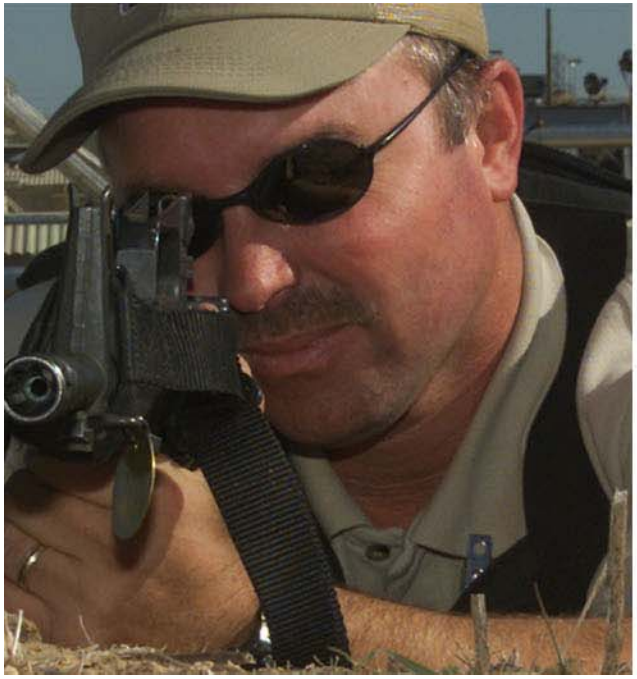


CNS | consolidated nuclear security, llc
PANTEX PLANT | Y-12 NATIONAL SECURITY COMPLEX

Long Term Environmental Stewardship Public Meeting

Tony Biggs

Environmental Projects Manager
Consolidated Nuclear Security, LLC

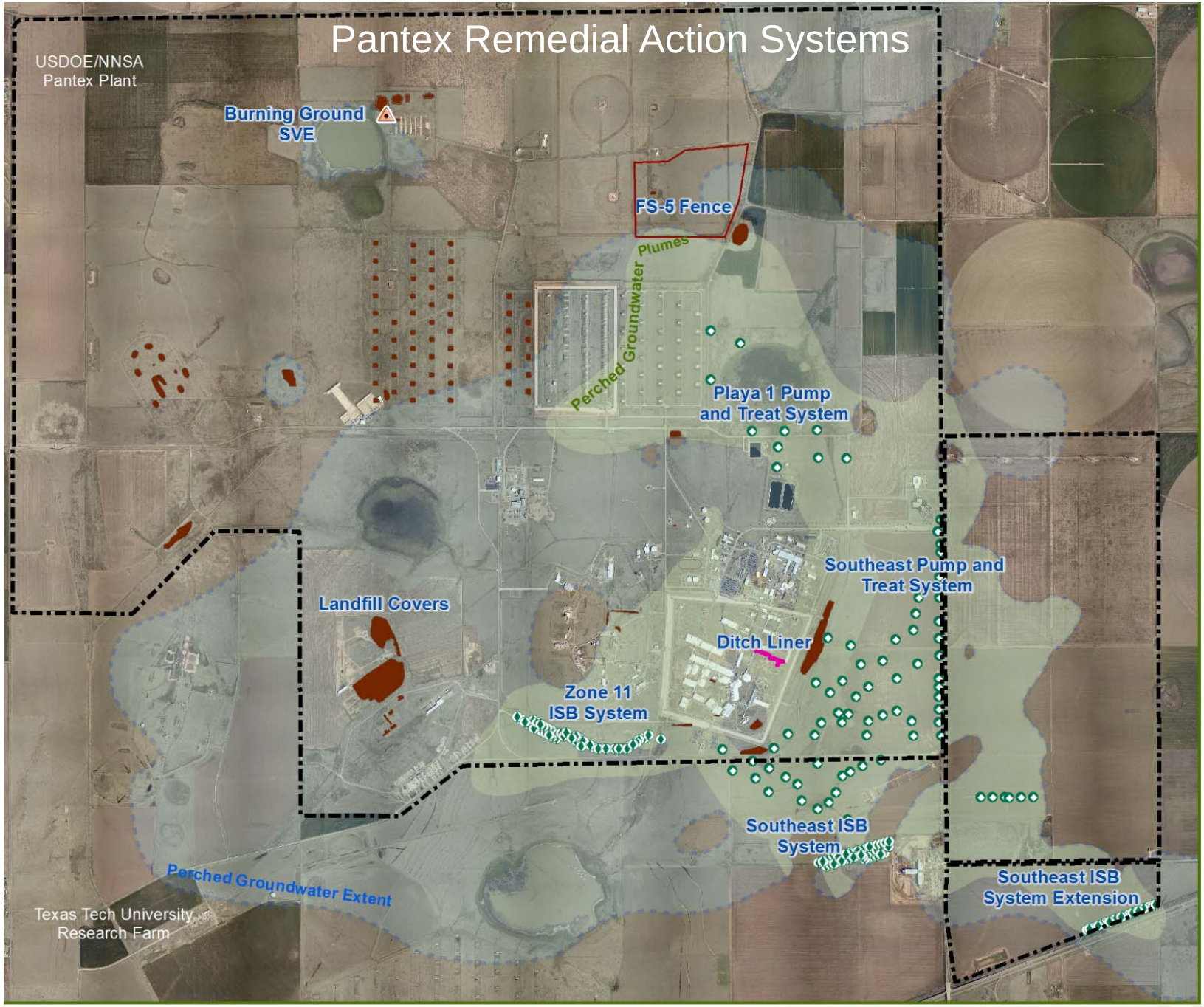
November 13, 2018

Meeting Focus

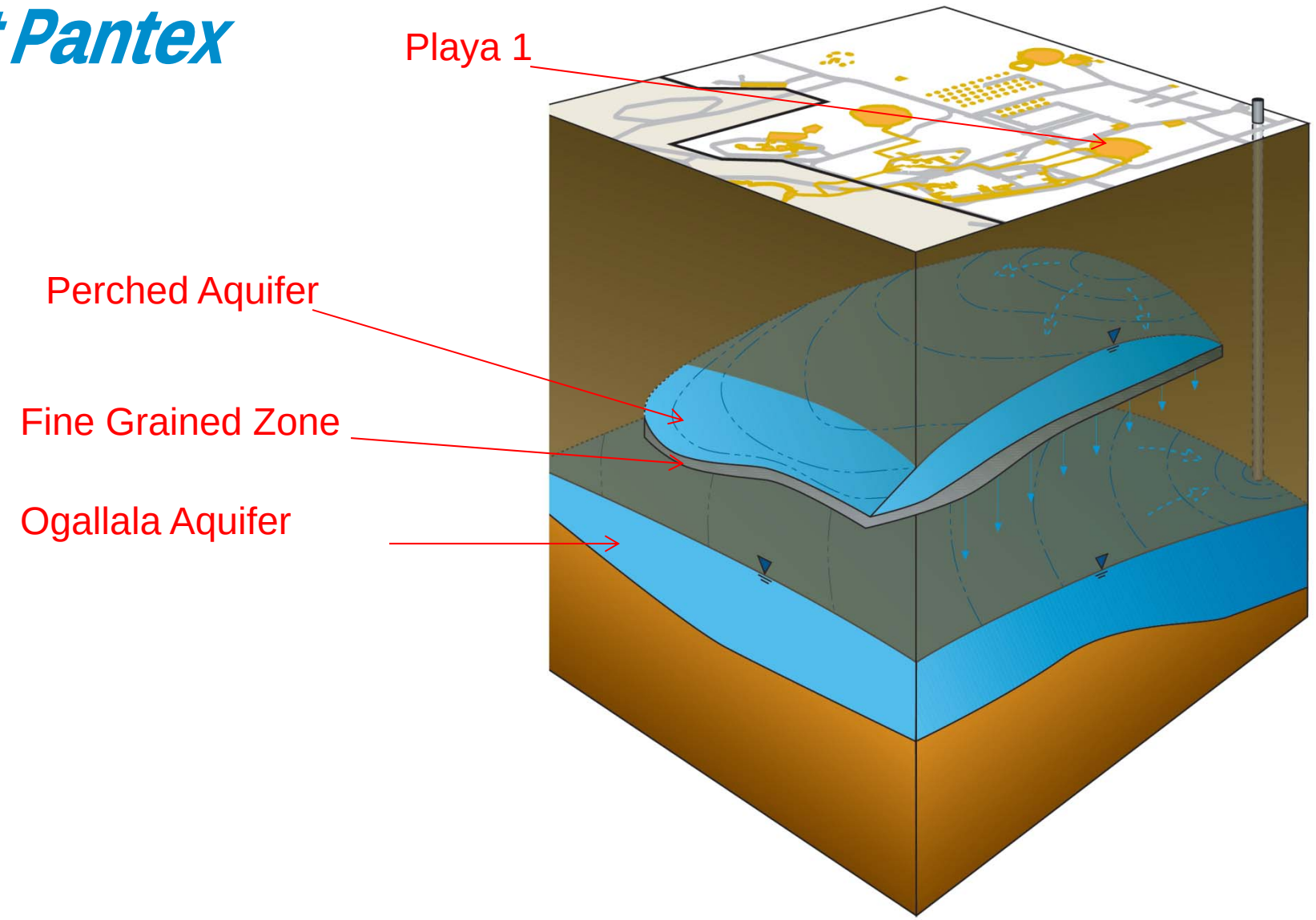
Cleanup of Legacy Waste Releases at Pantex

- Cleanup Actions
- Accomplishments from July 2017 – June 2018
- Five-Year Review (FYR) Results and Conclusions
- FYR Actions and Challenges to Cleanup; Operation and Maintenance (O&M) of the actions
- Future O&M and Actions

Pantex Remedial Action Systems



Groundwater Flow at Pantex



Environmental Cleanup Action Focus

- Groundwater Remedies
  - Pump and Treat
  - In Situ Bioremediation
- Soil Vapor Extraction

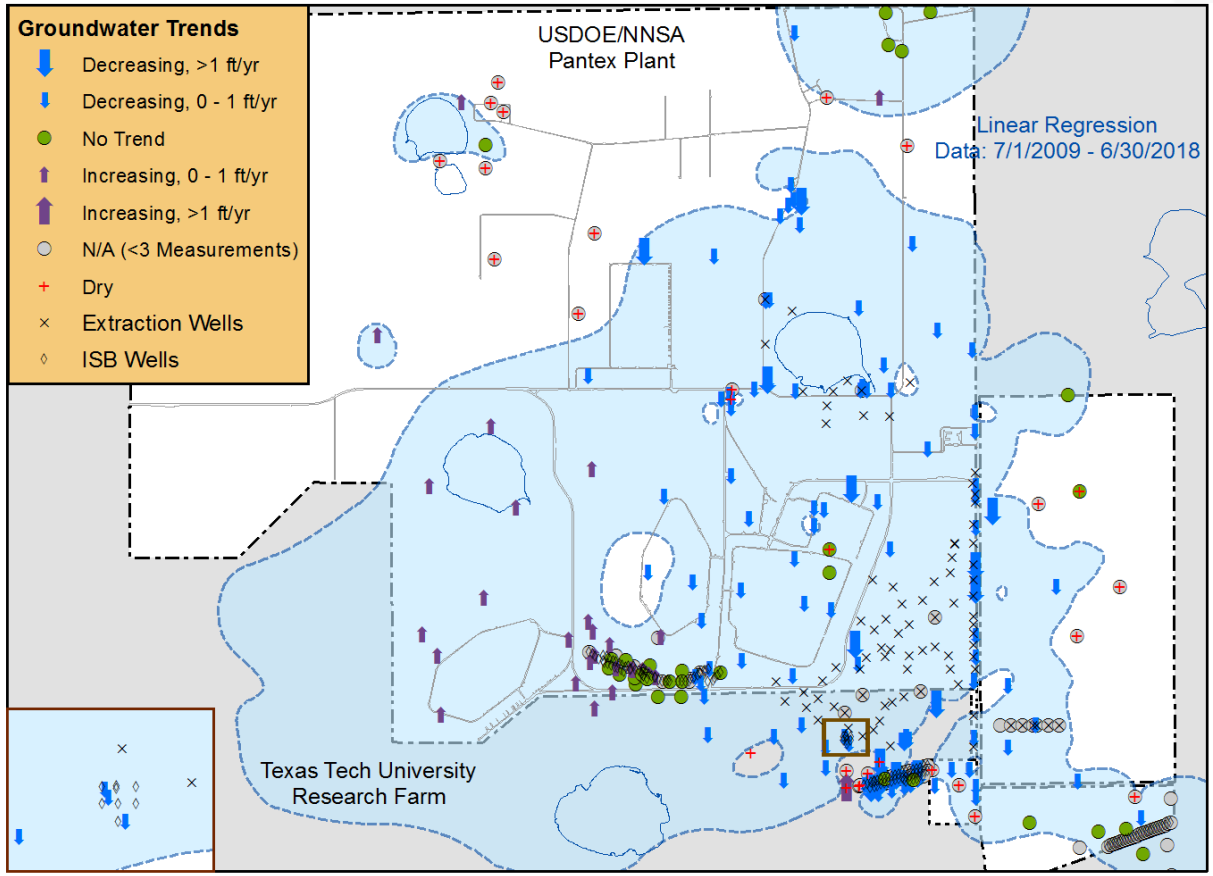
Goals:

- Remove water from perched aquifer
- Remove/reduce contamination to cleanup levels
- Prevent contaminant movement to Ogallala Aquifer

Accomplishments

Pump and Treat (July 2017 - June 2018)

- 140.5 Mgal treated
- 424 lbs of contaminants removed
- Water levels declining as expected in areas under the influence of the systems
- Limited beneficial use of treated water in 2017-2018



Pump and Treat (since startup)

- 2.6 billion gallons treated
- 1.7 billion gallons beneficially used

Issues:

- Irrigation system is under repair. Other options for use of treated water are being evaluated.
- Perchlorate migrating into Southeast P&T (SEPTS) well field.

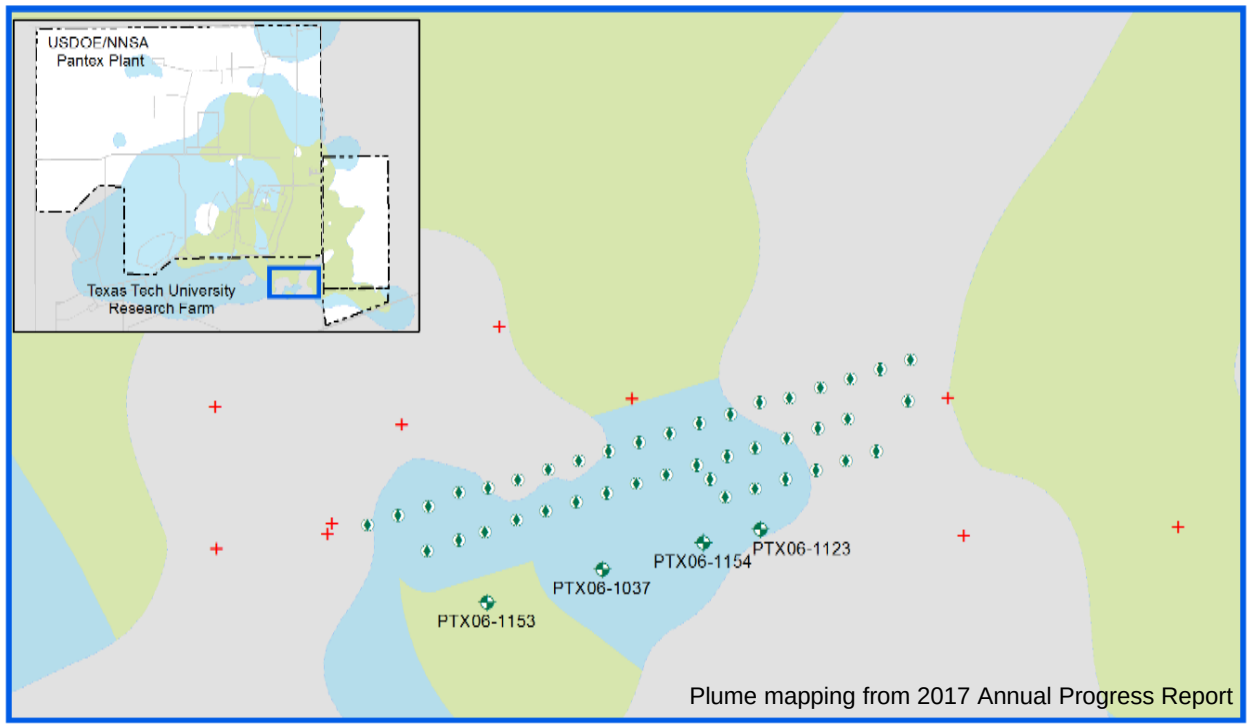
Current Path Forward:

- Repair current irrigation system
- Irrigation east of FM 2373
- Inject in perched groundwater near Playa 2
- Design and modify SEPTS for perchlorate cleanup
- Funding required

Accomplishments

Southeast In Situ Bioremediation (ISB)

- High Explosives reduced below groundwater protection standards (GWPS) at all but one downgradient monitoring well. Hexavalent chromium reduced in all wells.
- New signs of degradation at PTX06-1153 (seeing RDX breakdown products).



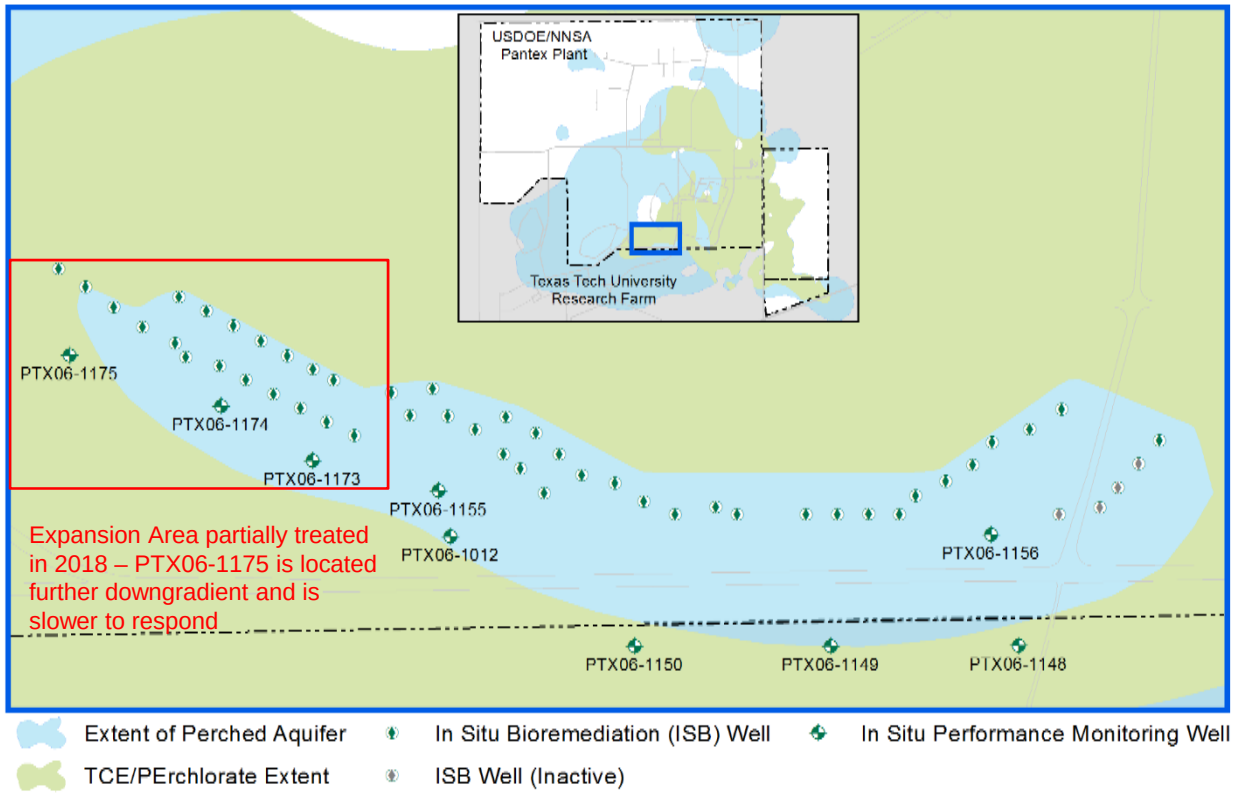
Well	Sample Date	Measured Value (ppb)
Hexavalent Chromium (GWPS 100 ppb)		
PTX06-1037	06/2018	ND
PTX06-1153	5/9/2018	12.4
PTX06-1154	06/2018	ND
RDX (GWPS 2 ppb)		
PTX06-1037	06/2018	ND
PTX06-1153	5/9/2018	263
PTX06-1154	06/2018	ND

PTX06-1123 does not have enough water to sample
ND – Not detected

Accomplishments

Zone 11 In Situ Bioremediation (ISB)

- Perchlorate and TCE reduced near or below groundwater protection standards (GWPS) at most wells
- Injection completed in expansion area in October 2018



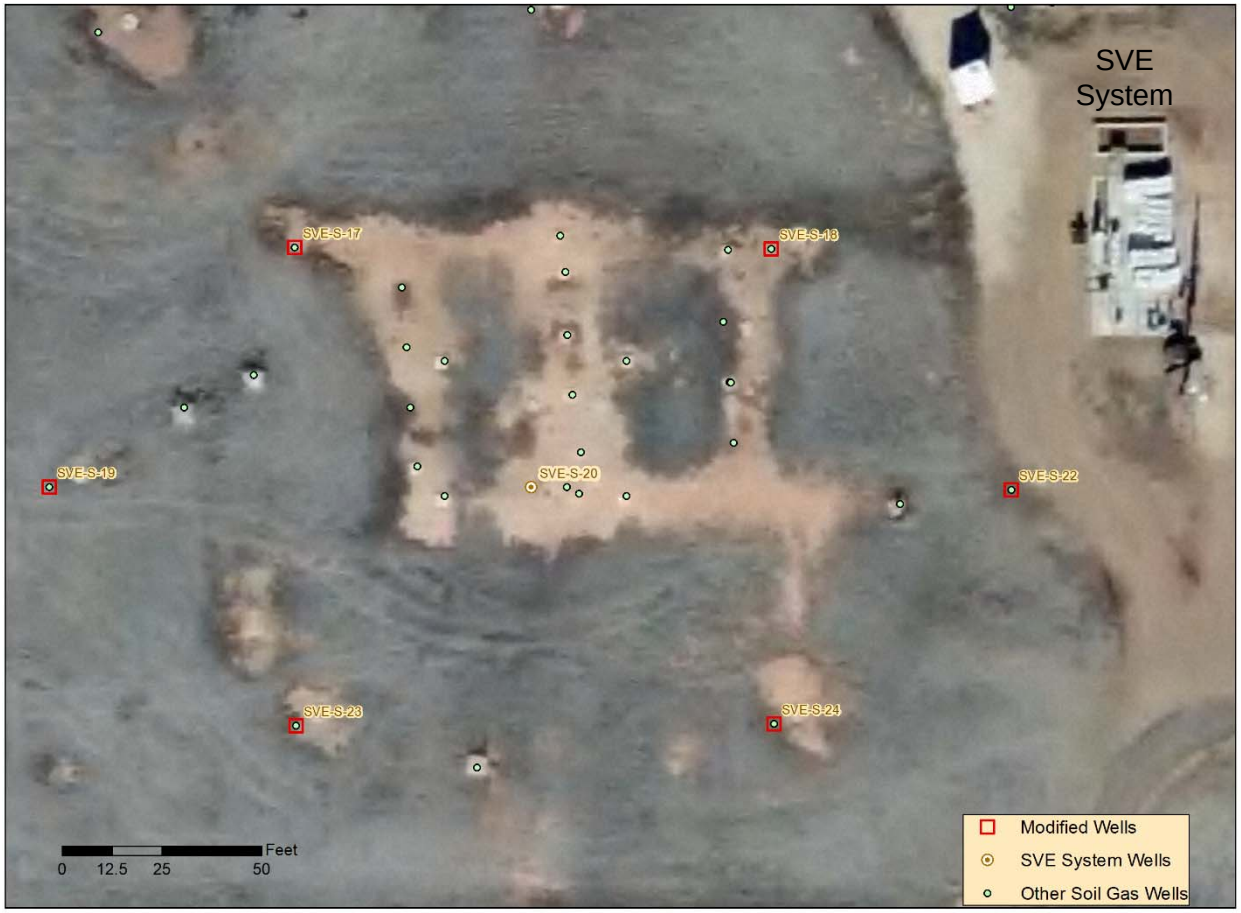
Well ID	Sample Date	Measured Value (ppb)
Perchlorate (GWPS 26 ppb)		
PTX06-1012	5/15/2018	ND
PTX06-1148	5/16/2018	50
PTX06-1149	5/16/2018	ND
PTX06-1150	5/16/2018	24
PTX06-1155	5/15/2018	ND
PTX06-1156	5/15/2018	ND
PTX06-1173	5/21/2018	ND
PTX06-1174	5/21/2018	ND
PTX06-1175	5/21/2018	120
TCE (GWPS 5 ppb)		
PTX06-1012	5/15/2018	1.4
PTX06-1148	5/16/2018	1.1
PTX06-1149	5/16/2018	1.2
PTX06-1150	5/16/2018	4.8
PTX06-1155	5/15/2018	ND
PTX06-1156	5/15/2018	ND
PTX06-1173	5/21/2018	0.65
PTX06-1174	5/21/2018	ND
PTX06-1175	6/6/2018	120

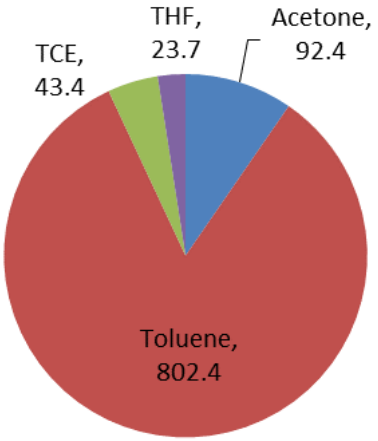
TCE and Perchlorate Plume mapping from 2017 Annual Progress Report

Accomplishments

Soil Vapor Extraction (SVE) (July 2017 – June 2018)

- Removed 962 lbs of volatile organic compounds





3rd quarter 2017 – 2nd quarter 2018

Total VOCs removed since startup: 20,109 lbs

Future Operation

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

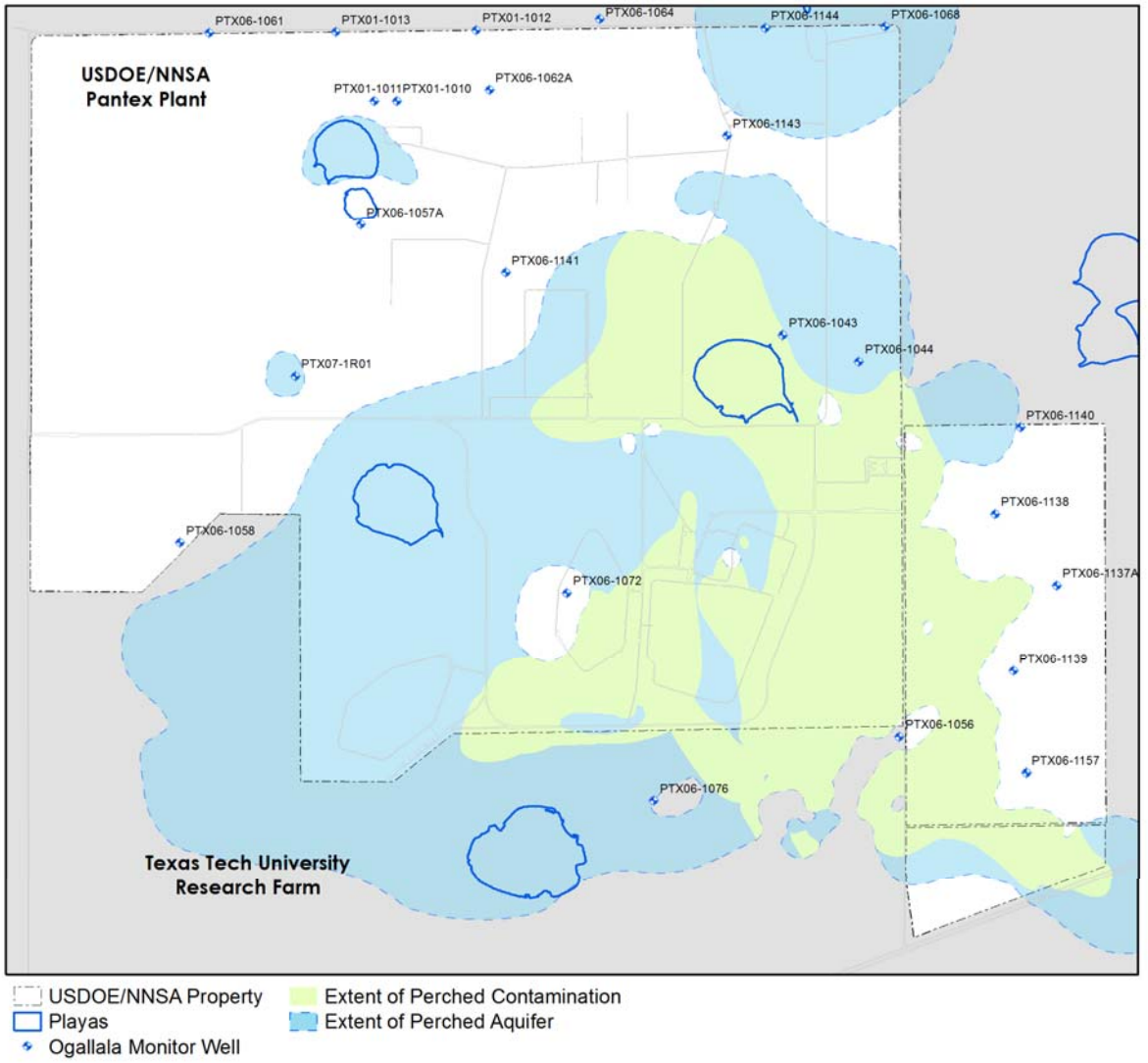
Accomplishments

Ogallala Detection Monitoring

- 24 wells monitored
- All detected analytes below the Groundwater Protection Standard

Issue:

- DNT4A, a high explosive, and 1,2-DCA, a volatile organic compound, continue to be detected below GWPS at PTX06-1056



DNT4A – 4-amino-2,6-dinitrotoluene 1,2-DCA – 1,2-dichloroethane

Five-Year Review (FYR) Conclusions

EPA and TCEQ approved the FYR September 13, 2018

The FYR indicates that the Selected Remedy is performing as intended and is protective of human health and the environment in the short term. It is currently protective because:

- **All soil remedies are functioning as designed and as expected.**
- **Risk of exposure to contaminated soils and affected perched groundwater is being minimized through contact prevention while remedies continue.**
- **The pump and treat systems continue to reduce saturated thickness and remove mass, thereby reducing water and contaminants that could affect the drinking water aquifer.**
- **The ISB systems are reducing contaminants and risk in perched groundwater.**

FYR Recommendations/Follow-up Actions

Recommendations and follow-up actions will need to be addressed to ensure the remedy will result in long-term protectiveness of human health and the environment. The following actions must be implemented:

- **Continue operation and maintenance of the soil and groundwater remedies.**
- **Enhance existing groundwater remedies and install an additional ISB system in the southeast lobe of perched groundwater.**
- **Continue to maintain and enforce the established institutional controls to restrict access, use of perched groundwater, and drilling.**
- **Continue to collect data on performance and effectiveness of the Selected Remedy.**
- **Address issues identified in the FYR.**

FYR Follow-Up Actions - Issues

- **Continue to monitor for unexpected contaminants -**
  - Dissolved metals from ISBs, cadmium in Zone 12, and 1,4-dioxane and hexavalent chromium in Zone 11
- **Address the perchlorate plume that is moving into the SEPTS well field**
  - Continue monitoring the plume expansion and the influent to the SEPTS.
  - Addition of perchlorate treatment unit to the SEPTS.
- **Prepare an Explanation of Significant Difference by the next FYR.**
  - Address the modifications to the Zone 11 ISB and the new ISB
  - Address new standards that have been developed for perchlorate.
- **Address incomplete treatment of contaminants downgradient of the west end of the Southeast ISB, at well PTX06-1153.**
  - Continue monitoring to evaluate water levels and contaminant trends.
  - Consider targeted injection near or in PTX06-1153.

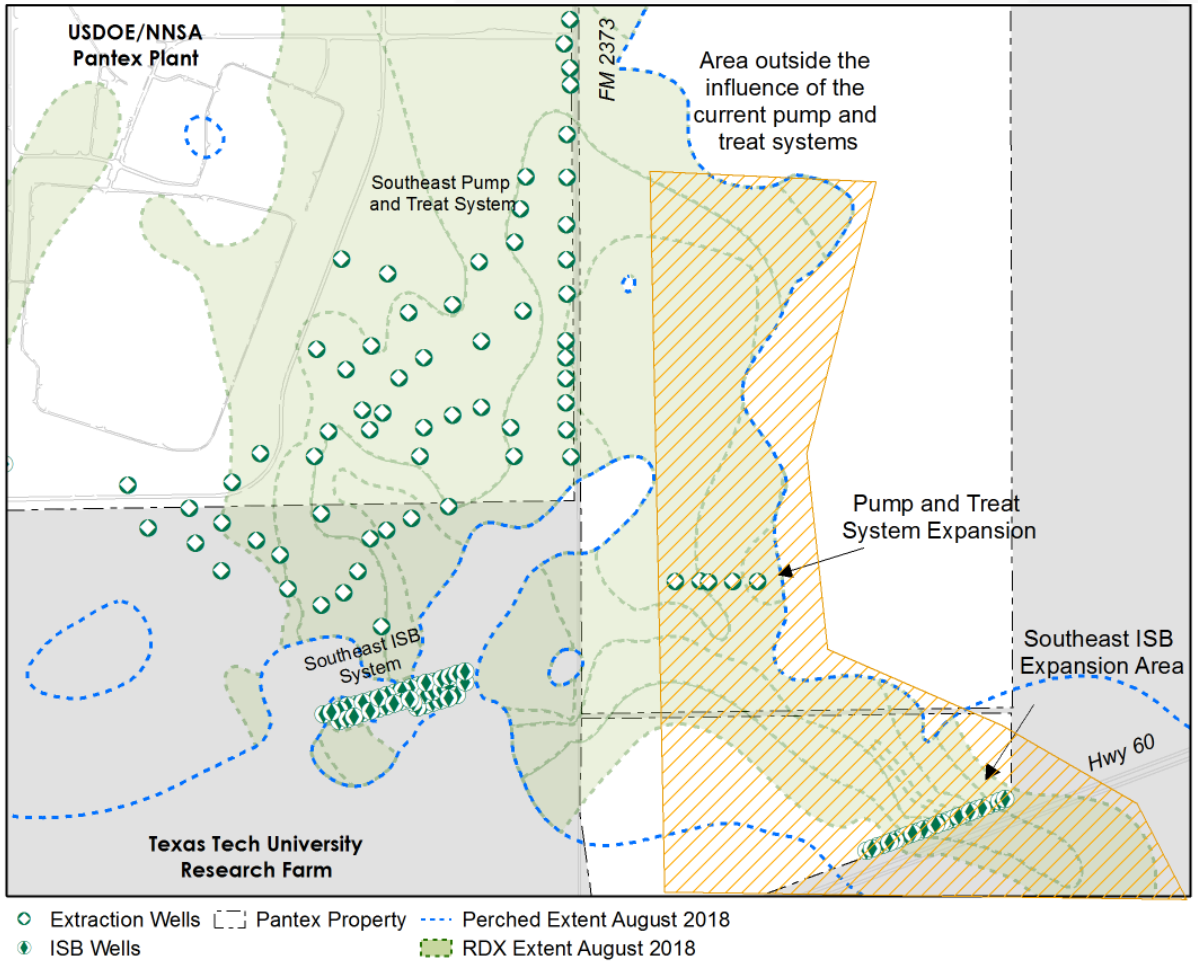
FYR Follow-Up Actions - Issues

- **Address minor deficiencies in landfill protective soil covers.**
  - Pantex has two contracts to address issues at 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.
- **Meet with EPA to discuss toxicity changes for radionuclides.**
- **Address the TCE plume that extends west, outside of the Zone 11 ISB system.**
  - Evaluate options for treatment.
- **Address expanding plumes of high explosives to the southeast.**
  - Complete characterization of high explosive plumes (primarily RDX).
  - Establish institutional controls by establishing deed restrictions

Southeast Lobe – Previous Actions

Expanding plume at the southeast lobe of perched groundwater

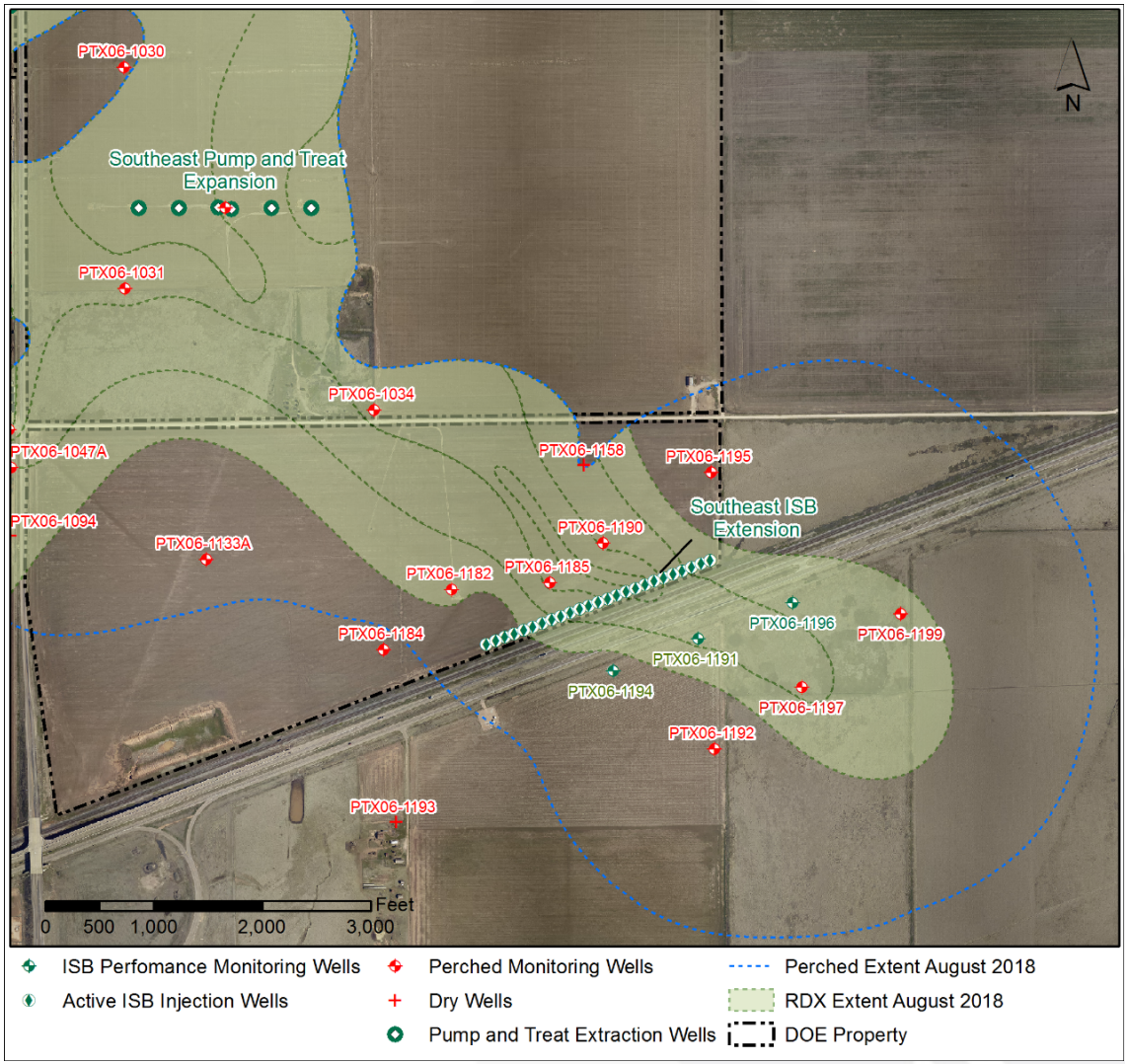
- **Area determined to be outside the influence of the pump and treat system**
- **Installed wells and conducted pump tests in 2015 to evaluate pump and treat expansion**
- **Drilled pump and treat extraction wells in 2016 – connection to system near completion - Start-up scheduled for December**



- **Added new wells in 2016, 2017, and 2018 to determine extent of plume to the southeast**

Southeast Lobe Actions 2017-2018

- **Added 25 ISB wells along Pantex boundary**
  - Injection beginning December 2018
- **Four new onsite monitoring wells**
- **Seven new wells drilled offsite**
  - One well was dry (PTX06-1193)
  - One well was clean – no detections of contaminants
  - Three wells with concentrations of RDX (23, 93, and 123 ppb)
  - Two wells near GWPS, indicating that plume extent was defined in that area
  - Three wells had detections of DNT4A slightly above GWPS

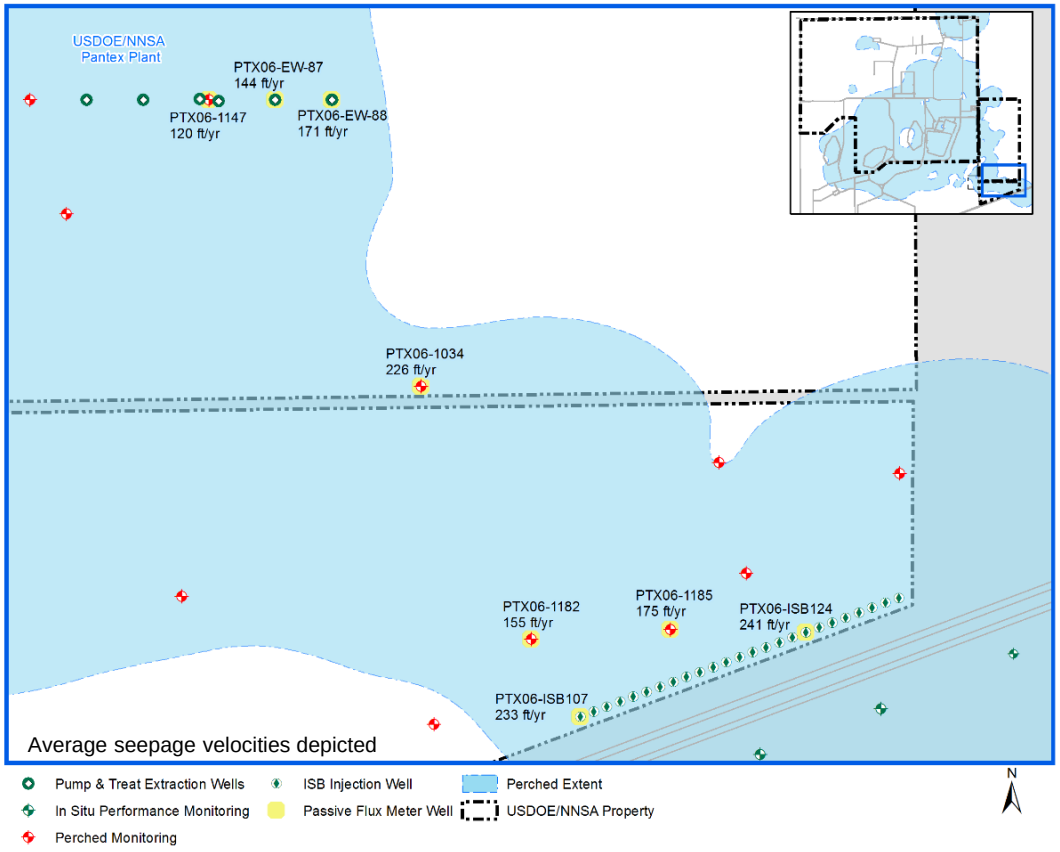


Well ID	RDX	DNT4A	Well ID	RDX	DNT4A
PTX06-1191	93.5	1.81	PTX06-1196	23.5	3.7
PTX06-1192	ND	ND	PTX06-1197	123	2.84
PTX06-1194	0.137	ND	PTX06-1199	3.68	1.01

Measured values in ppb. ND = Not detected.
Groundwater Protection Standard for RDX = 2 ppb, DNT4A = 1.2 ppb

Southeast Lobe Actions 2017-2018

- **Innovative Technology Use**
  - Passive Flux Meters to determine groundwater flow velocities across the SE lobe
    - Flow velocities higher in specific wells
    - Indicates channel flow faster than predicted in other parts of perched groundwater

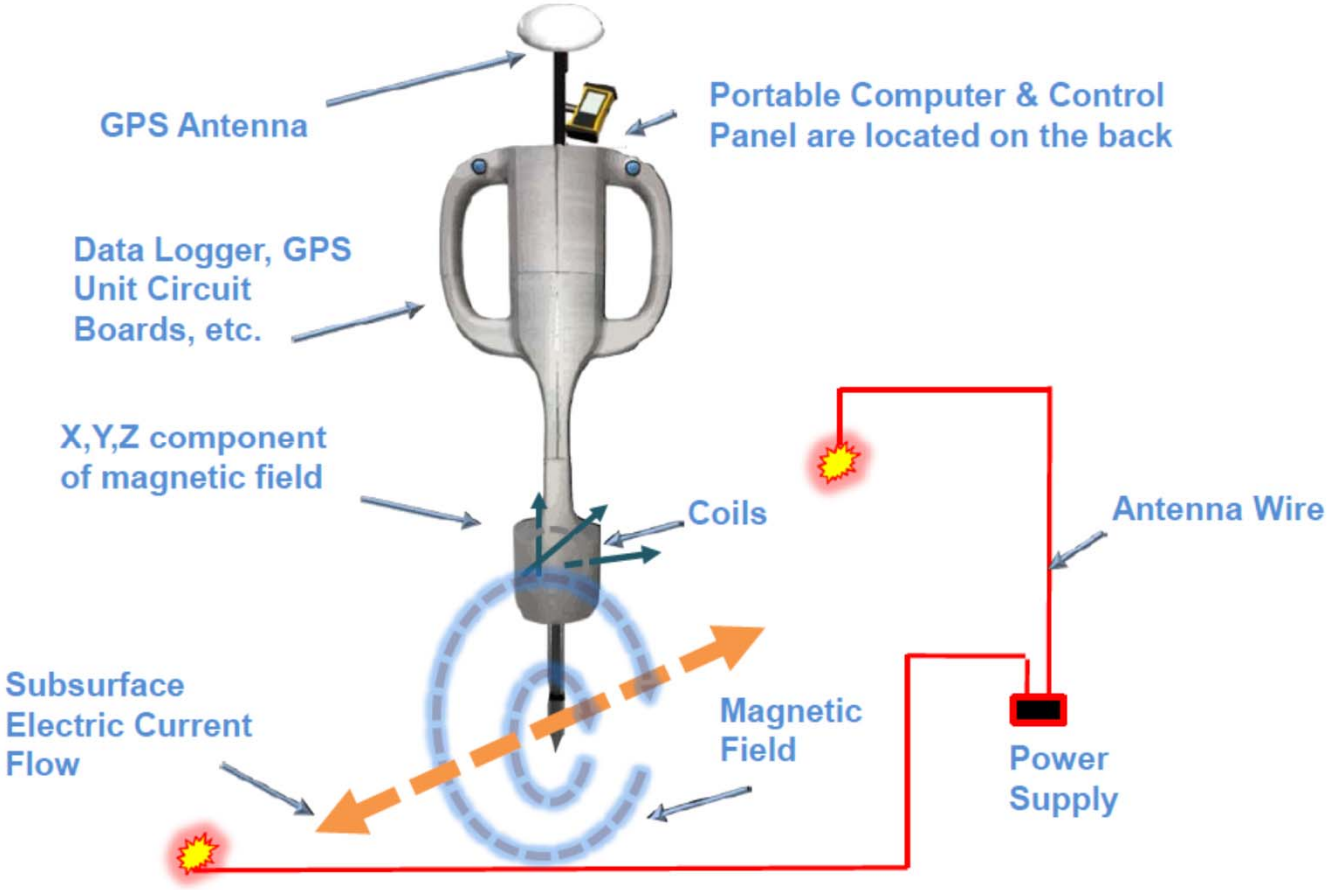


PFM installation and sampling (April-May 2018)

SE Lobe Actions 2017-2018

Expanded Southeast Lobe Actions

- **Continue use of innovative technology to identify preferential flow paths**



Willowstick – electromagnetic study that will induce current through probes in groundwater wells. Measurements then collected at the surface to evaluate where the current (and water) is flowing faster (November completion)

Future

Expanded Southeast Lobe Actions

- Drill 4-6 wells offsite to determine extent of RDX and DNT4A
- Evaluate best methods for cleanup of the offsite plume
- Continue yearly injection into the Southeast ISB Extension

Future

O&M of Cleanup Actions

- **Zone 11 ISB Injection: May 2019**
- **Southeast ISB Injection: August 2019**
- **Southeast ISB Extension Injection: November 2019**
- **Continue to evaluate options for beneficial use of treated water**
  - Request funding to design and install changes to Southeast Pump and Treat System, conveyance lines and controls to areas east of FM 2373, and pivot sprinkler system
  - Request funding to extend line to Playa 2 area to inject treated water into 3 wells

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