



Managed and Operated by
Consolidated Nuclear Security, LLC

**Long Term Environmental Stewardship
Public Presentation**

2020

Presentation Highlights

Pantex Overview

- Site History
- Environmental Projects Department
- Groundwater Flow and Plumes at Pantex

Remedial Action Status at Pantex

- Cleanup Actions
- Accomplishments from July 2019 – June 2020
- Five-Year Review (FYR) Milestones Accomplishments

Site History

- **Legacy waste management practices resulted in the release of treated and untreated industrial wastewater to the surface (ditches and playas) and impacted perched groundwater beneath the main Plant and to the southeast**
- **Many soil sites were impacted by past waste management practices that released contaminants to soils.**
 - Most soil sites were cleaned up to acceptable standards during investigation
 - The final Remedial Action focuses on maintaining Landfills, a high explosive test area , and a solvent pit
- **Conducting remediation for soil and groundwater contaminants**
- **Permit drivers:**
 - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA/Superfund) administered by EPA
 - Resource Conservation and Recovery Act (RCRA) administered by Texas Commission on Environmental Quality (TCEQ)

Pantex Environmental Projects Group

PURPOSE: To perform cleanup actions on legacy contaminated groundwater and soils through

- **Management of environmental construction projects**
- **Operation & maintenance of two groundwater pump & treat systems, three groundwater bioremediation sites (plus new offsite ISB system), a soil vapor extraction site, ditch liners and landfill covers**
- **Performance and analysis of sampling of environmental media to determine:**
 - Compliance with permits
 - Evaluation of groundwater plume movements
 - Remediation effectiveness
 - Early detection of contamination in the drinking water aquifer
 - Waste characterization

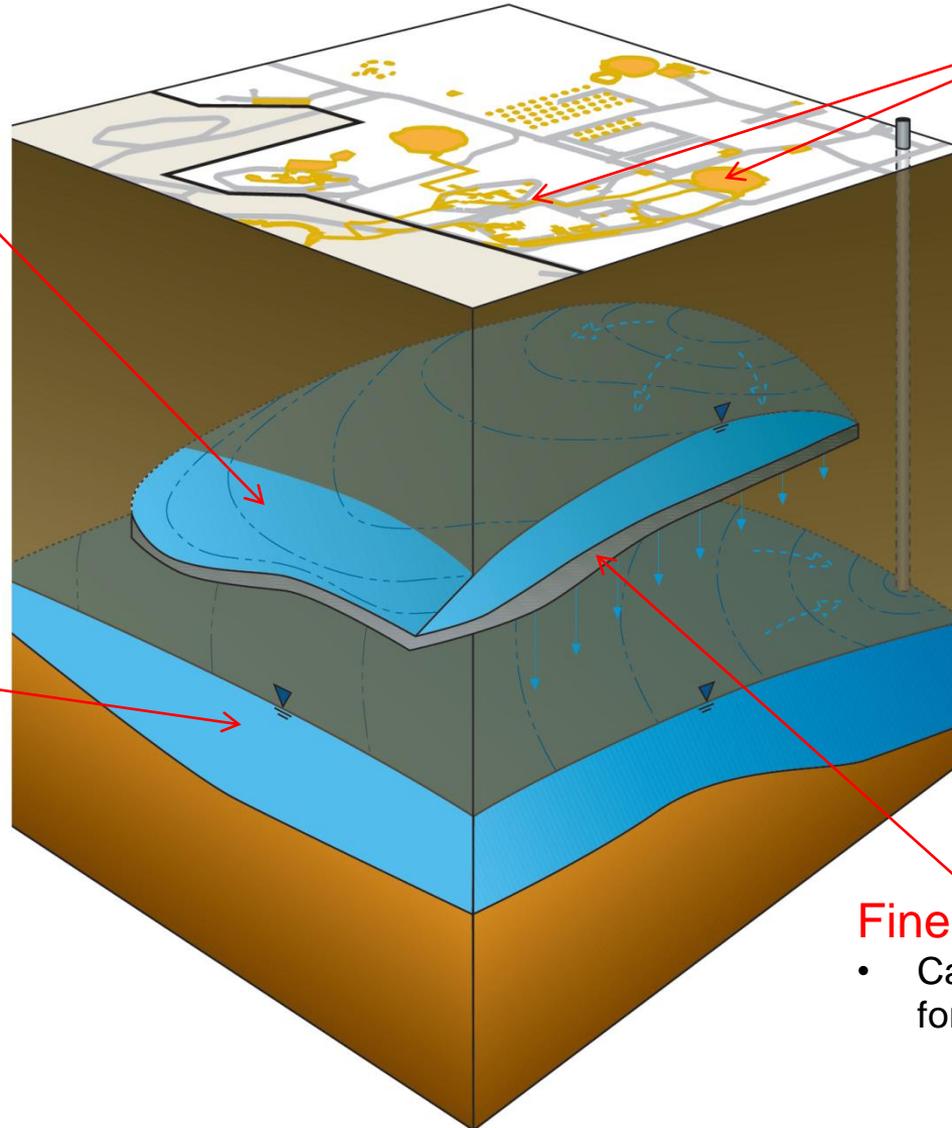
Groundwater Flow at Pantex

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



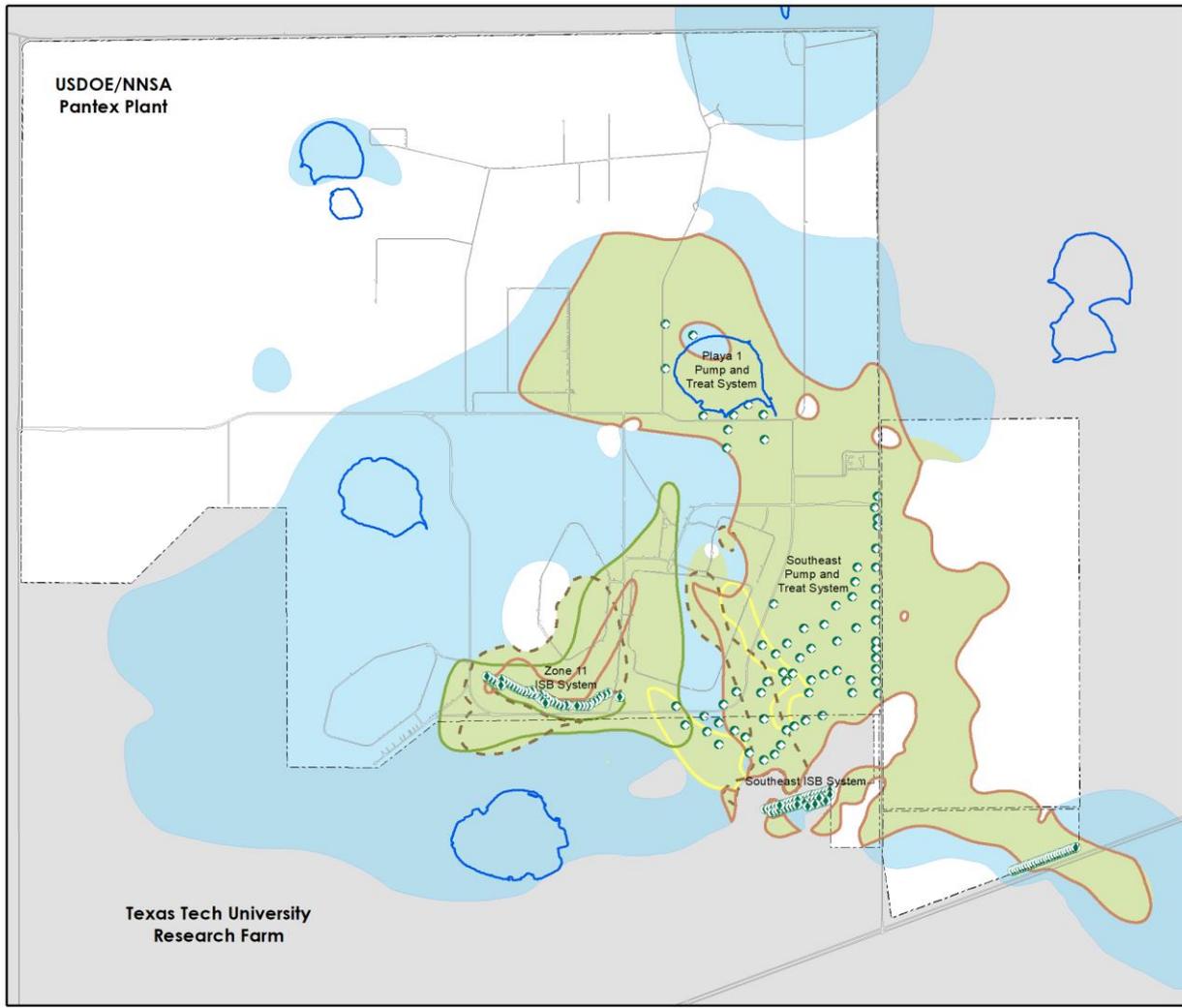
Playas/Ditches

- Past discharges of legacy wastes expanded our perched aquifer and contributed high explosive, 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 2019
- Main contaminants:
 - RDX
 - High explosive
 - Hexavalent Chromium
 - Cr⁺⁶
 - Metal
 - Trichloroethylene
 - TCE
 - Solvent
 - Perchlorate
 - ClO₄⁻
- Mainly contained within DOE controlled boundaries; one area of migration offsite identified for action.

Environmental Cleanup Action Focus

Pantex Environmental Systems

- **Groundwater Remedies**
 - Pump and Treat
 - In Situ Bioremediation
- **Soil Vapor Extraction**
- **Ogallala Monitoring**
- **Follow Up Actions for Five Year Milestones**

Primary Goals:

- Dewater contaminated perched aquifer
- Reduce contaminant mass in groundwater and soil vapor to cleanup levels
- Beneficially reuse treated water
- Protect Ogallala Aquifer and mitigate offsite movement of groundwater contaminants

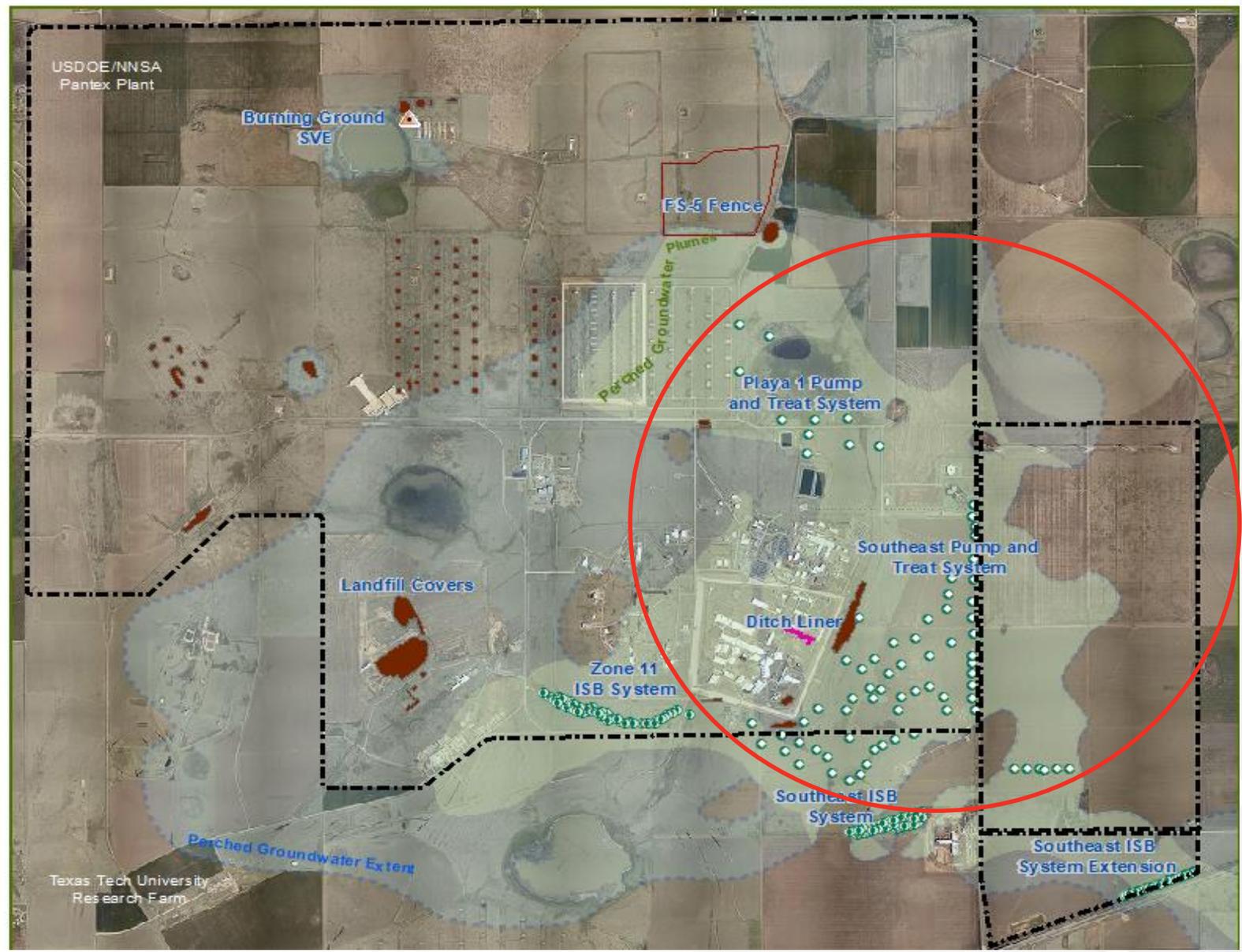
How We Achieve Cleanup Goals

- Operate Pump & Treat systems to dewater perched aquifer
- Operate onsite bioremediation systems to treat groundwater not captured by the pump and treat systems
- Install and operate offsite bioremediation system to address contamination migrating offsite
- Minimize water discharge to playa lakes (a known recharge of the perched)
 - Beneficially reuse treated water for drip irrigation

Pump and Treat Systems



Pantex
Plant
Remedial
Action
Systems



Pump and Treat Systems

Two Systems:

- (1) Southeast Pump and Treat (SEPTS)
 - Intercepts plumes/contamination and removes water
- (2) Playa 1 Pump and Treat (P1PTS)
 - Reduces water mounding

Accomplishments

(Since startup)

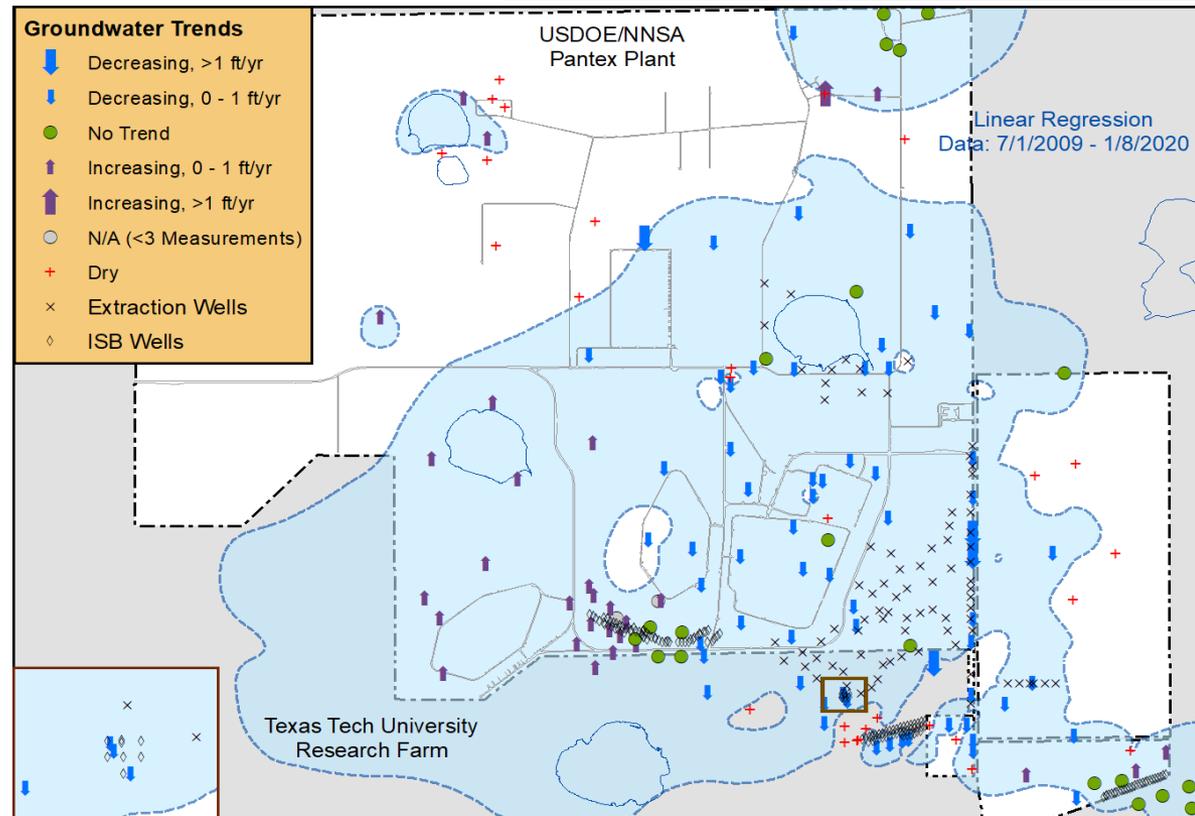
- 2.8 billion gallons treated
- 1.7 billion gallons beneficially used
- Declining water levels in areas under the influence of the systems

July 2019 - June 2020

- 119.8 Mgal treated
- 530 lbs of contaminants removed
- Systems were shutdown from April 8 – June 25 due to COVID-19

Current/Upcoming Related Projects:

- Repair on current irrigation system complete by late 2020
- New Pivot Irrigation east of FM 2373 – (design phase initiated)
- Inject in perched groundwater near Playa 2 (next slide)
- New Perchlorate Vessel at SEPTS to treat perchlorate plume



SEPTS Expansion: Playa 2 Injection



Milestones:

- Completed design in Dec 2019
- Began construction in Feb 2020
- Completing construction in Nov 2020

System Components:

- 3 injection wells, 150 gpm, subsurface conveyance line and booster pump
- SCADA system to communicate with SEPTS

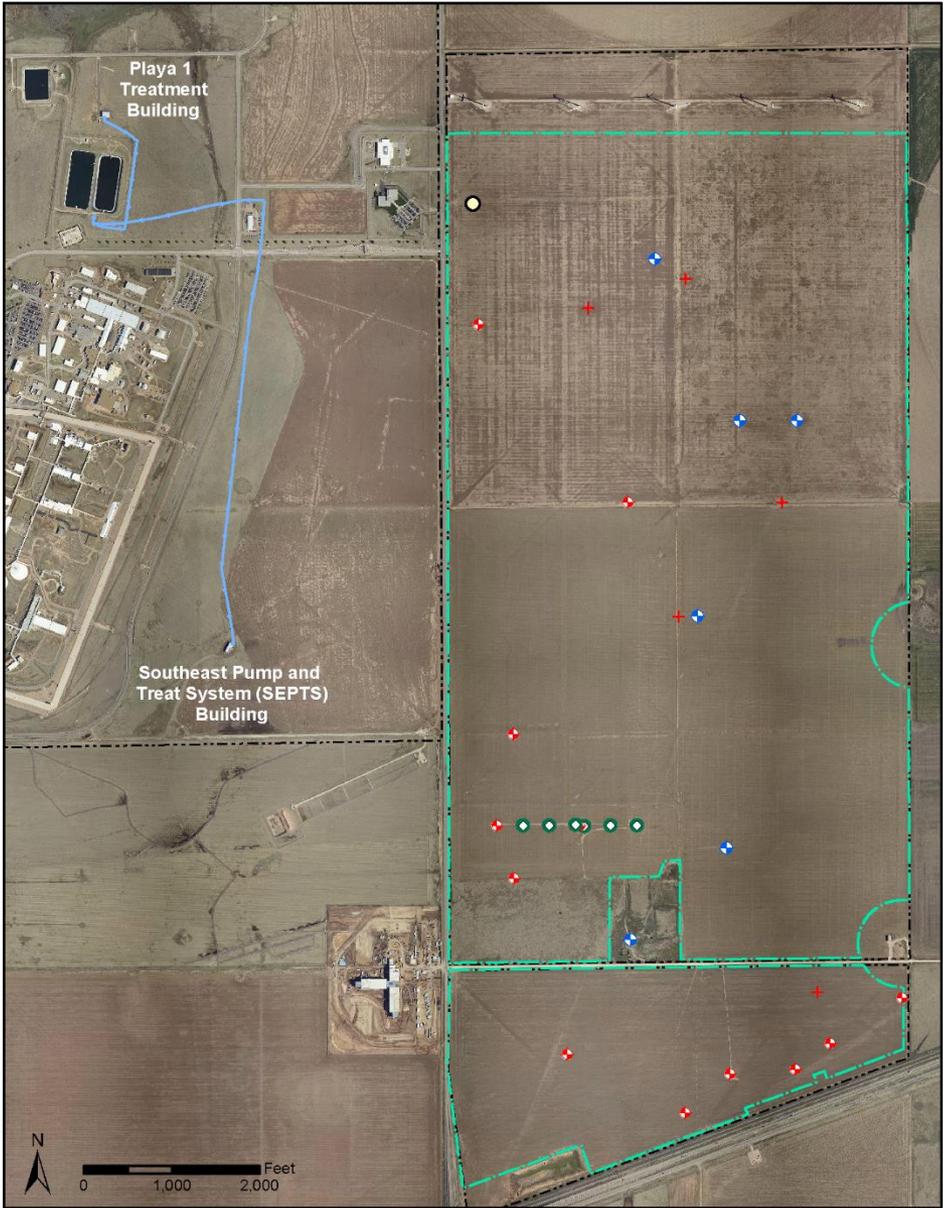
Pivot Sprinkler East of FM 2373

Milestones:

- Design began in Oct 2020
- Begin construction in Summer 2021
- Complete construction in 2022

System Components:

- 3 – 6 pivot sprinklers, subsurface conveyance line and booster pump
- SCADA system to communicate with SEPTS and P1PTS



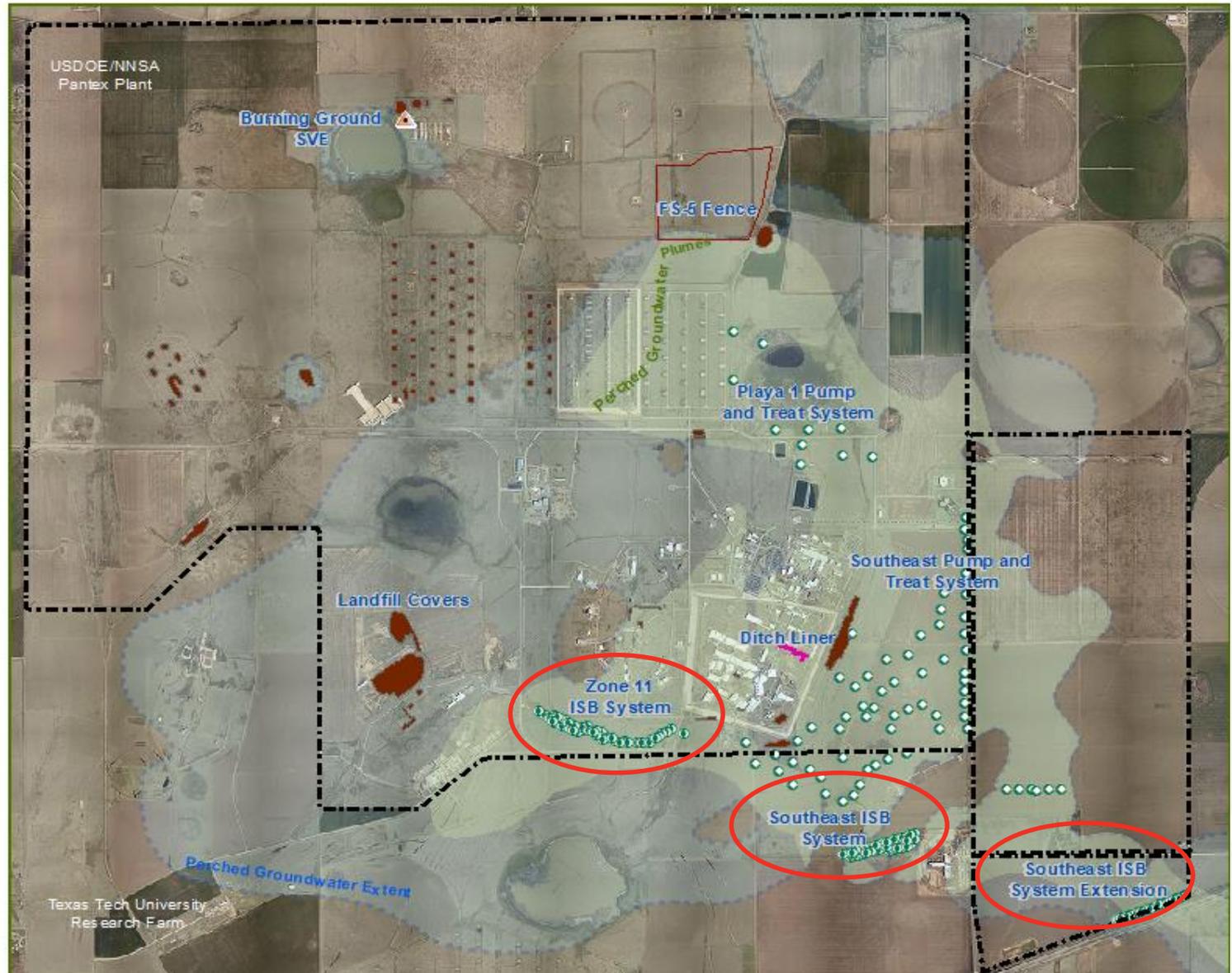
Well Type	
● Perched Extraction	◆ Ogallala Wells
◆ Perched Monitoring	○ East TLAP Outfall
● Perched Dry Well	— Treated Effluent Conveyance
	□ East TLAP Boundary

Site Layout for the Pivot Sprinkler Design Project

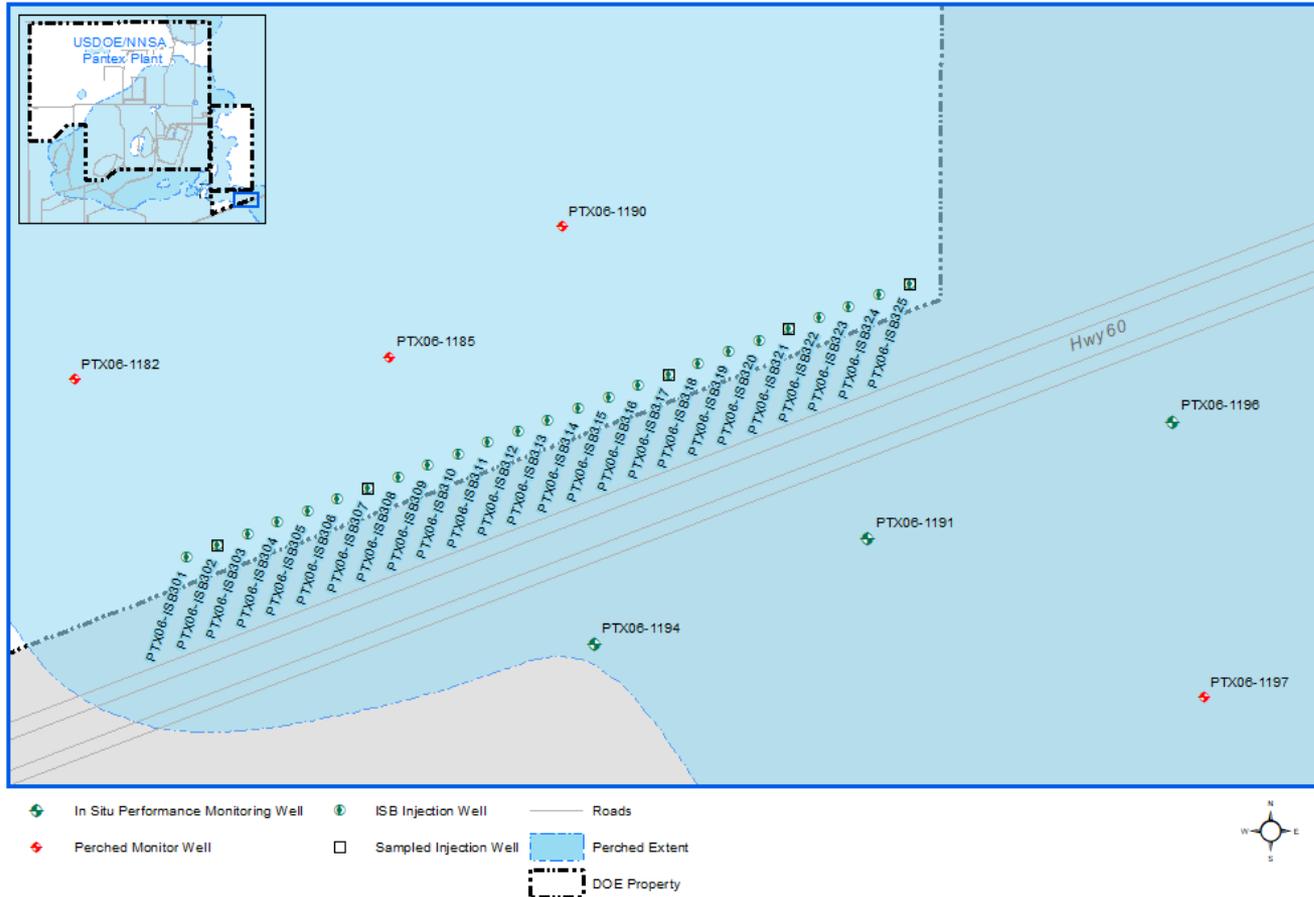
In Situ Bioremediation Systems



Pantex Plant Remedial Action Systems



Southeast Extension ISB



July 2019 - June 2020

- Injection completed in expansion area in Sept 2019

Current/Upcoming Related Projects:

- Injections every 6 - 9 months currently planned
- Installation of 4 new ISB wells to the north of ISB325 to encompass the plume

System Information:

- Main contaminant – RDX
- Installed in 2018
 - 25 injection wells
 - 3 performance monitoring wells
- Positioned to treat the contaminants in the southeast plume moving to offsite landowner property
- First 2 injections occurred in 2019 (February and September)
- Degradation of RDX is not expected to occur until late 2021
- Molasses is only amendment used currently at this system

Timeline to Execution of Offsite System

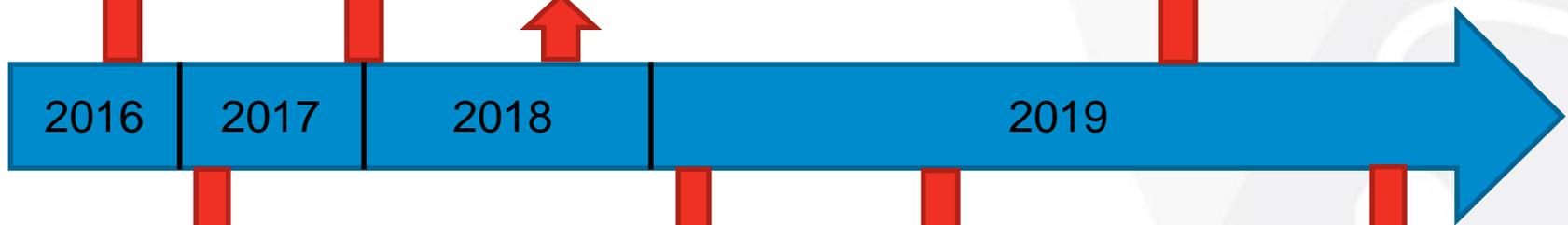
2016:

Observation of Southeast Moving Plume

2017/2018:
Plume Extending Further SE

2018: Installed 25 injection wells to remediate/cutoff plume (SE-Ext ISB)

2019: 2nd Injection into SE-Ext ISB



2016

2017

2018

2019

Installation of New Offsite System Begins

2019: 1st Injection into SE-Ext ISB

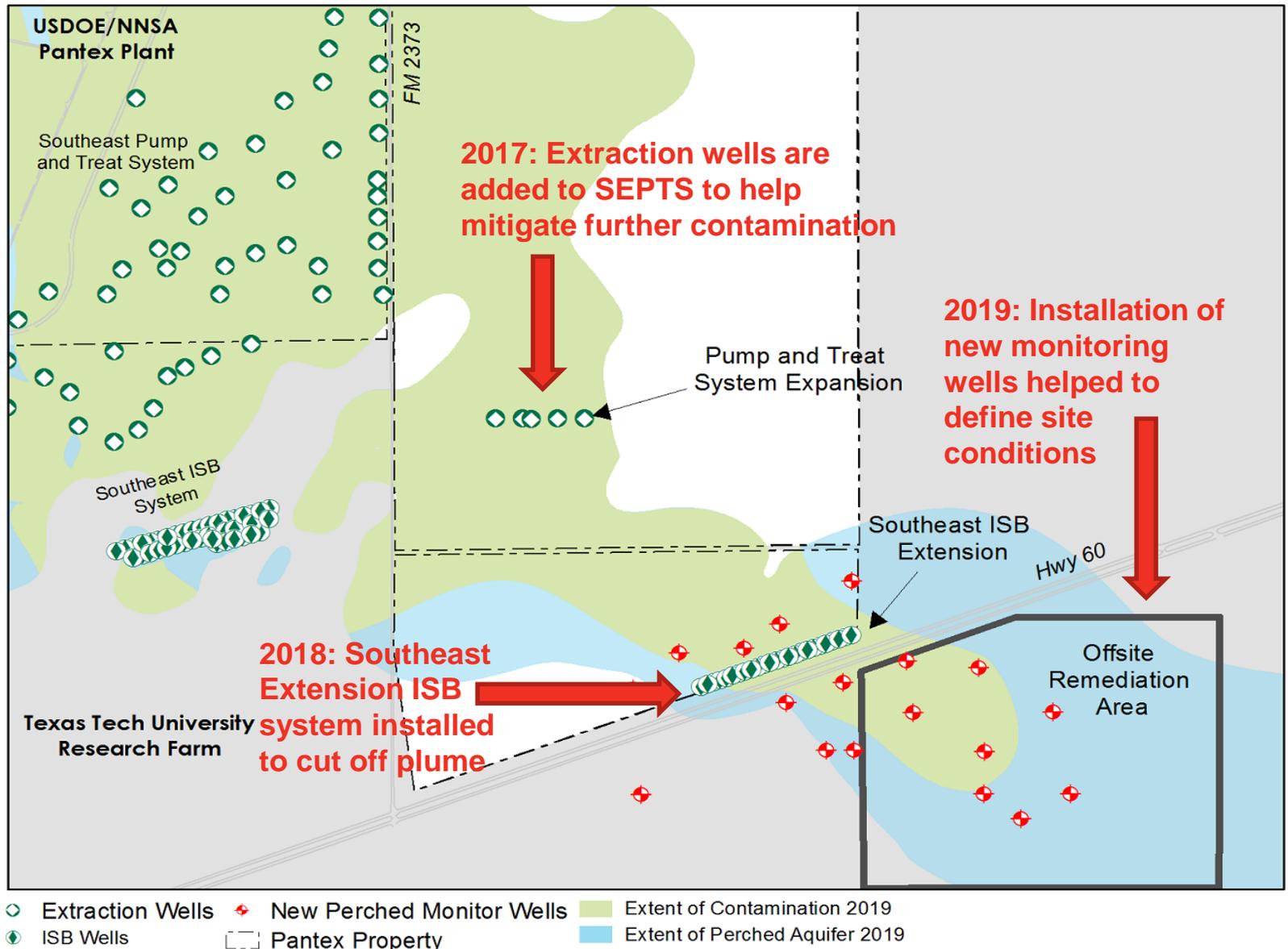
2019: Addition of monitoring wells on neighbors property to define extent

2017: Pump and treat wells are added east of FM 2373 to SEPTS system to reduce impact of water movement to SE

Offsite Extent Defined

2019: Optimization/modeling of new system to right-size the remedy is completed and remedy is selected

Remedial Actions to Address Offsite Plume



Offsite ISB System as of October 2020

Pantex Offsite Treatment Area
Well Types and Locations

*Phase 1 (Oct 2019 – Jun 2020):
Installation of 10 ISB injection
wells, 4 ISB extraction wells*

Wells were placed to address
leading edge of the plume.
Further expansion of plume is
cut off.

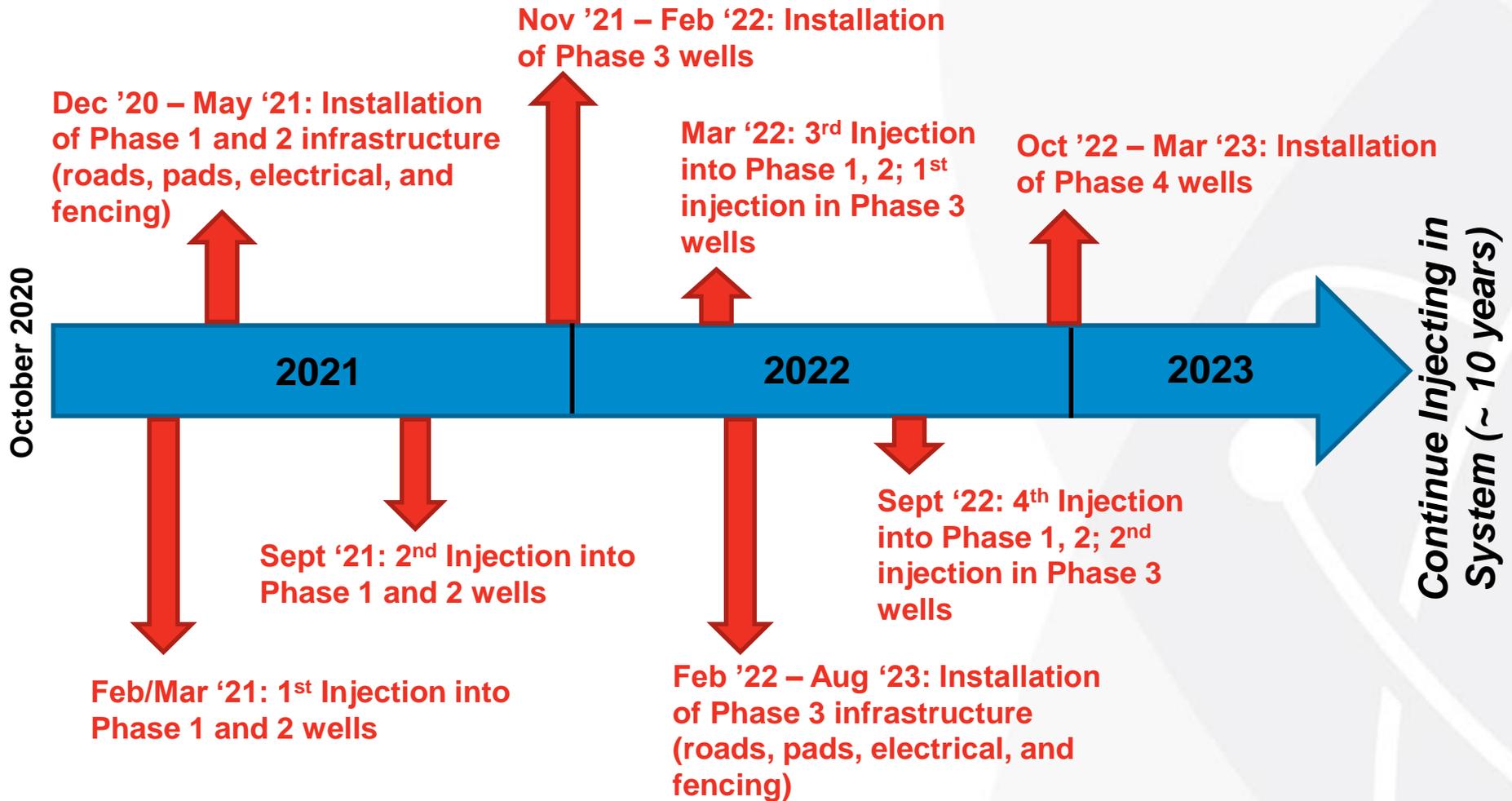
*Phase 2 (Jul 2020 – Sept 2020):
Originally planned for 2021 but
worked with contractors to
expedite project during COVID-19
Installation included 6 ISB
injection wells, 7 ISB extraction
wells, 3 pump and treat extraction
wells*

- Extraction Wells
- ISB Wells
- ISPM Wells
- Monitoring Wells
- Neighbor Property 1
- Neighbor Property 2
- DOE Property

0 250 500 1,000 Feet



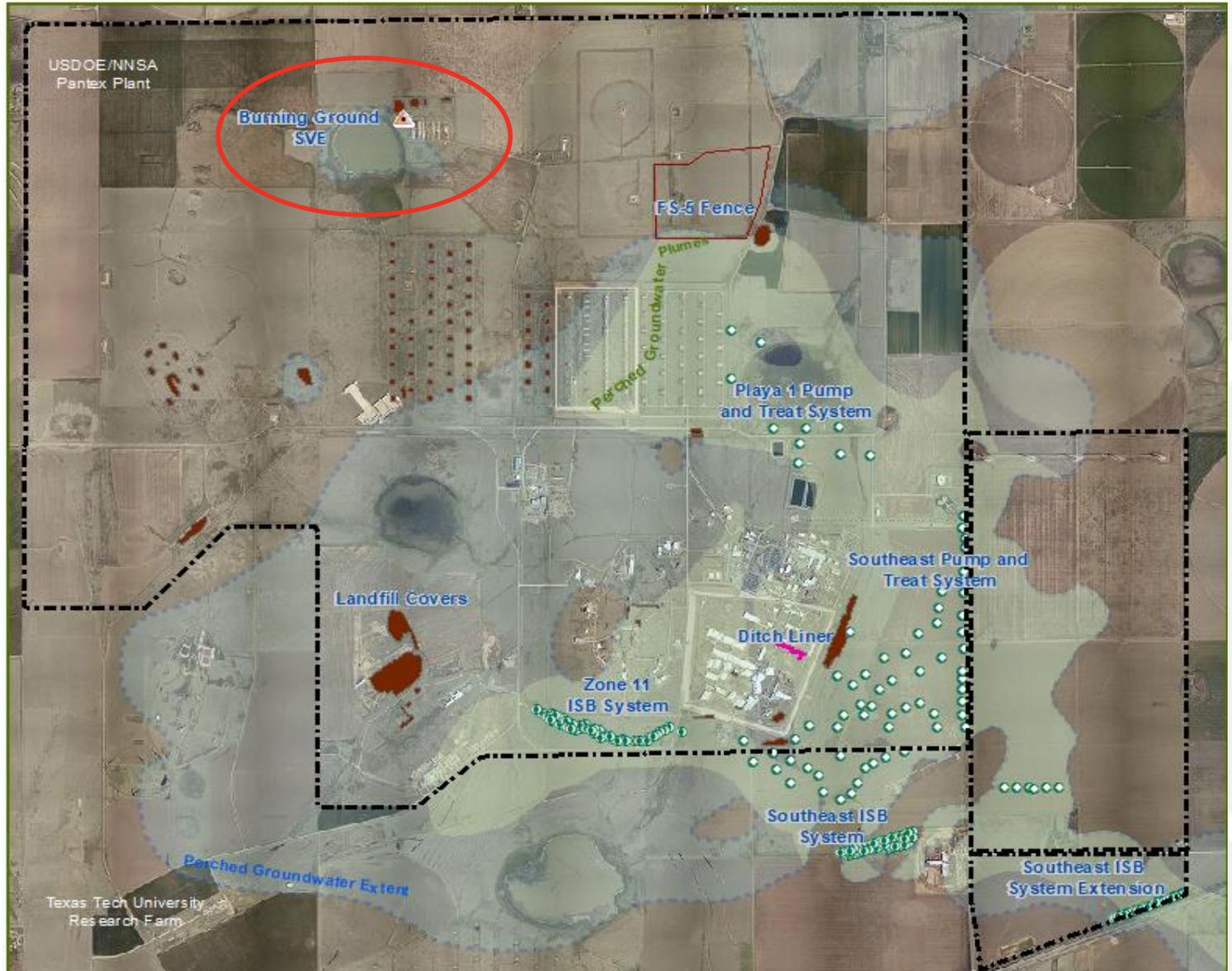
Future Timeline for Offsite ISB System



Soil Vapor Extraction System



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Soil Vapor Extraction System

Installed in February 2002

- Remedial goal to reduce the mass of Volatile Organic Compounds (VOCs) – highest historical concentration ~ 1845 ppmv; highest current concentration ~ 100 ppmv



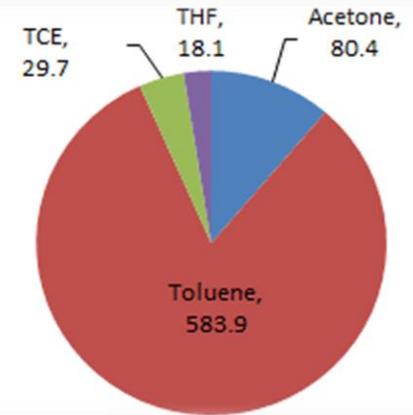
System Information:

- Large-scale catalytic oxidation originally
- System transitioned to:
 - Activated carbon drums
 - Smaller blower motor for extraction
- Later replaced by more cost efficient small scale CatOx system (current system)
- Modified in May 2017 to increase air flow

Soil Vapor Extraction System

Accomplishments: (July 2019 – June 2020)

- Removed 214 lbs of volatile organic compounds



Total VOCs removed since startup:
21,035 lbs

Future Operations?

- Continue to evaluate declining source
- Plan to pulse system in 2020 - 2021 to evaluate potential for future closure

Five Year Review Follow-Up Actions – 2020-2021

- **Address the perchlorate plume that is moving into the SEPTS well field**
 - Continue monitoring the plume expansion and the influent to the SEPTS
 - Existing resin can treat low levels of perchlorate
 - Evaluation of perchlorate treatment at the SEPTS has been performed and new perchlorate treatment vessel will be installed to address plume
- **Address minor deficiencies in landfill protective soil covers**
 - Completed repairs and maintenance of covers on Landfills 1 and 3
 - A long-term contract has been established to address minor deficiencies in the soil covers. Annual tasks are set up to address new findings
- **Address the TCE plume that extends east and west, outside of the Zone 11 ISB system**
 - Evaluated treatment options and will expand ISB treatment to the southeast

Questions/Comments

Reports, fact sheets and past public meeting information
can be found at:

<https://pantex.energy.gov/mission/environment/environmental-cleanup-documents-0>

Please email maeghan.brundrett@cns.doe.gov
for comments and question about the presentation
through December 10, 2020.