



Managed and Operated by
Consolidated Nuclear Security, LLC

Environmental Projects: Public Meeting

November 9, 2023

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Environmental Projects Department Manager

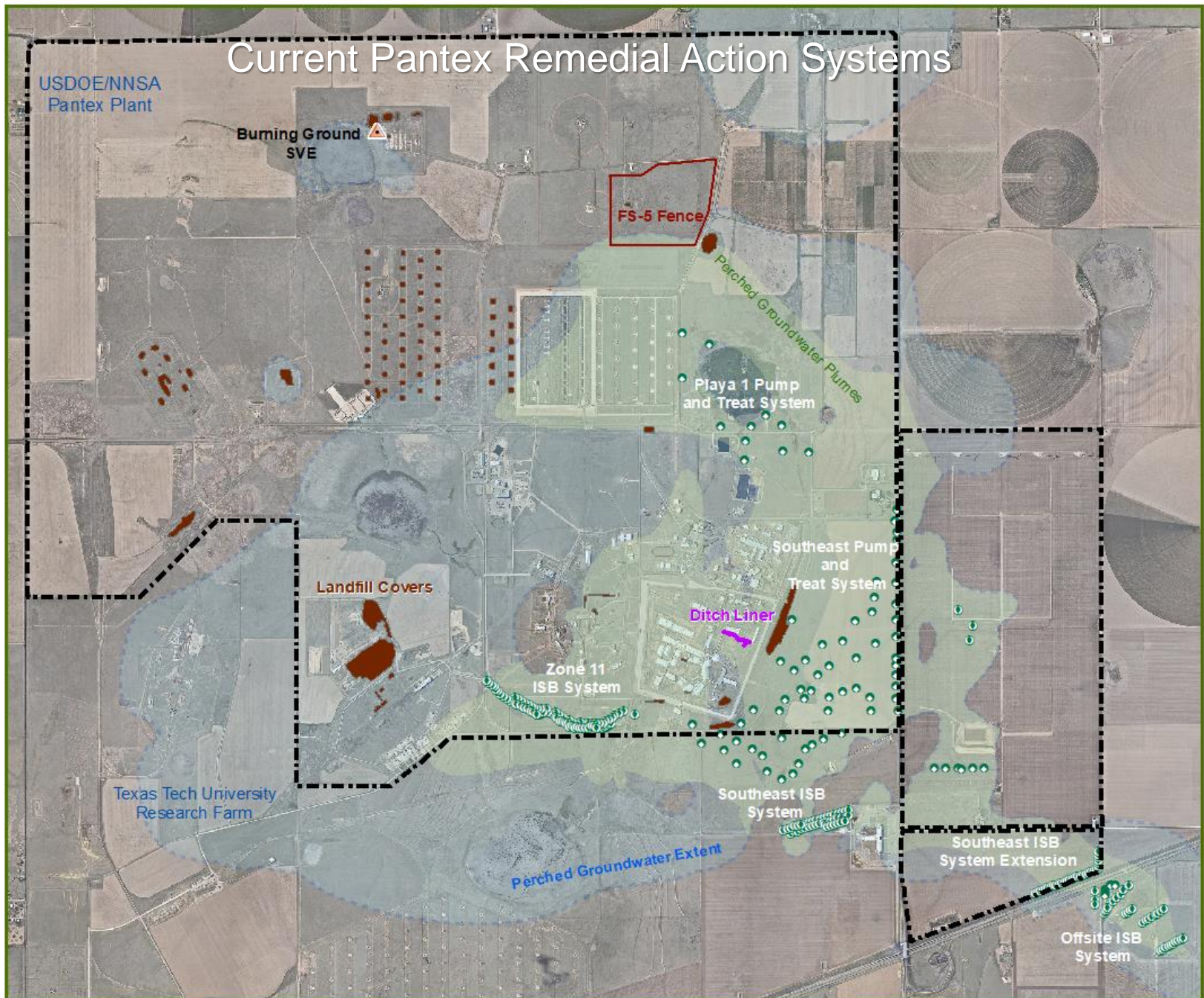
Presentation Highlights

Pantex Overview

Remedial Action Status at Pantex

- Cleanup Actions and Accomplishments for 2022
 - Current Status
 - Pump and Treat Systems
 - *In Situ* Bioremediation Systems
 - Soil Vapor Extraction System
 - Ogallala Detection Monitoring
- Emerging contaminants – Per- and Polyfluoroalkyl Substances (PFAS)
- Five-Year Review (FYR)
 - 2nd FYR – Milestones and Accomplishments
 - 3rd FYR – Findings and Conclusions

Current Pantex Remedial Action Systems



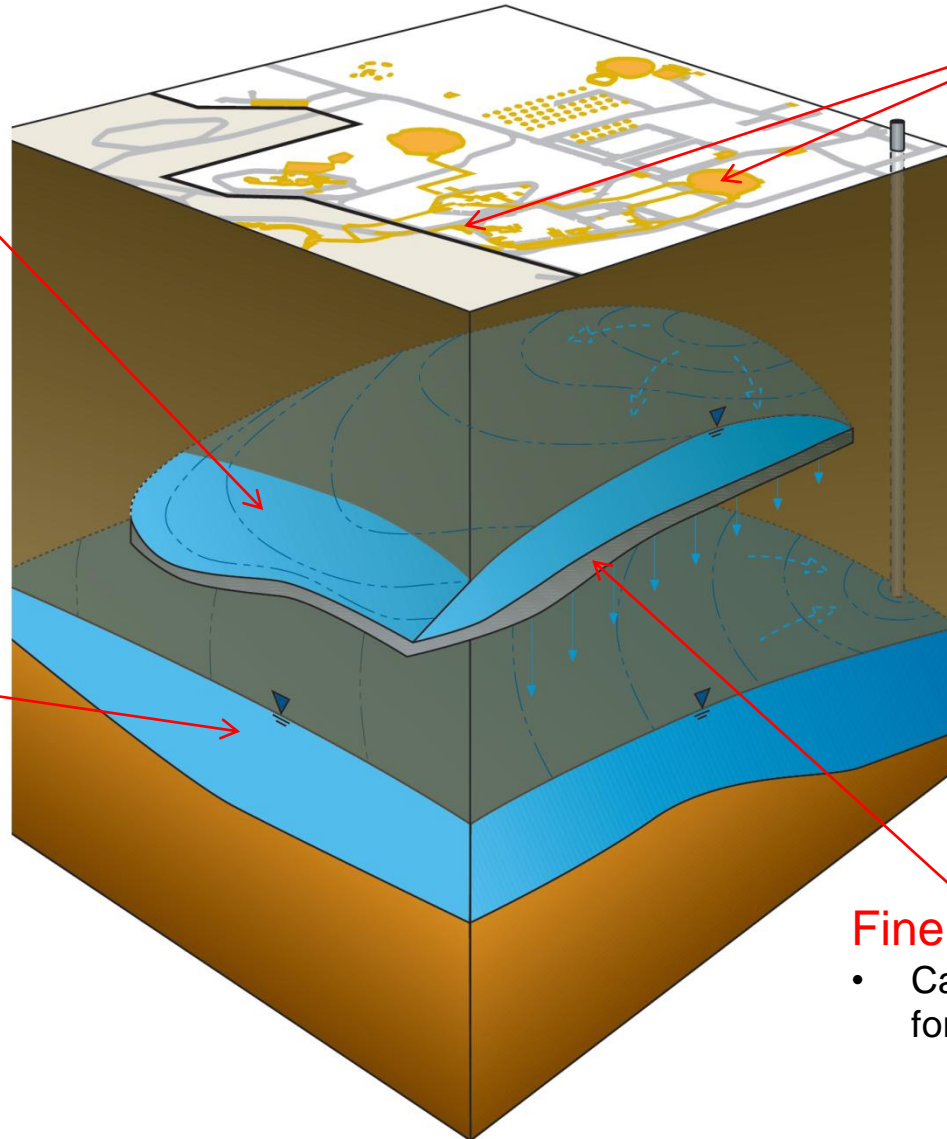
Groundwater Flow at Pantex

Perched Aquifer

- Depth: 200-300 ft bgs
- Saturated thickness: <1 to 75 ft (avg 15 -20')

Ogallala Aquifer

- Regional drinking water resource
- Depth: 400-500 ft bgs
- Saturated thickness ranges from 100-400 ft occurs 100-200 ft beneath perched aquifer



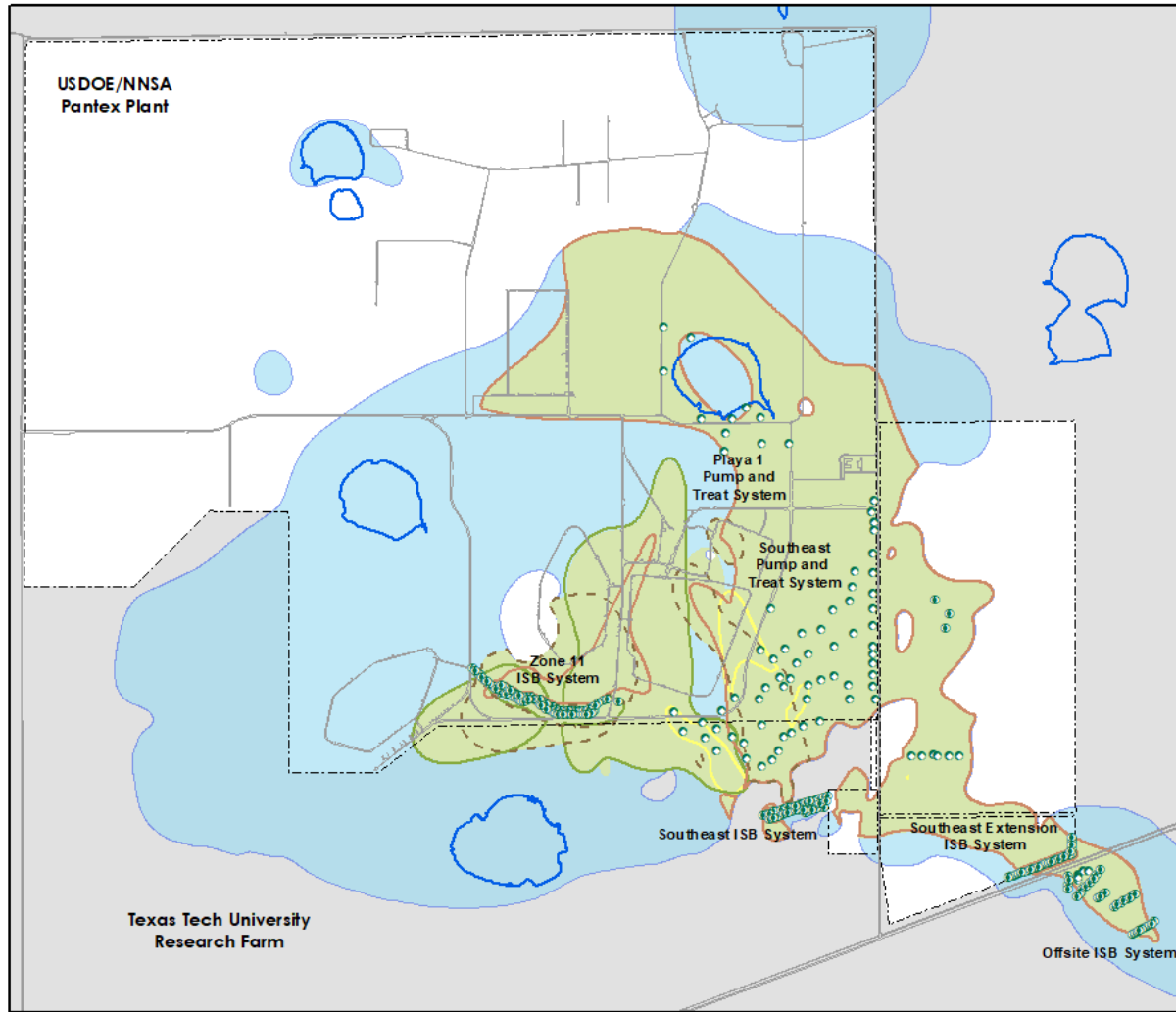
Playas/Ditches

- Past discharges of legacy wastes expanded our perched aquifer and contributed high explosives, solvents, perchlorate and chromium to perched groundwater

Fine Grained Zone (FGZ)

- Causes perched water to form

Groundwater Plumes at Pantex



- Perched Groundwater Extent as of Dec 2022
- Main contaminants:
 - High explosives (RDX)
 - Metals (Cr^{+6})
 - Solvents (TCE)
 - Perchlorate
- Mainly contained within DOE controlled boundaries; one area of migration offsite requiring action.

USDOE/NNSA Property
Pantex JCDC Property
Playas

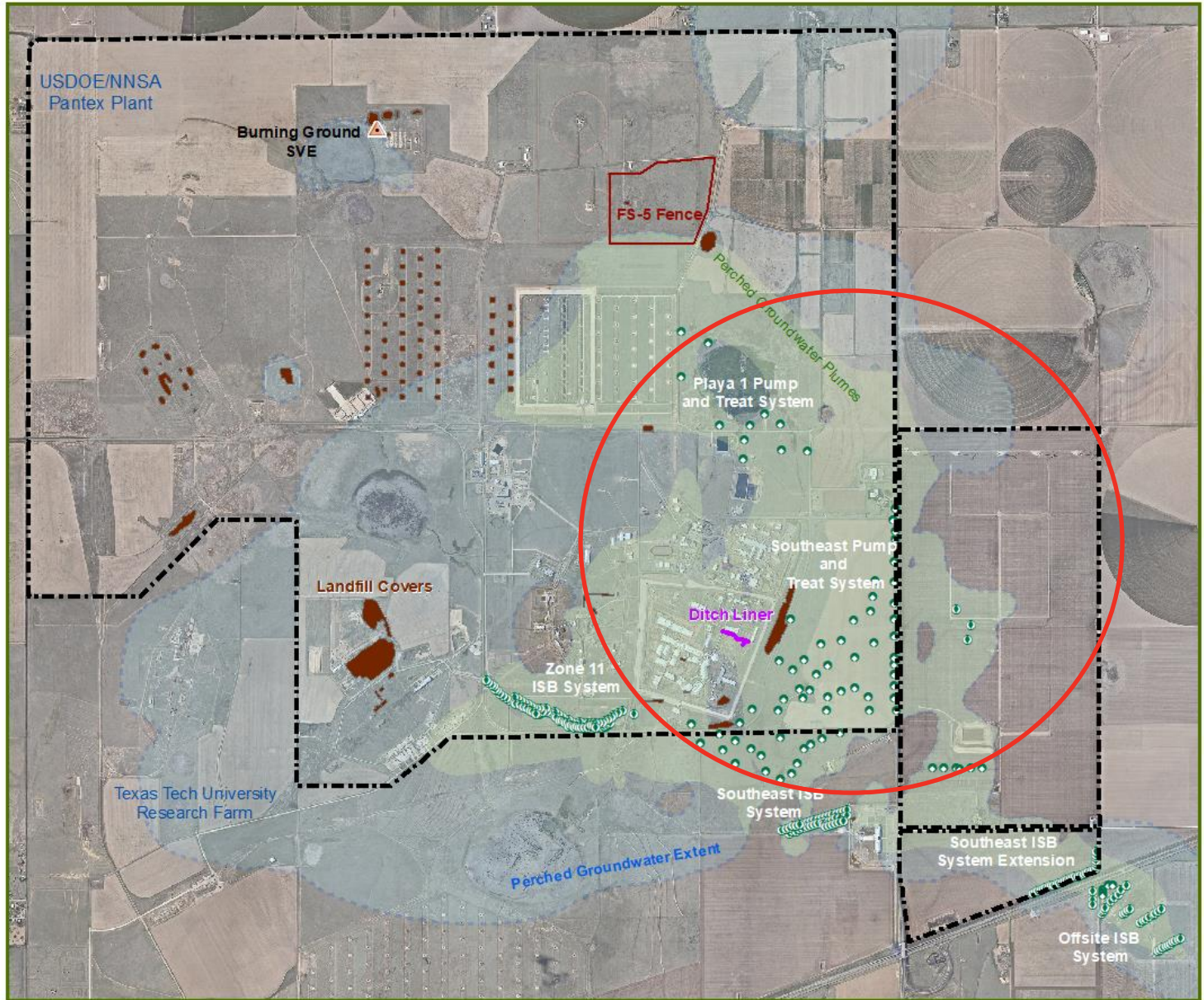
Extent of COCs
RDX
Hexavalent Chromium
TCE
Perchlorate
Extent of Perched Aquifer

Extraction Well
In Situ Bioremediation Well

Pump and Treat Systems



Pantex Plant Remedial Action Systems



Pump and Treat Systems

2022 Accomplishments:

- 123 Mgal treated
- 457 lbs of contaminants removed

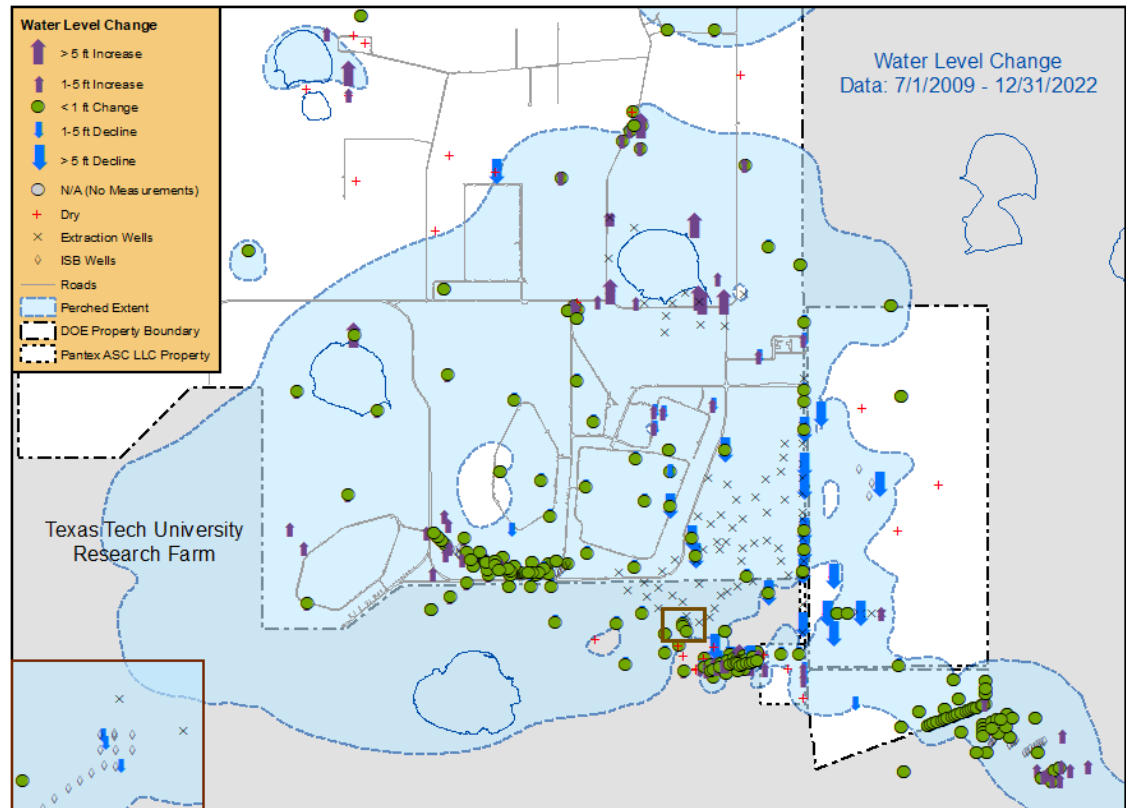
Accomplishments

(Since startup)

- 3.2 billion gallons treated
- 1.8 billion gallons beneficially used
- 16,485 lbs of contaminants removed

Challenges:

- **Drip irrigation system under repair into 2022**
 - Resolution: New Pivot Irrigation east of FM 2373 – (construction completed in August 2023)
 - Resolution: Drip irrigation system repairs recently completed
- **Aging infrastructure at SEPTS and P1PTS**
 - Resolution: Ongoing phased design to replace SCADA systems at pump and treat systems
- **Perchlorate entering SEPTS wellfield**
 - Resolution: Finished installation of perchlorate treatment at SEPTS in August 2022



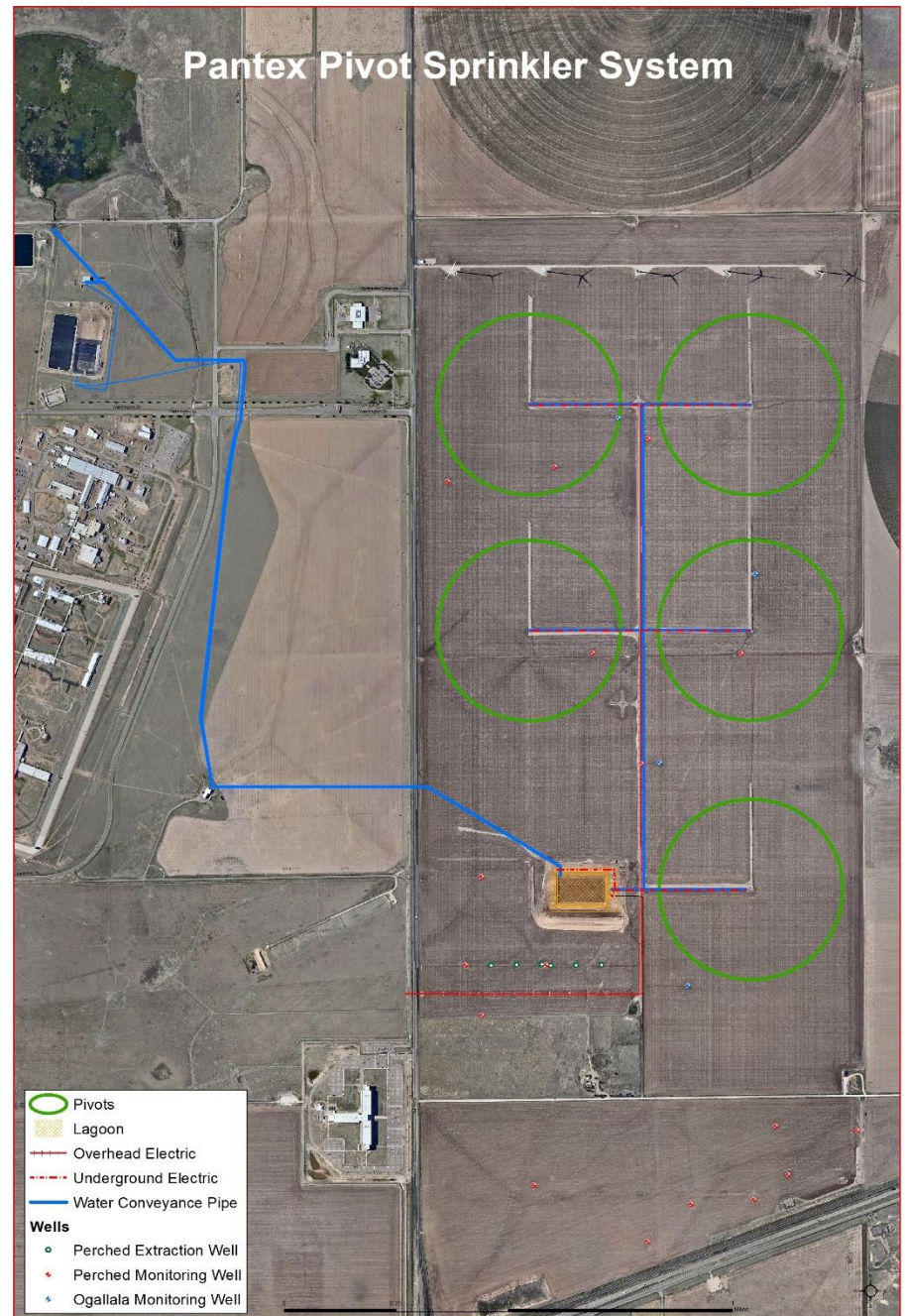
Pivot Sprinkler East of FM 2373

Milestones:

- Began construction in November 2021
- Completed construction in August 2023
- First crop (winter wheat) planted in October 2023

System Components:

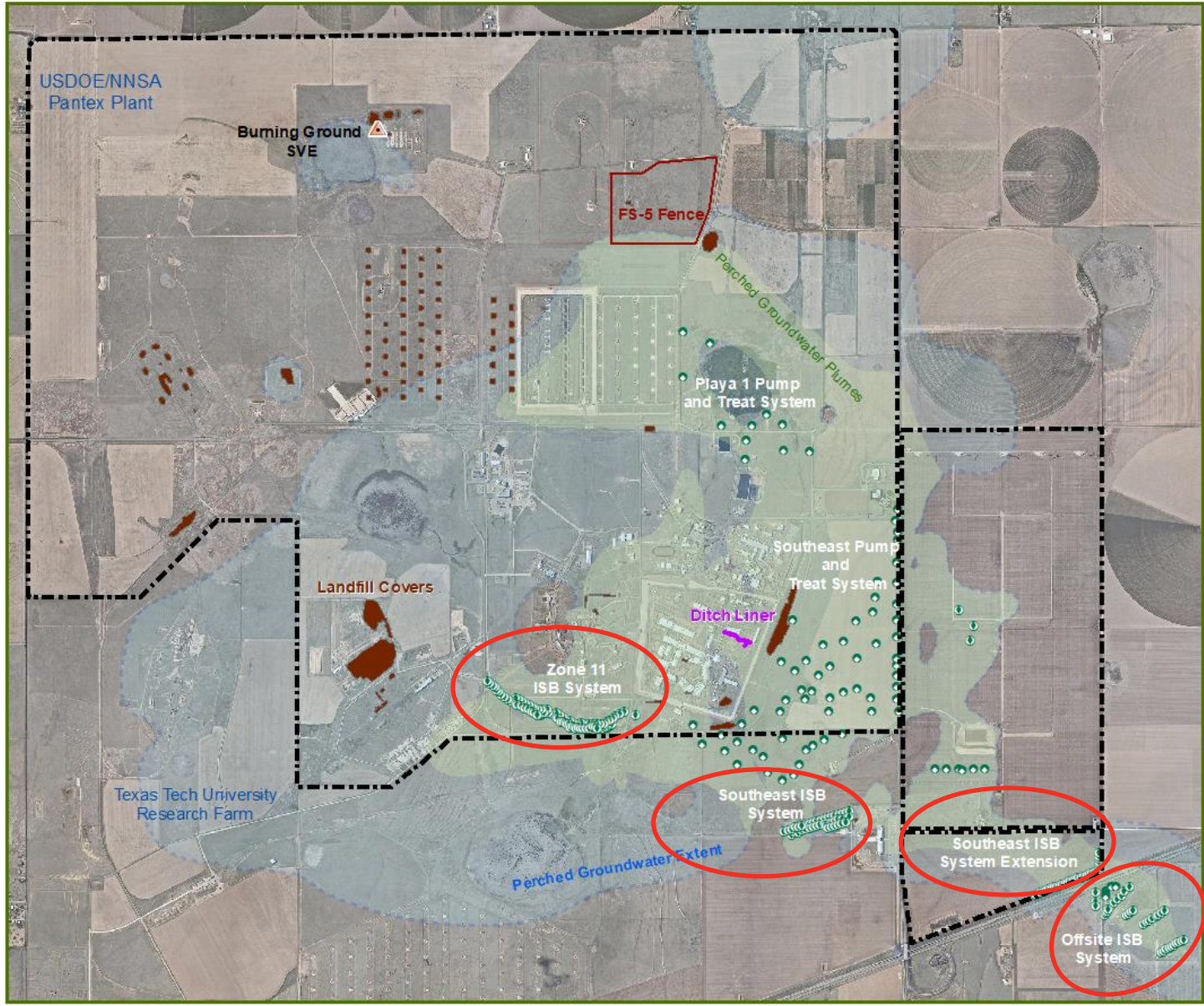
- 5 pivot sprinklers, subsurface conveyance line and lagoon pond
- Pivot SCADA system to communicate with SEPTS and P1PTS



In Situ Bioremediation Systems



Pantex Plant Remedial Action Systems



In Situ Bioremediation (ISB) Systems

(1) Zone 11 ISB:

- Perchlorate and TCE reduced near or below groundwater protection standards (GWPS) at most wells

(2) Southeast ISB:

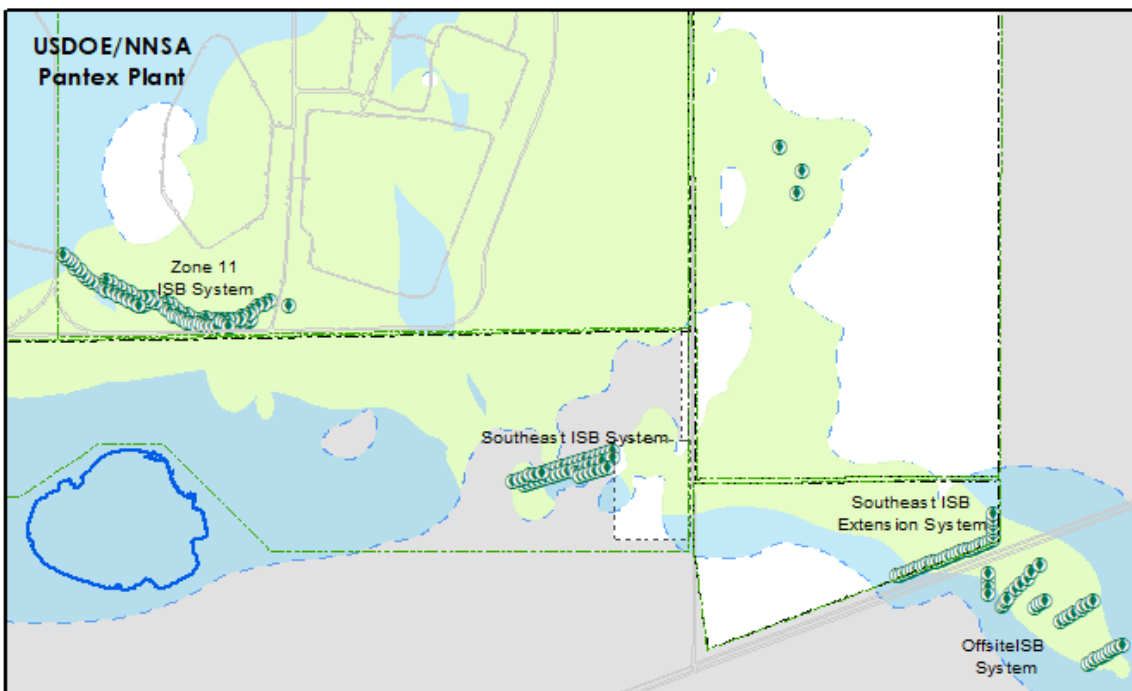
- High explosives reduced below groundwater protection standards (GWPS) at most wells
- Hexavalent chromium reduced in all wells.

(3) Southeast Extension ISB:

- Expected reduction of HE in 2023 – early indications of treatment in Offsite Treatment System wells near the northern boundary

2022 Accomplishments :

- Zone 11 ISB
 - Completed one injection event on both sides of system (east and west)
 - All new wells installed in 2021 were injected
- Southeast ISB Extension
 - Completed one injection event in 2022
- Southeast ISB
 - System injected in 2022
 - Continue to monitor system for treatment



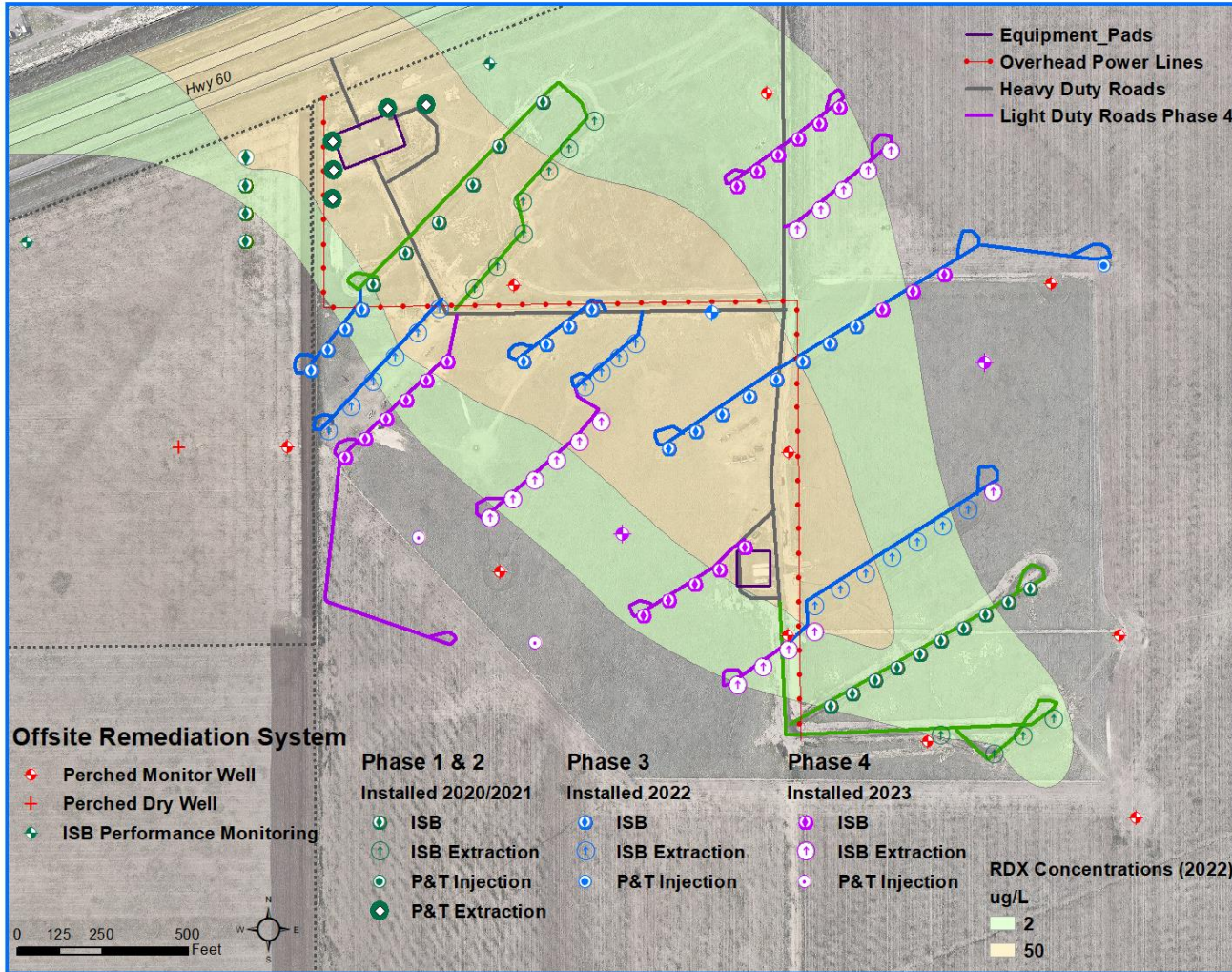
USDOE/NNSA Property
Pantex JCDC Property
Playas

In Situ Bioremediation Well
GW Deed Restriction Areas

Extent of Perched Aquifer, 2022

Extent of Contamination
Water Table Extent

Offsite Plume Remediation



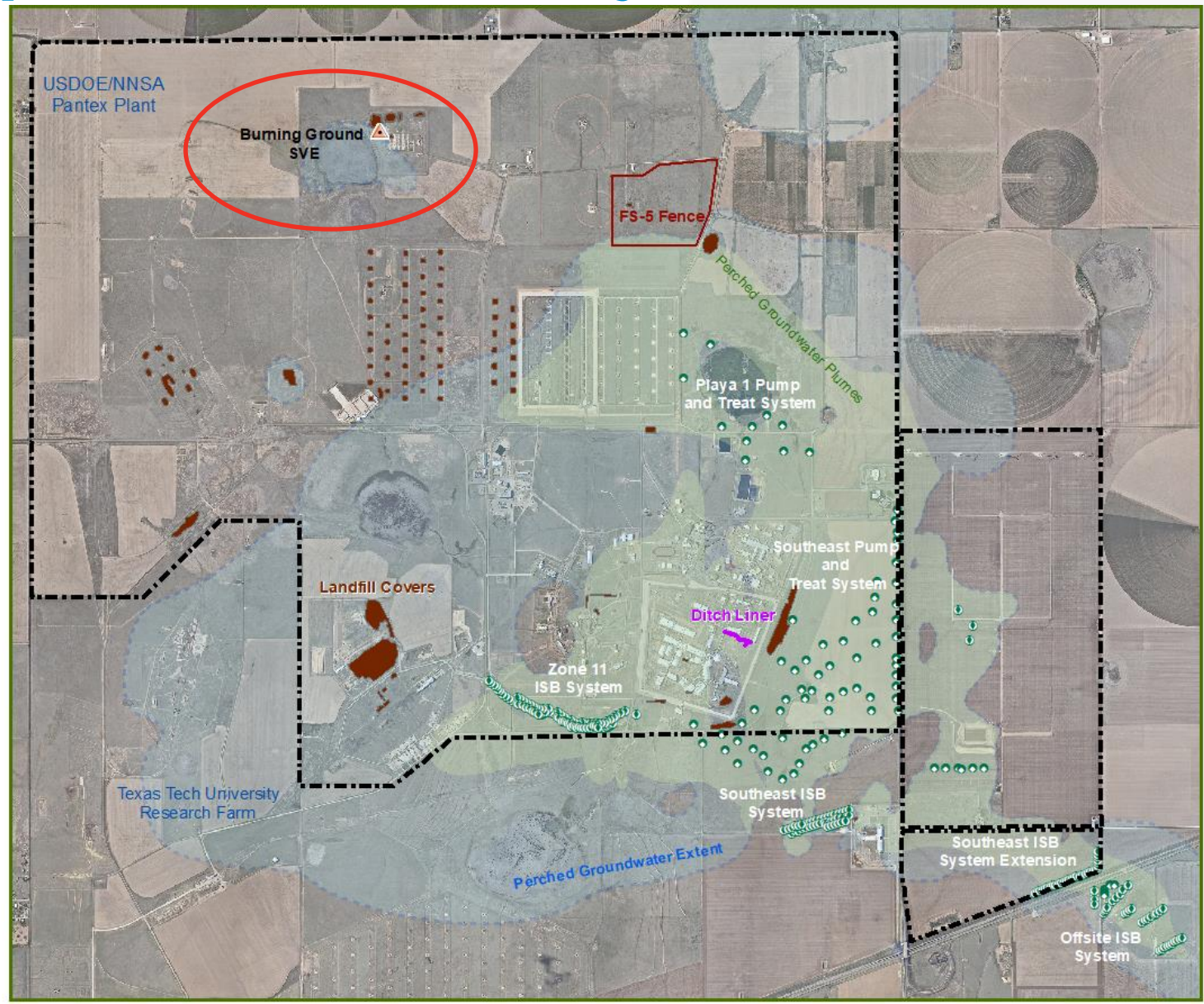
2022 Accomplishments :

- Injections
 - Completed two injections at toe of the plume
 - Completed one injection in Phase 2 wells (northern wells)
- Infrastructure
 - Completed Phase 3 of Offsite infrastructure in Summer 2023
 - Phase 4 infrastructure will be complete by end of 2023
 - Mobile Pump and Treat Unit that will run off the north pad was complete in 2023
 - 2 new ISB trailers were completed in 2023 and are now operational

Soil Vapor Extraction System



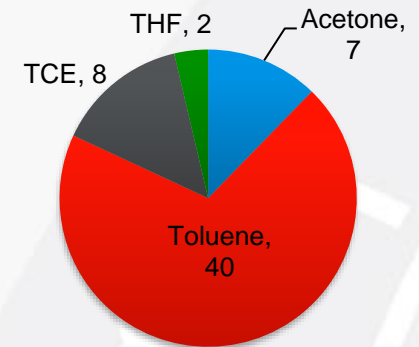
Pantex Plant Remedial Action Systems



Soil Vapor Extraction System

Installed in February 2002

- Remedial goal to reduce the mass of Volatile Organic Compounds (VOCs) – highest historical Toluene concentration ~ 1845 ppmv; highest current concentration ~ 59 ppmv



2022 Accomplishments

Future Operations:

- Pulsed system in 2020 - 2023
- Closure report provided to EPA and TCEQ in August 2023

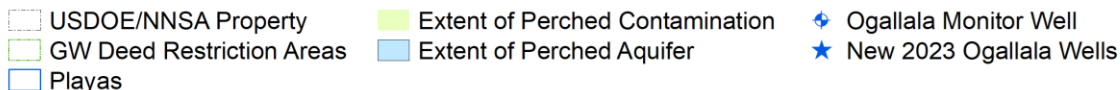
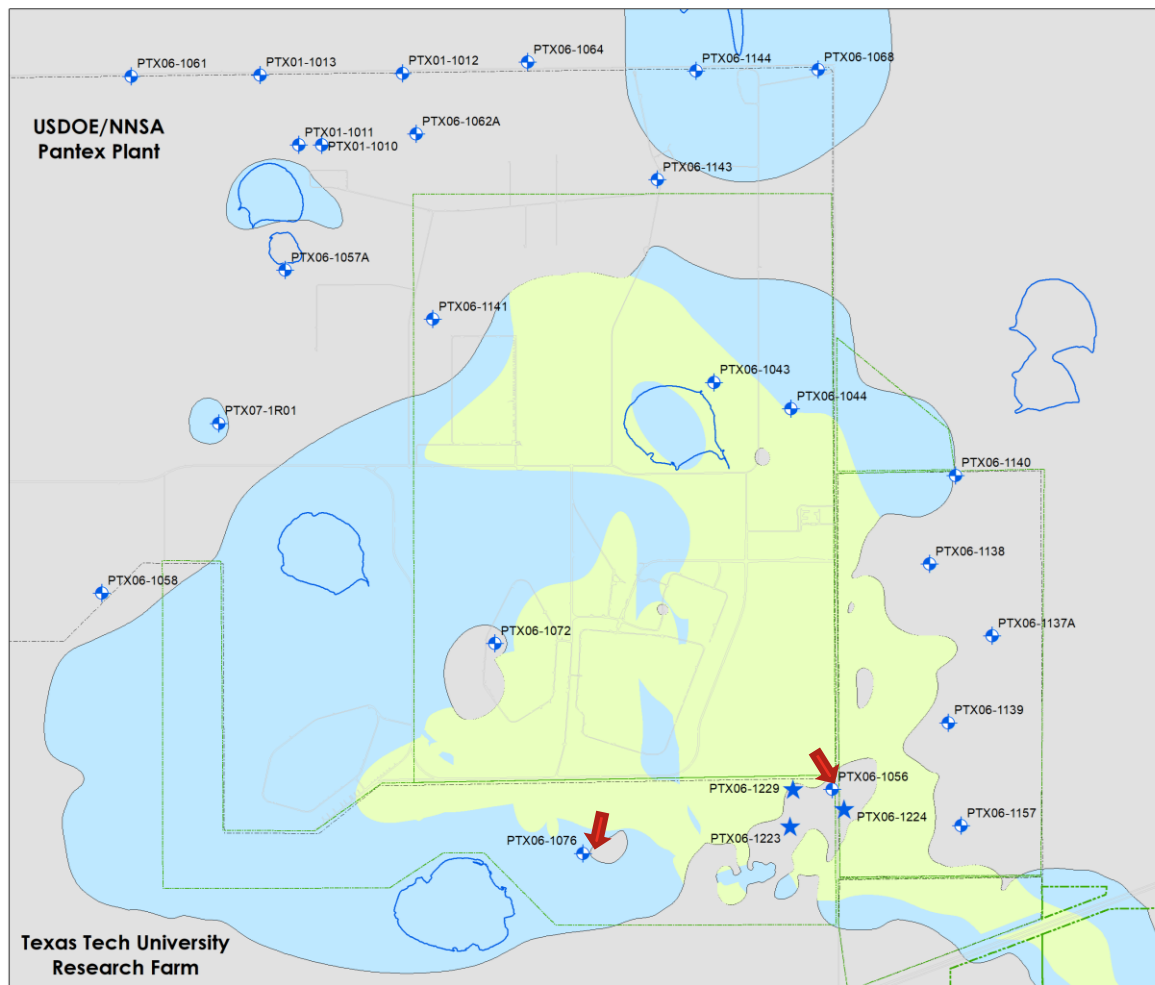
Ogallala Detection Monitoring

Monitoring Information:

- 27 wells monitored
 - Including one well located on neighbor property (PTX06-1064, located north of Pantex property) and 3 new Ogallala wells installed in 2023 (starred on map)

Challenges with Recent Detections

- PTX06-1056
 - 1,2-DCA, a volatile organic compound, continued to be detected below GWPS
 - DNT4A, a high explosive was detected below the GWPS through 2021 but was detected slightly above GWPS in 2022
 - In response, installation of new Ogallala wells
- PTX06-1076
 - DNT4A, a high explosive was detected below the GWPS through 2023



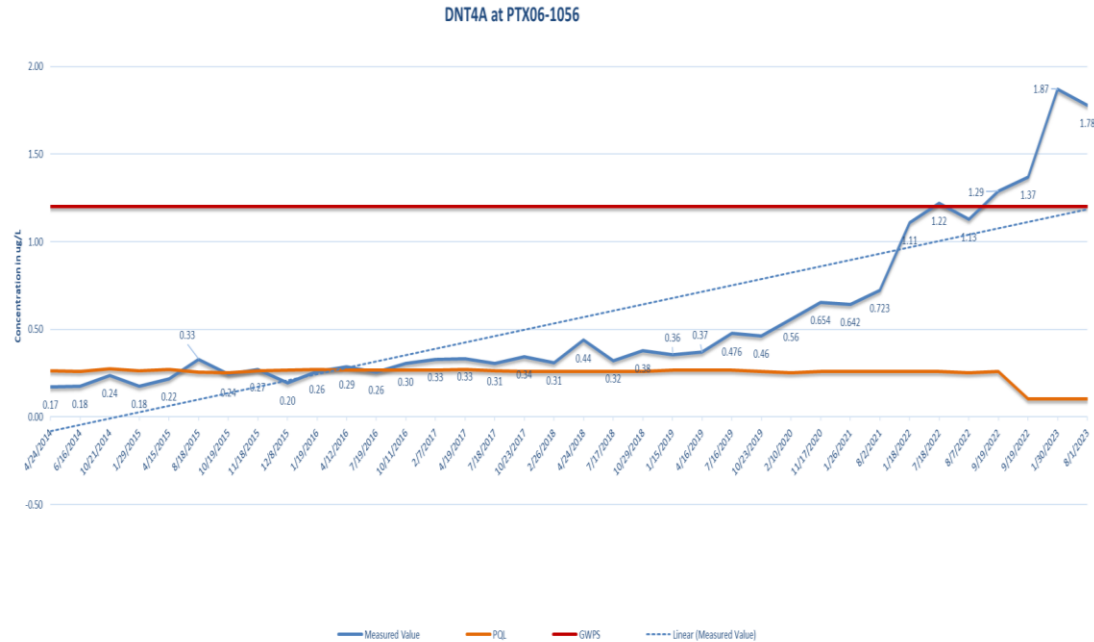
DNT4A – 4-amino-2,6-dinitrotoluene

1,2-DCA – 1,2-dichloroethane

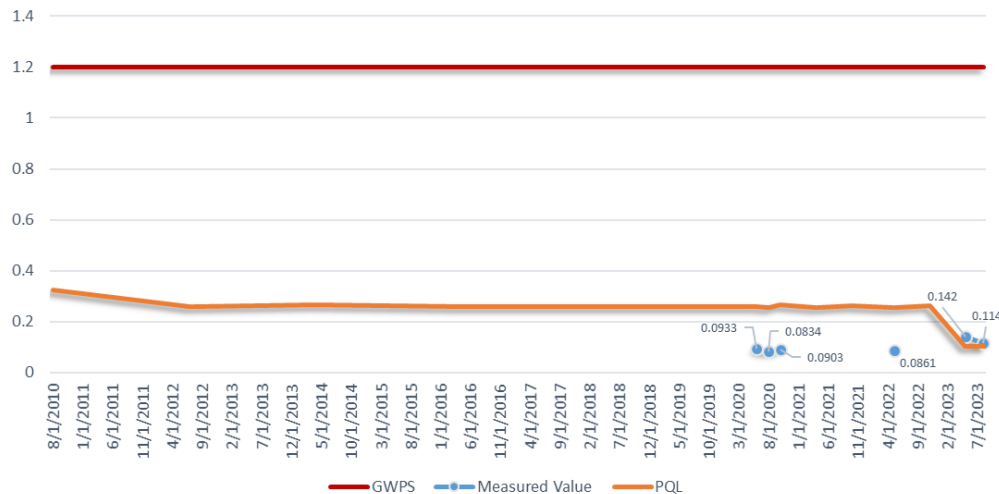
Ogallala Detections

PTX06- 1056 (DNT4A)

- First detected in April 2014 at 0.17 ppb, below the practical quantitation limit (PQL) of 0.262 ppb
- Slow increasing trend throughout the years
- First detect above cleanup value (GWPS – groundwater protection standard) was in July 2022



PTX06-1076 DNT4A Detections

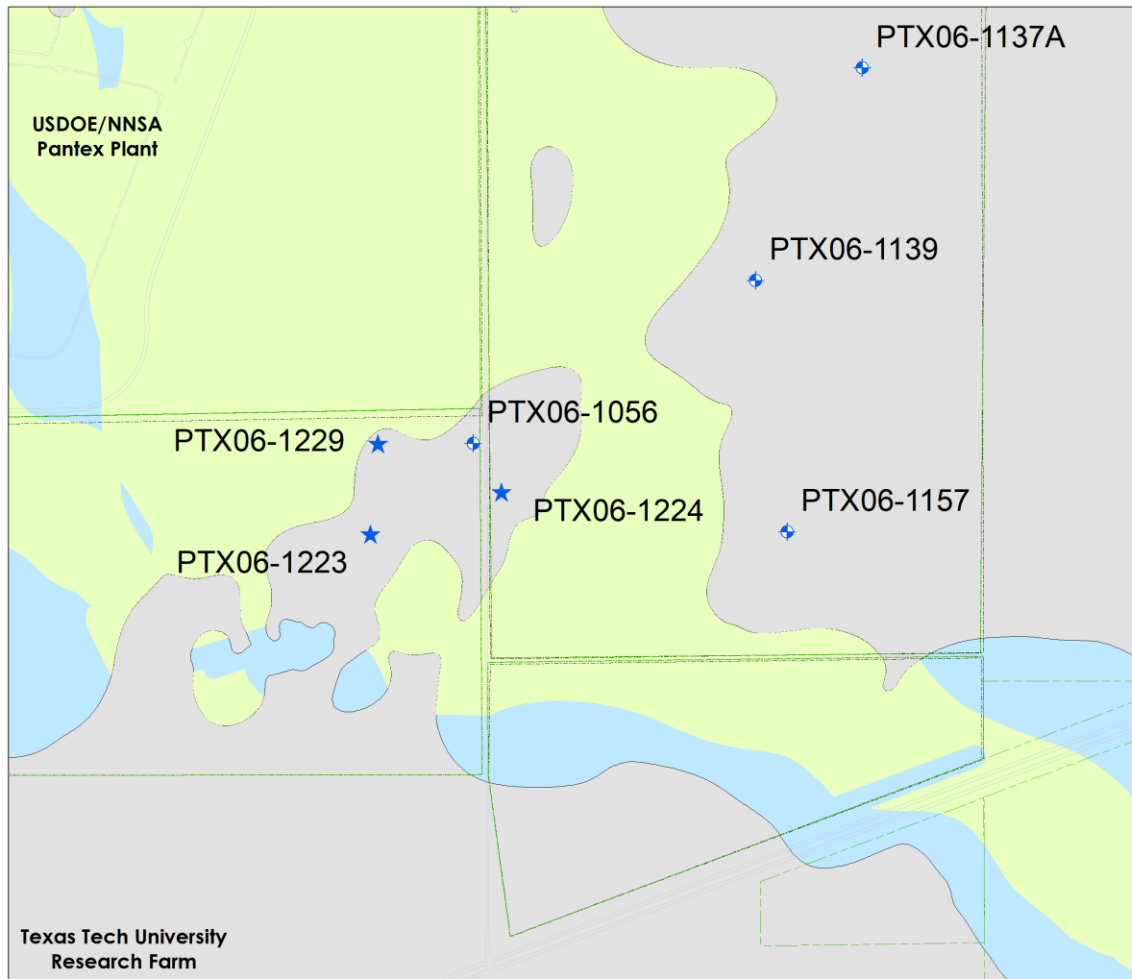


PTX06-1076 - (DNT4A)

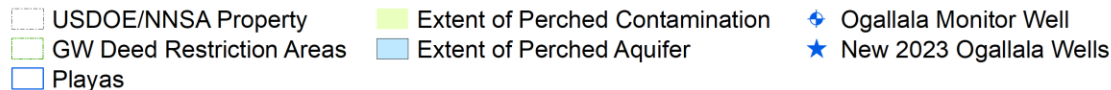
- First detected in June 2020 at 0.09 ppb, below the practical quantitation limit (PQL) of 0.26 ppb
- Sporadic detections since that time
- First detect above PQL (practical quantitation limit) was in May 2023
- Detection limit improvement when we moved analysis to a new lab

New Ogallala Monitoring Wells

3 New Ogallala Wells installed in 2023



- In response to HE detections at PTX06-1056, obtained special funding to install 2 new Ogallala wells
- Reprogrammed funds were used to install a 3rd well
- Well placement based on modeling
- All wells installed by September 2023
- First sampling scheduled for end of 2023
- Results available in early 2024



Per- and polyfluoroalkyl Substances (PFAS)

- **PFAS is an emerging contaminant**
 - Common uses of PFAS include firefighting foams, non-stick cookware, waterproof gear and clothing, and grease-resistant packaging for fast food
 - Known as forever chemicals; regulatory agencies concerned with health issues and are in the process of developing regulations
 - Department of Energy (DOE) has developed a roadmap to address PFAS across the complex
- **Following guidance from the DOE *PFAS Strategic Roadmap: DOE Commitments to Action 2022 – 2025***
 1. *Pantex identifying known historic and current PFAS use*
 - Major PFAS releases at Pantex are from AFFF
 - AFFF used by Fire Department from 1970s until 2019
 - Used in emergency response
 - Fire fighting training and demonstration event

Per- and Polyfluoroalkyl Substances (PFAS)

Completed Studies

1. Developed PFAS sampling plan

- Developed a study to evaluate the potential use of dedicated sampling equipment in wells
- Focuses on sampling perched groundwater to evaluate treatment through our current systems

2. Texas Tech Study to evaluate if PFAS is present in perched groundwater and can be managed in pump and treat systems

- Can the granular activated carbon (GAC) we are currently using adequately remove it?
- GAC change frequency requirements?
- Final report completed in June
- Found PFAS in the influent to both pump and treat systems
- GAC currently used at the two pump and treat systems removes PFAS
- Data indicates that GAC would require change at a slightly higher frequency than planned for high explosives
 - 1 extra change-out per year at SEPTS
 - Up to 2 extra change-outs per year at P1PTS

3. Select pump and treat perched extraction wells and Pantex Plant drinking water supply have been sampled

- PFAS was detected in some extraction wells
- PFAS was NOT detected in the Pantex drinking water supply

2nd Five Year Review Follow-Up Actions

- **All 2nd Five Year Review Action Items are complete**
 - Addressed the perchlorate plume that is moving into the SEPTS well field
 - Completed with installation of new perchlorate treatment system at SEPTS
 - Completed August 2022
 - Addressed minor deficiencies in landfill protective soil covers
 - Landfill repairs occurred throughout 2022
 - Additional repairs were completed at protective ditch liner covers (repairs done Summer 2023)

Explanation of Significant Difference

- **Completed Explanation of Significant Difference (ESD)**
 - As part of the closeout of the 2nd FYR, Pantex submitted an ESD to the regulatory agencies
 - The ESD describes the nature of the significant differences Pantex has implemented to remedial actions selected in the Record of Decision (ROD) and originally installed to achieve cleanup objectives
- **Significant Differences**
 - Change to a more mobile carbon source (molasses) for injections
 - Perchlorate GWPS changed from 26 ppb to 15 ppb
 - Additional wells installed at Zone 11 ISB to help with injections where older wells were unable to take required injection volumes
 - Installation of new ISBs to address expanding plumes
- The concurrence of EPA and TCEQ was received in December 2022
- Public was notified via notices of availability published in the Amarillo Globe News and Panhandle Herald on February 2, 2023

3rd Five Year Review

- **The new FYR final report was submitted to TCEQ and EPA in September 2023**
 - EPA and TCEQ concurred with the report in September 2023
- **3rd Five Year Review Findings:**
 - Most of the remedial actions are performing as designed:
 - P1PTS needs to resume consistent operation
 - Additional injection wells at the Zone 11 ISB, installation and operation of the Southeast ISB Extension and the Offsite ISB, and use of molasses as the amendment in these systems has improved and expanded treatment of perched contaminants
 - Additional information needs to be acquired to improve understanding of DNT4A in the Ogallala Aquifer in the vicinity of PTX06-1056
 - Additional data needs to be acquired to understand the presence and nature of PFAS at Pantex
- **Overall Conclusion**

The remedial actions are protective in the short-term, but continued operation of Pump and Treat Systems and In Situ Bioremediation Systems are needed to achieve long-term protectiveness

Questions

Reports and slides can be found at:

<http://pantex.energy.gov/mission/environment/environmental-cleanup-documents>

Remediation Summary Booklet – available here and on our website

Fact Sheets – available here and on our website

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