



# Test Area North Status Update

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**EM** Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Idaho Cleanup Project

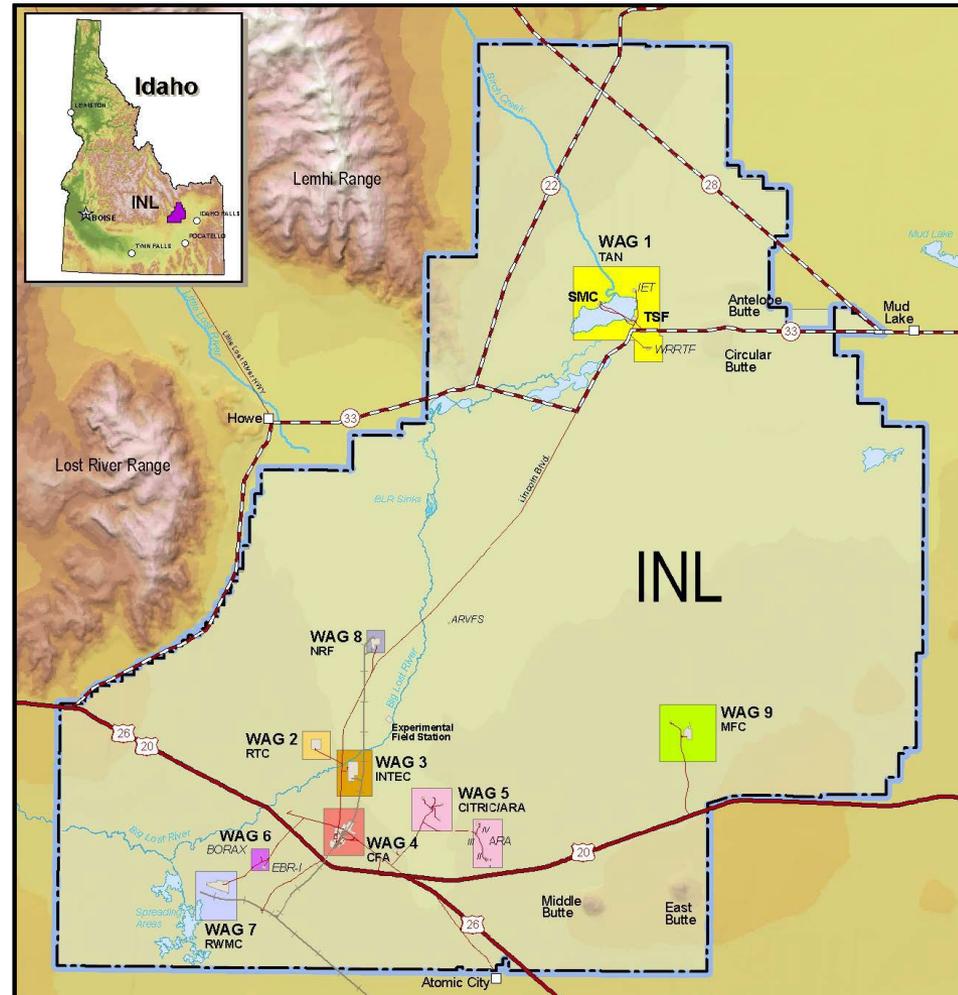
# What We'll Cover

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Monitoring Program Overview
- Remediation Status at Test Area North (TAN)



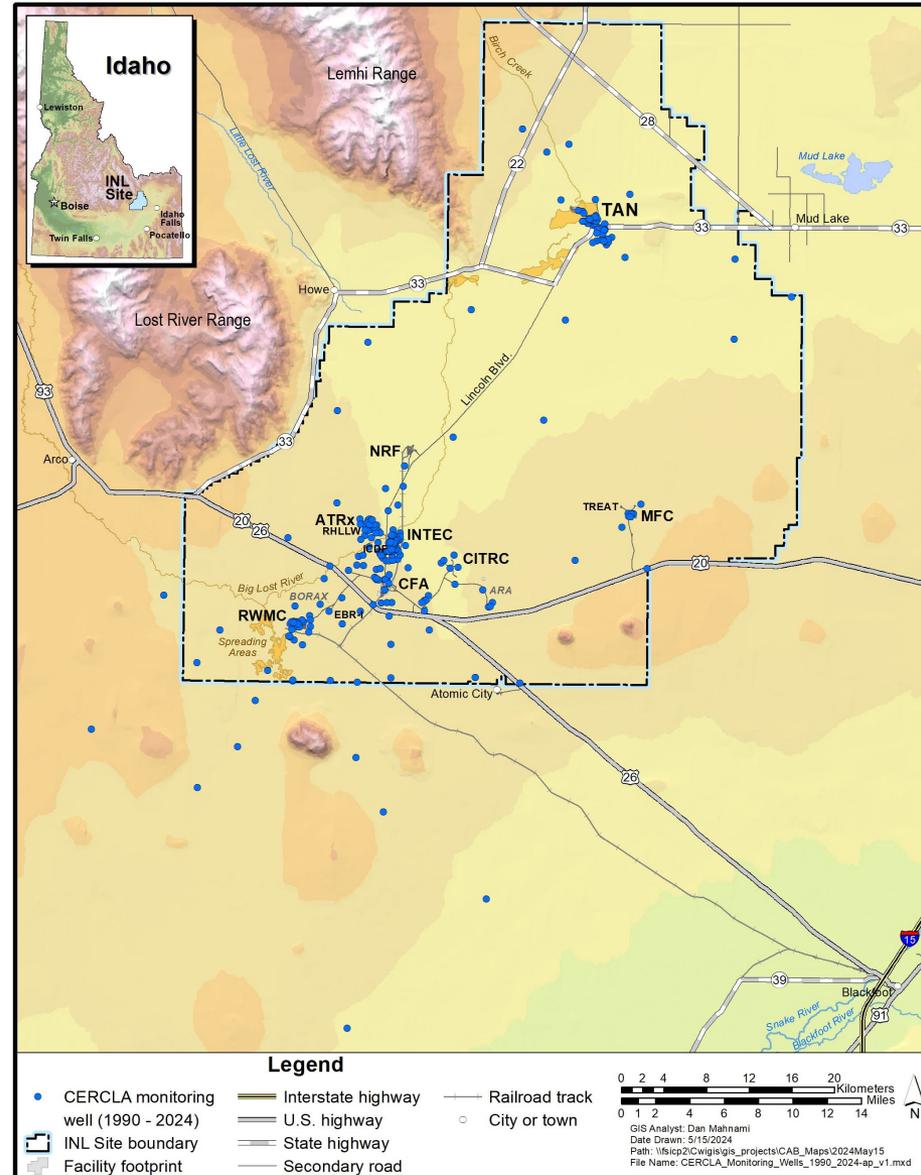
# CERCLA Review

- INL is divided into 10 Waste Area Groups (WAGs)
  - WAGs 1 to 9 correspond to facilities, WAG 10 is sitewide
  - WAG 8 is managed by DOE-Naval Reactors Laboratory Field Office - Idaho Branch Office
- Each WAG has a comprehensive Record of Decision (ROD) that addresses groundwater and soil contamination, and human and ecological risk
- Each WAG has actions to restore or protect groundwater in the Snake River Plain Aquifer (SRPA) to MCLs by 2095



# CERCLA Monitoring Network

- Aquifer Monitoring Network
  - 261 wells
  - 7,550 water-level measurements (1991-2024)
  - 68,394 water-quality samples collected with 471,790 records (1990-2024)
- Perched-Groundwater Monitoring Network
  - 82 wells
  - 8,832 water-level measurements (1990-2024)
  - 8,316 water-quality samples collected with 62,321 records (1990-2024)



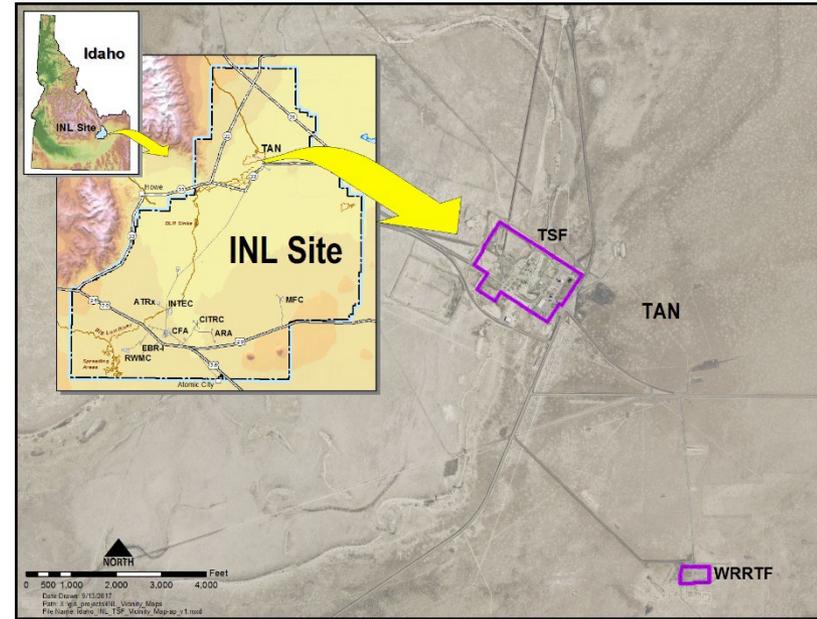
# CERCLA Monitoring Data

- Data collected from monitoring wells is used for a variety of activities
  - Annual WAG reports
  - Coordination with Agencies
  - Track and monitor remediation efforts
  - Make CERCLA decisions



# Test Area North (WAG 1)

- Groundwater Contaminants of Concern
  - Volatile organic compounds (primarily trichloroethylene [TCE])
  - Radionuclides (Sr-90; Cs-137)
- Estimated 350 to 35,000 gal of industrial wastewater injected at TSF-05 into SRPA from 1953 to 1972
  - Solvents; TCE, PCE, DCE
  - Low level radioactive wastes; Sr-90, Cs-137
  - Sanitary sewage
- Aquifer is in fractured basalt with contamination at ~200-400 fbg



## Acronym key

gal: gallons

PCE: perchloroethylene

DCE: 1,2-dichloroethane

fbg: feet below ground surface



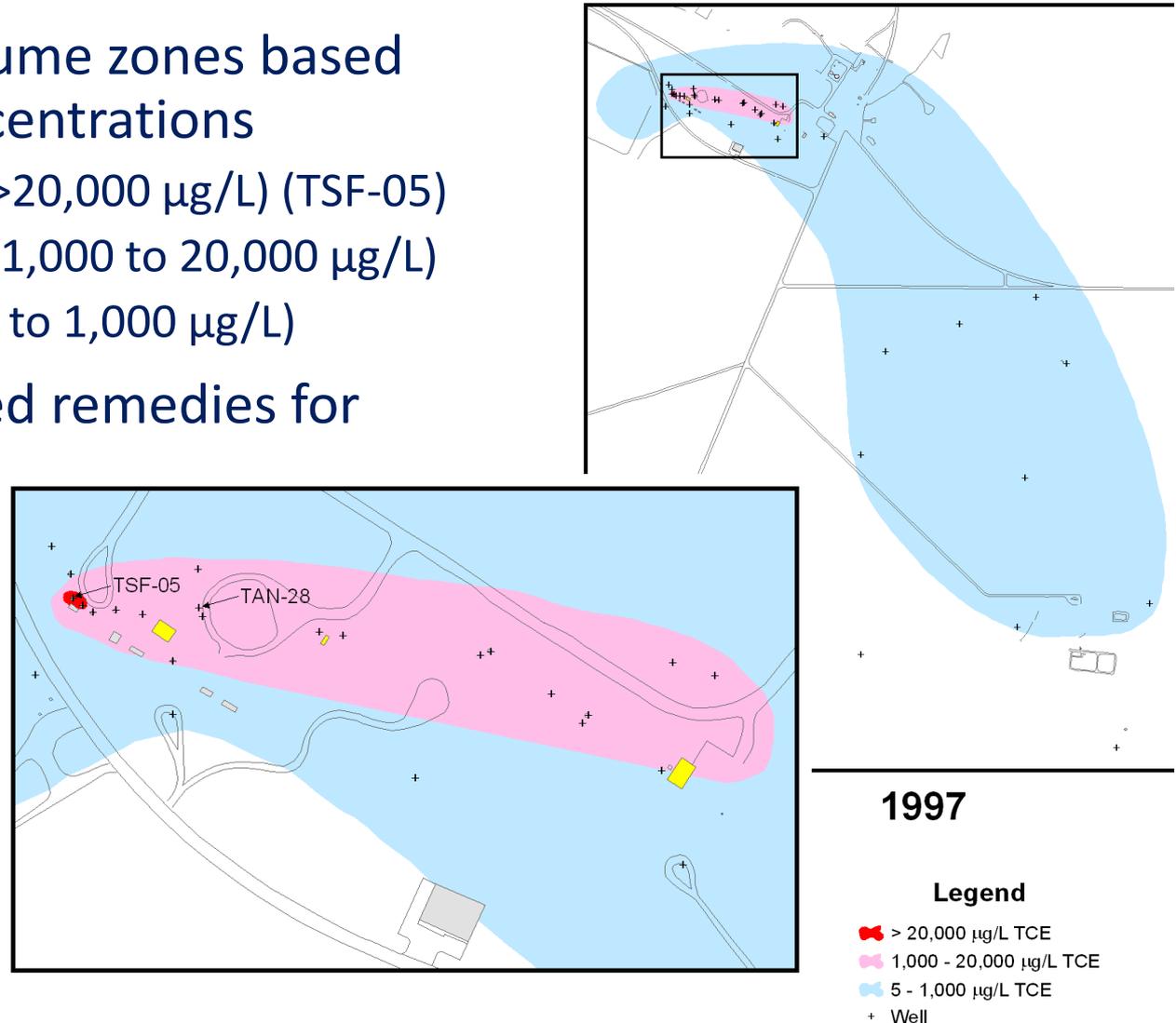
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# TCE Plume Zones

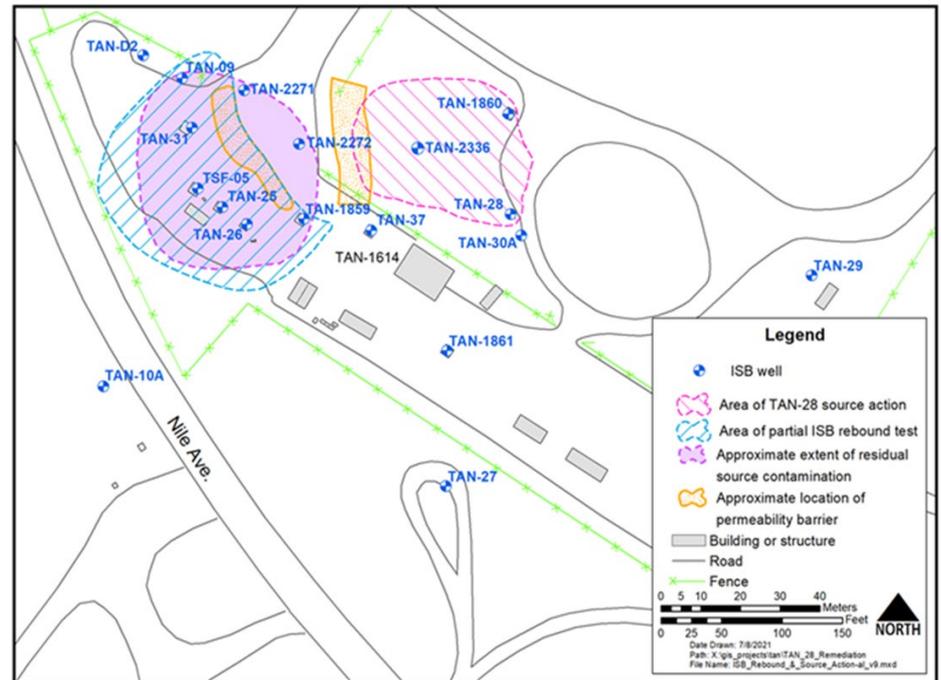
- Three TCE plume zones based on 1997 concentrations
  - Source zone (>20,000 µg/L) (TSF-05)
  - Medial zone (1,000 to 20,000 µg/L)
  - Distal zone (5 to 1,000 µg/L)
- ROD identified remedies for each zone



# TCE Remedy

- Source Zone

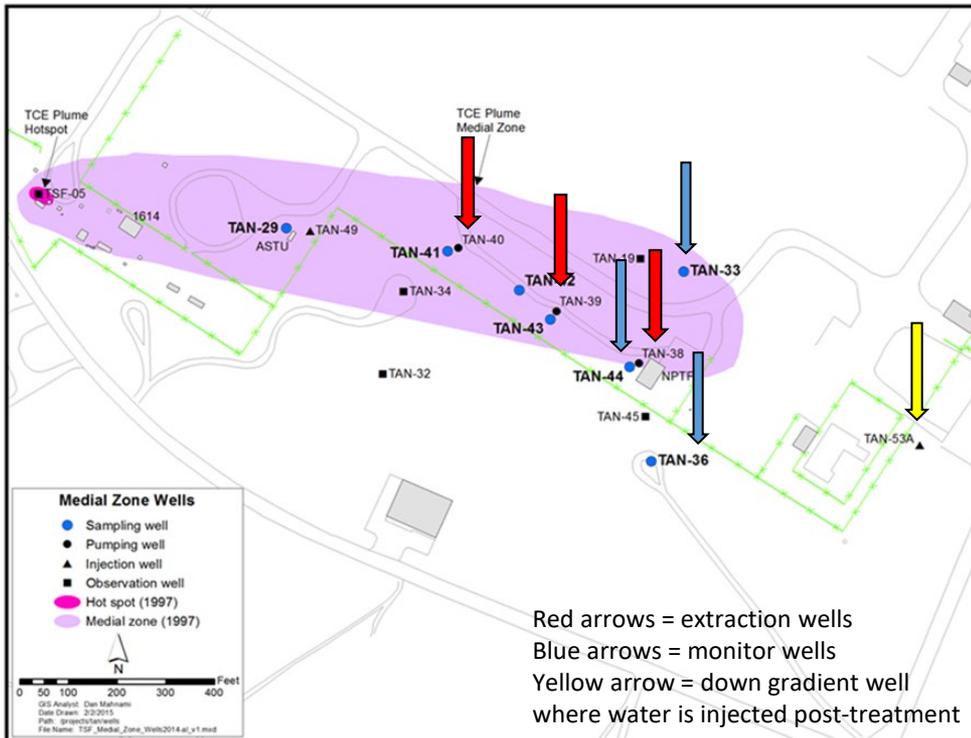
- In-situ bioremediation (ISB) – Injects carbon source (electron donor), such as sodium lactate and whey, into the aquifer at the *source zone* to stimulate naturally occurring anaerobic microbes to degrade volatile organic compounds (VOCs) in aquifer
- Current Status – Stopped ISB injections into the source zone to allow dissipation of the amendment to evaluate effectiveness of the treatment



# TCE Remedy

- Medial Zone

- Pump and treat – Treats VOC concentrations in *medial zone* using New Pump and Treat Facility (NPTF)
- Current Status – NPTF operates 4 days/week to reduce flux of TCE to distal zone



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# TCE Remedy

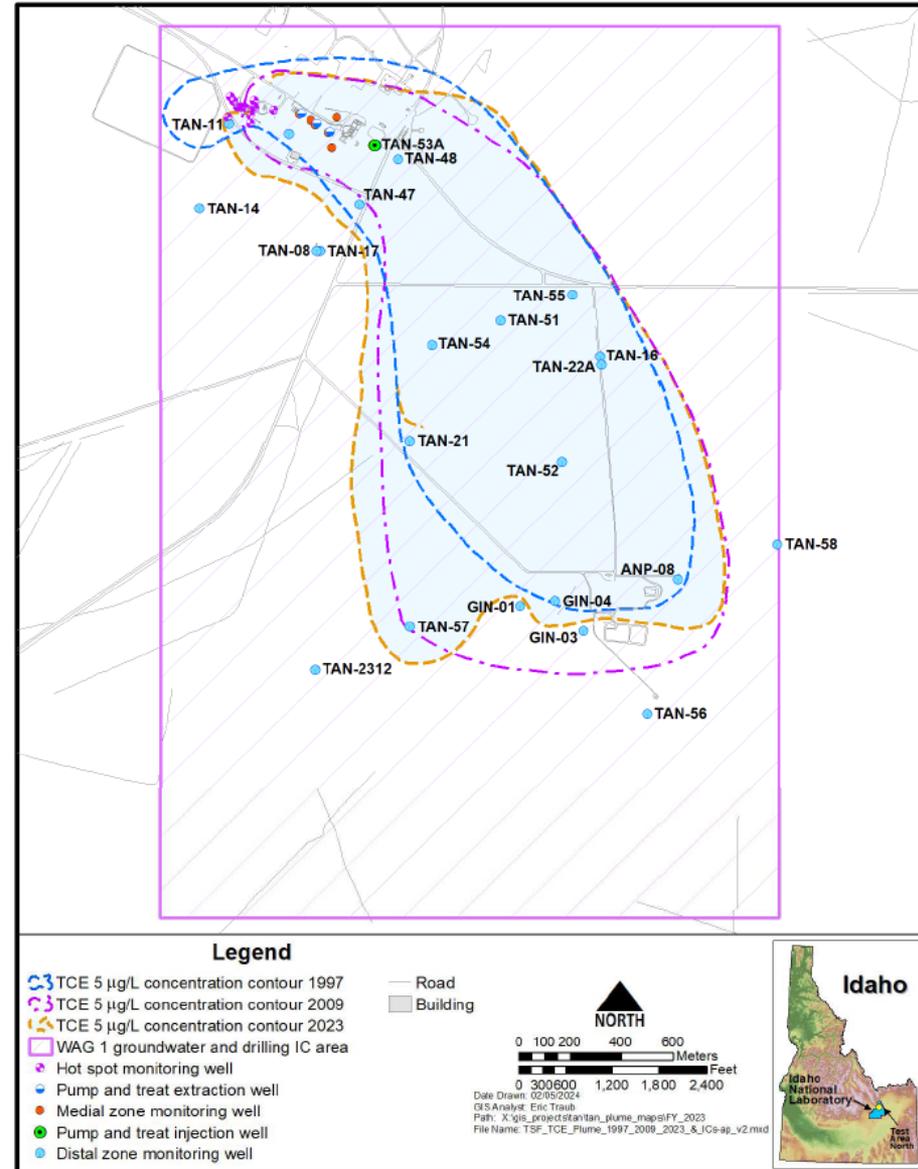
- Distal Zone

- Monitored natural attenuation (MNA) -Monitors *distal zone* TCE concentrations

- Remedial action objective (RAO) is to meet cleanup levels (MCLs) by 2095

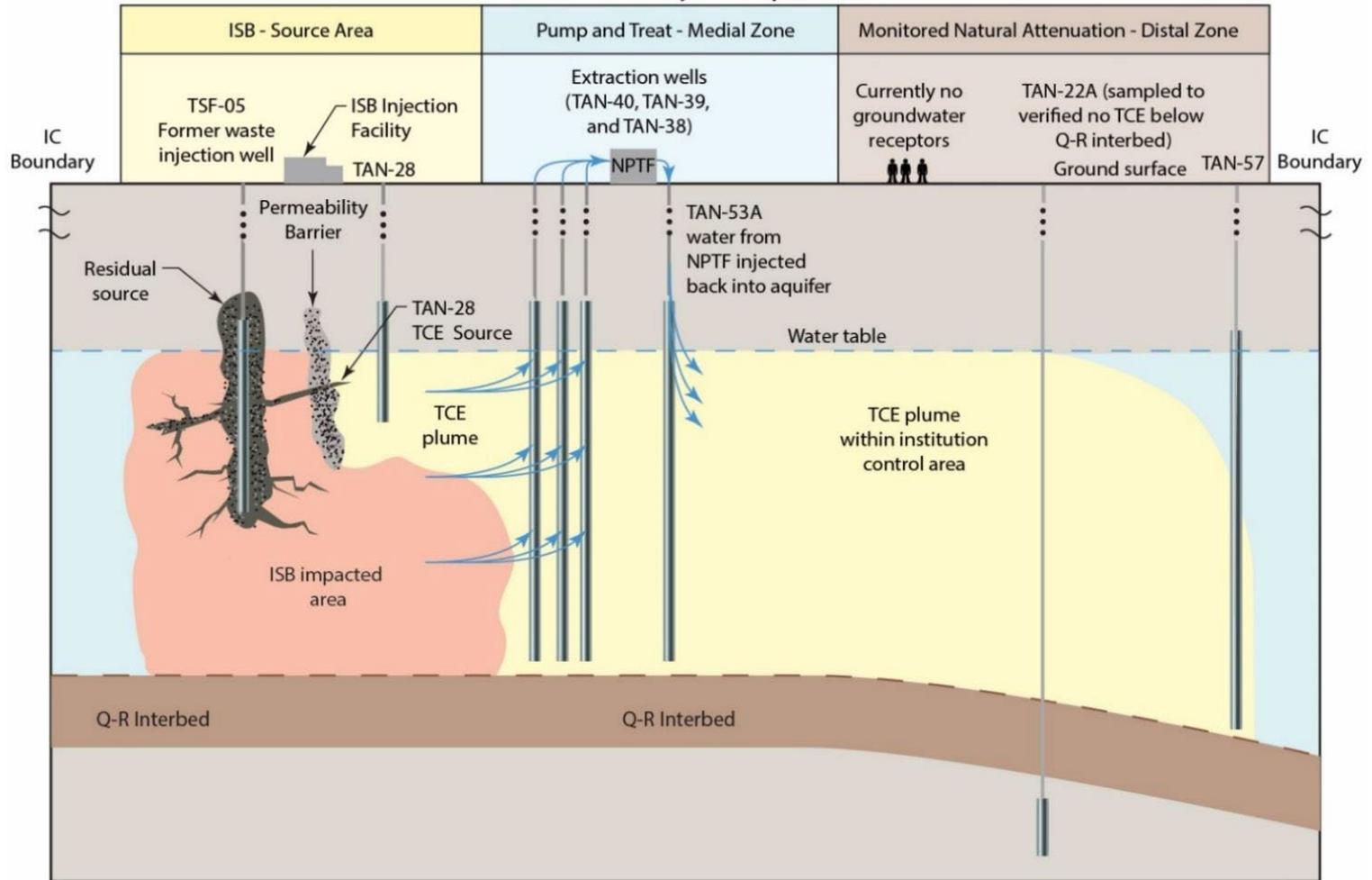
- Plume allowed to expand by 30%

- Current Remedy Status – MNA well trends are consistent with model simulations that predict TCE MCL will be met by 2095 and plume expansion is currently at 16.8%



# TCE Remedy

## OU1-07B Remedy Components

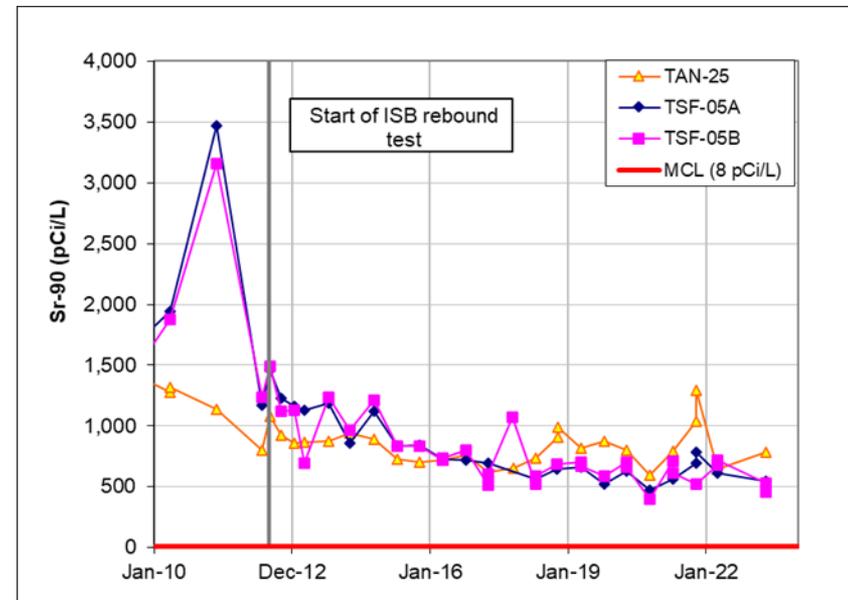
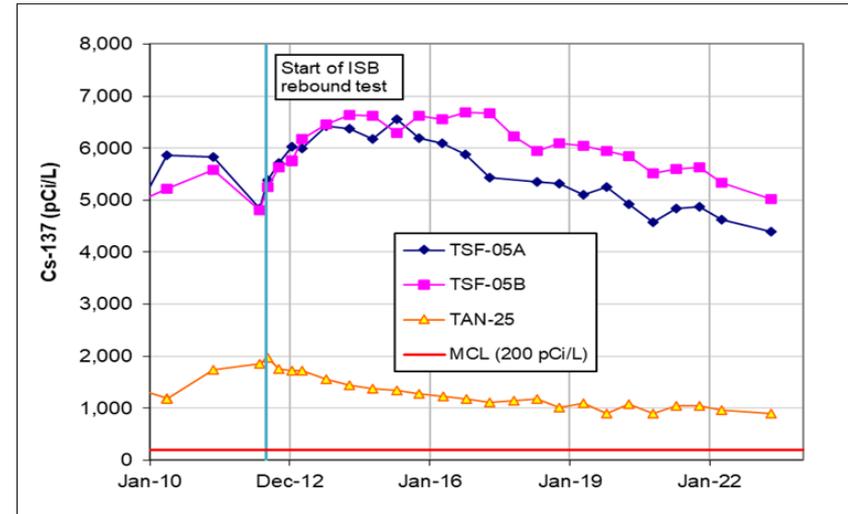


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# Radionuclide Remedy

- 2001 ROD Amendment identified MNA as remedy for radionuclides
  - Sr-90 and Cs-137 identified in the ROD as COCs and are currently above their respective MCLs (only within the TCE source zone and a few wells in the medial zone)
- ISB injections produce a temporary increase in radionuclides
  - Constituents in the ISB amendment compete with the radionuclides for sorption sites in subsurface causing Sr-90 and Cs-137 to be more mobile
  - Expected that radionuclides will decrease as the ISB amendment dissipates out of the aquifer
- Path forward - Continue monitoring program to verify that Sr-90 and Cs-137 will meet MCLs by 2095



# Summary

- ISB
  - Awaiting residual source area to return to background conditions to assess remediation impacts
  - Continued remediation of TAN-28 source area through ISB injections
- Pump and Treat
  - NPTF will continue running until TAN-28 remediation is complete
- MNA
  - Distal zone TCE concentrations are decreasing and expected to be below the MCL by 2095
- Radionuclides
  - Continue sampling for Sr-90 and Cs-137 to confirm they are trending down in the source area wells as competing elements decrease.



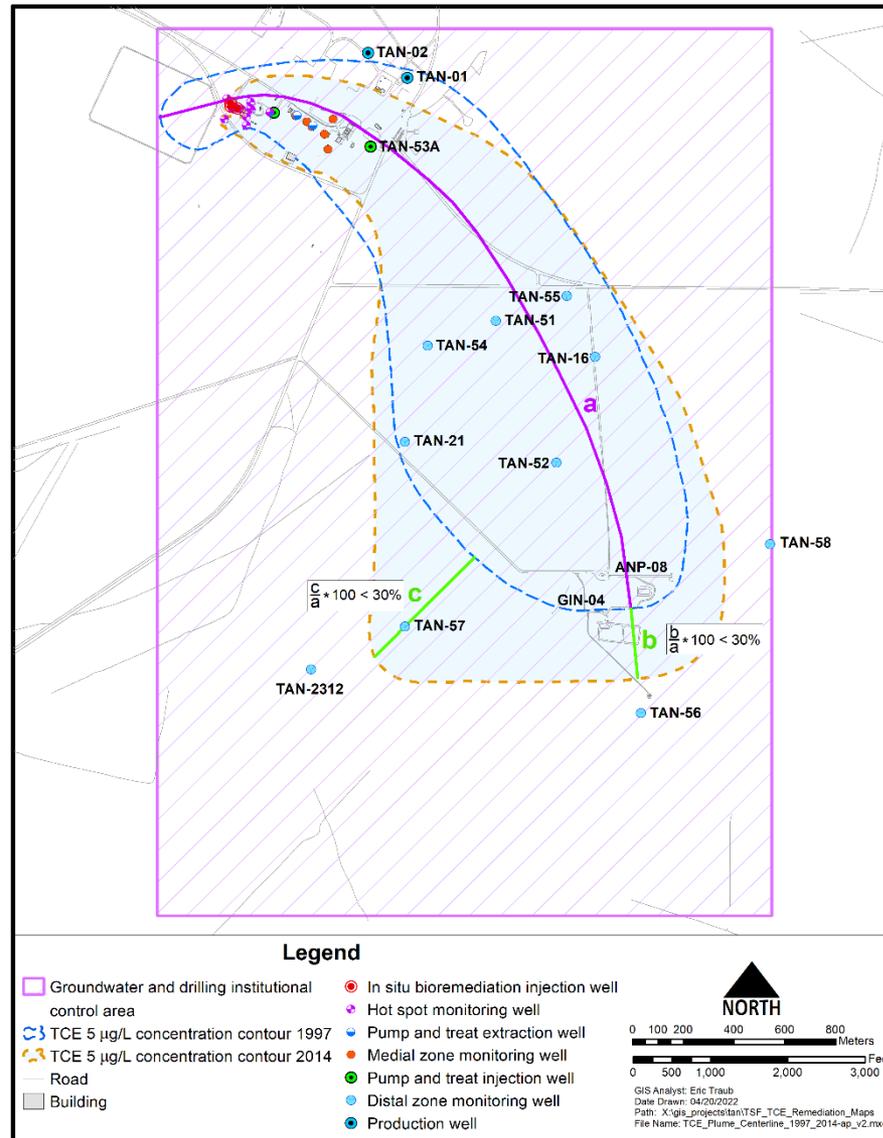
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# BACK UP SLIDES

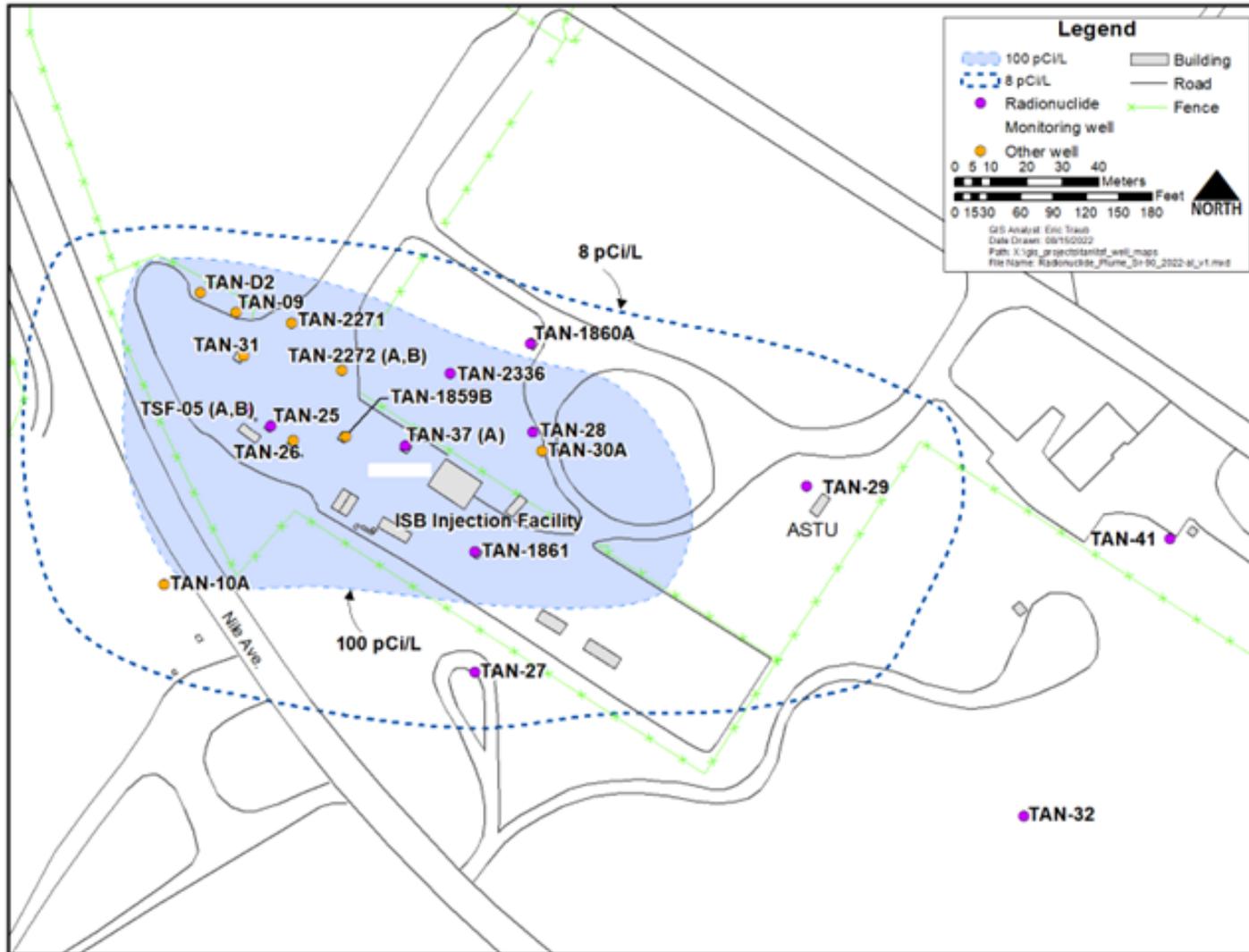




# Plume Expansion Calculation



# Sr-90 Trend Map



# Sr-90 Trends

