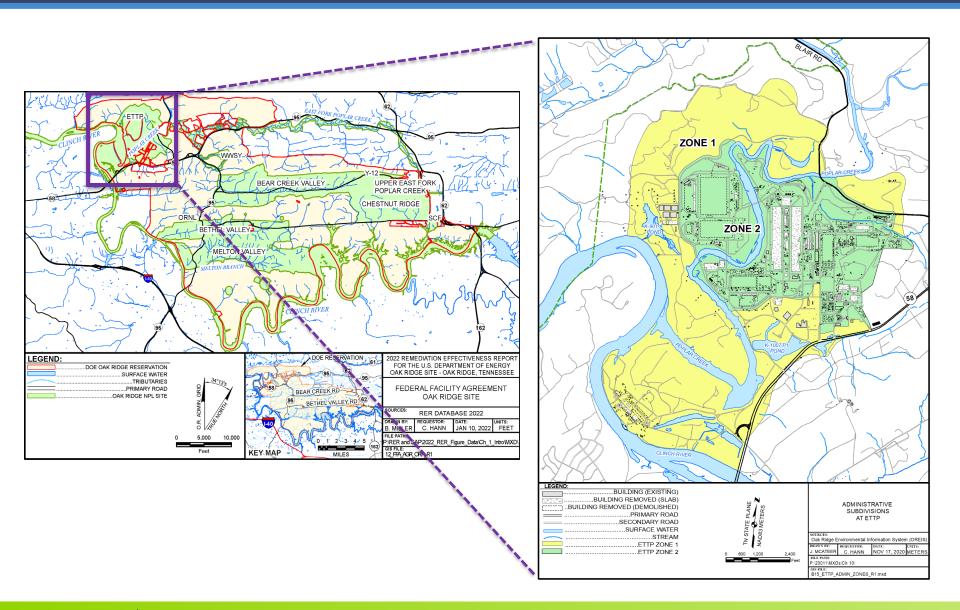


# East Tennessee Technology Park Groundwater Remedies Update

Sam Scheffler, Groundwater and Water Quality Program Manager Oak Ridge Office of Environmental Management

## Oak Ridge Reservation Administrative Watersheds

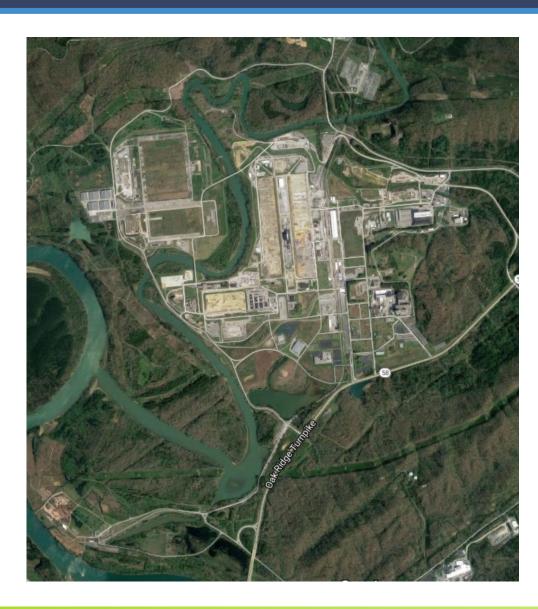




# Groundwater Decisions at the East Tennessee Technology Park



- K-31/K-33 Area
  - Remedial Investigation/Feasibility
     Study (RI/FS) D2: July 5, 2022
  - o Proposed Plan: September 30, 2022
  - Record of Decision (ROD):July 30, 2023
- Main Plant Area (MPA)
  - Focused Feasibility Study: in progress
  - o Proposed Plan (PP): March 09, 2022
  - Interim Record of Decision (IROD):
     May 1, 2023
- Zone 1 Groundwater Plumes
  - Remedial Investigation Work Plan (RIWP) D2: June 18, 2022



## K-31/K-33:

## Three Decades of Groundwater Investigations



1987 – 1989 Monitoring wells installed



1987 – To Date Monitoring well sampling ongoing



2019 – 2020 Tri-party discussions Additional data collected



2021 – 2022
Piezometers installed
RI/FS (D2) and PP (D1) in progress
(based on most recent 5 years of data)



## K-31/K-33:





- Sources to groundwater contamination have been eliminated and No Further Action approved under Zone 2 Soils ROD
- Groundwater is contaminated in isolated locations

primarily with low-concentrations of nickel and chromium

- o Metals have had declining concentrations in most wells
- Alternatives proposed in Remedial Investigation/Feasibility Study:
  - No Action
  - Monitored Natural Attenuation and Land Use Controls
  - Pump and Treat plus Land Use Controls



## Main Plant Area





## Main Plant Area:

## Two Decades of Groundwater Investigation



1997 – 1998 Groundwater Remedial Investigation began



1997 – To Date Monitoring well sampling ongoing



2021 – 2022 Focused Feasibility Study (D3) in progress Proposed Plan (D1) submitted



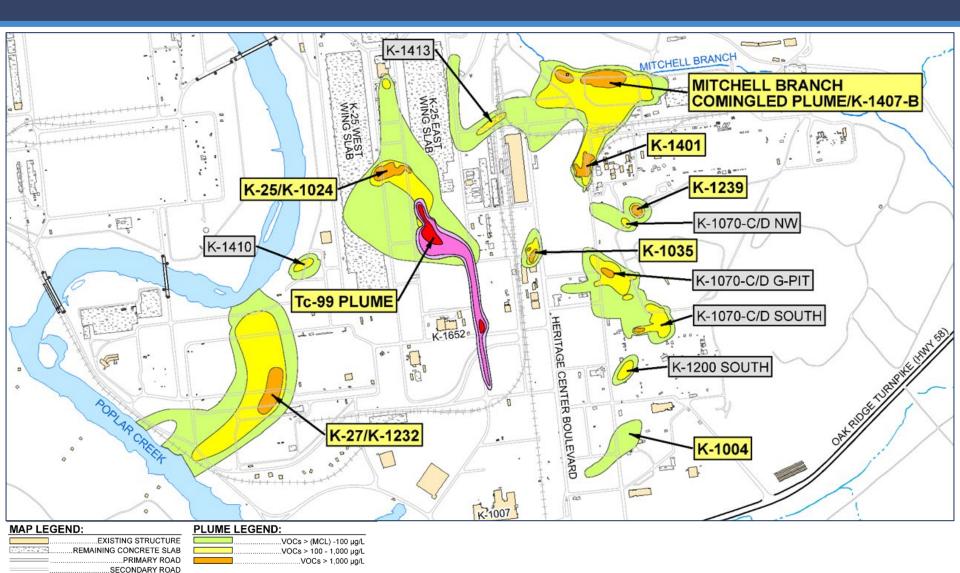
2023 – 2024 IROD (D1) submittal planned May 1, 2023 Remedial Action start planned 2024



#### Main Plant Area Groundwater Plumes

.....Tc-99 > 900 - 1,000 pCi/L .Tc-99 > 1,000 - 10,000 pCi/L .....Tc-99 > 10,000 pCi/L





PLUMES COVERED BY IROD

BOLD

.RAILROAD TRACKS

## Main Plant Area: Focused Feasibility Study



TMZ	Alternative	Unconsolidated Zone	Bedrock
Priority CVOC Sources	S0	No Action	No Action
	S1	In Situ Thermal Treatment	In Situ Thermal Treatment
	S2	Enhanced In Situ Bioremediation	Enhanced In Situ Bioremediation
	S3	In Situ Soil Mixing with ZVI & Bentonite	Enhanced In Situ Bioremediation
K-1004 CVOC Plume	PO	PDI to demonstrate RA need	No Action
	P1	PDI to demonstrate RA need	Enhanced In Situ Bioremediation
	P2	PDI to demonstrate RA need	Monitored Natural Attenuation
Tc-99 Plume	Tc0	No Action	PDI to demonstrate RA need
	Tc1	Subgrade Biogeochemical Treatment unit	PDI to demonstrate RA need
	Tc2	Monitored Natural Attenuation	PDI to demonstrate RA need

CVOC = chlorinated volatile organic compound.

EISB = Enhanced In Situ Bioremediation.

ISSM = In Situ Soil Mixing.

ISTT = In Situ Thermal Treatment.

LUC = land use control.

MNA = monitored natural attenuation.

P0 = No Action.

P1 = EISB and LUCs.

P2 = MNA and LUCs.

S0 = No Action.

S1 = ISST and LUCs.

S2 = EISB and LUCs.

S3 = ISSM, EISB, and LUCs

SBGT = Subgrade Biogeochemical Treatment.

Tc0 = No Action.

Tc1 = chemical reduction via SBGT, MNA, and LUCs.

Tc2 = MNA and LUCs.

Tc-99 = technetium-99.

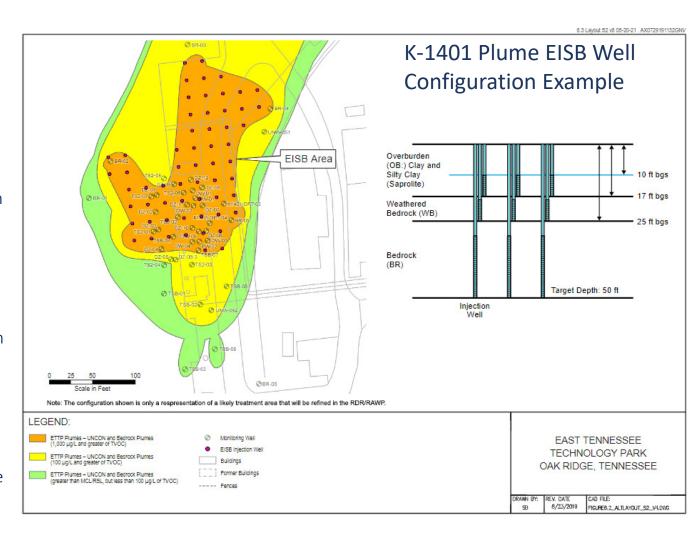
TMZ = target management zone.

ZVI = zero-valent iron.

## Main Plant Area: Proposed Plan for IROD



- Active remediation using Enhanced In-Situ
   Bioremediation (EISB) at six chlorinated volatile organic compound (CVOC) plume areas
- Monitored Natural Attenuation (MNA) demonstration studies at the K-1004 and Tc-99 plumes
- Additional activities designed to obtain a future final decision for the Main Plant Area in response to concerns about remaining uncertainties
- Adaptive Management Site
   Management Plan to adapt the
   interim remedy over time AND
   manage a path to the Final
   ROD



#### Zone 1 Groundwater Plumes

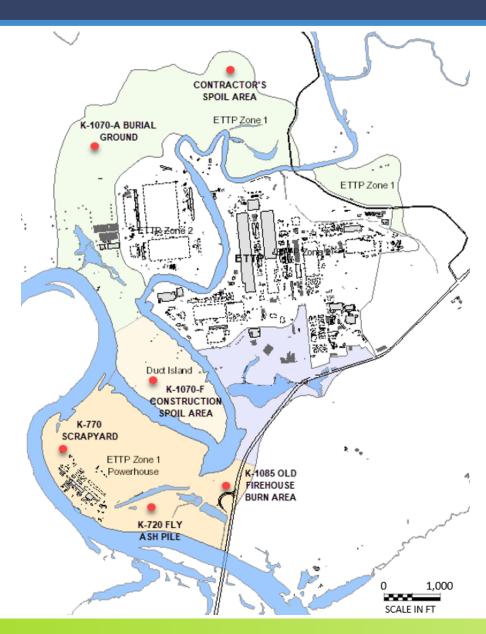


- Soil Remedial Actions complete
- Remedial Investigation Work Plan
   (D1) submitted September 20,
   2021
  - Plan investigations to address data gaps, develop/update conceptual site models, and arrive at a final groundwater decision(s)
  - Seven areas of concern
    - Blair Quarry was added per EPA/TDEC request
  - Tri-party discussions to resolve concerns

#### Schedule

o Proposed Plan: Fiscal Year 2025

Record of Decision: Fiscal Year 2026



## Groundwater Accomplishments and Path Forward





#### At the East Tennessee Technology Park, OREM has:

- Invested millions of dollars in groundwater investigations
- Established a comprehensive monitoring well network resulting in valuable data
- Developed groundwater management approaches with a range of technologies and alternatives
- Continued collaboration with TDEC and EPA to enable reindustrialization.



# Questions?