East Tennessee Technology Park Groundwater Remedies Update

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We will require groundwater decisions soon at ETTP

- Main plant
  - Proposed Plan: December 22, 2021
  - Record of Decision: January 8, 2022
- K-31/K-33 Area
  - Remedial Investigation/Feasibility Study: June 30, 2021
  - Proposed Plan: September 30, 2021
  - Record of Decision: April 30, 2022
- Remaining groundwater
  - After path forward for K-31/K-33 and main plant area finalized

There are thirty years of groundwater investigations at K-31/K-33

- 1987-1989: 21 permanent monitoring wells installed
- 1987-2017: Wells sampled 336 times
- December 2017: DOE, EPA, and TDEC meet to identify wells needing sampled before submitting report
- May 2019: DOE submit D2 Report recommending No Further Action
- May 2019: TDEC and EPA request additional sampling
- June 2019: DOE agrees to collect two more rounds of sampling along with additional analytes
- July 2019: First round completed; Analytical Parameters included Metals, Anion, Polychlorinated biphenyl (PCBs), Semi Volatile Organic Compounds (SVOCs), Volatile Organic Compounds (VOCs), Radiological (gross alpha/beta, Tc-99, U-233/234, U-235/236, and U-238)

There are thirty years of groundwater investigations at K-31/K-33 (continued)

- February-March 2020: Wet season sampling completed
- October–November 2020: Additional dry season sampling completed
- 2020: Agreement to collect four more quarters of groundwater samples to allow for approximately 6 to 8 data points per well for statistically valid trend analyses
- 2020: By triparty agreement, the FFA milestone for the D1 RI/FS Report was moved to 5/31/21, with the understanding that the results of the third and fourth rounds of additional quarterly sampling would be added to the D2 RI/FS
- January–February 2021: Additional wet season sampling completed
- 2021: Five new piezometers installed in former sinkholes and process building footprints and water levels and groundwater samples collected

K 31/K 33 Area MCL exceedances in groundwater January/February 2021

Since completion of all of the K-31/K-33 Area demolition activities in 2015 and installation of dedicated micropurge, low-flow sampling pumps in 2019, there was a reduction in the number of metal and radiological constituents that have exceeded Maximum Contaminant Levels (MCLs):

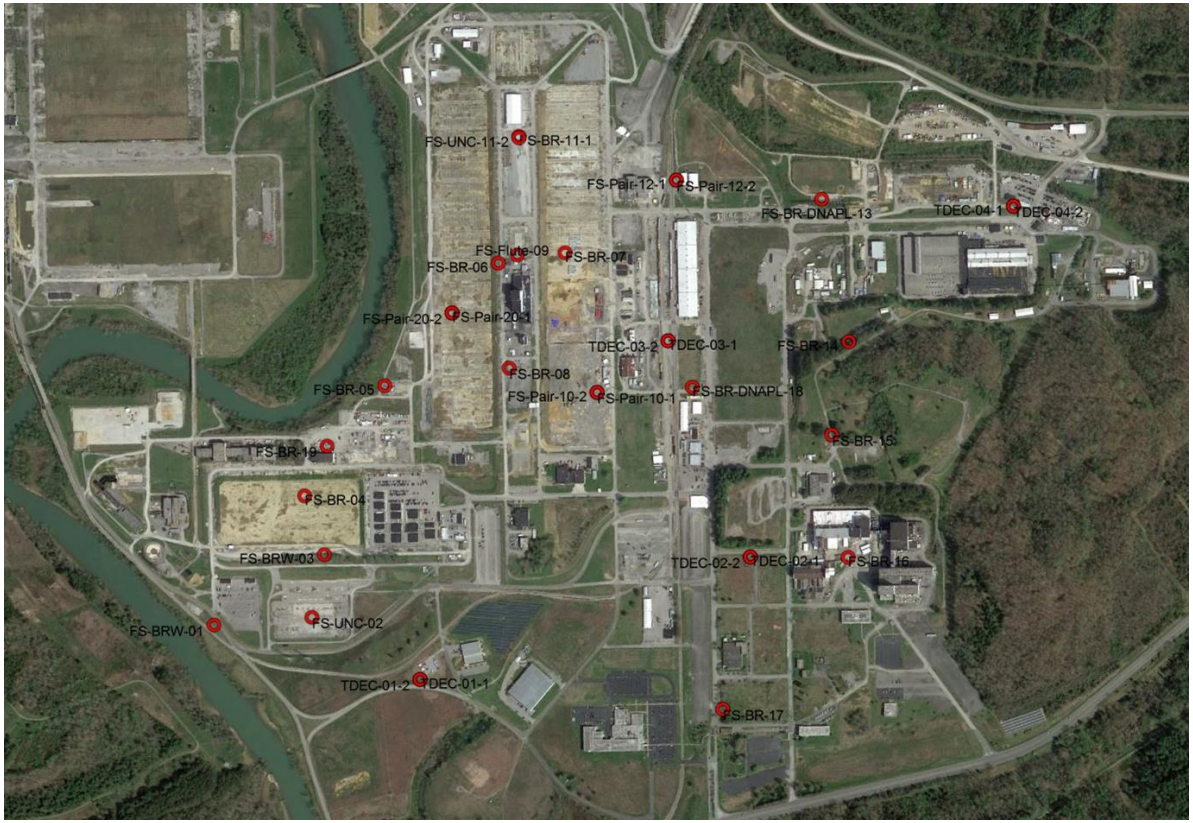
	Unfiltered Groundwater October/November 2020	Unfiltered Groundwater January/February 2021
Constituent	Well	Well
Alpha activity	UNW-040	None
Antimony	None	None
Arsenic	None	None
Beryllium	None	None
Chromium	BRW-030, BRW-031, UNW-039, UNW-083	BRW-030, UNW-039
Lead	None	None
Nickel	UNW-039, UNW-043, UNW-083	UNW-039, UNW-043, UNW-083

- Chromium:
  - Six unfiltered samples > MCL
- Nickel:
  - Six unfiltered samples > State MCL
- Antimony/Arsenic/Lead:
  - Zero unfiltered samples > MCL

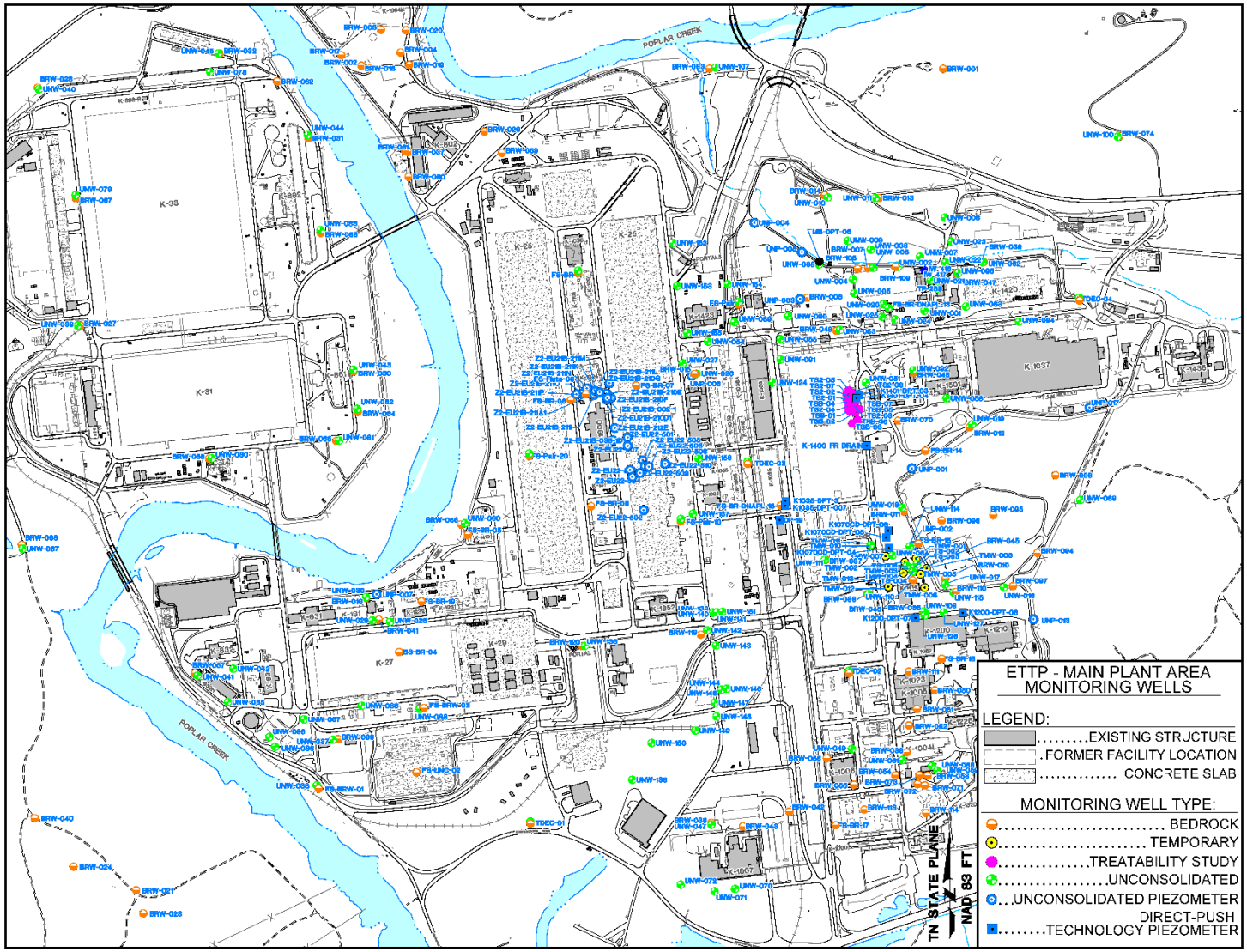
Majority of contaminated groundwater is localized to main plant area

DOE has conducted over twenty years of groundwater evaluation at the main plant area

- Groundwater remedial investigation began 1997-1998
- 355 existing permanent monitoring wells in Main Plant Feasibility Site Area (471 wells for entire ETTP site)
  - 96 new wells in 2017/2018 as part of treatability study design for K-1401
  - 31 new wells in 2018/2019 to support Feasibility Study



Extensive network of wells in place at East Tennessee Technology Park main plant

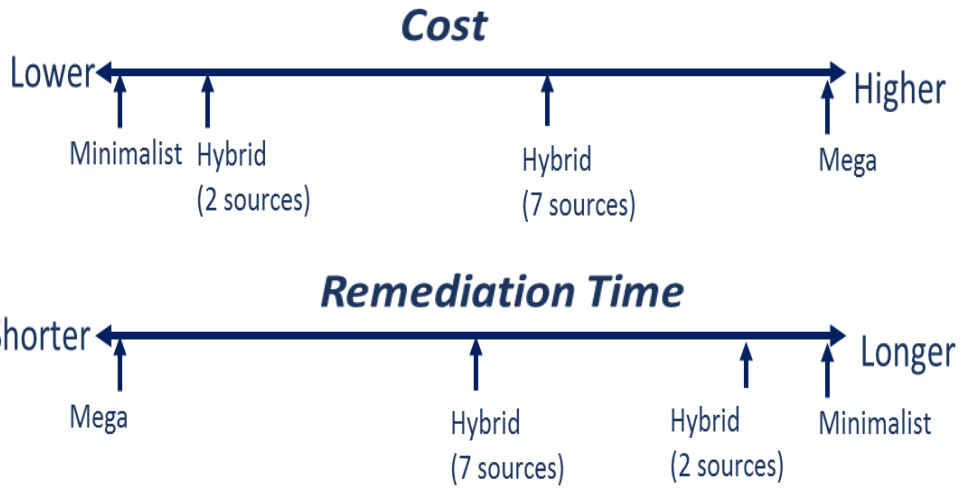


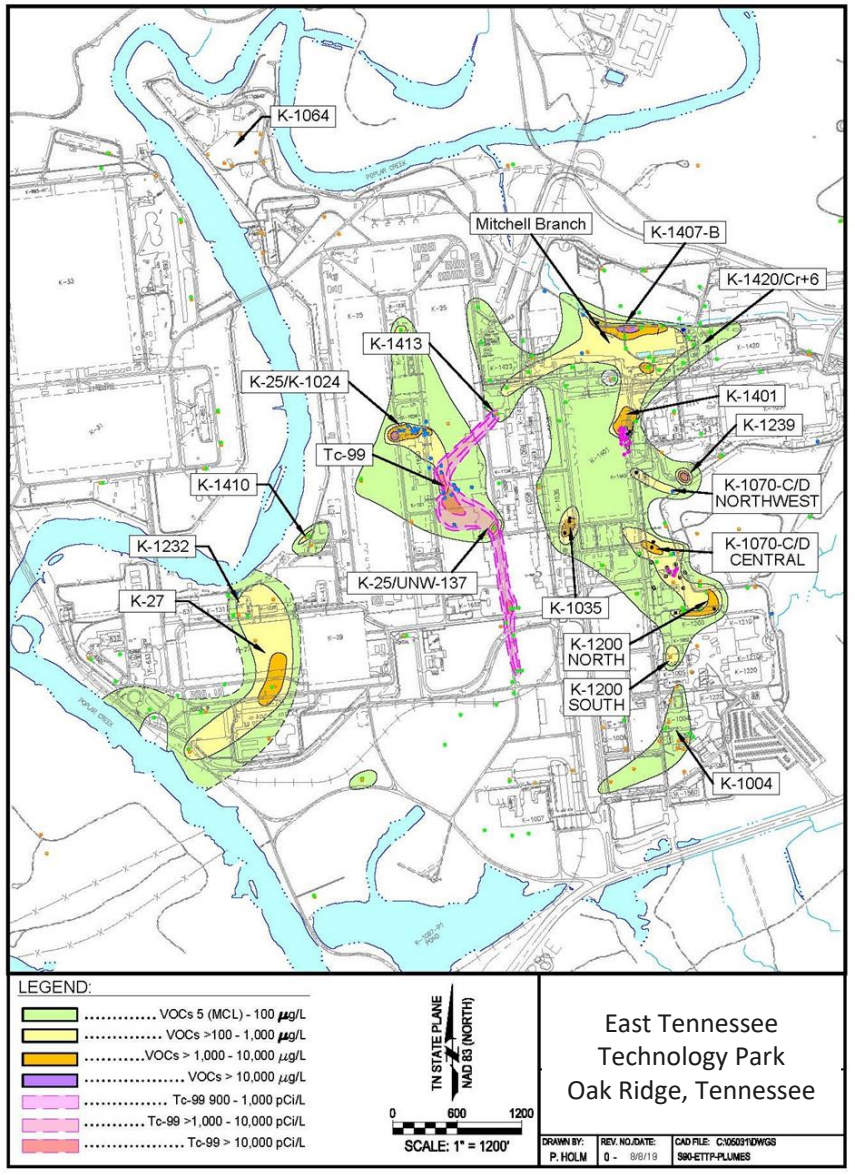
Multiple technical alternatives being evaluated for remedy

TMA	Alternative	Major Component	
		Unconsolidated Zone	Bedrock
CVOC Sources	S1	In situ thermal treatment	In situ thermal treatment
	S2	Subgrade biogeochemical treatment unit	Enhanced in situ bioremediation
	S3	In situ soil mixing with zero valent iron and bentonite	Enhanced in situ bioremediation
	S4	Monitored natural attenuation	Monitored natural attenuation
	S5	Pump & Treat – extraction wells with above ground treatment system	Pump & Treat – extraction wells with above ground treatment system
CVOC Plumes	P1	Enhanced in situ bioremediation	Enhanced in situ bioremediation
	P2	Monitored natural attenuation	Monitored natural attenuation
	P3	Pump & Treat – extraction wells with above ground treatment system	Pump & Treat – extraction wells with above ground treatment system
Tc-99 Plume	Tc1	Subgrade biogeochemical treatment unit	NA – no significant contamination in bedrock
	Tc2	Monitored natural attenuation	
	Tc3	Funnel and gate	
	Tc4	Pump and treat	
Unique Areas	BG1	Permeable reactive barriers at K-1070 C/D	Monitored natural attenuation
	Cr1	Continued operation of Chromium Water Treatment System	Monitored natural attenuation
	CW1	Constructed wetlands at Mitchell Branch	Monitored natural attenuation

We are working with TDEC and EPA to establish interim Record of Decision for main plant groundwater to enable reindustrialization

- Full range of groundwater cleanup approaches under evaluation with DOE, EPA, and TDEC
  - Monitored Natural Attenuation
  - Aggressive high-cost extensive treatment of both high and low concentration area
  - Combination of above





OREM has collected a tremendous amount of data to allow for remediation decisions

- OREM has completed multiple investigations and has a vast monitoring network that provides an immense amount of data
- We have spent millions over the past several years collecting additional groundwater data
- Crews have installed all of the wells requested by EPA/TDEC
- We have collected enough information to work with regulators on developing interim decisions

- Range of technologies and alternatives evaluated in Feasibility Study
- Decisions needed to proceed with groundwater management approach

Questions?