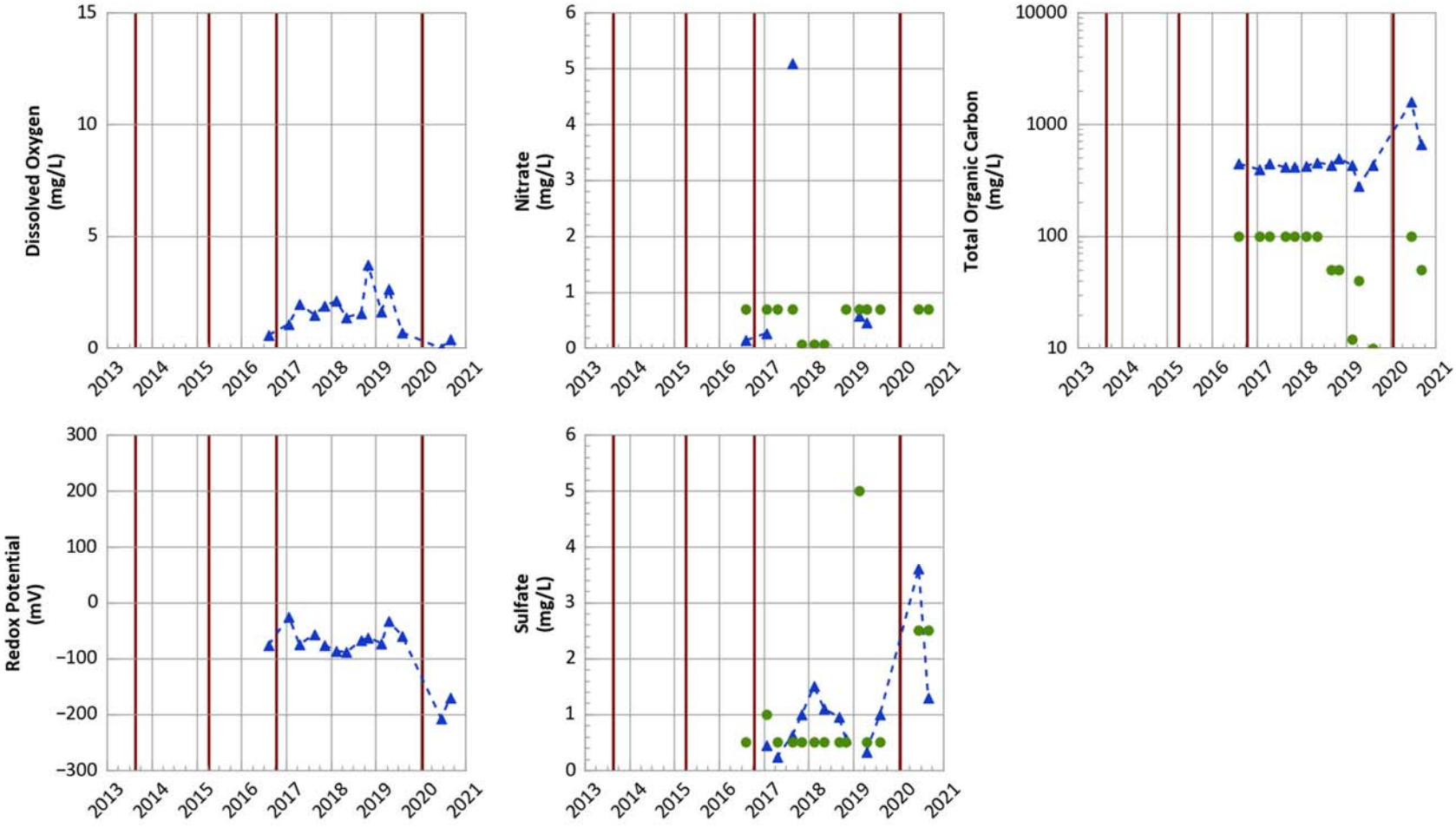
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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

Well Location


PTX06-ISB030B Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant
Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Organic Carbon (mg/L)
Redox Potential (mV)
Sulfate (mg/L)
2013
2014
2015
2016
2017
2018
2019
2020
2021
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

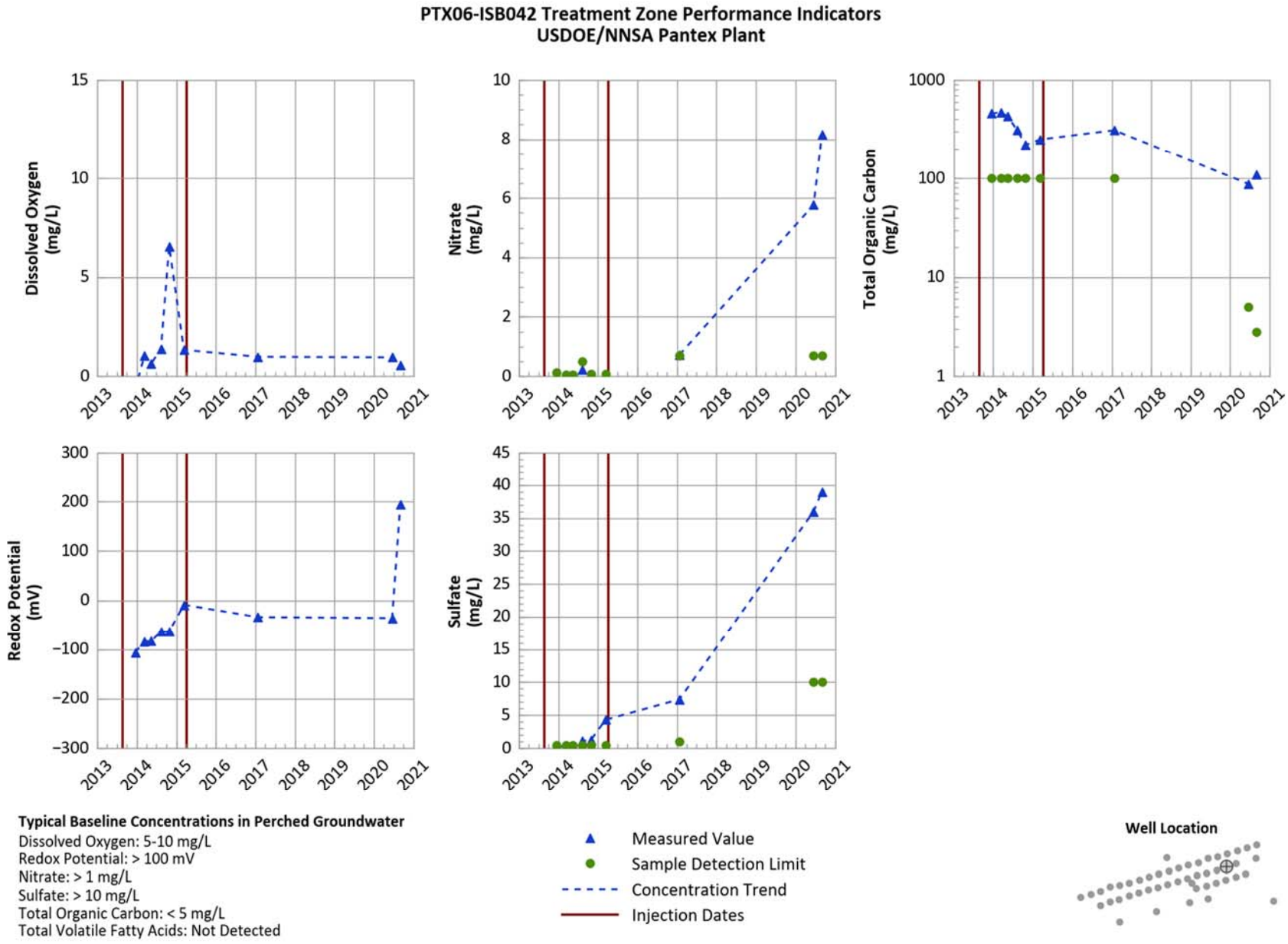
PTX06-ISB038 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



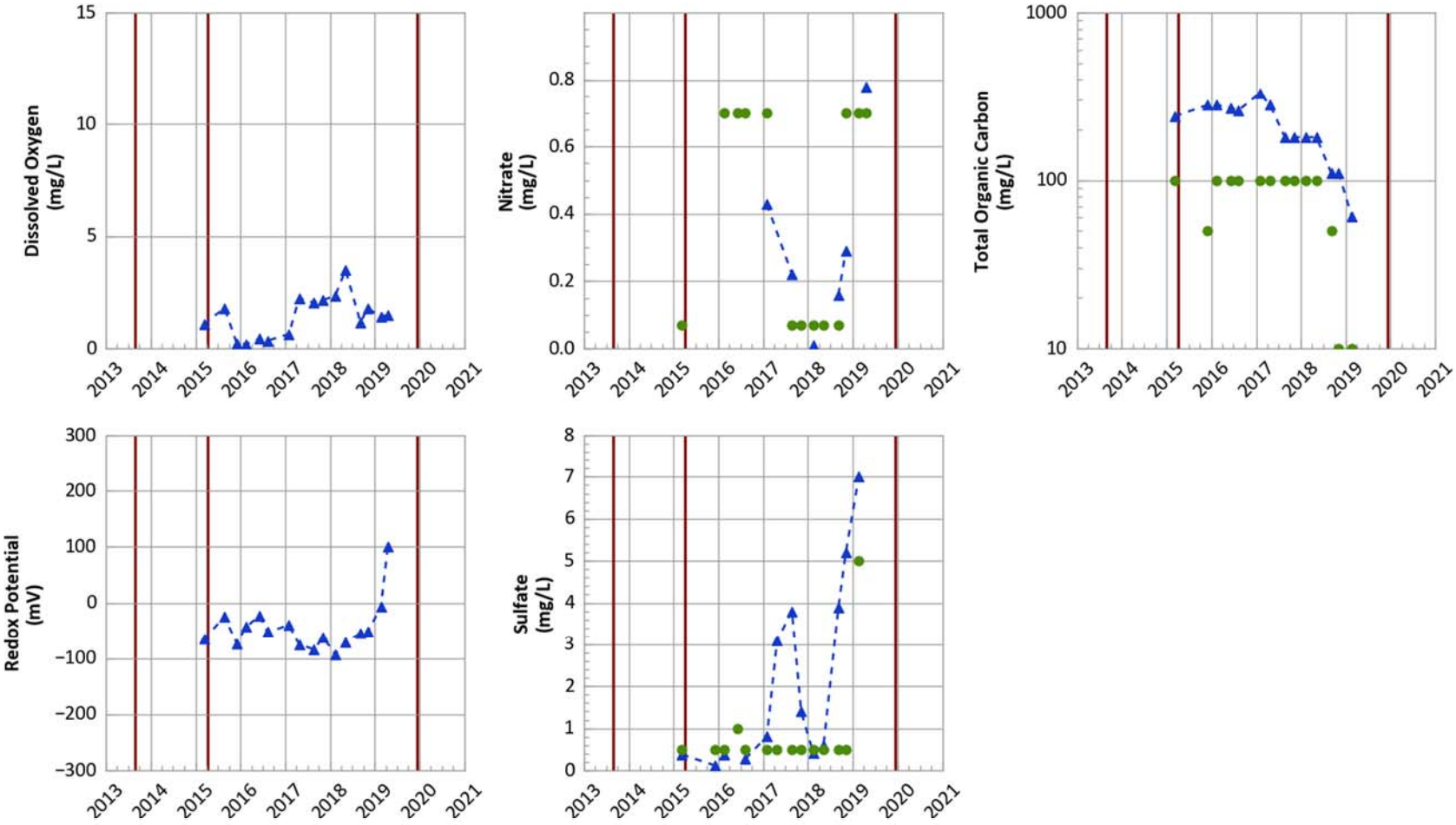
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location

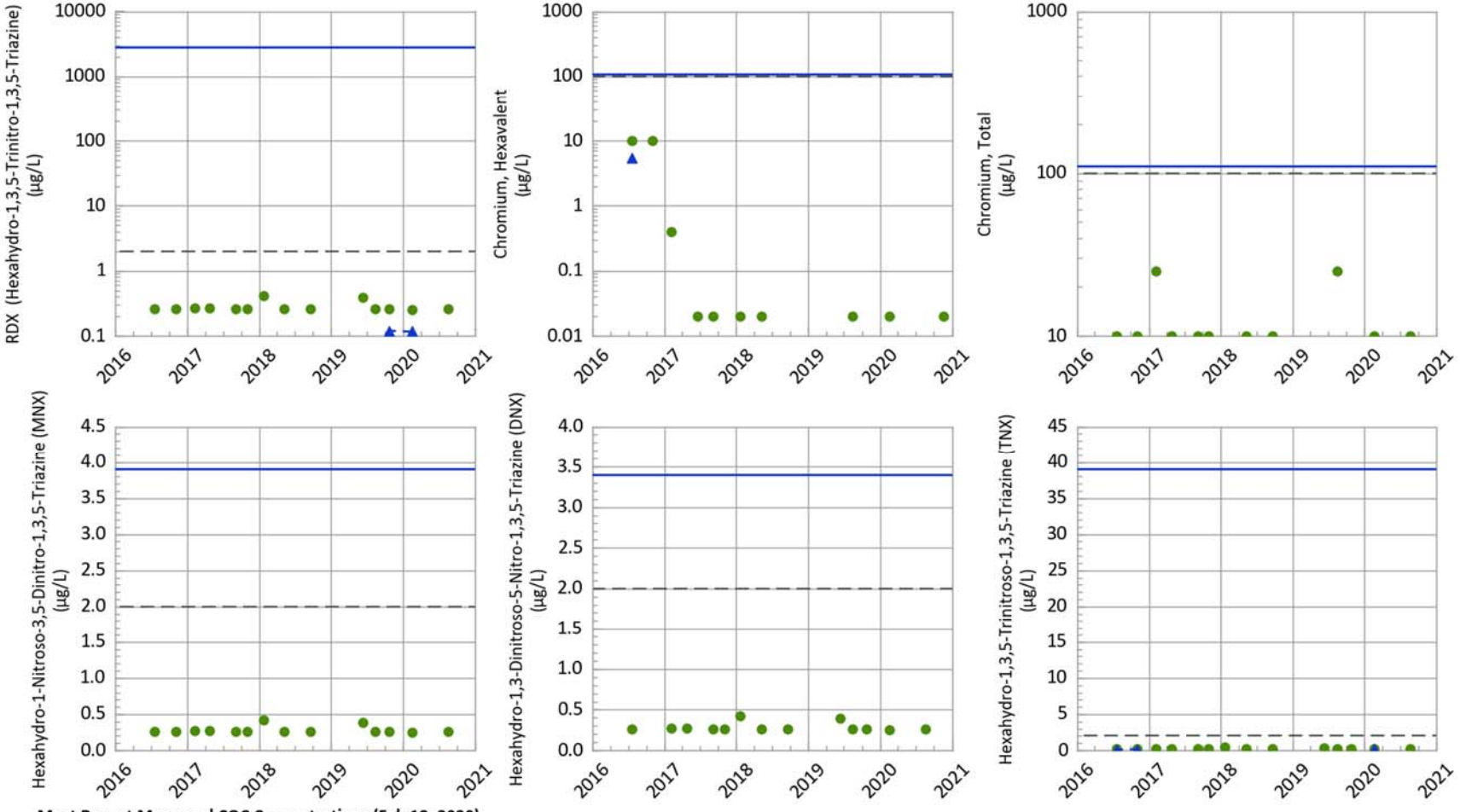

PTX06-ISB042 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant
Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Organic Carbon (mg/L)
Redox Potential (mV)
Sulfate (mg/L)
2013
2014
2015
2016
2017
2018
2019
2020
2021
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 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-ISB048 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



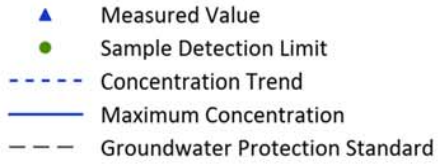
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

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



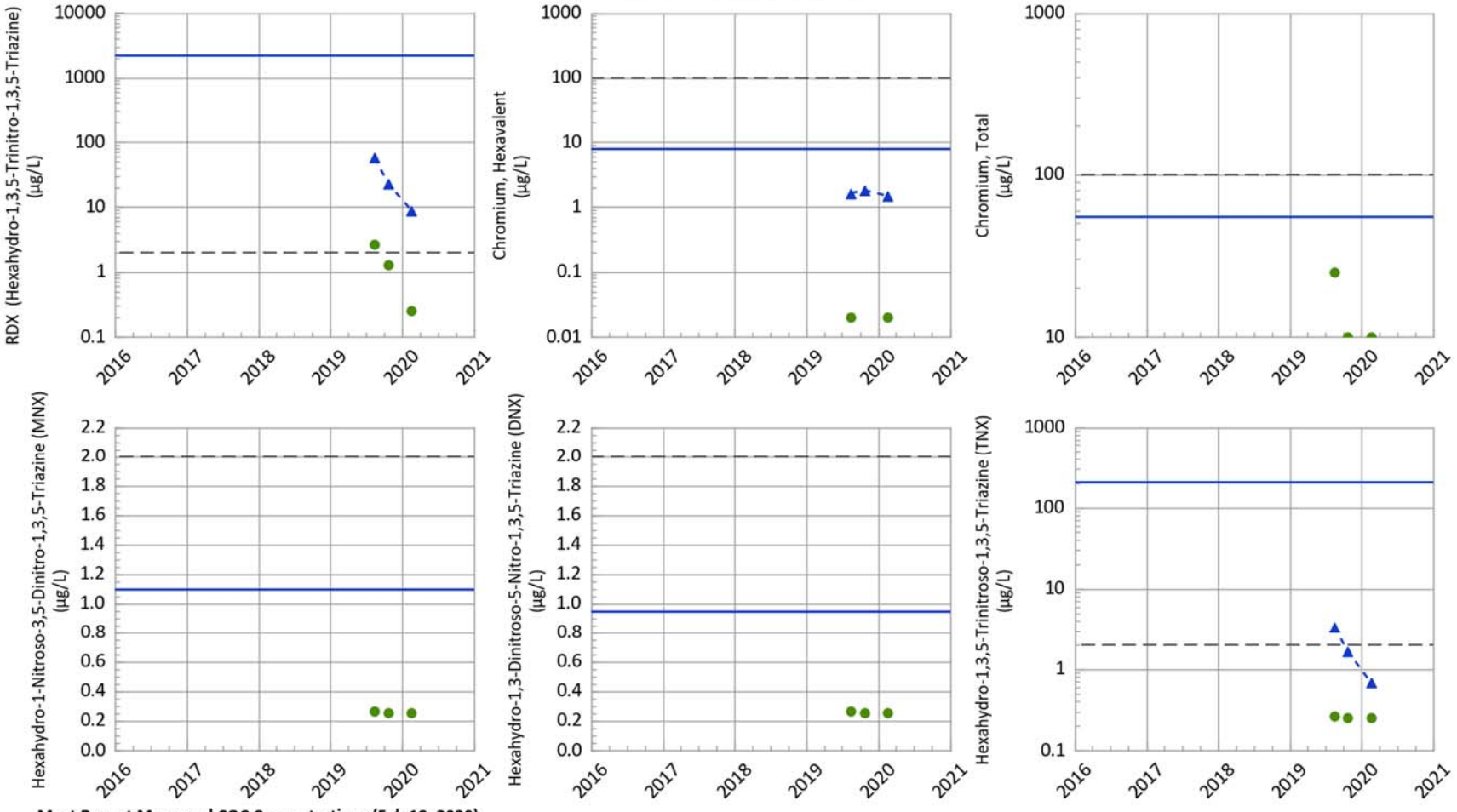
Most Recent Measured COC Concentrations (Feb 18, 2020)

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



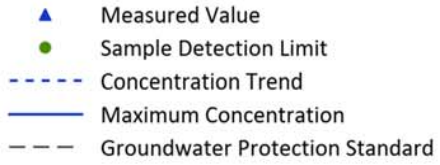
Well Location

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



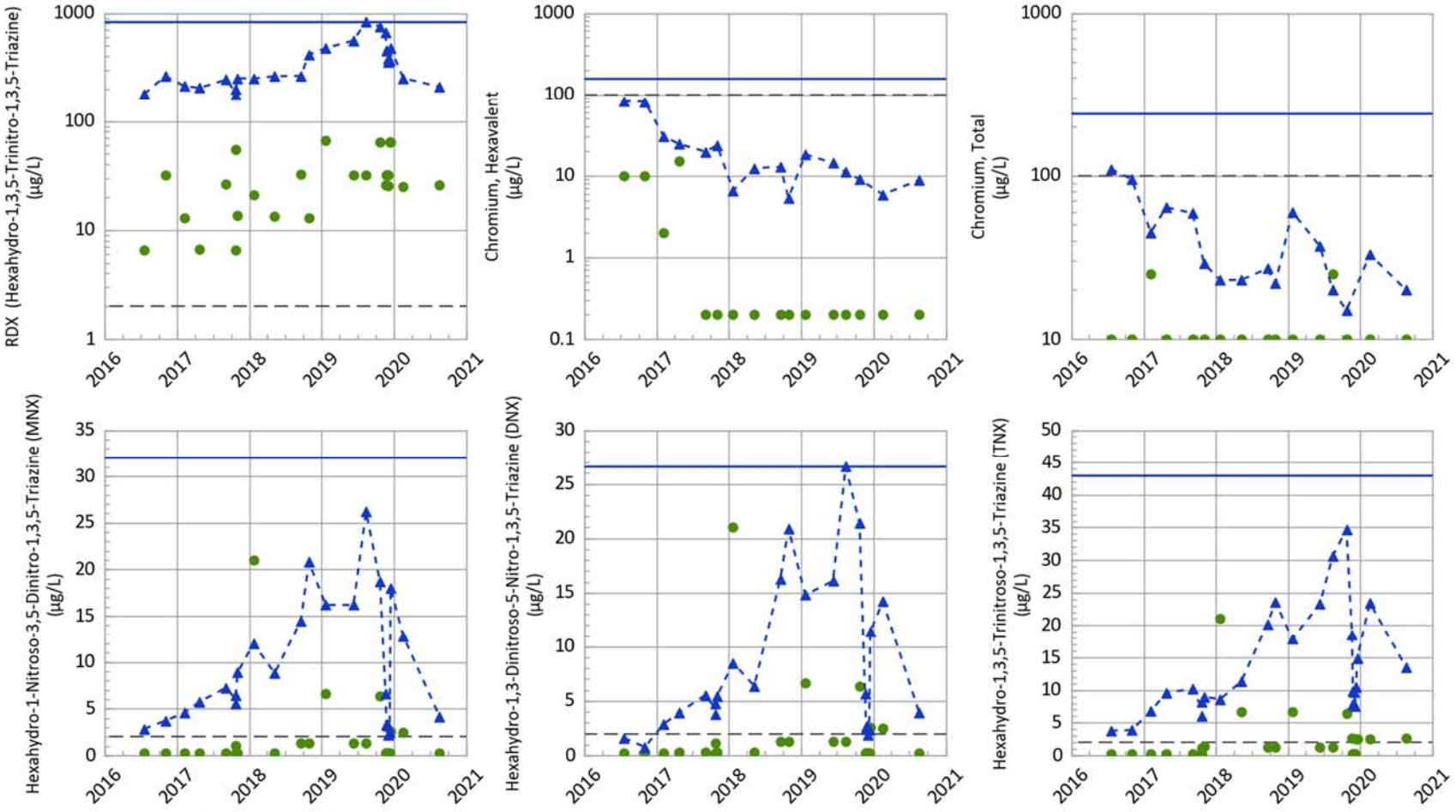
Most Recent Measured COC Concentrations (Feb 18, 2020)

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



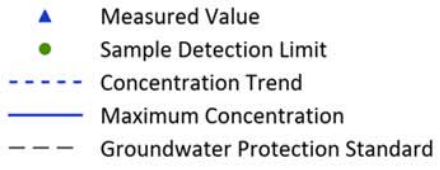
Well Location

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



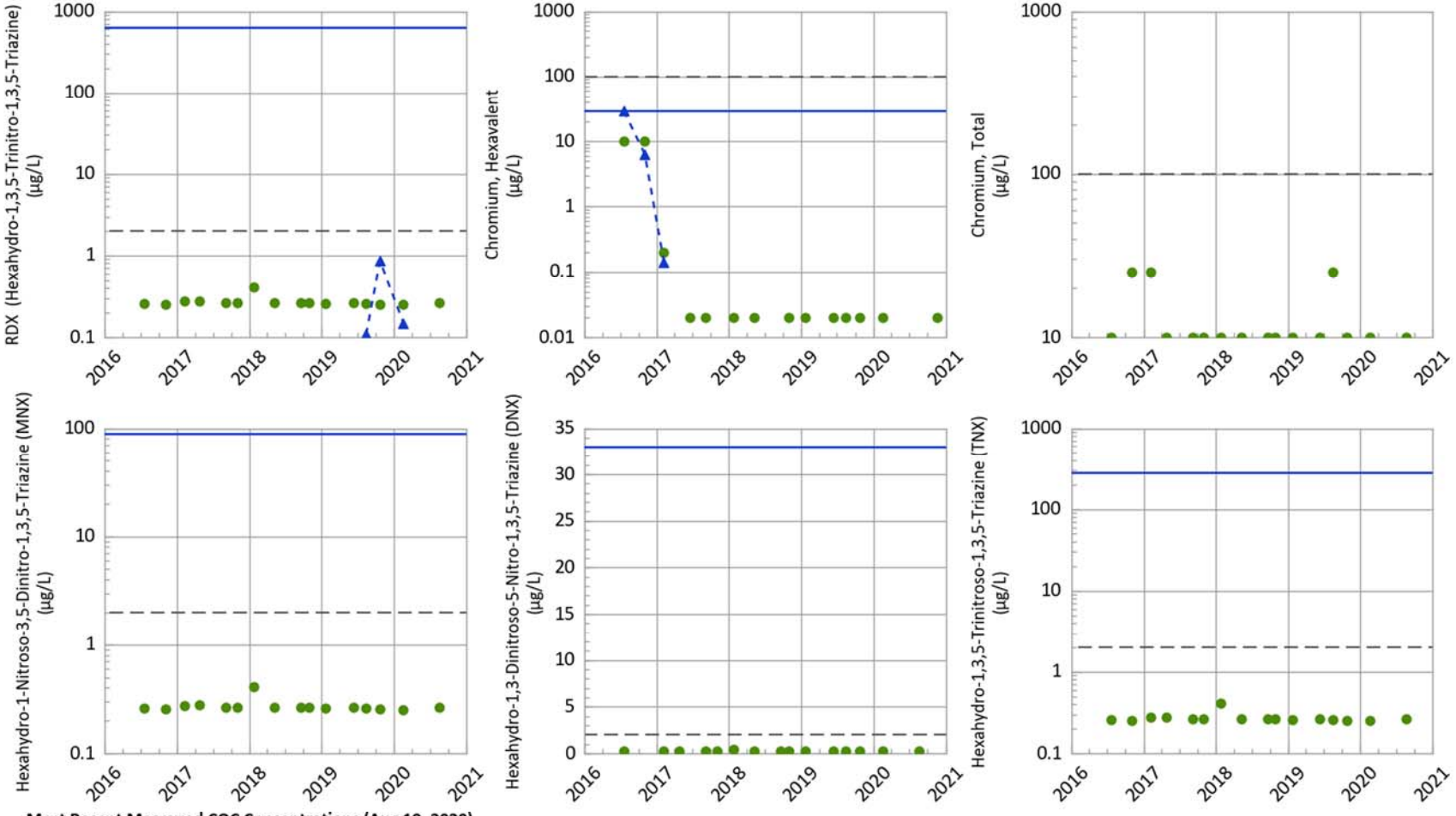
Most Recent Measured COC Concentrations (Aug 19, 2020)

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



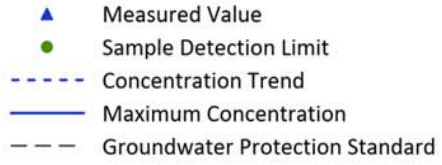
Well Location

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



Most Recent Measured COC Concentrations (Aug 19, 2020)

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



Well Location

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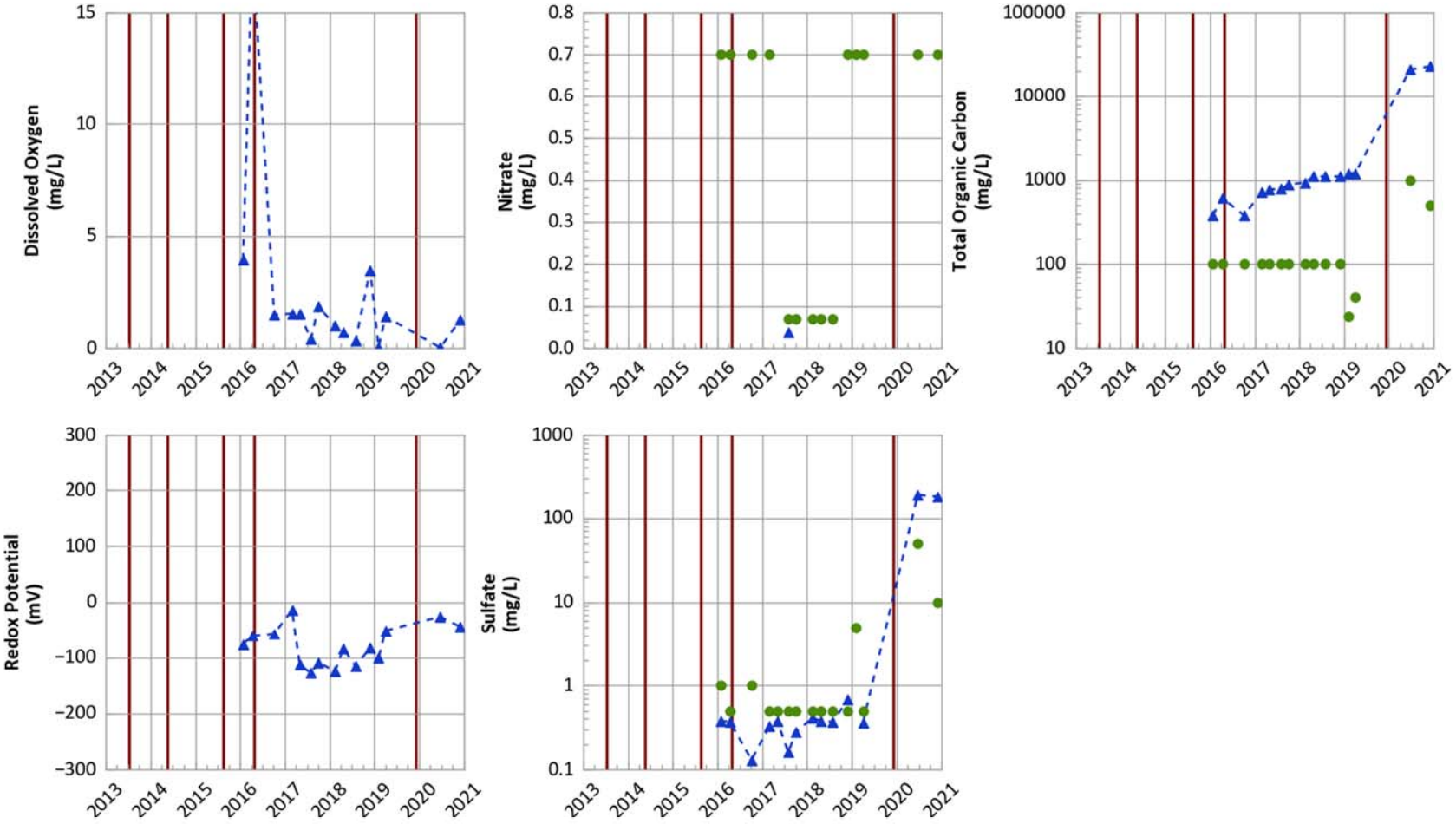
Zone 11 ISB Graphs

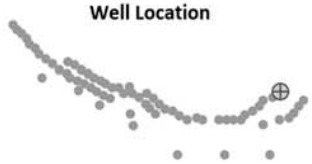
PTX06-ISB055 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

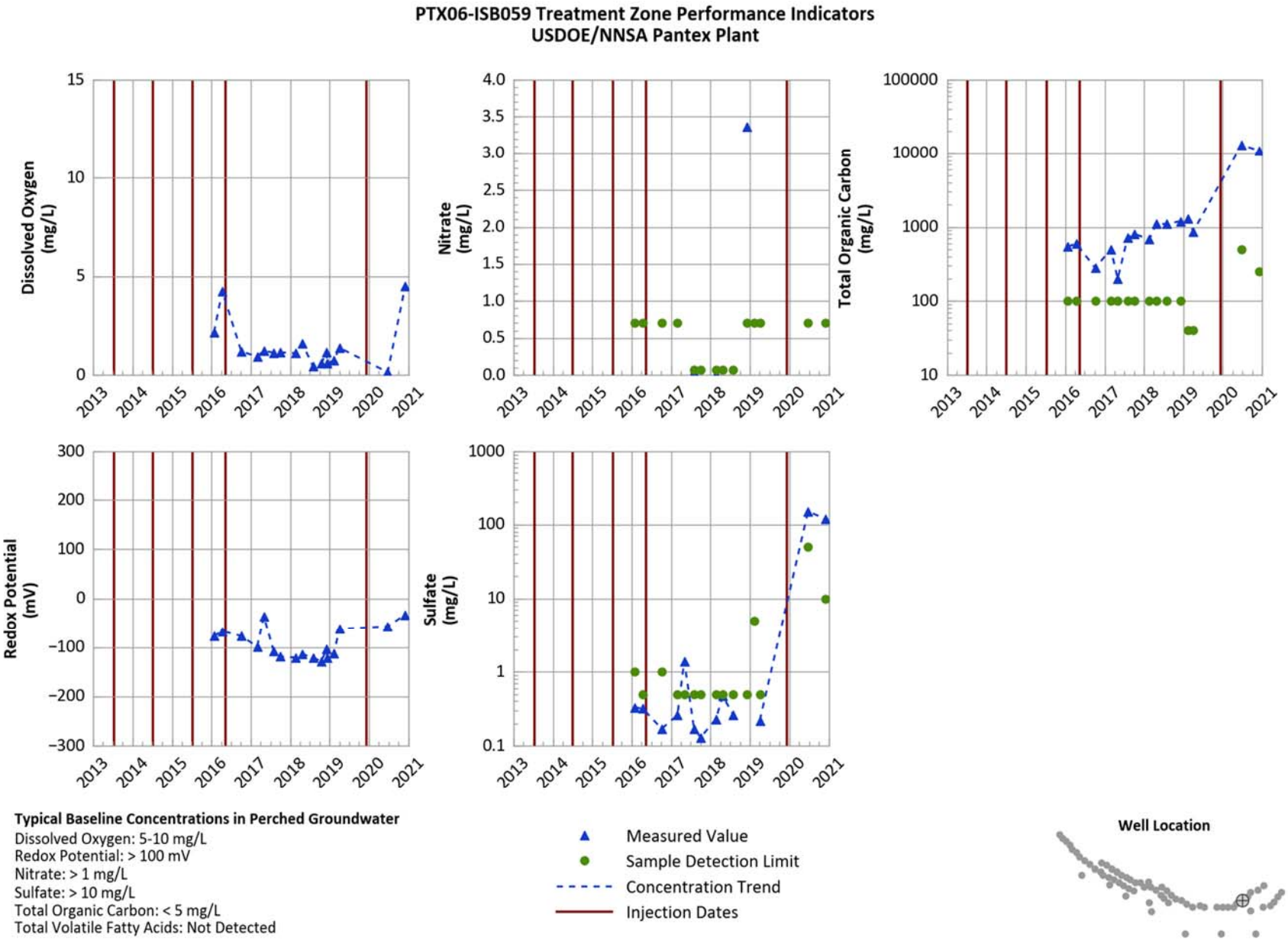


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

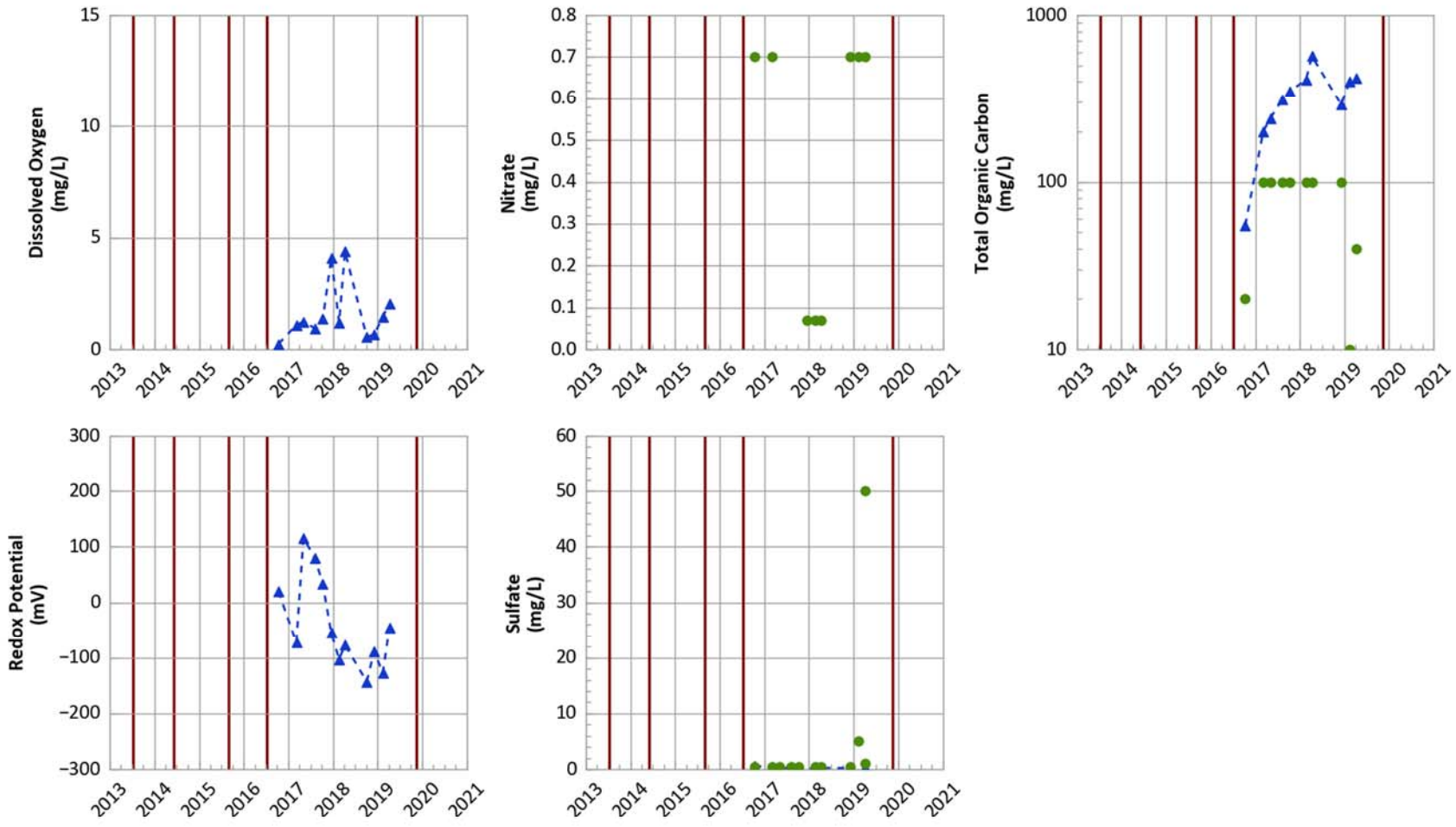
Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location




PTX06-ISB059 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant
Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Organic Carbon (mg/L)
Redox Potential (mV)
Sulfate (mg/L)
2013
2014
2015
2016
2017
2018
2019
2020
2021
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

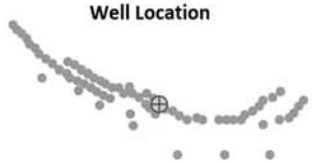
PTX06-ISB071 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

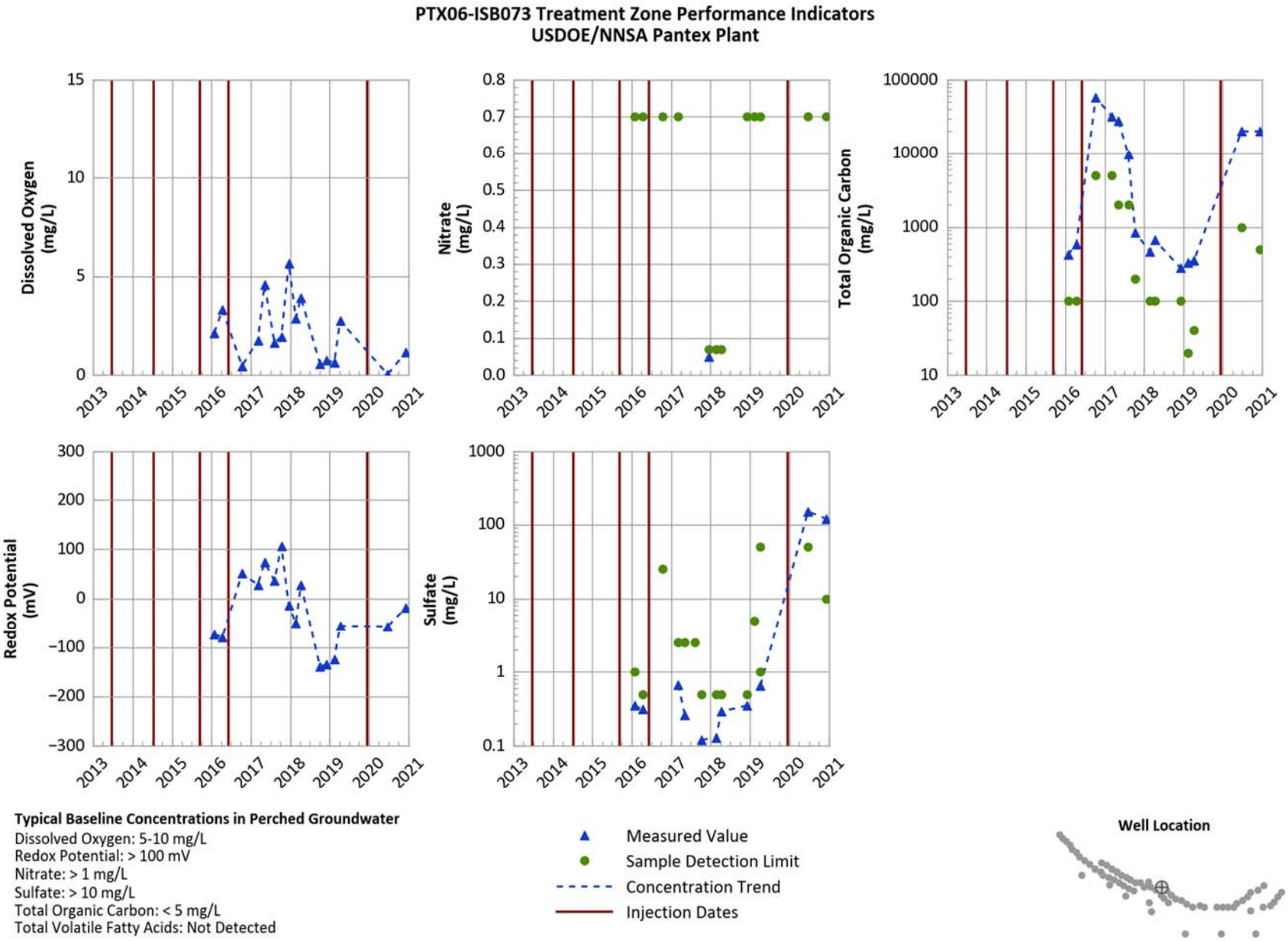


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

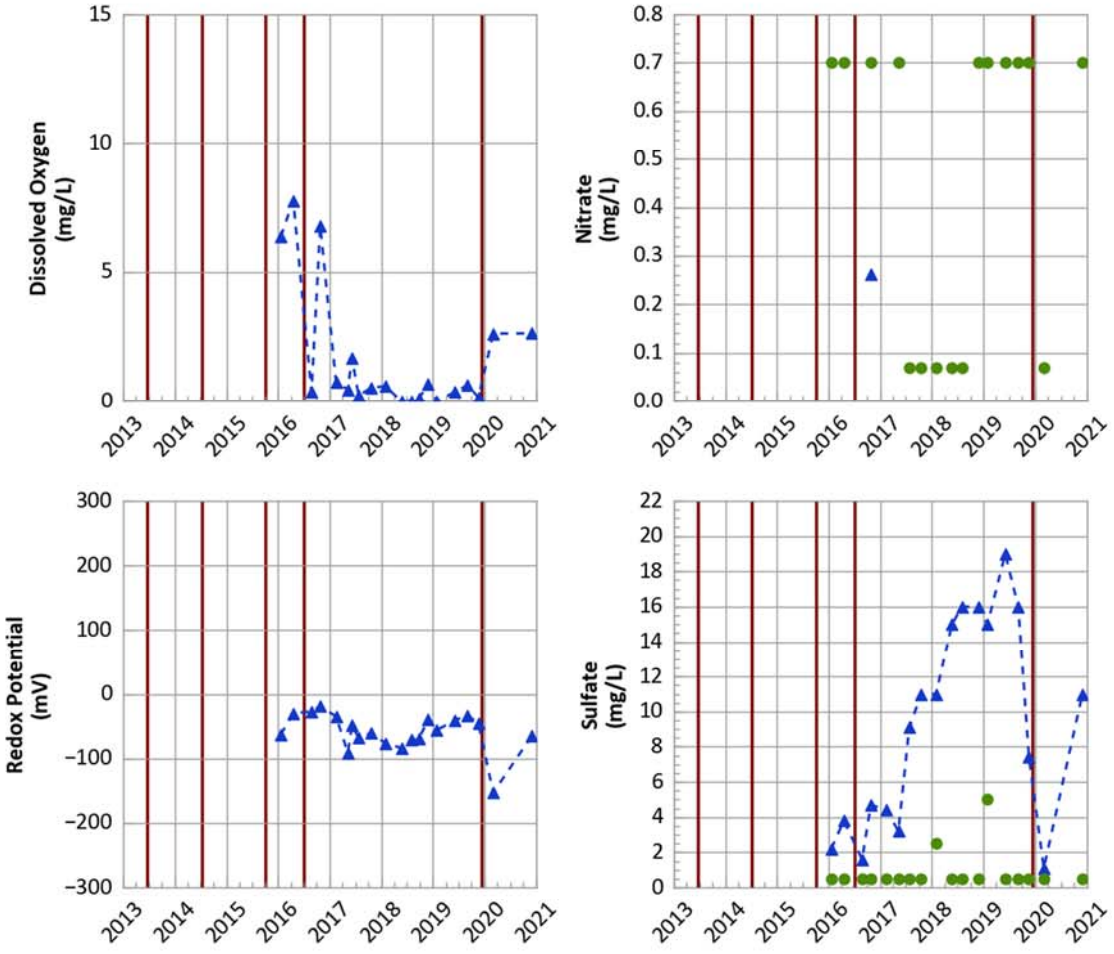
Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location




PTX06-ISB073 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant
Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Organic Carbon (mg/L)
Redox Potential (mV)
Sulfate (mg/L)
2013
2014
2015
2016
2017
2018
2019
2020
2021
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

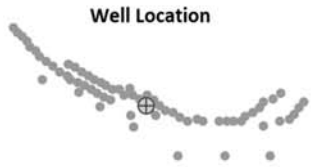
PTX06-ISB075 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



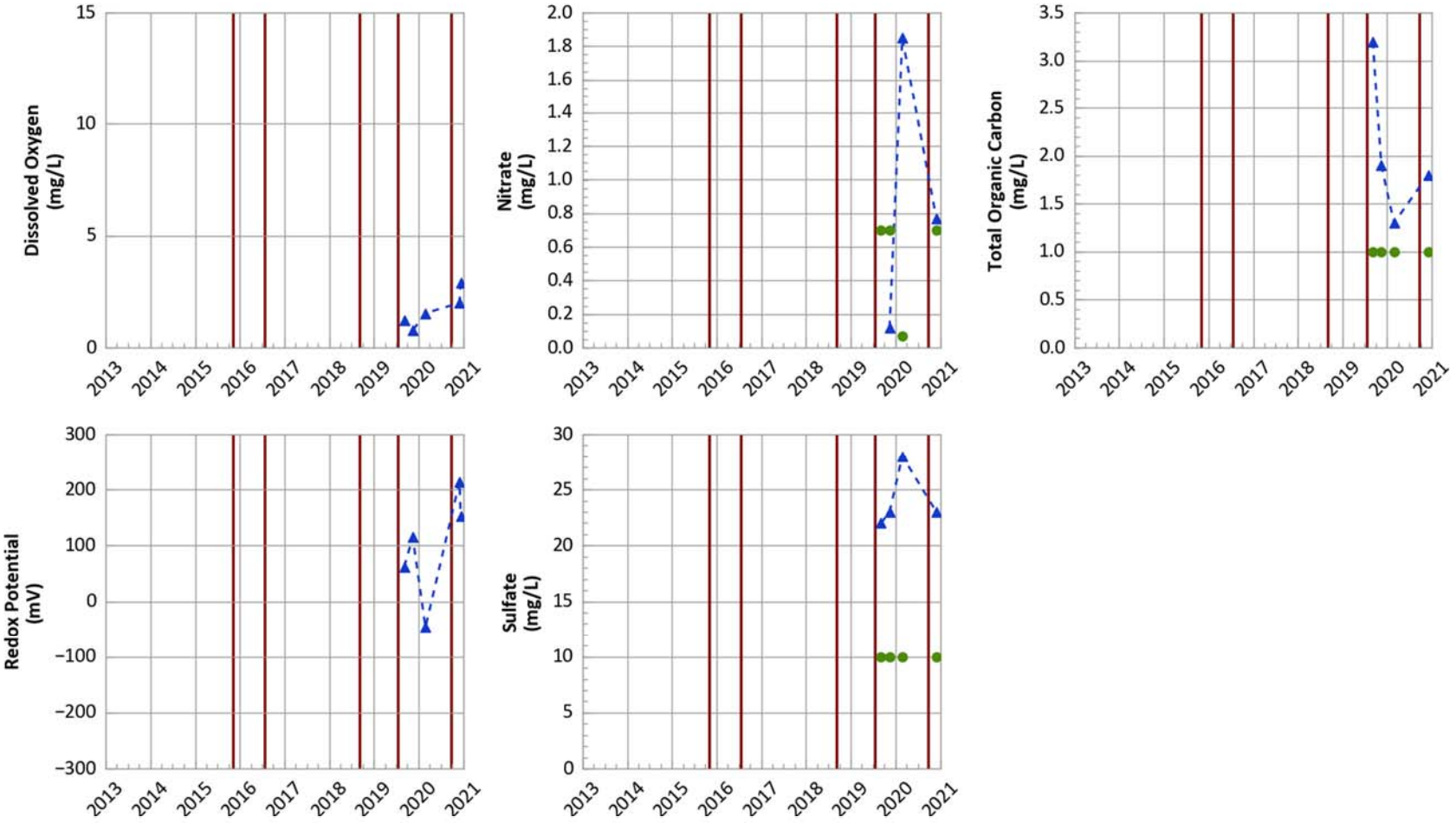
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location

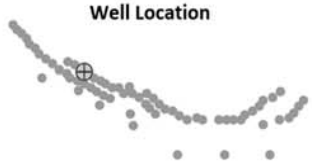


PTX06-1164 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

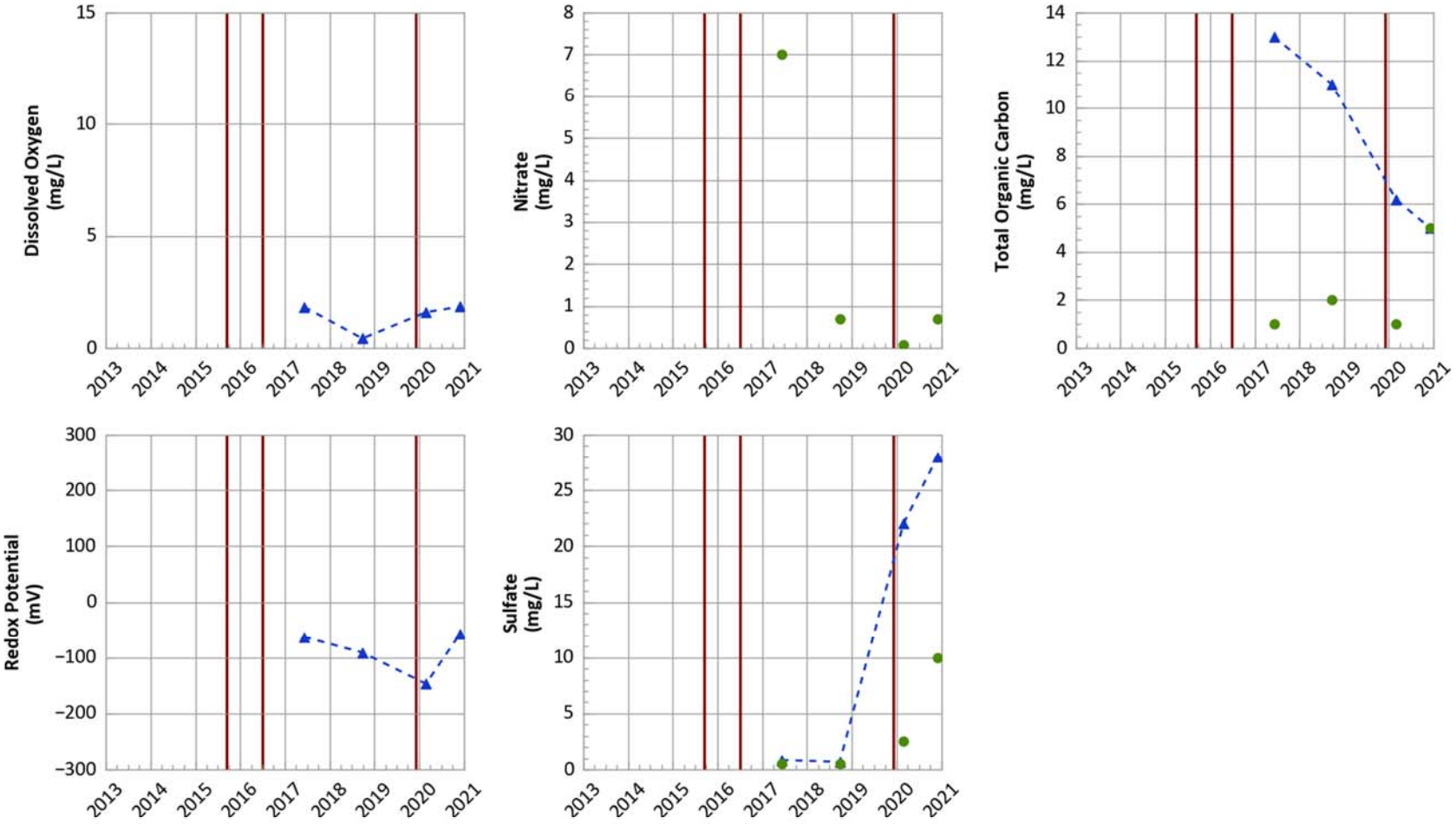


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates



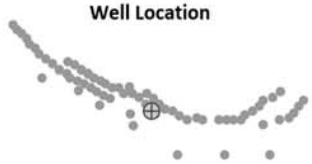
PTX06-1169 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

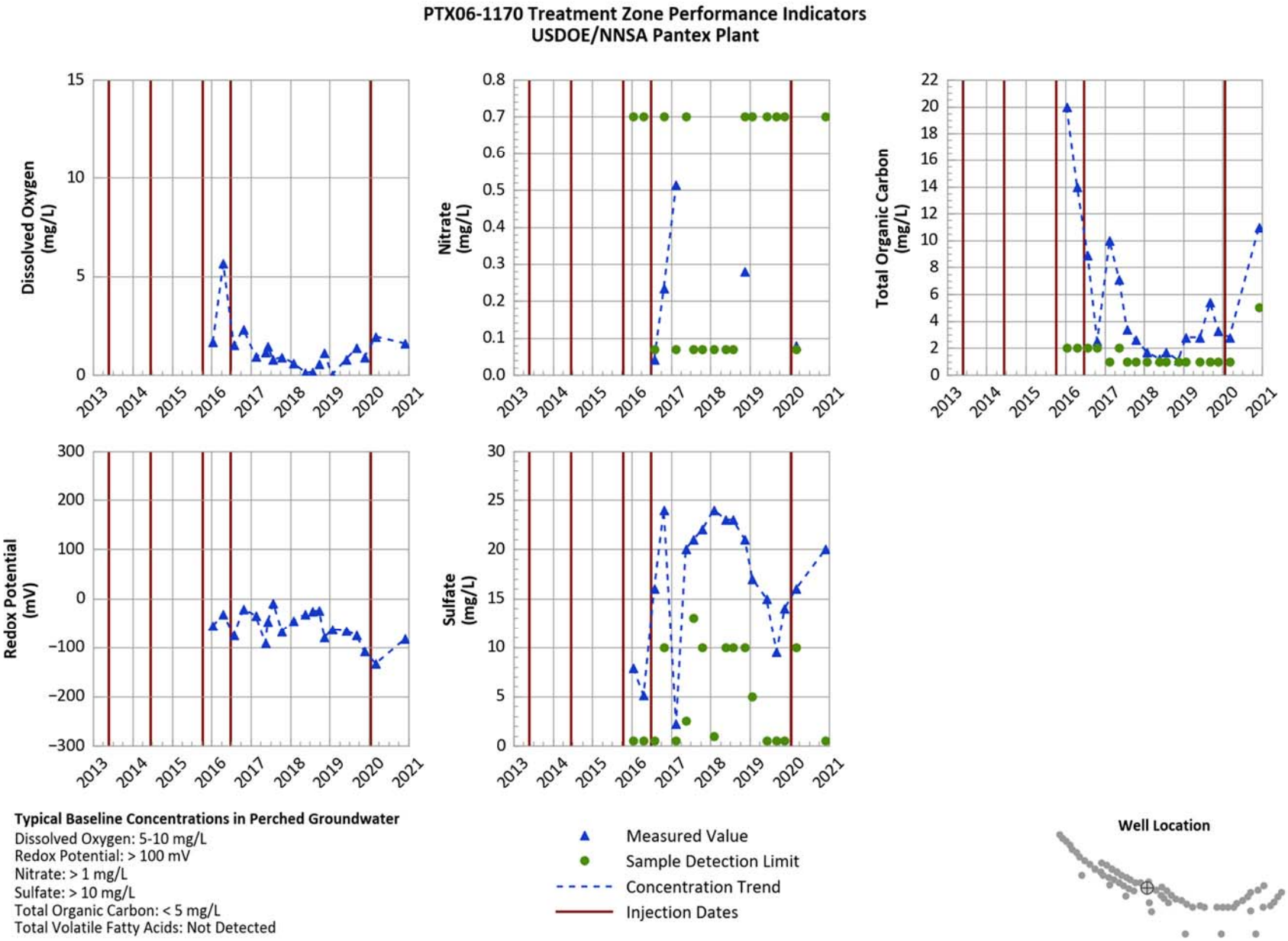


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

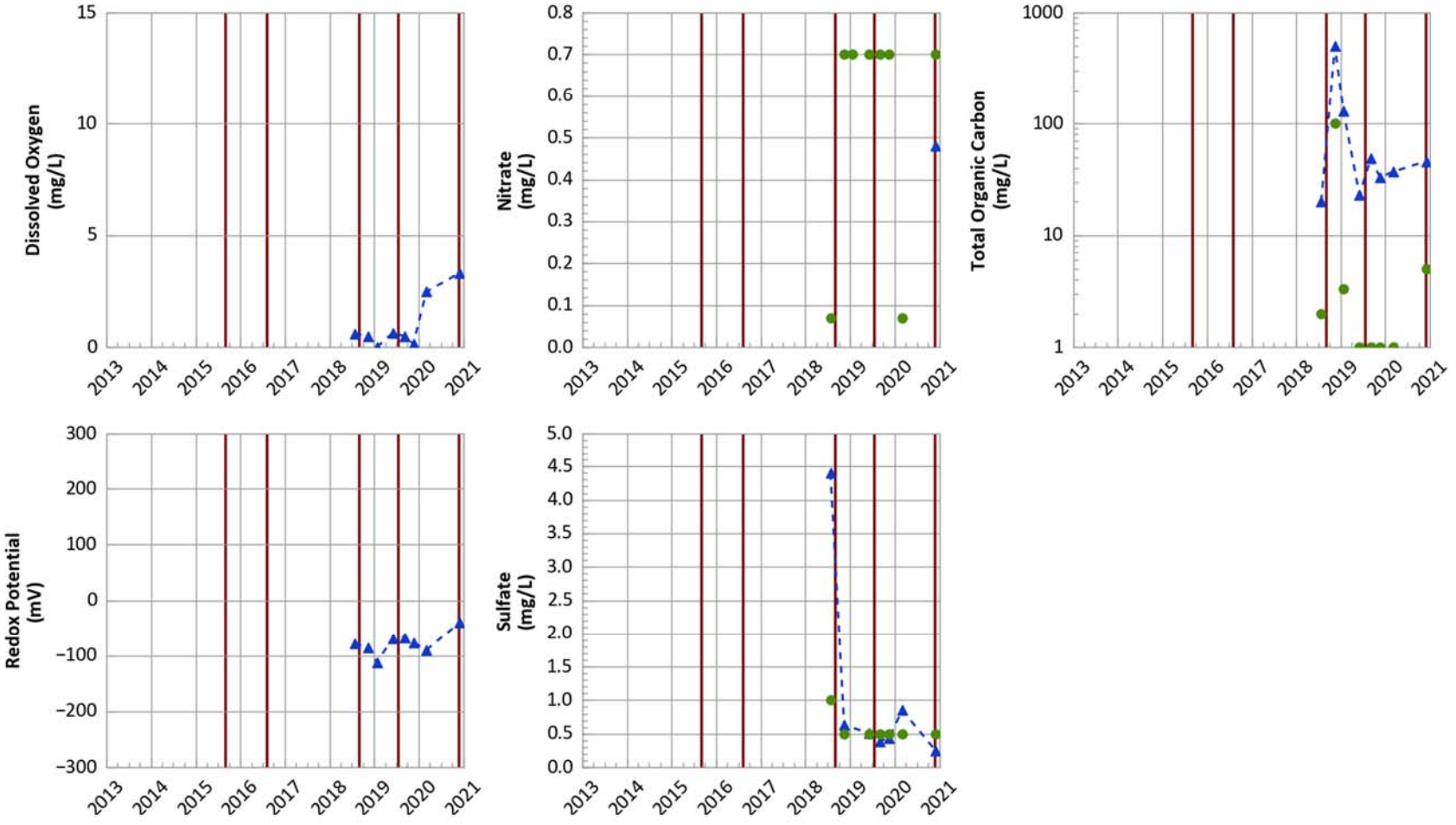
Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location




PTX06-1170 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant
Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Organic Carbon (mg/L)
Redox Potential (mV)
Sulfate (mg/L)
2013
2014
2015
2016
2017
2018
2019
2020
2021
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

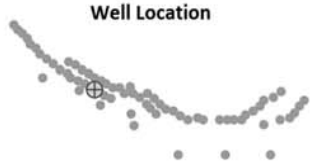
PTX06-1176 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

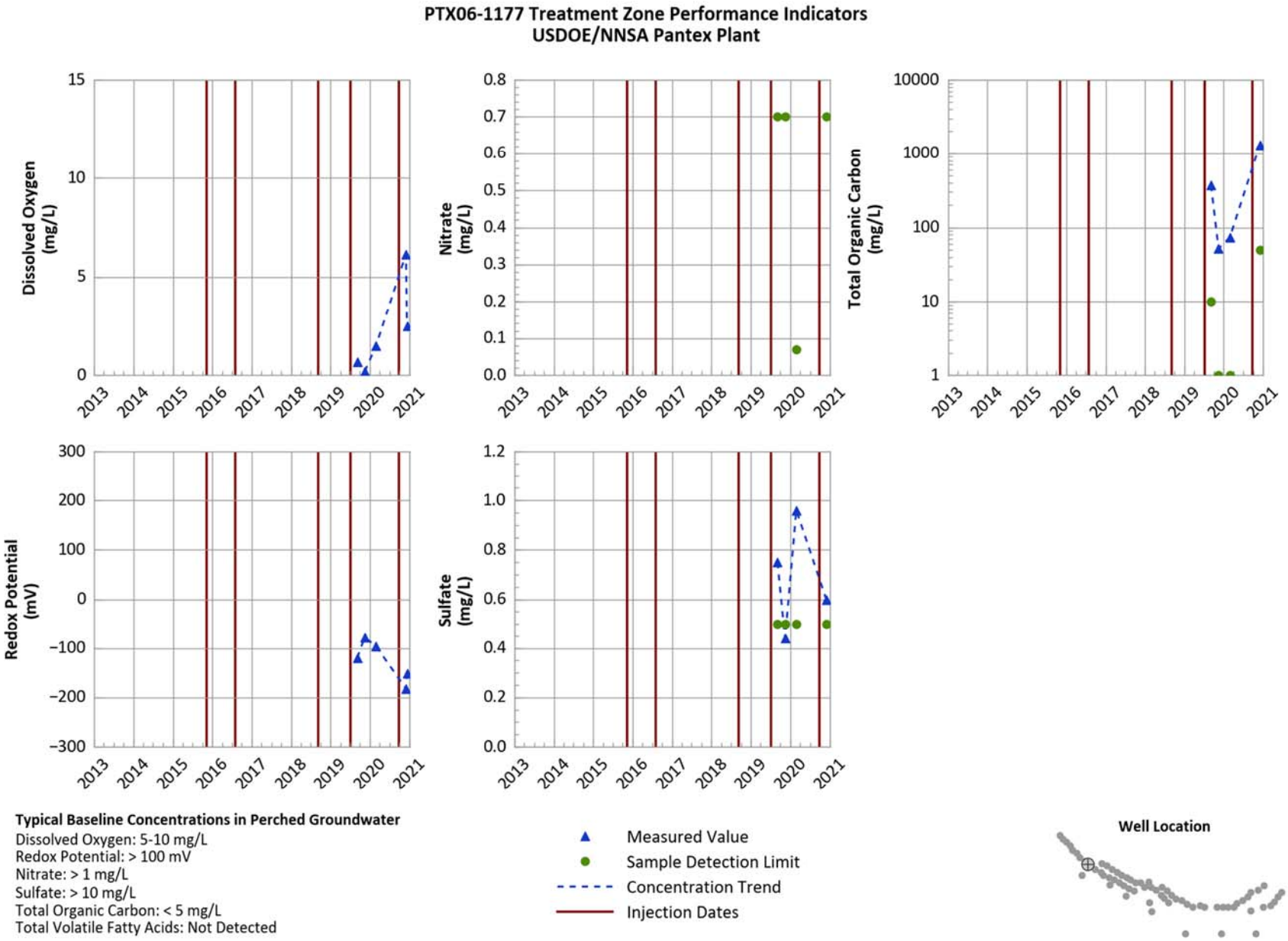


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

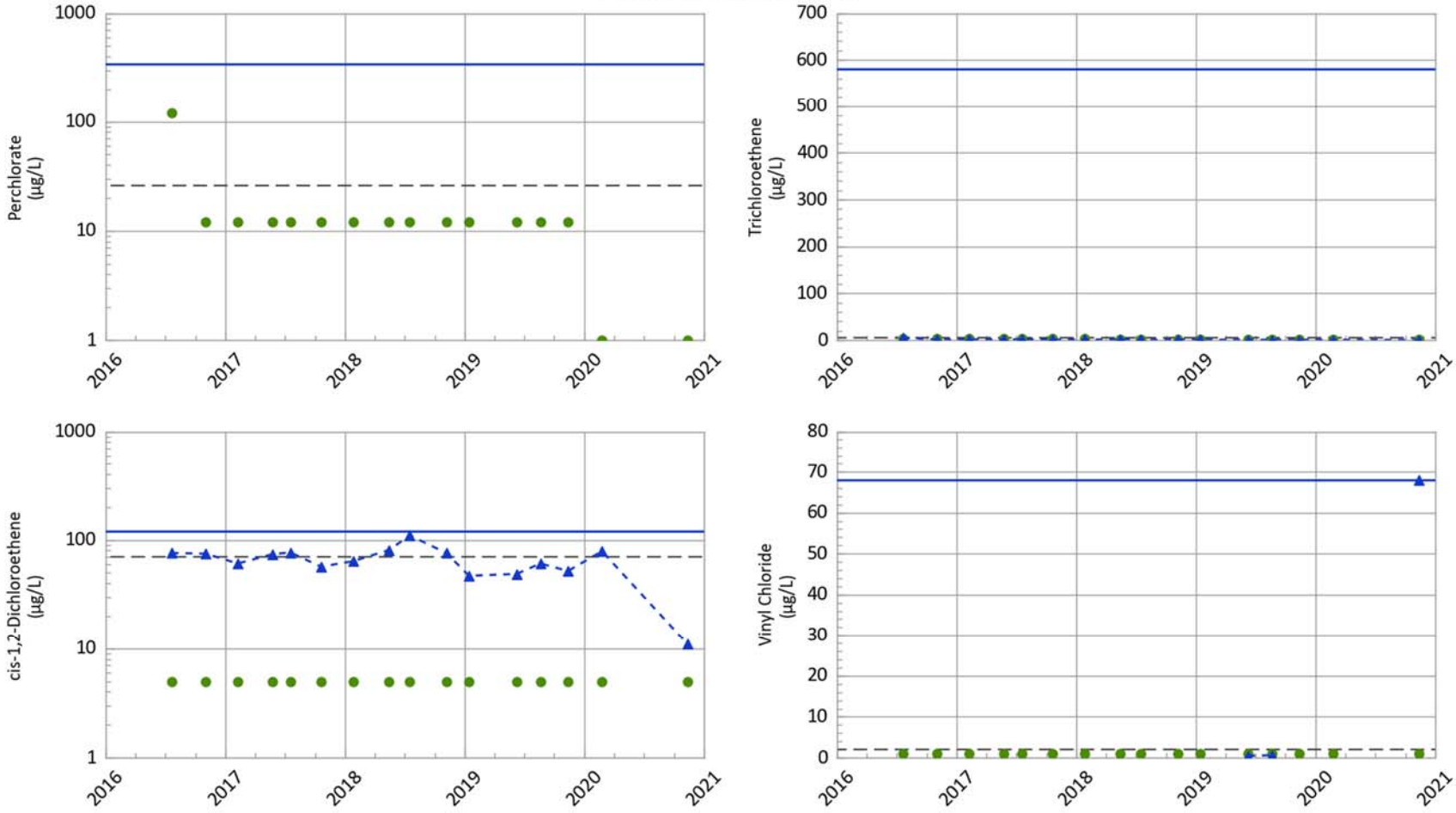
Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

Well Location




PTX06-1177 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant
Dissolved Oxygen (mg/L)
Nitrate (mg/L)
Total Organic Carbon (mg/L)
Redox Potential (mV)
Sulfate (mg/L)
2013
2014
2015
2016
2017
2018
2019
2020
2021
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

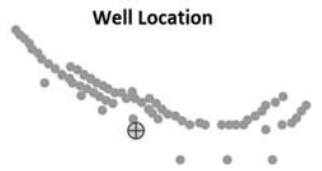
PTX06-1012 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



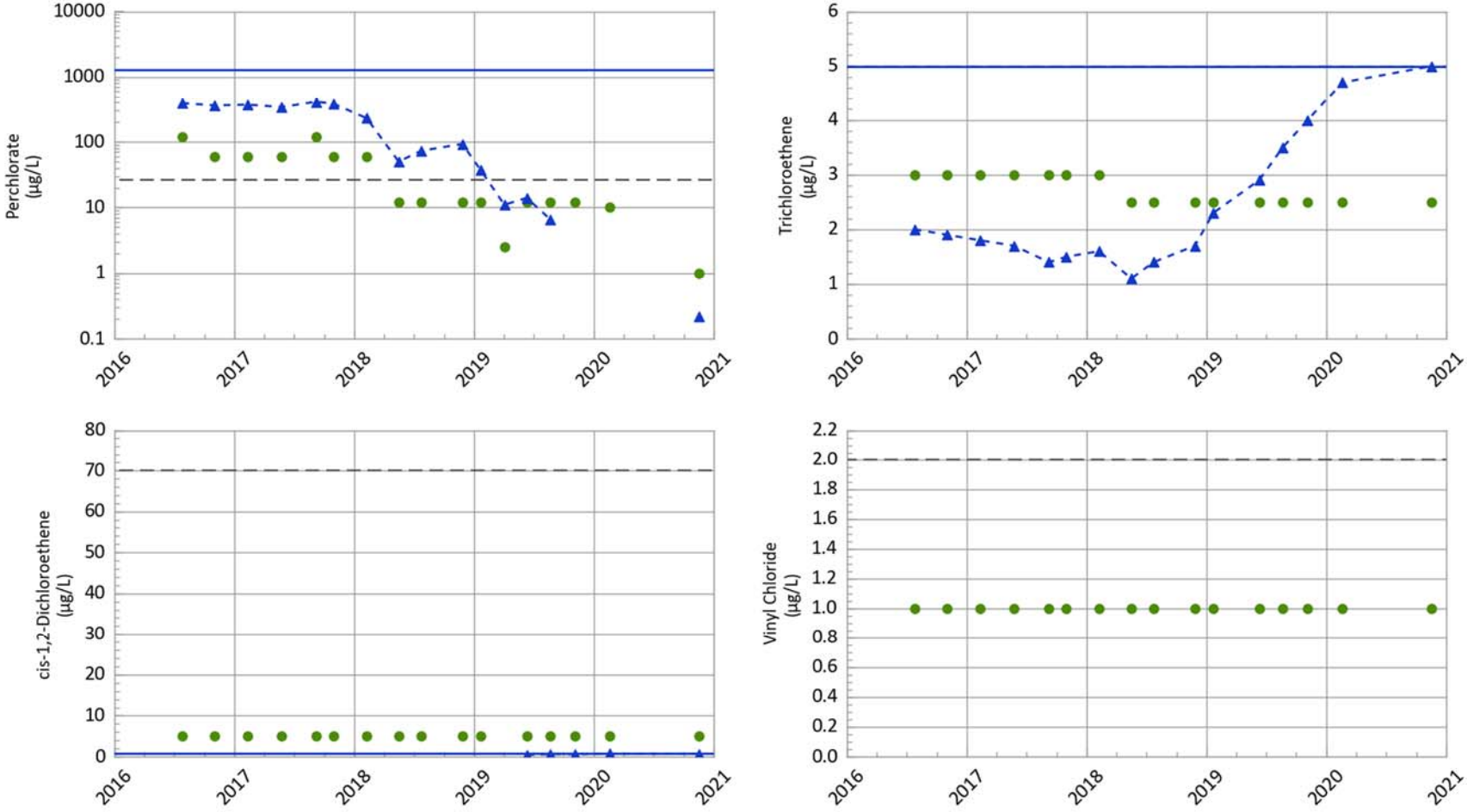
Most Recent Measured COC Concentrations (Nov 12, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	11.0	70.0
TCE	0.42	5.0
VC	68.0	2.0

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



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

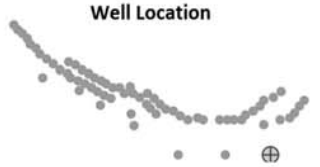


Most Recent Measured COC Concentrations (Nov 17, 2020)

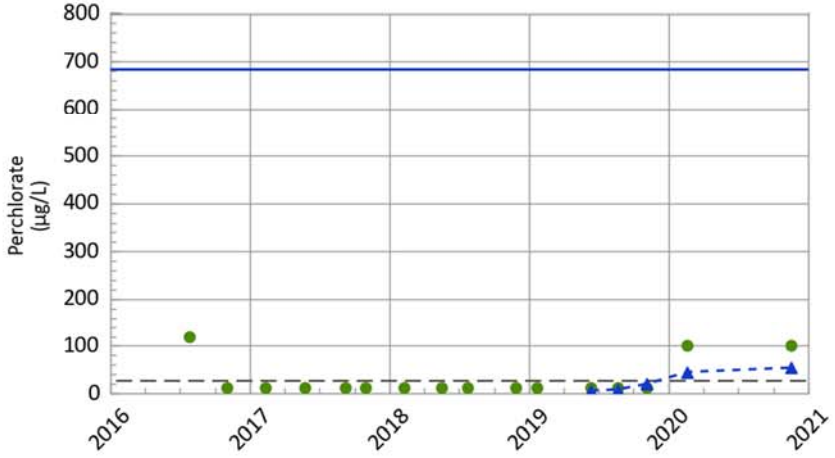
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	0.22	26.0
DCE12C	0.68	70.0
TCE	5.0	5.0
VC	Non-Detect	2.0

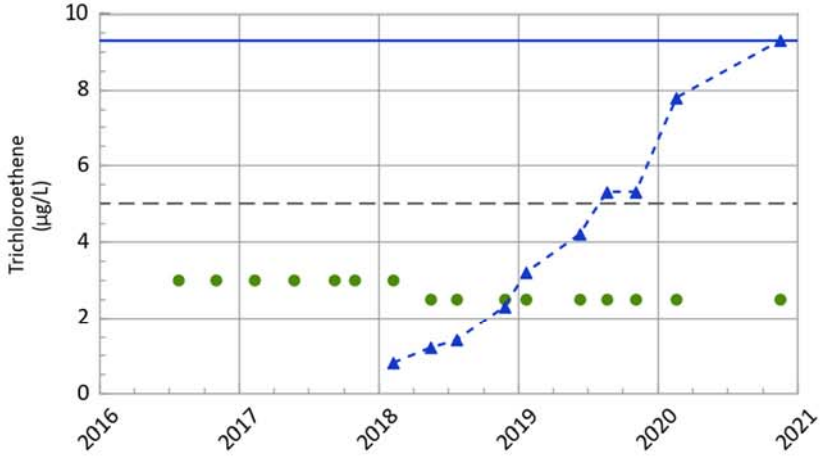
Measured Value
Sample Detection Limit
Concentration Trend
Maximum Concentration
Groundwater Protection Standard

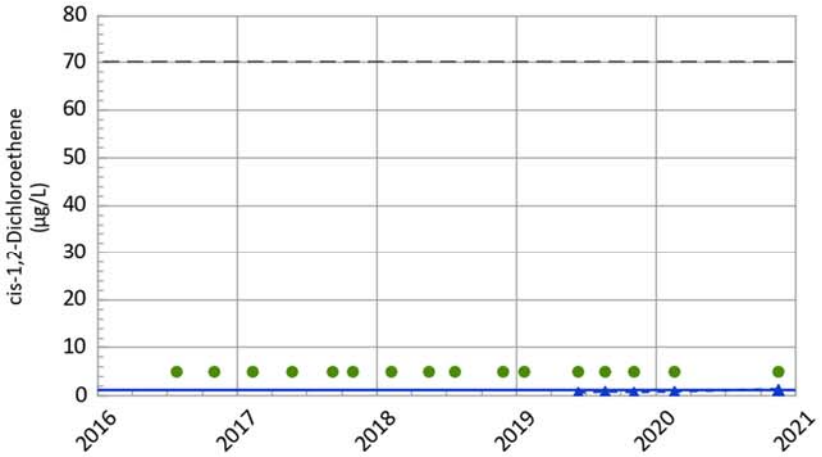
Well Location

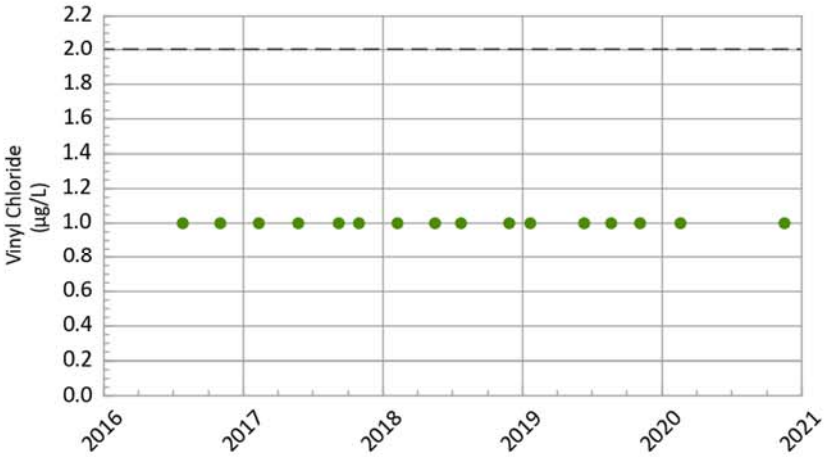


PTX06-1149 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



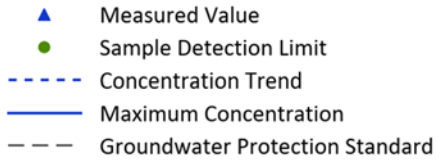


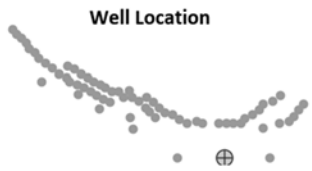




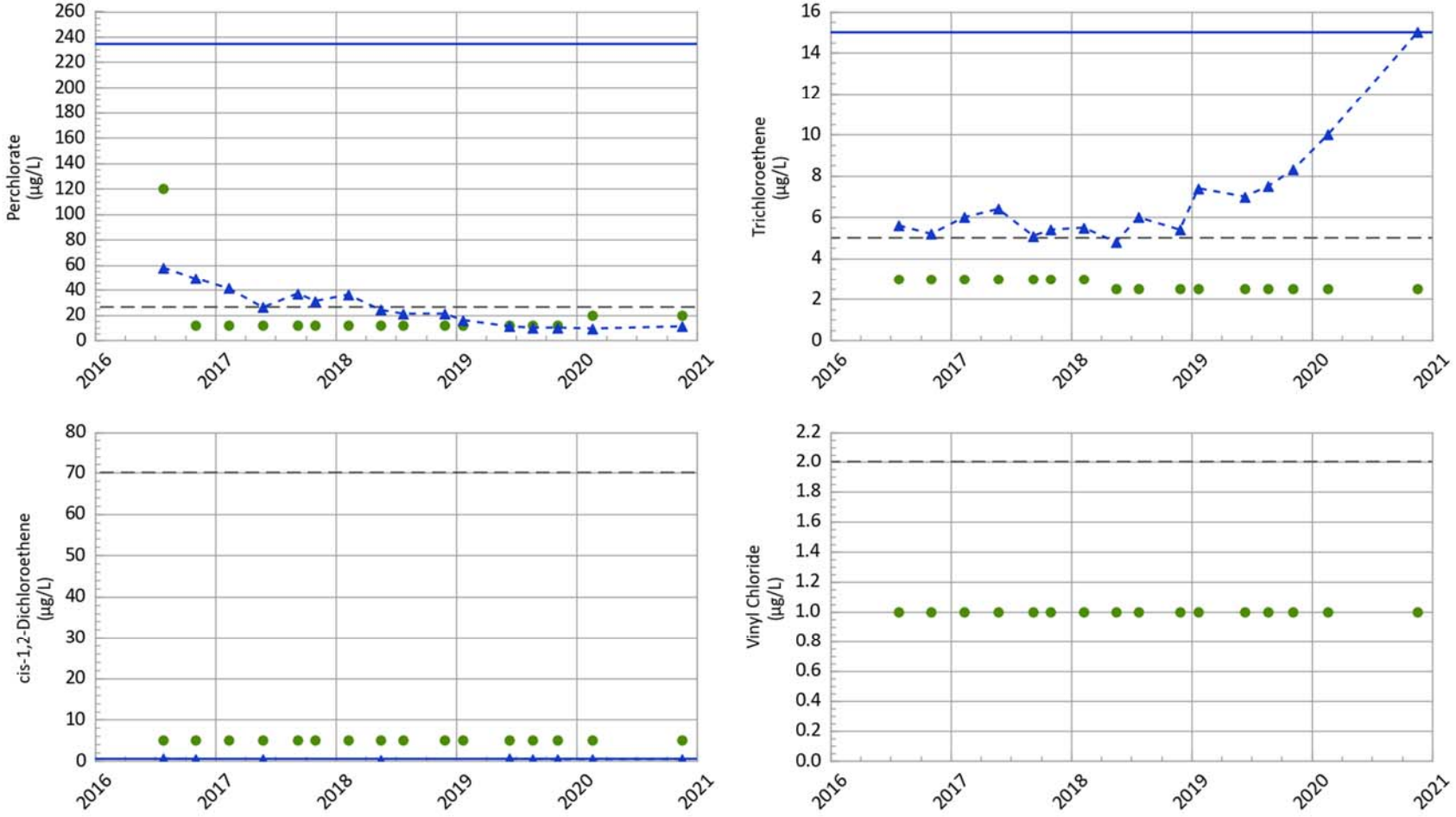
Most Recent Measured COC Concentrations (Nov 17, 2020)

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



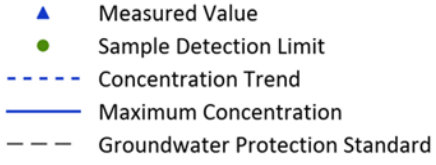


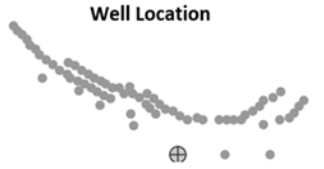
PTX06-1150 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



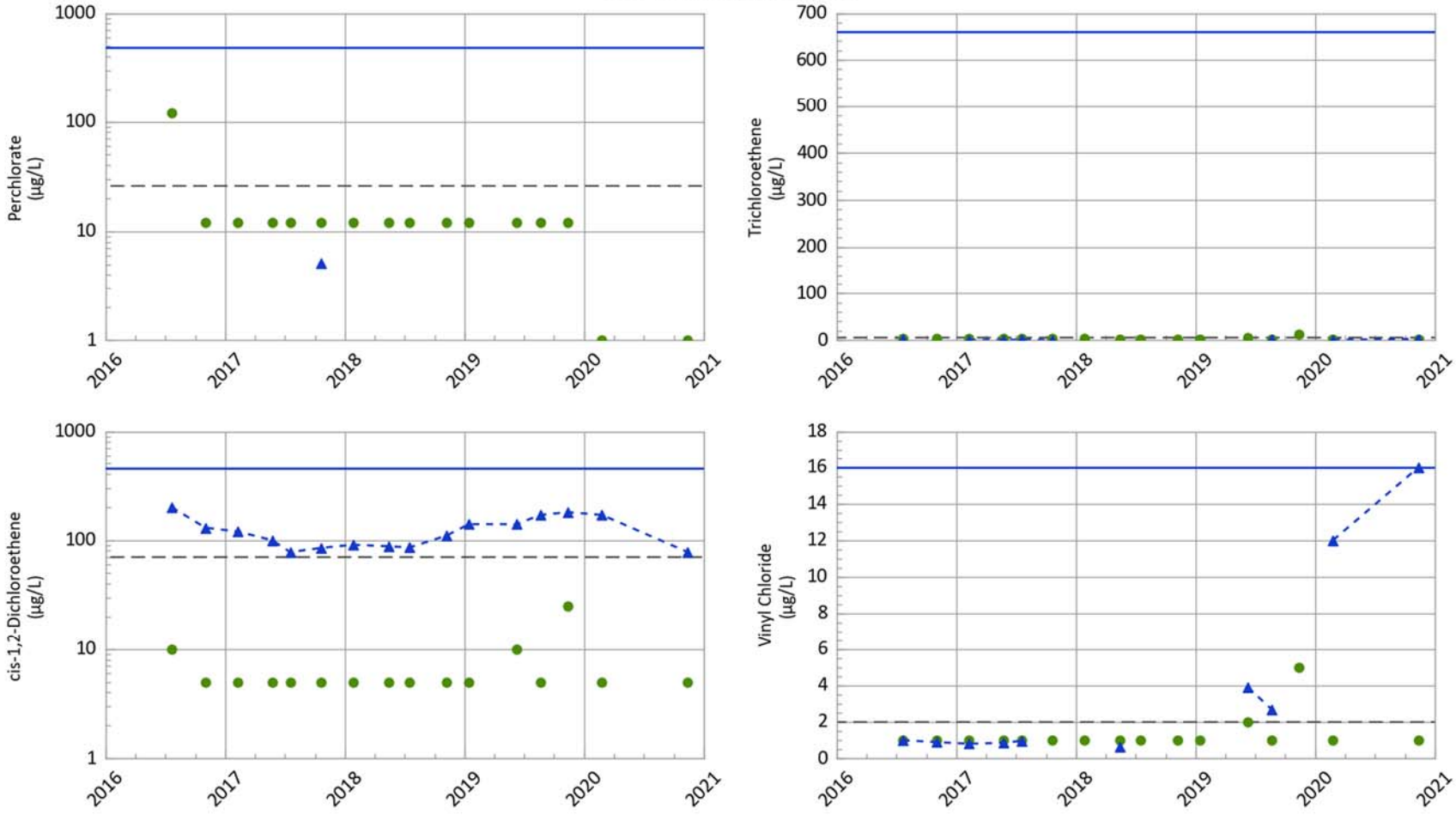
Most Recent Measured COC Concentrations (Nov 17, 2020)

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



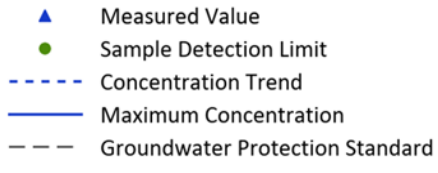


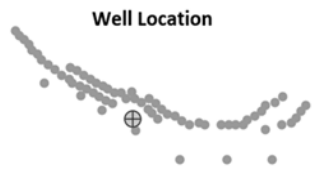
PTX06-1155 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



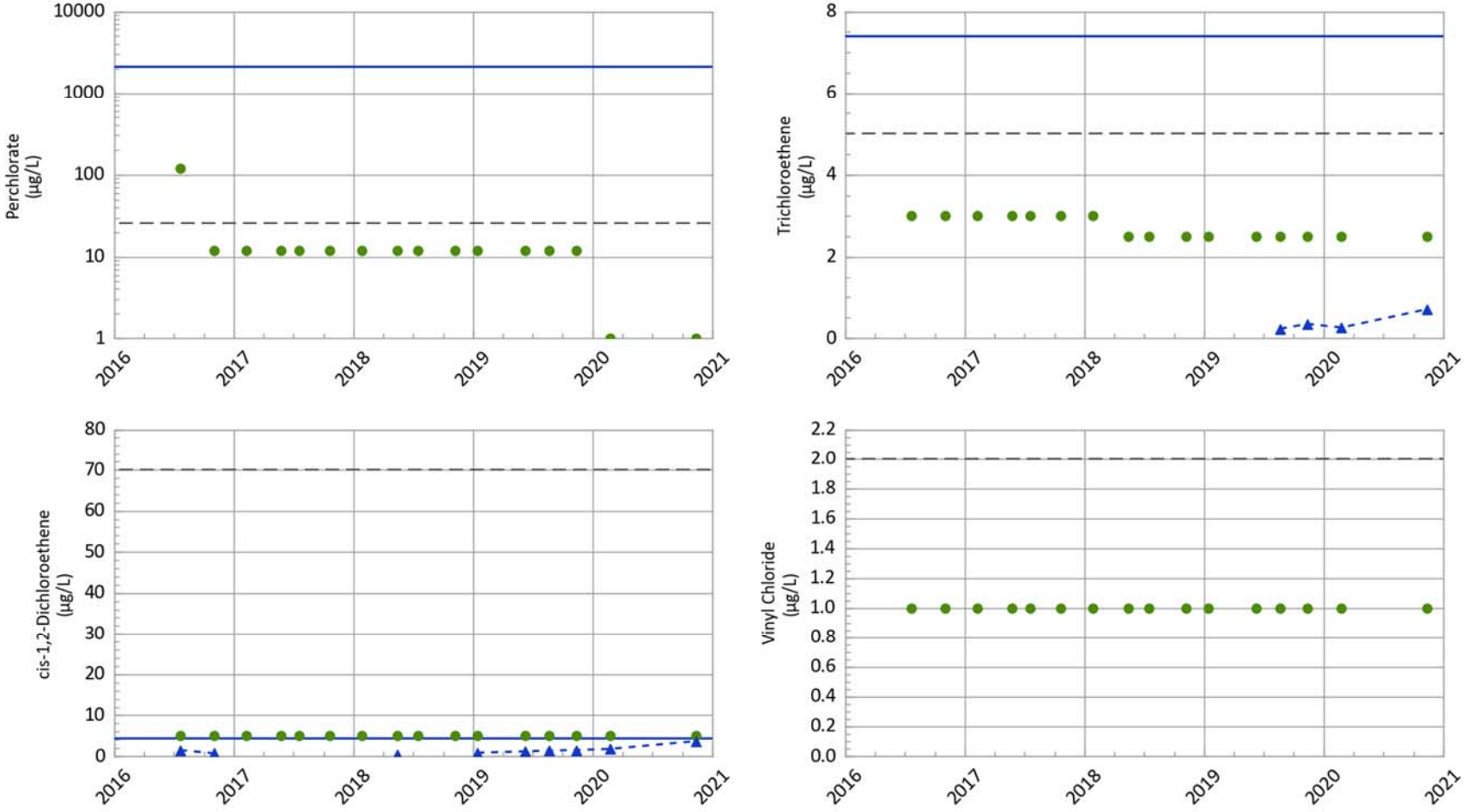
Most Recent Measured COC Concentrations (Nov 12, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	78.0	70.0
TCE	2.5	5.0
VC	16.0	2.0





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

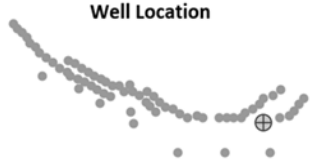


Most Recent Measured COC Concentrations (Nov 12, 2020)

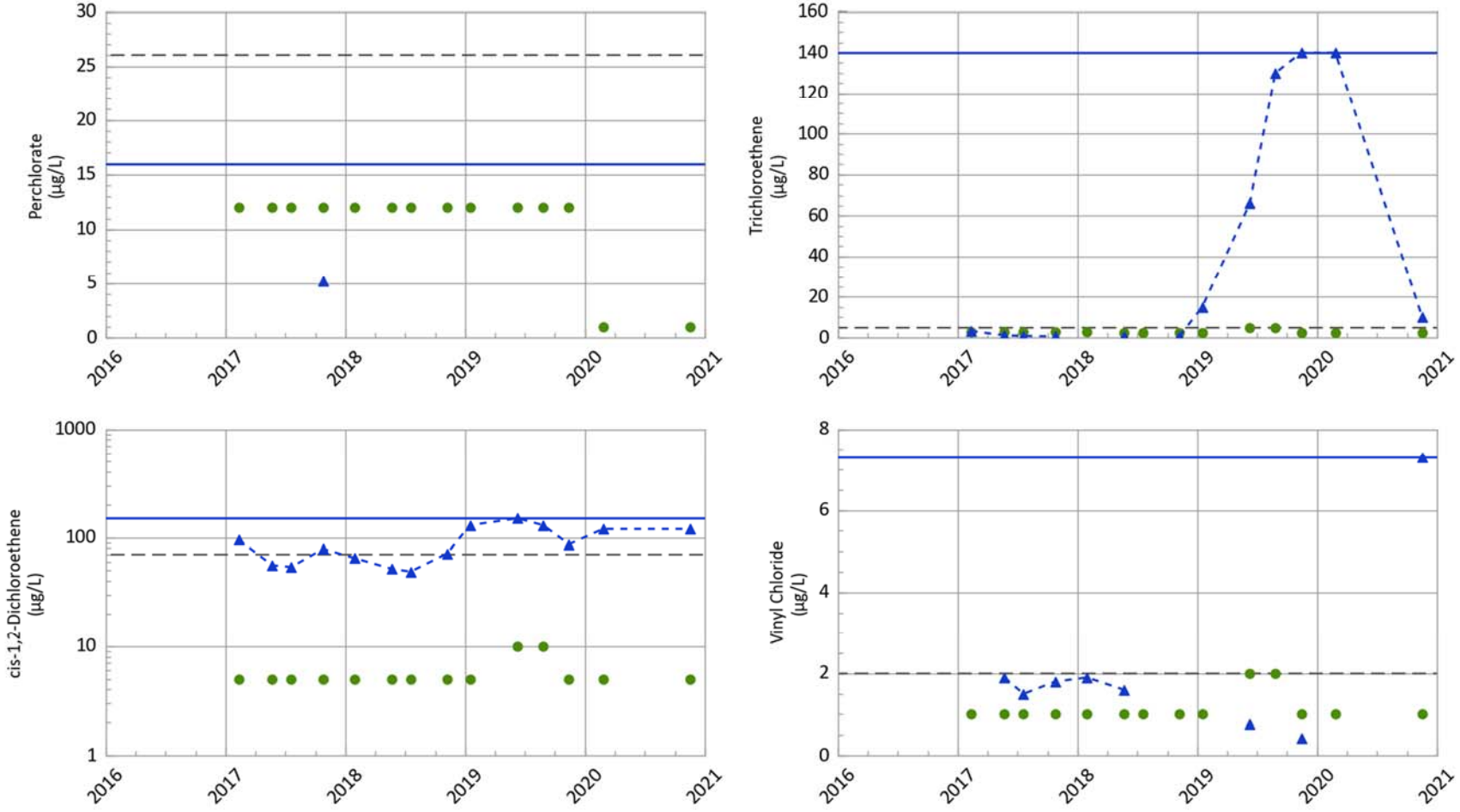
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	3.7	70.0
TCE	0.71	5.0
VC	Non-Detect	2.0

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

Well Location



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

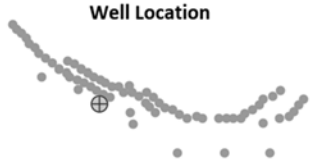


Most Recent Measured COC Concentrations (Nov 16, 2020)

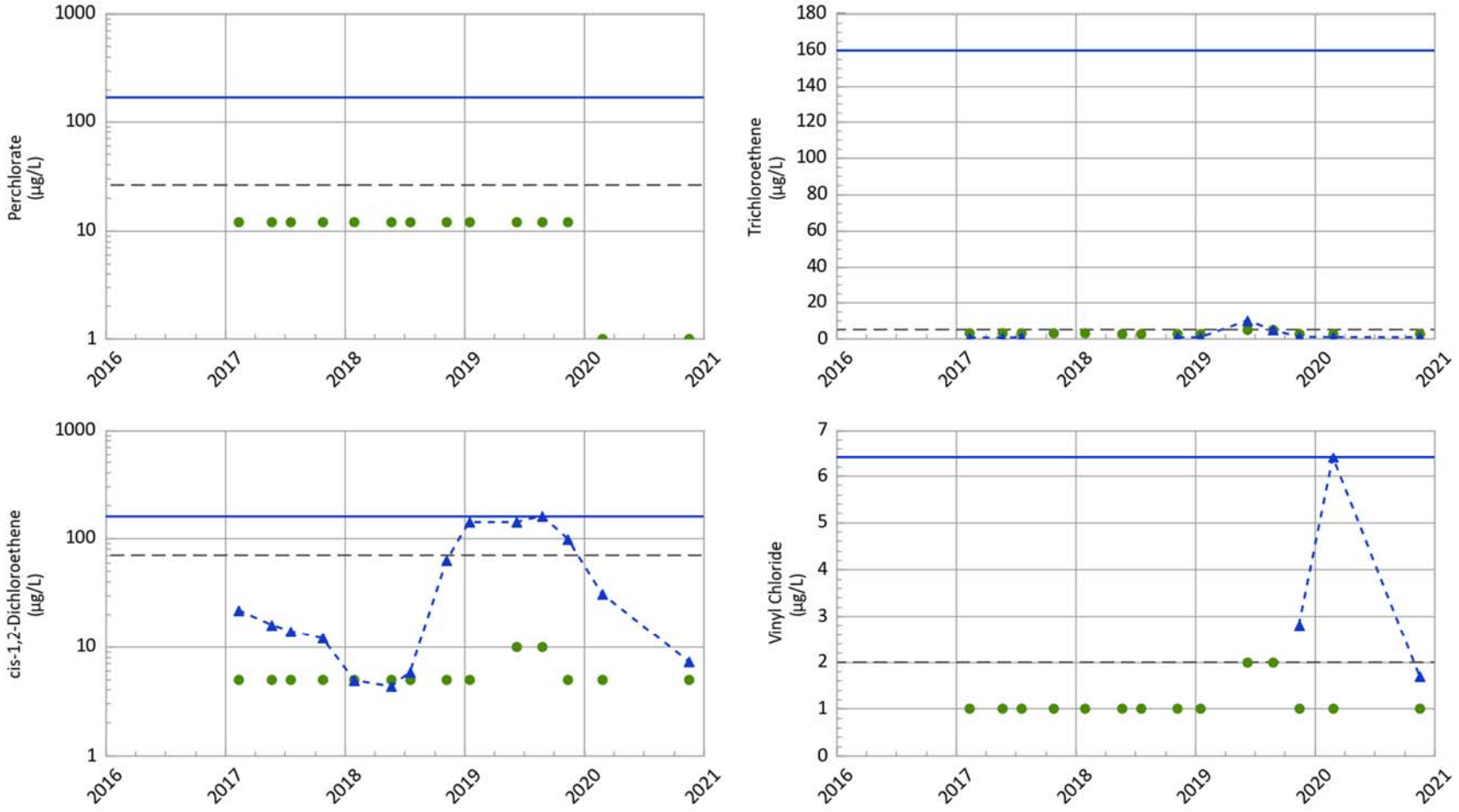
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	120.0	70.0
TCE	10.0	5.0
VC	7.3	2.0

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

Well Location

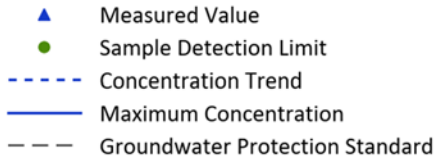


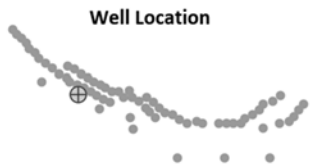
PTX06-1174 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



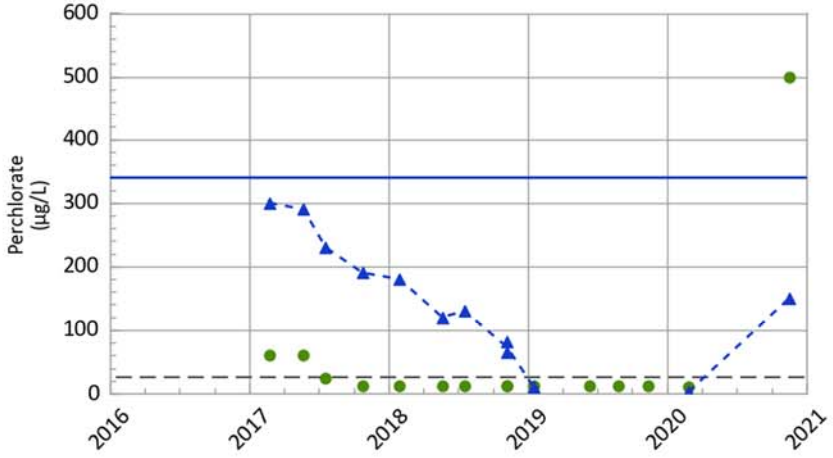
Most Recent Measured COC Concentrations (Nov 16, 2020)

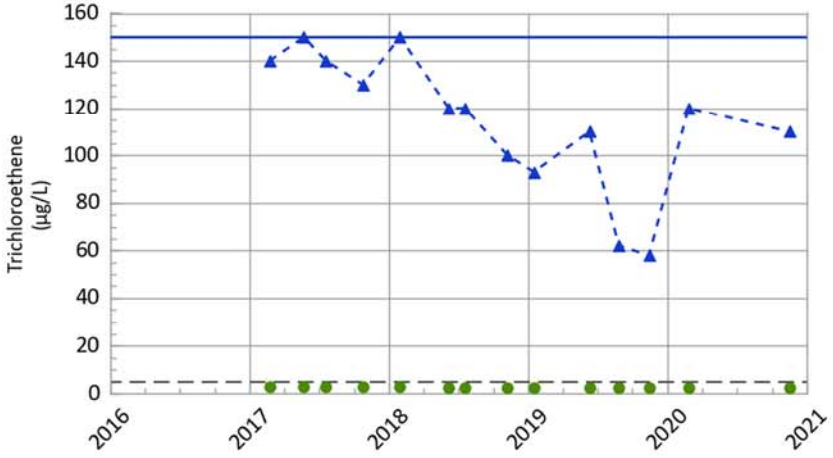
COC	Concentration (µg/L)	GWPS (µg/L)
PERC	Non-Detect	26.0
DCE12C	7.3	70.0
TCE	0.75	5.0
VC	1.7	2.0

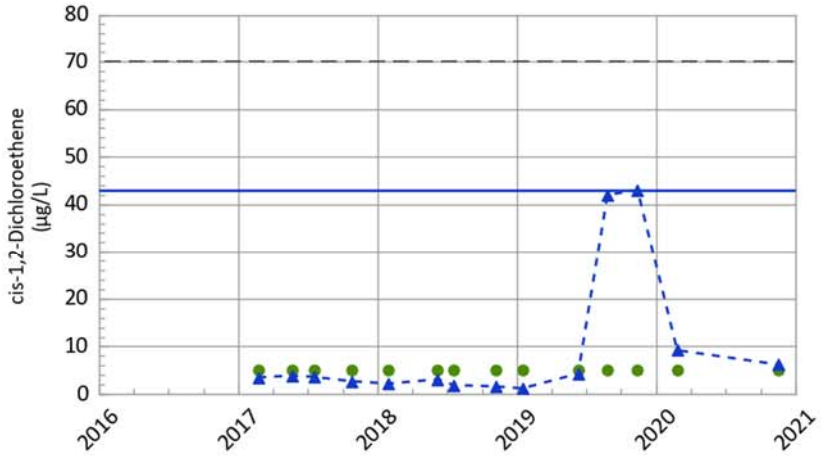


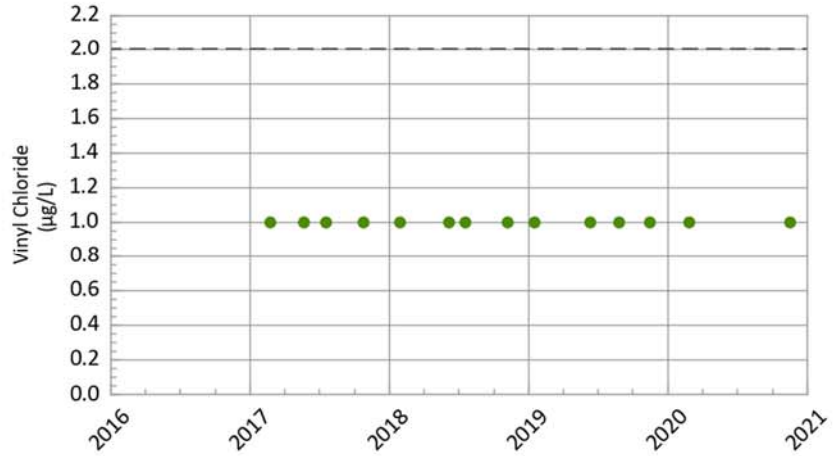


PTX06-1175 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



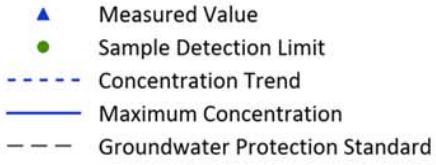


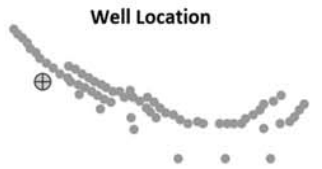




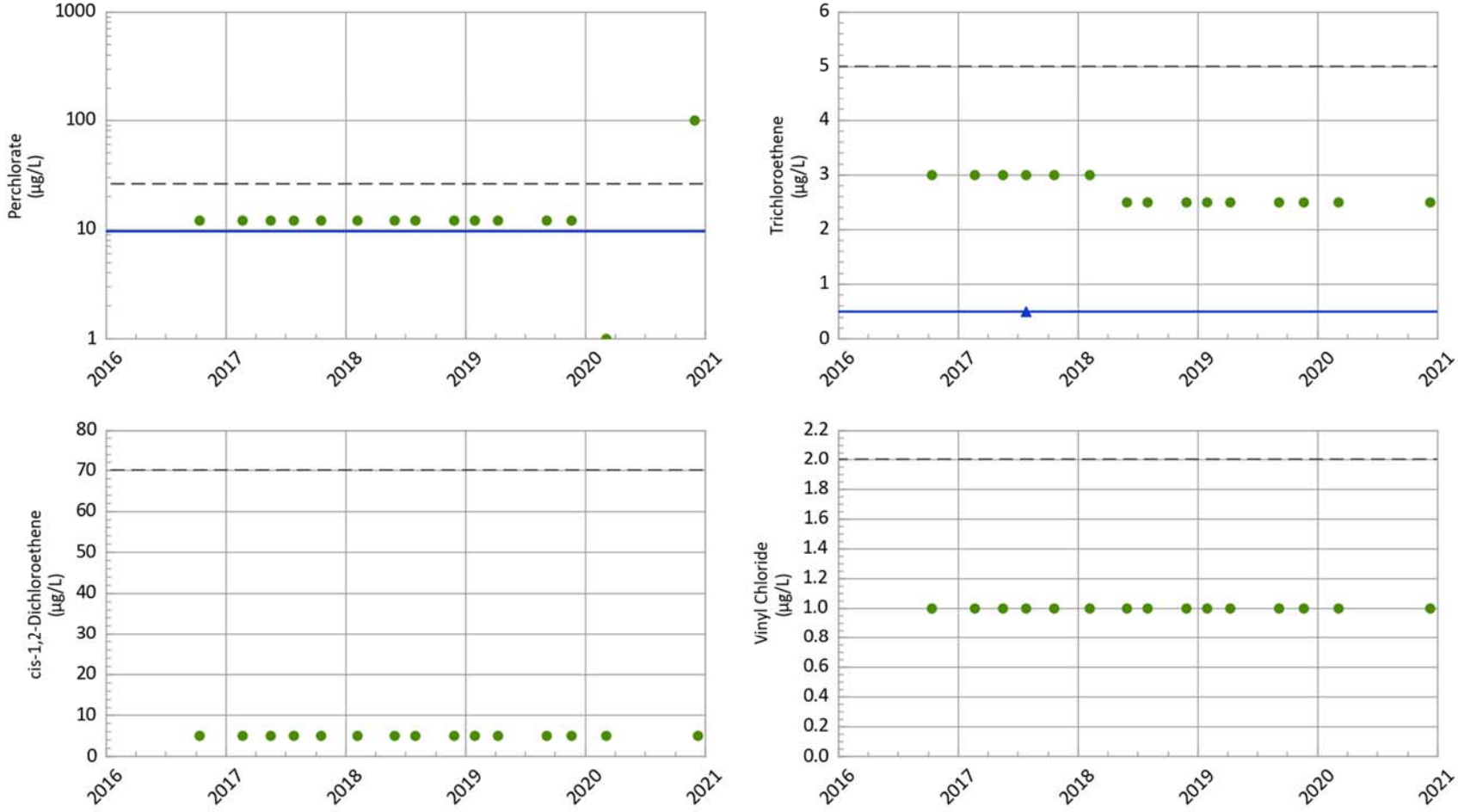
Most Recent Measured COC Concentrations (Nov 16, 2020)

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



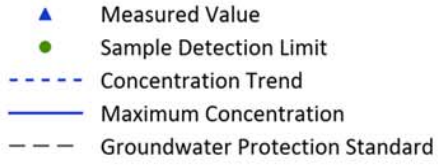


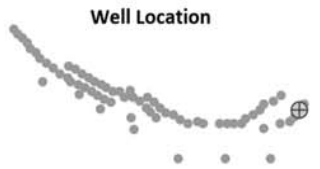
PTX06-ISB079 Downgradient Performance Indicators
Zone 11 In Situ Bioremediation System
USDOE/NNSA Pantex Plant



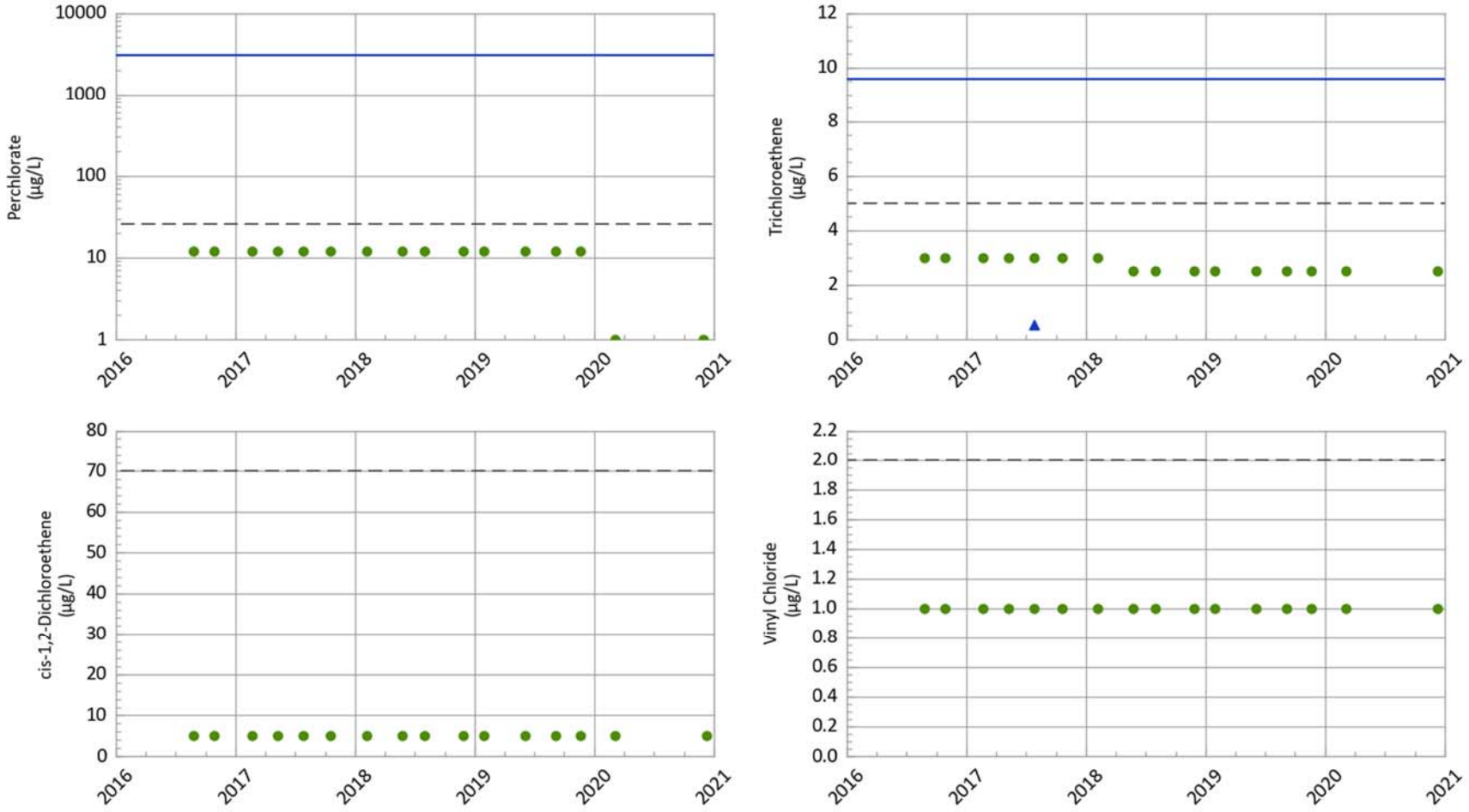
Most Recent Measured COC Concentrations (Dec 10, 2020)

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

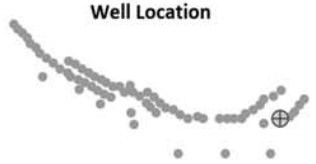


Most Recent Measured COC Concentrations (Dec 10, 2020)

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

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

Well Location



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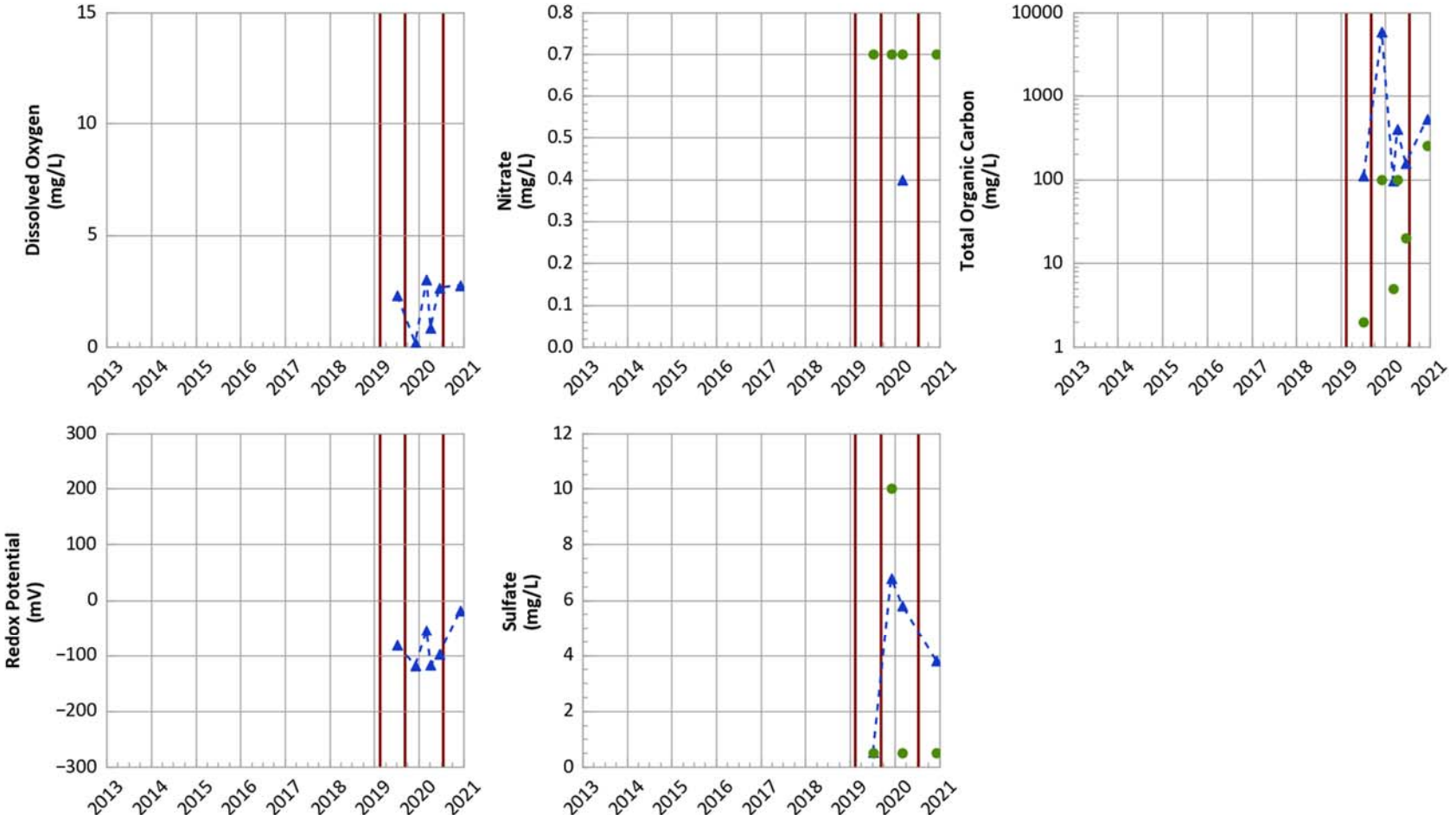
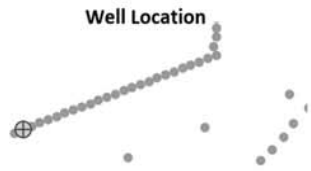
Southeast ISB Extension

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

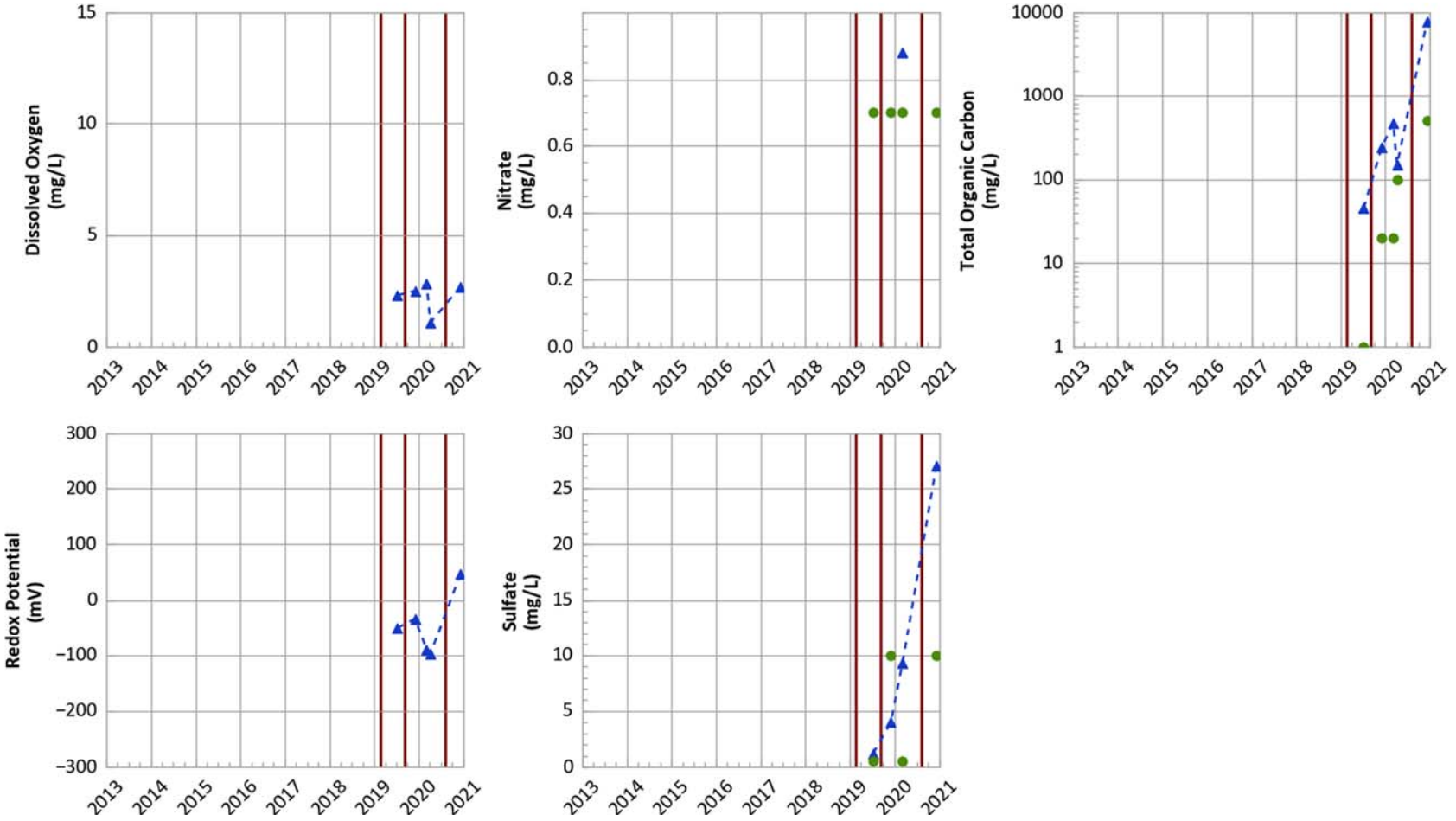


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

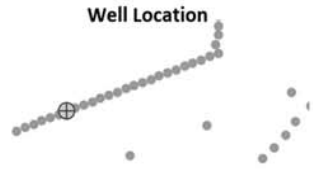


PTX06-ISB307 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant

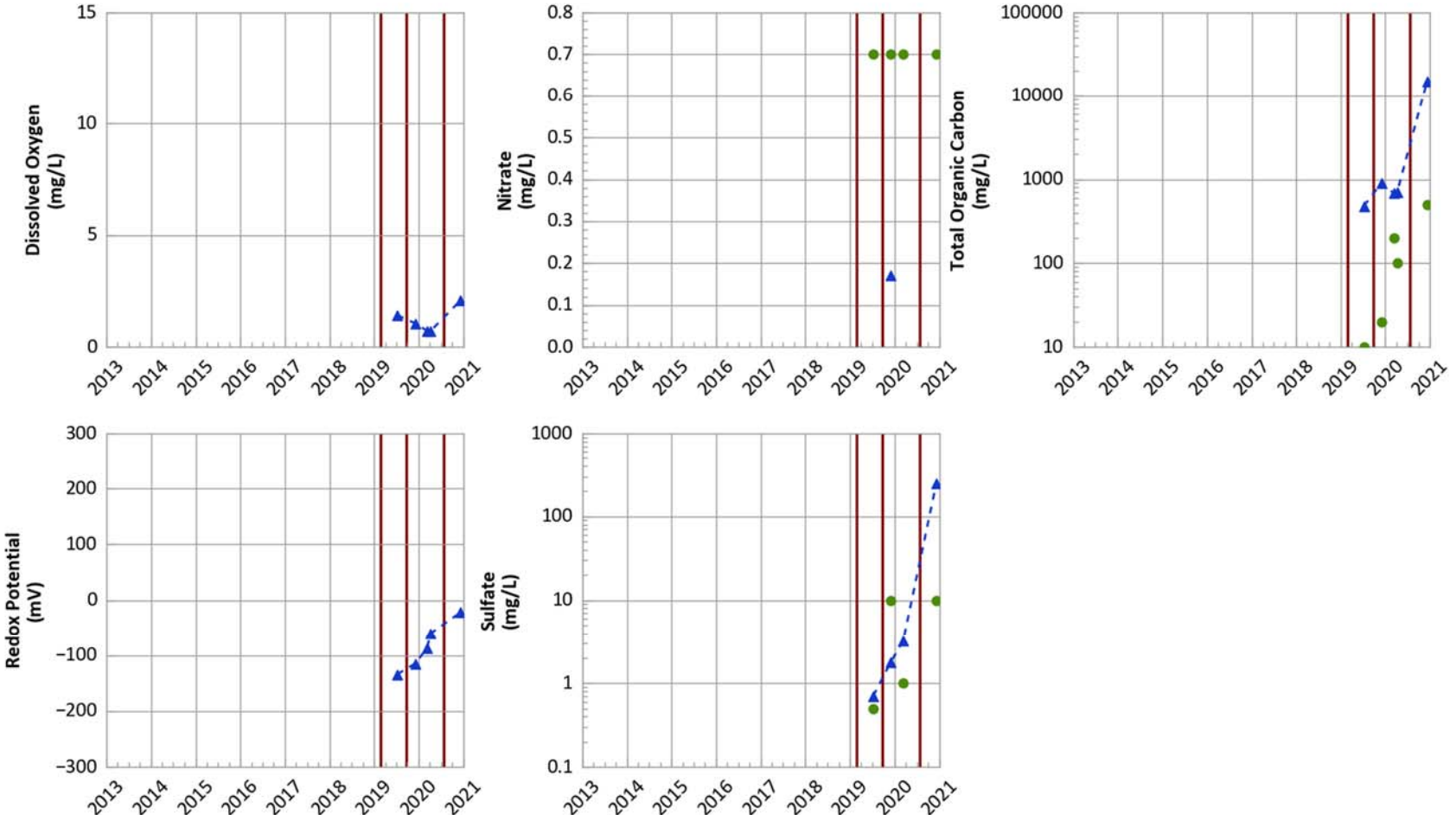


Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates



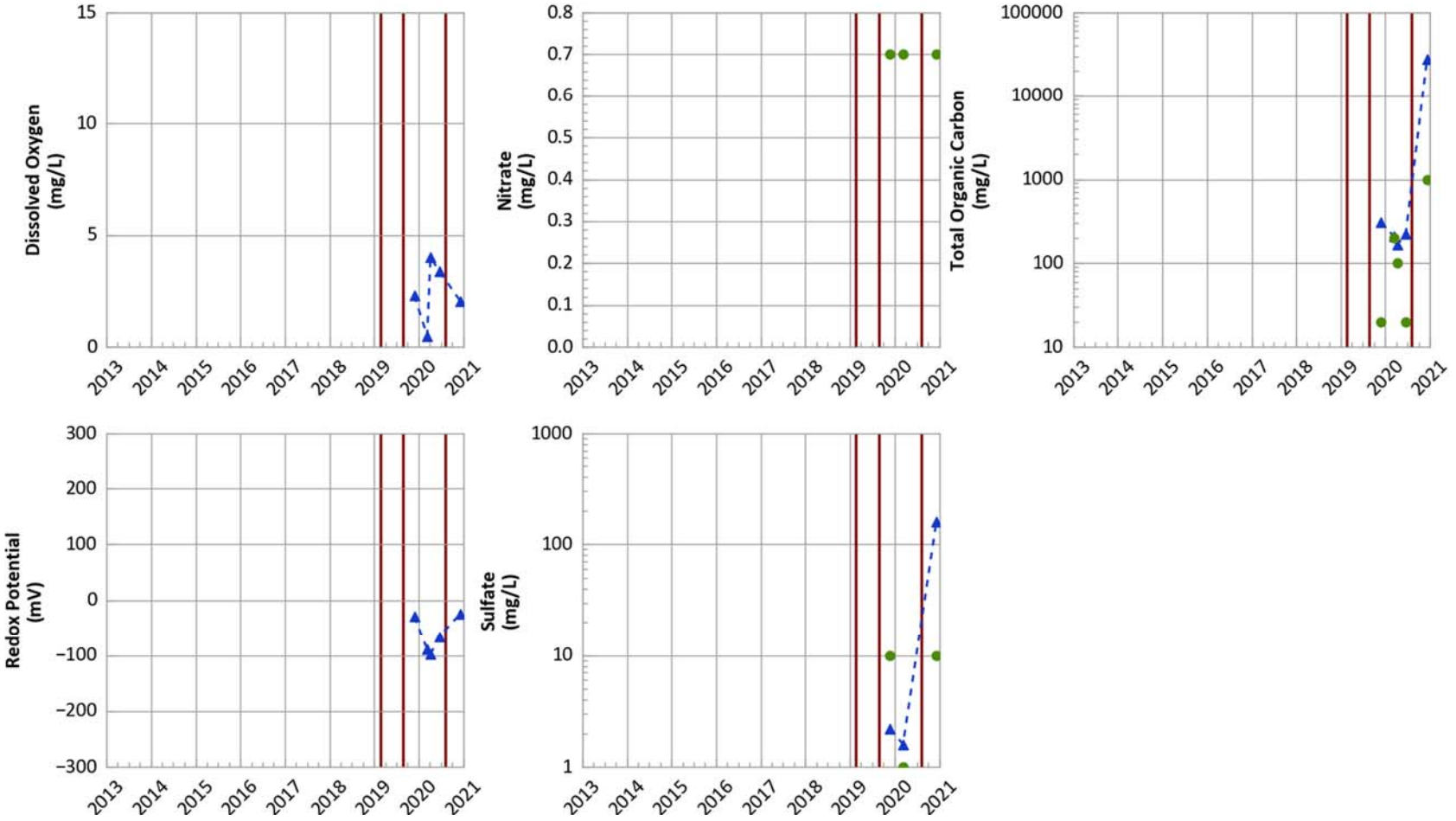
PTX06-ISB317 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



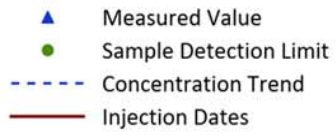
Typical Baseline Concentrations in Perched Groundwater
Dissolved Oxygen: 5-10 mg/L
Redox Potential: > 100 mV
Nitrate: > 1 mg/L
Sulfate: > 10 mg/L
Total Organic Carbon: < 5 mg/L
Total Volatile Fatty Acids: Not Detected

Measured Value
Sample Detection Limit
Concentration Trend
Injection Dates

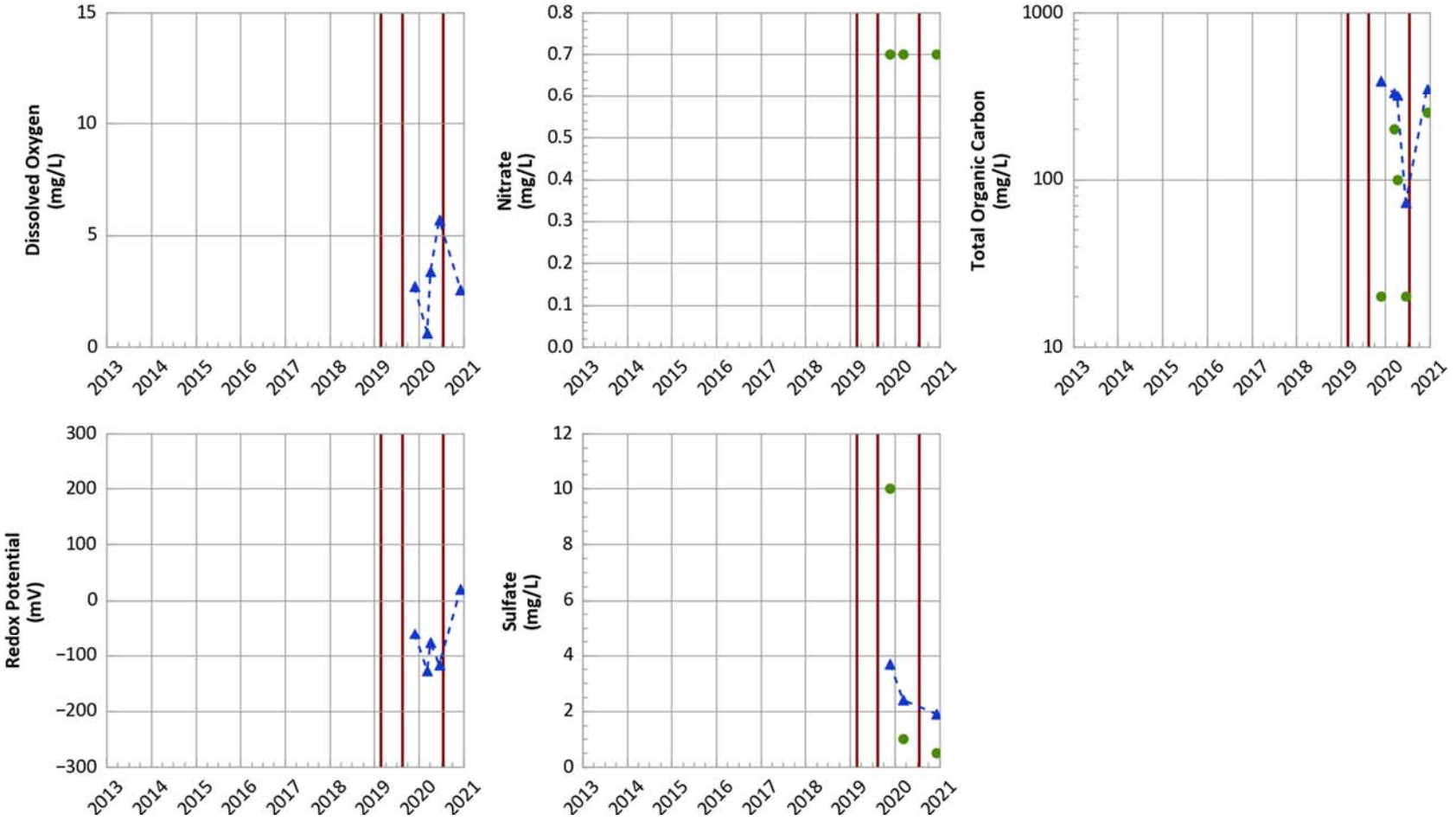
PTX06-ISB321 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



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



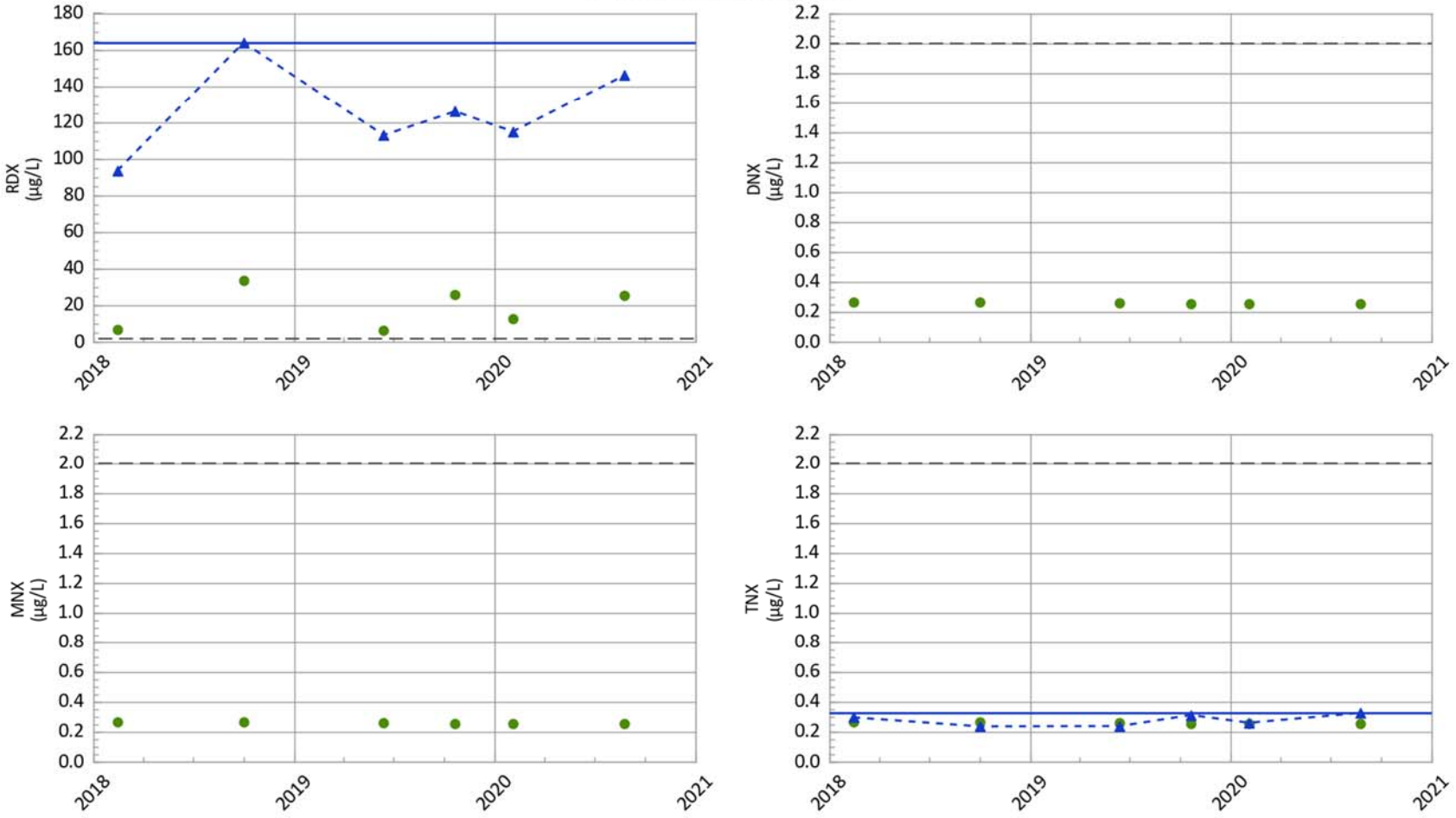
PTX06-ISB325 Treatment Zone Performance Indicators
USDOE/NNSA Pantex Plant



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

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

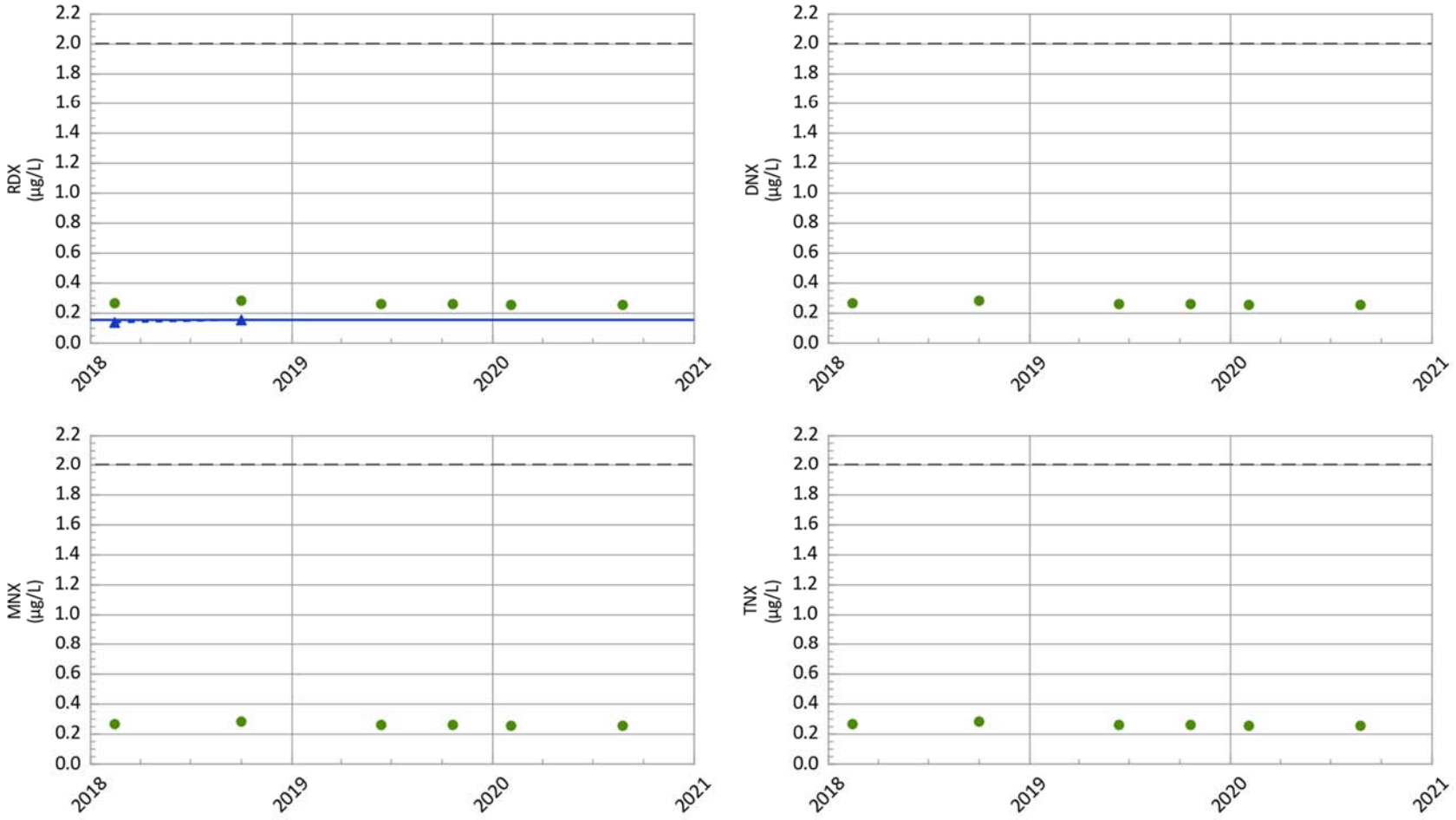


Most Recent Measured COC Concentrations (Aug 24, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	146.0	2.0
MNX	Non-Detect	2.0
DNX	Non-Detect	2.0
TNX	0.327	2.0

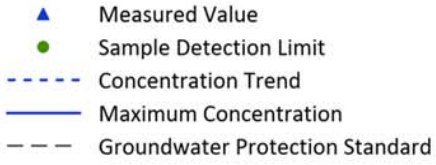
Measured Value
Sample Detection Limit
Concentration Trend
Maximum Concentration
Groundwater Protection Standard

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

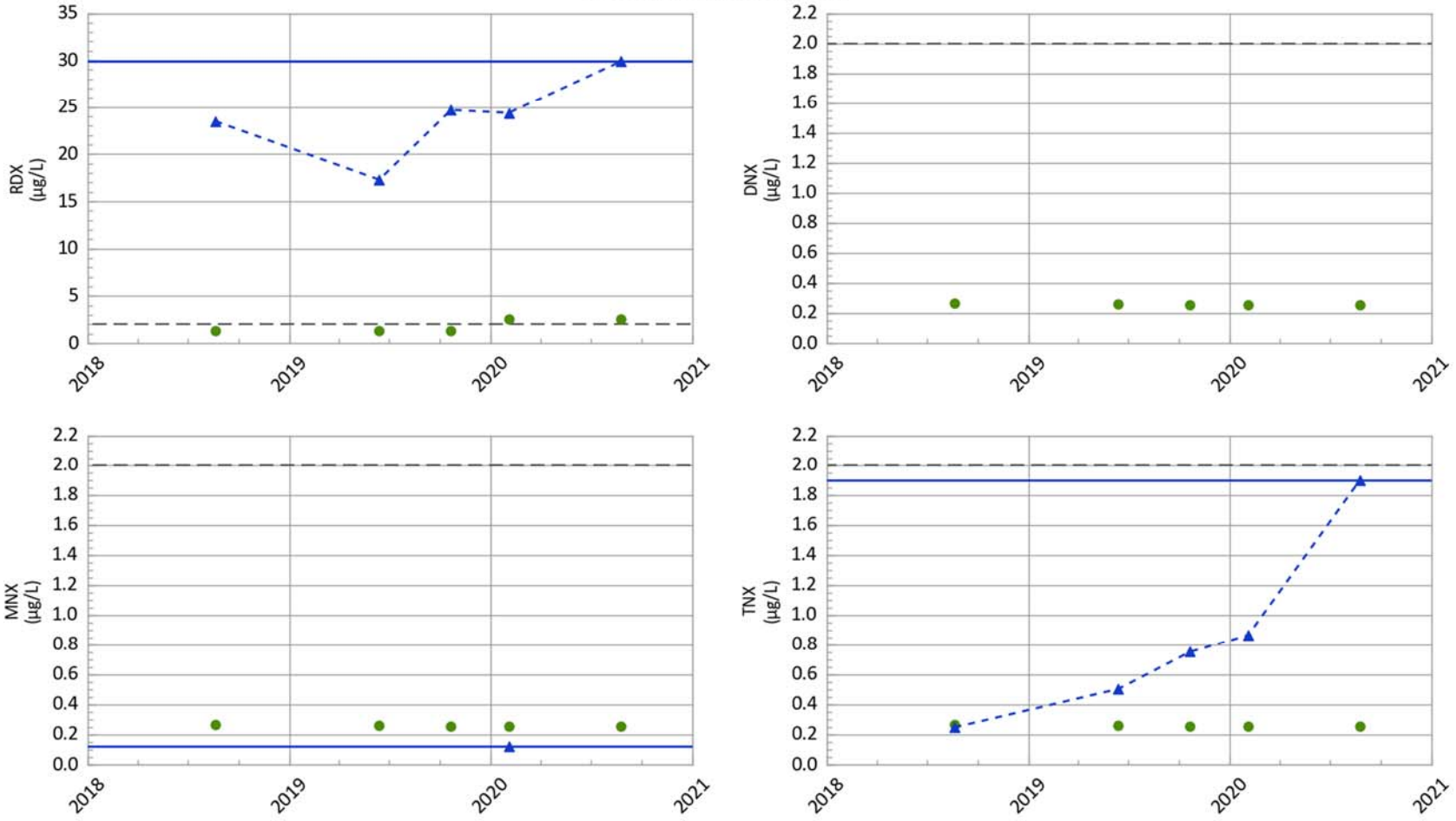


Most Recent Measured COC Concentrations (Aug 24, 2020)

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 (Aug 24, 2020)

COC	Concentration (µg/L)	GWPS (µg/L)
RDX	29.9	2.0
MNX	Non-Detect	2.0
DNX	Non-Detect	2.0
TNX	1.9	2.0

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

Well Location