
Idaho Cleanup Project
2004-2009
Five-Year Review

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Five-year Review Basics

- 5-year review purpose
 - evaluates the implementation and performance of a remedy or remedies in the case of the INL
 - determines if the remedy is or will be protective of human health and the environment
 - is required if hazardous substances, pollutants, or contaminants remain on site in concentrations that preclude unlimited use and unrestricted exposure.



Agencies' Roles

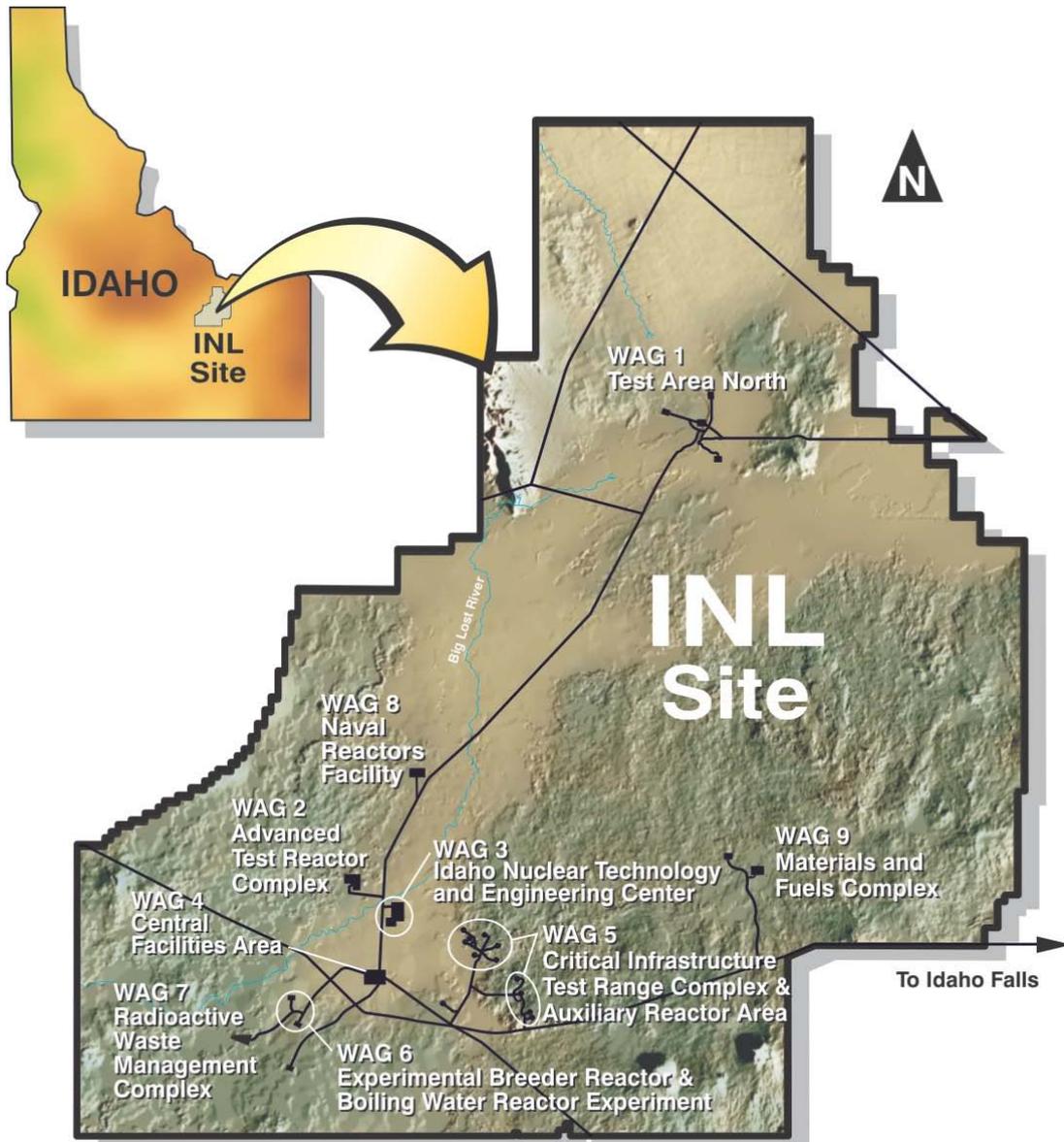
- DOE conducts the 5-year review, prepares the report, and submits it to the support agencies for review and comment.
- EPA and DEQ have supporting roles.
- EPA retains final authority over whether the 5-year review adequately addresses the protectiveness of remedies.



Scope of This 5-Year Review

- Examines 9 of the 10 waste area groups (WAGs)
- Assesses all response actions under CERCLA that are subject to 5-year reviews
- Covers 5 years from Fiscal Year 2005 (October 2004) to Fiscal Year 2009 (September 2009)





G10-2122-24

INL Site and Waste Area Groups



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5-Year Review Guidance

- EPA guidance for 5-year reviews as applied to federal facilities was used.



United States
Environmental
Protection Agency

Office of Emergency
and Remedial
Response (5204G)

EPA 540-R-01-007
OSWER No. 3355.7-03B-P
June 2001

Superfund

Comprehensive Five-Year Review Guidance

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, D.C. 20460

URL: <http://www.epa.gov/superfund/pubs.htm>
Superfund Information 1-800-424-9346



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Major Steps as Identified in EPA Guidance

- Gather information
- Assess progress since the last review
- Review and evaluate data
- Conduct technical assessments
- Identify issues and recommendations to address those issues
- Develop protectiveness statements



Conduct Technical Assessments

- **Question A:** Is the remedy functioning as intended by the decision documents? 
 - **Question B:** Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid? 
 - **Question C:** Has any other information come to light that could call into question the protectiveness of the remedy? 
- If answers are Yes, Yes, No
 - No Issues or Recommendations
 - Any other combination of answers
 - Leads to issues and recommendations



Identify Issues and Recommendations

- To be identified as an issue, an item must have the potential to prevent a response from being protective now or in the future.
- Issues are a logical product of the technical assessment.



Overall Summary of Results

- **Progress since the last 5-year review:**
 - 14 previously identified issues were satisfactorily closed out and one was retained for further attention.
- **Technical assessments:**
 - Answers were not always *yes, yes, no*.
- **Identification of new issues:**
 - 8 issues and recommendations involving 4 WAGs.
- **Protectiveness statements:**
 - Each remedial action is currently protective of human health and the environment and is expected to be protective in the future.



WAGs With Issues and Recommendations

- Four WAGs:
 - WAG 1, Test Area North
 - WAG 4, Central Facilities Area
 - WAG 9, Materials and Fuels Complex
 - WAG 10, Miscellaneous Sites and Site-wide Groundwater
- DOE is implementing the 5-year review recommendations to resolve these issues.

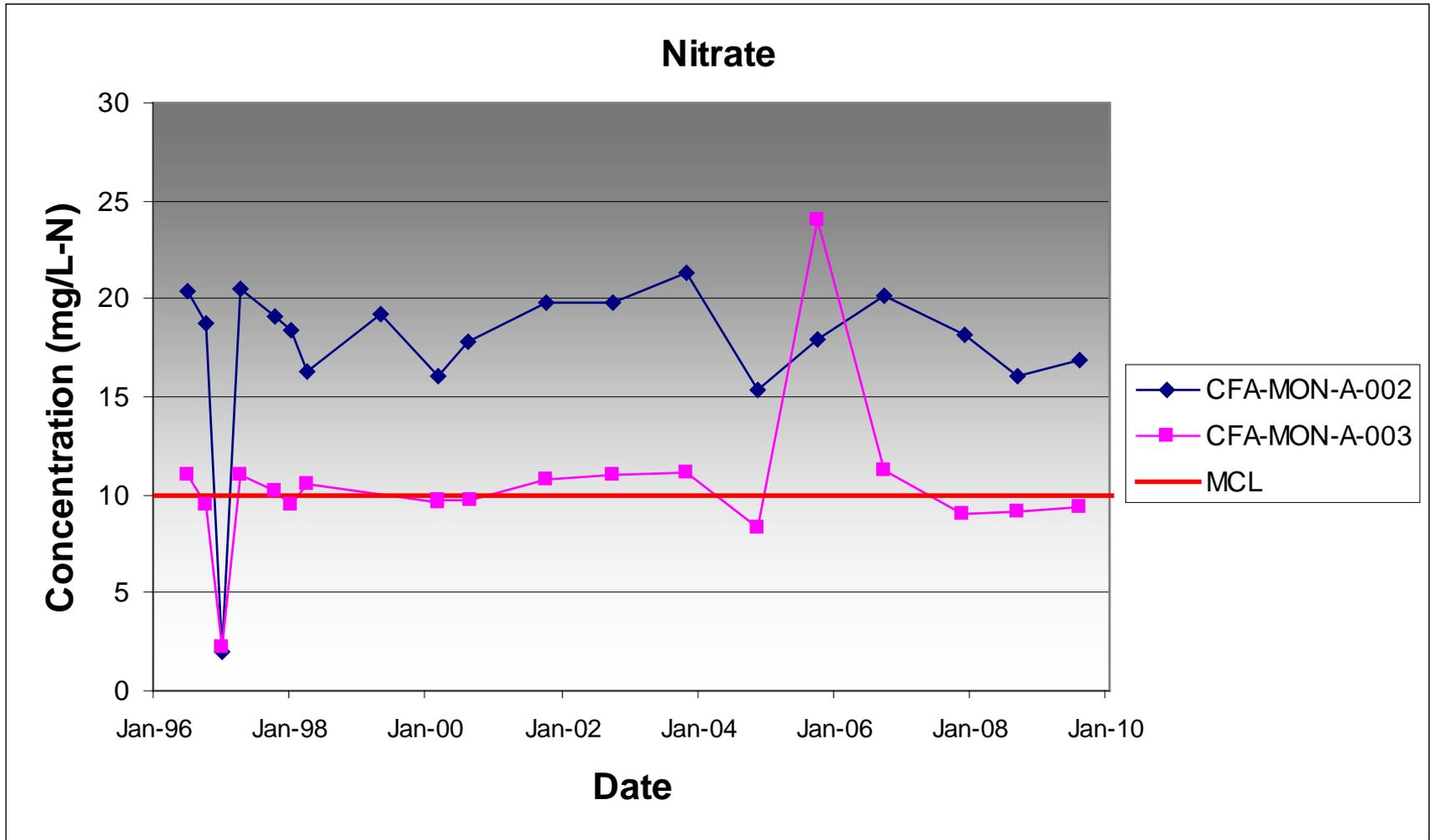


WAG 4, Central Facilities Area

- **Issue:** Nitrate concentrations in the aquifer continue to exceed the maximum contaminant level at two downgradient monitoring wells
- **Recommendation:** Continue to monitor and assess nitrate trends annually. If concentration trends do not begin to decline over the next 5-year review period, the Agencies will consider additional steps to re-evaluate the persistence of nitrate in the aquifer.



WAG 4, Nitrate Concentrations



WAG 9, Materials and Fuels Complex

- **Issue:** The new site identification process for two sites, ANL-64 and ANL-65, was initiated and left incomplete. Therefore, these sites were not added to the IC database or addressed in the IC/O&M Plan or annual reports.
- **Recommendation:** Finish processing the new site identification form and identify responses in accordance with the process established in the OU 10-08 ROD.



WAG 10, Balance of Site

- **Issue:** Multiple inconsistencies among the IC database, IC/O&M Plan, and annual IC reports were noted and appear to be caused by a systematic deficiency in the tracking mechanism. Language concerning ICs differs in each of the individual WAG RODs, as shown in the IC/O&M Plan, further complicating evaluation in the 5-year review.



WAG 10, Balance of Site

Recommendation:

- Thoroughly validate the IC database to ensure that it is an accurate tracking mechanism for all sites requiring ICs and revise the IC/O&M Plan accordingly.
- Establish requirements to annotate annual IC reports and revisions to the IC/O&M Plan sufficient to track a site as its status changes.
- With Agency concurrence, modify the IC/O&M Plan to standardize wording on ICs for consistency across the INL Site.



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WAG 1 Issues, OUI-07B, Summary

- **Issue 1:** Available information is not sufficient to estimate an end date for Ics for 2 CERCLA sites
- **Issue 2:** TCE concentrations have not decreased as expected at aquifer monitoring well TAN-28 downgradient of the hot spot.
- **Issue 3:** Cs-137 concentrations have been increasing at the hot spot, and Sr-90 concentrations remain high in the hot spot and several locations in the medial zone.
- **Issue 4:** The monitoring strategy may not be adequate for evaluating plume expansion.



WAG 1 Issues, Operable Unit 1-10

- Site TSF-28 and TSF-43
 - **Issue 1:** Available information is not sufficient to estimate an end date for ICs
 - **Recommendation:** Sample to obtain data for estimating an end date for ICs



Operable Unit (OU) 1-07B Background

- An injection well at Test Area North, used from 1953 to 1972, contaminated the aquifer
- Aquifer contamination was discovered in 1987
- Sludge was removed from the bottom of the well in 1990
- Interim action (OU 1-07A) to extract and treat groundwater began in 1992
- Remediation continues as directed by the OU 1-07B Record of Decision (1995) and its subsequent Amendment (2001)



Cleanup Levels—Volatile Organic Compounds

Contaminant of Concern	Maximum Historical Concentration (µg/L)	Cleanup Goal (µg/L)
Trichloroethene (TCE)	12,000–32,000	5
Tetrachloroethene (PCE)	110	5
<i>cis</i> -1,2- dichloroethene	3,200–7,500	70
<i>trans</i> -1,2- dichloroethene	1,300–3,900	100



Cleanup Levels—Radionuclides

Contaminant of Concern	Maximum Historical Concentration (pCi/L)	Cleanup Goal (pCi/L)
Tritium	14,900–15,300	20,000
Strontium-90	530–1,880	8
Cesium-137	1,600–2,150	119
Uranium-234	5.2–7.7	27



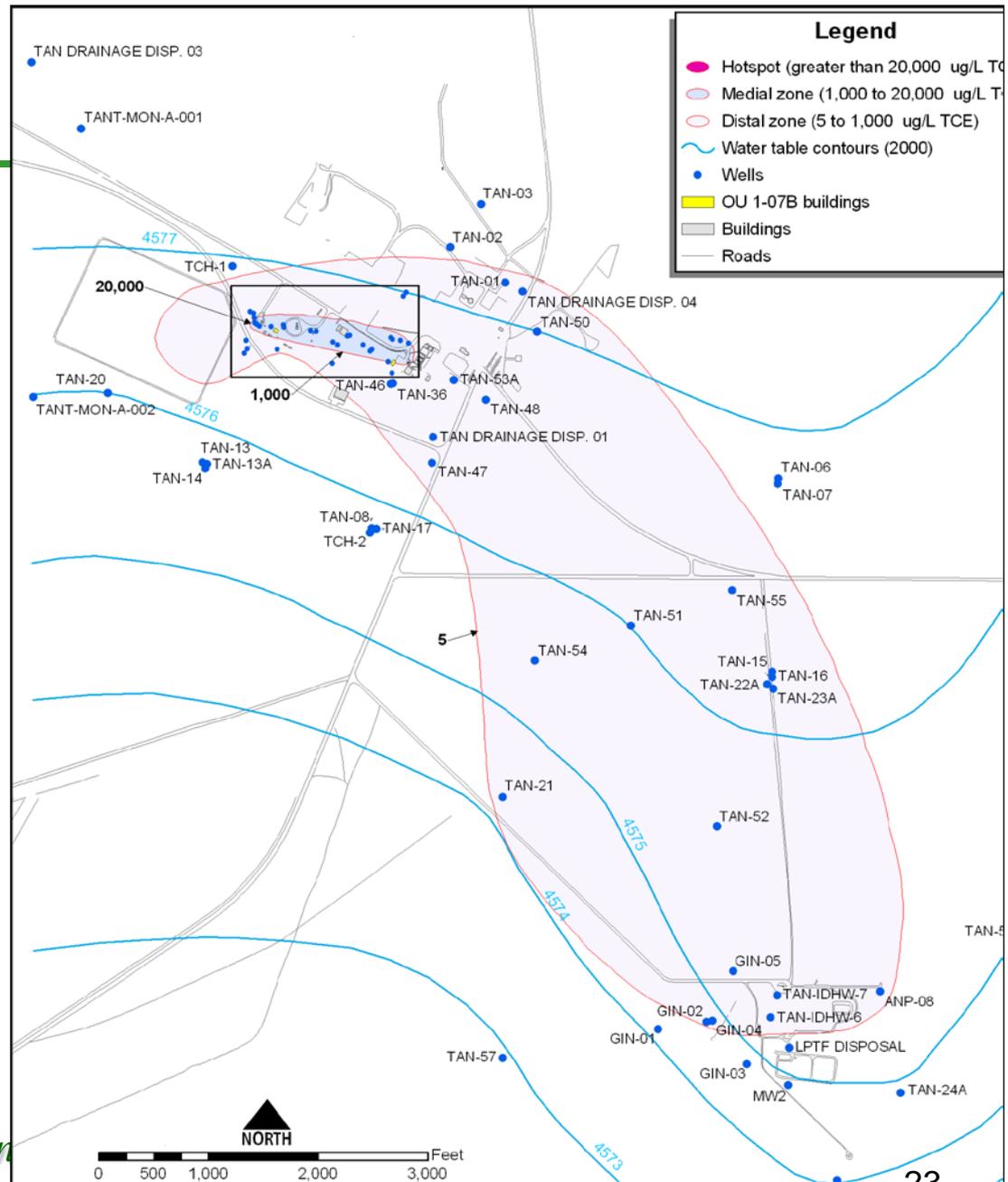
Anatomy of the Plume

- The plume is subdivided into three zones based on trichloroethene concentrations:
 - Hot spot
 - Medial zone
 - Distal zone

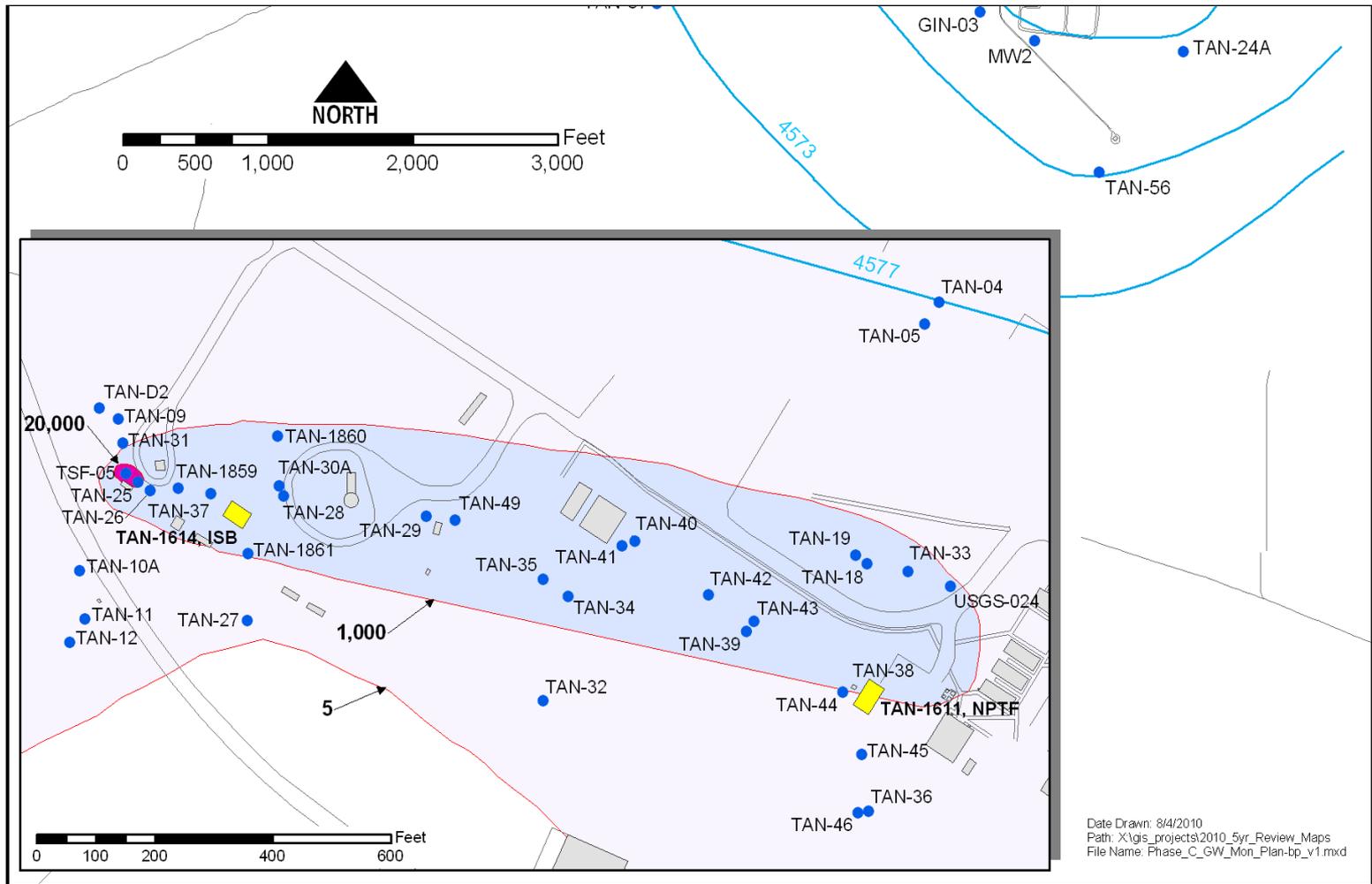


1997 Plume

- Hot spot
- Medial zone
- Distal zone



1997 Hot Spot and Medial Zone



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OU 1-07B Remedy Components

- **In situ bioremediation (ISB)** – Treats the hot spot to reduce the residual VOC source in the aquifer and reduce downgradient VOC flux.
- **Pump and treat** – Treats VOC concentrations in the medial zone using the New Pump and Treat Facility (NPTF).
- **Monitored natural attenuation (MNA)** - Monitors distal zone contaminant concentrations to determine if natural declines are on track to meet RAOs.



Data Review Summary

- ISB- Data suggest that more than 95% of the contactable source material will be removed in wells within the residual source area by 2012. TCE concentrations have remained elevated at some medial zone wells (e.g., TAN-28)
- Because continuing ISB operations may be increasing radionuclide concentrations in the hot spot and medial zone, it is not clear that radionuclides in the source area will meet remedial action objectives.



Data Review Summary (continued)

- NPTF- Data indicate that the remedy is functioning as intended
- MNA – Data show MNA is functioning as intended for VOCs. TCE Plume expansion has been less than the 30 % allowed in the ROD Amendment.
 - Evaluation of TCE peak concentrations in distal zone wells continues and is needed to confirm that TCE concentrations will meet RAOs.

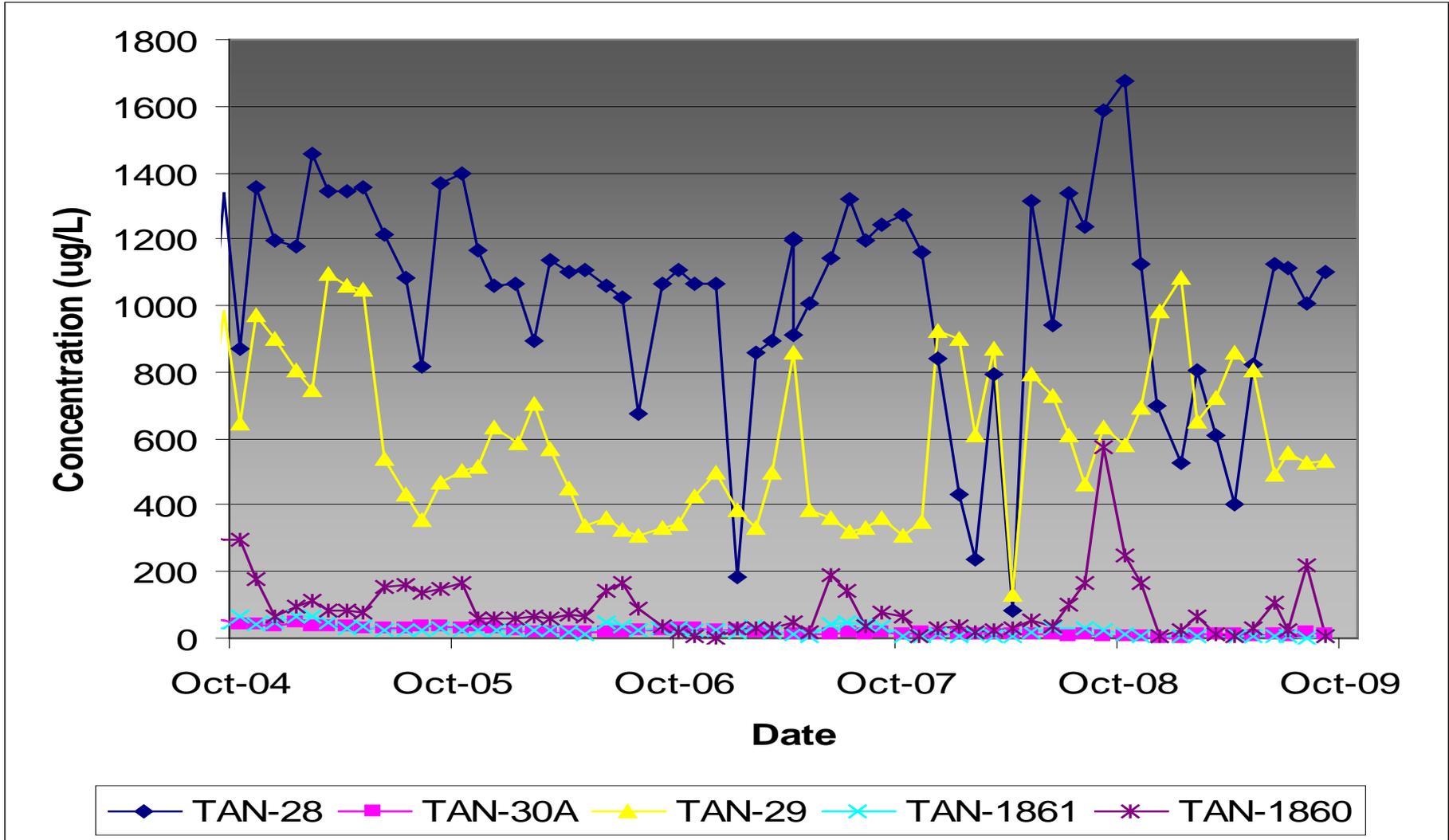


Technical Assessment-- Summary

- ISB is remediating the residual source in the aquifer; however, TCE concentrations remain elevated at some downgradient locations.
- Elevated radionuclide concentrations in the hot spot and medial zone should be evaluated to ensure that MNA will meet remedial action objectives in the future.
- NPTF and MNA continue to progress for volatile organic compounds, though the plume is expanding more toward the south-southwest than anticipated.



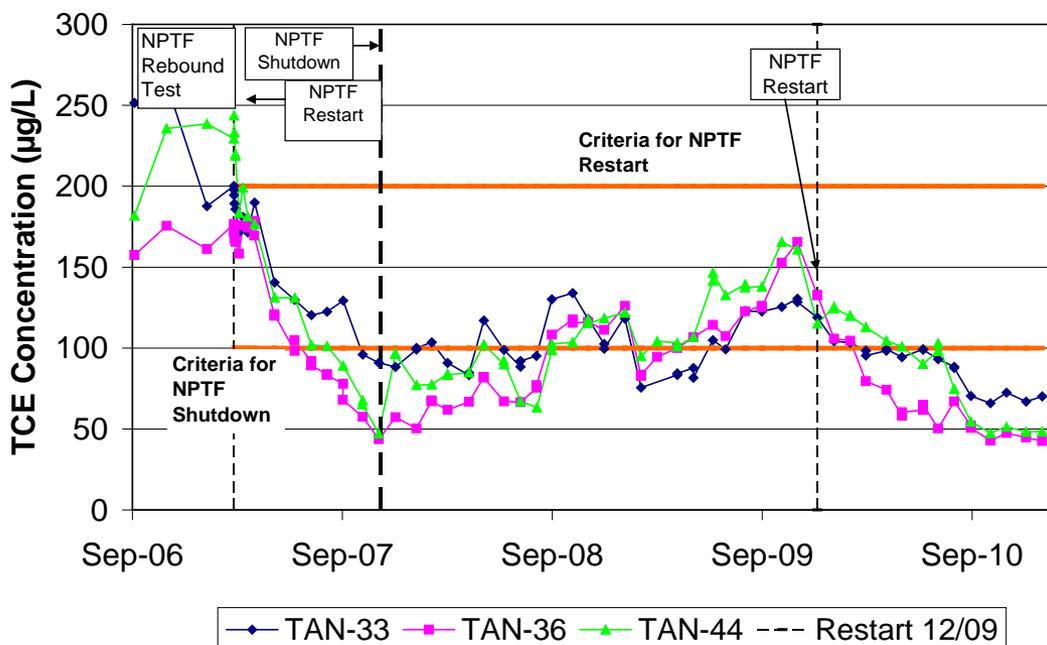
Downgradient Flux



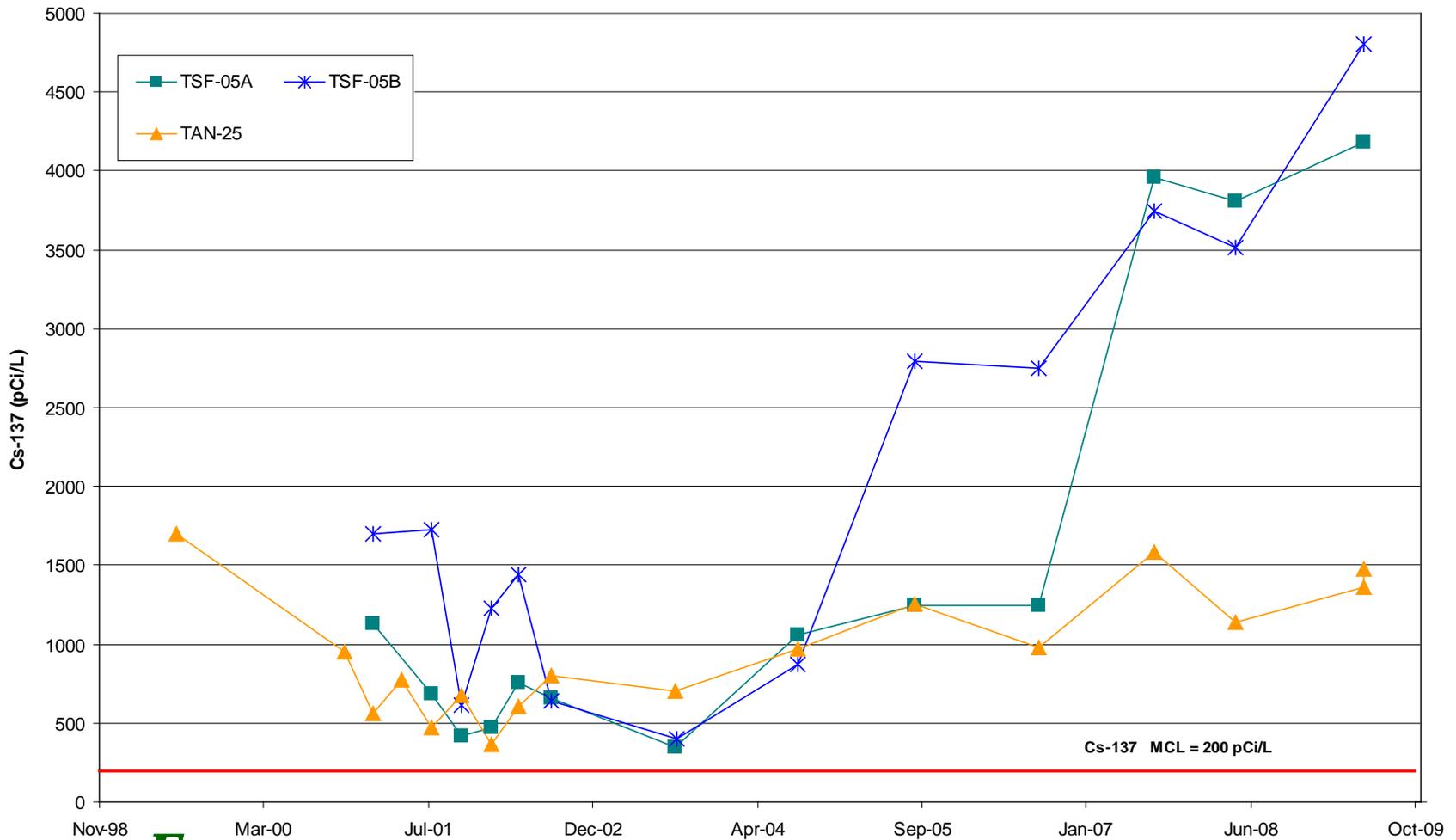
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New Pump and Treat Effectiveness

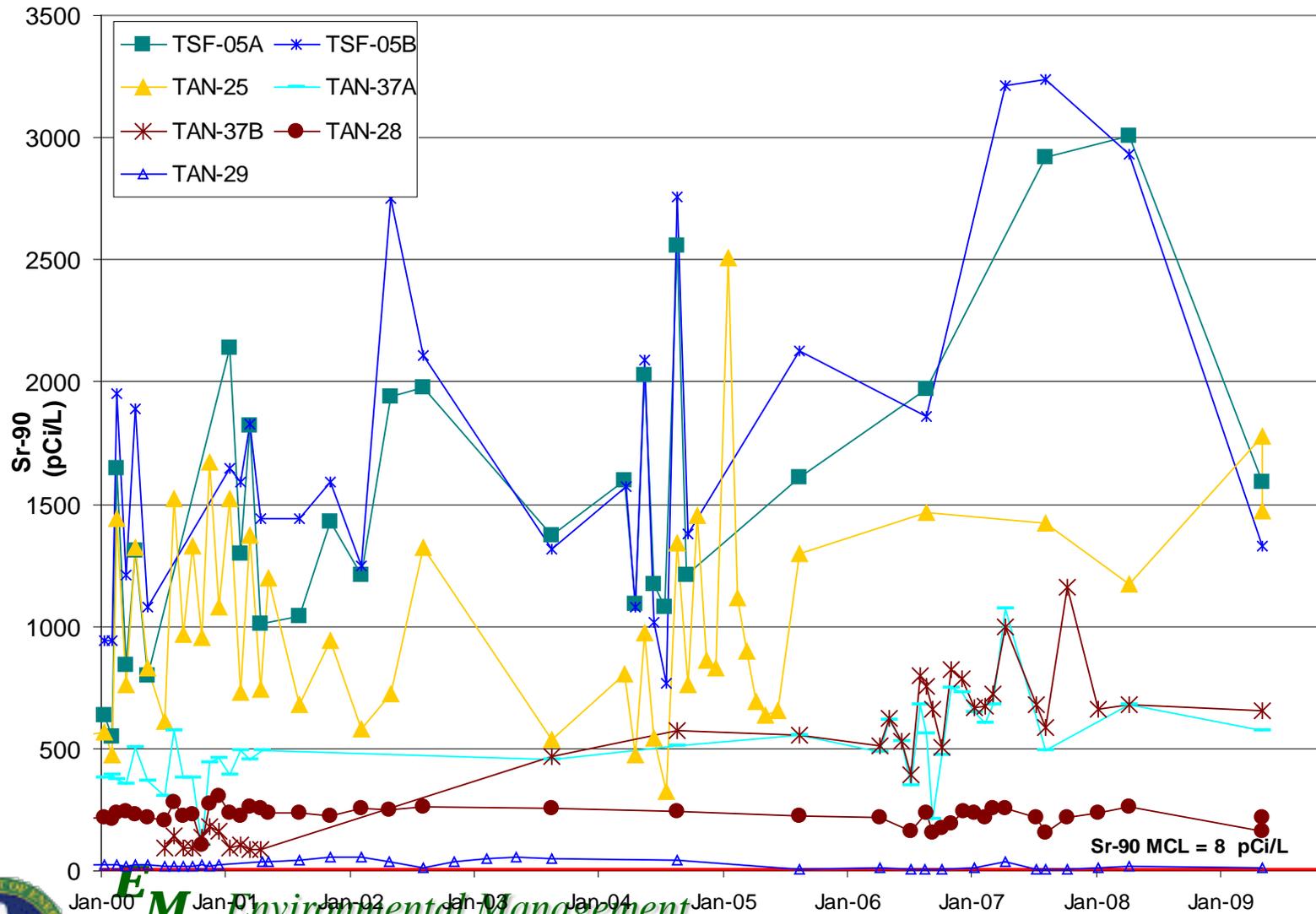
TCE Concentrations for the Medial Zone Wells



Cesium-137 at the Hot Spot

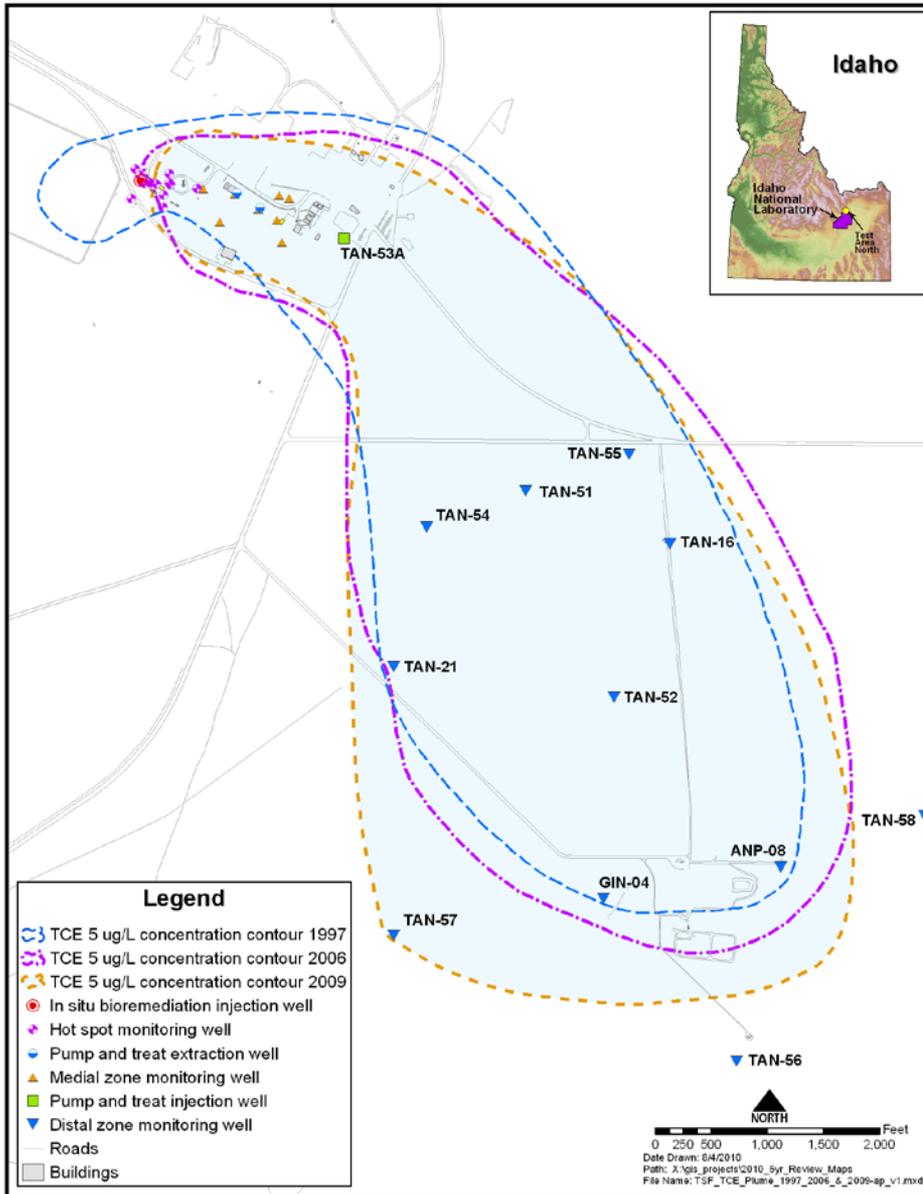


Strontium-90 at the Hot Spot



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Plume Expansion



- Sample data from distal zone wells indicate that the plume could be heading more south-southwesterly than anticipated; therefore, the monitoring strategy should be modified to adequately evaluate plume expansion in that direction.
- Plume expansion remains less than 30 percent to the south-southwest.



WAG 1 Issues, OUI-07B

- **Issue 2:** TCE concentrations have not decreased as expected at aquifer monitoring well TAN-28 downgradient of the hot spot.
- **Recommendation:** Prepare a test plan to address the TCE concentration issue at Well TAN-28 via a rebound test and vadose zone vapor monitoring.
 - Does a contaminated vadose zone exist?
 - Will TCE concentrations in TAN-28 trend downward?

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WAG 1 Issues, OUI-07B

- **Issue 3:** Cs-137 concentrations have been increasing at the hot spot, and Sr-90 concentrations remain high in the hot spot and several locations in the medial zone.
- **Recommendation:** Prepare a test plan to address radionuclide concentrations in the hot spot via a rebound test.
 - Will radionuclide concentrations trend downward?



WAG 1 Issues, OUI-07B

- **Issue 4:** The monitoring strategy may not be adequate for evaluating plume expansion.
- **Recommendation:** Prepare a test plan to increase monitoring frequency to yearly rather than once every 3 years at Wells TAN-57 and GIN-4. If TCE concentrations at either well or TAN-56 exceed 10 µg/L, install a downgradient monitoring well.
 - Better track leading edge of the plume



OU 1-07B Protectiveness Statement

- The remedy at OU 1-07B is currently protective of human health and the environment.
- Follow-up actions documented in the 5-year review to address WAG 1 issues will ensure the remedy remains protective for the long term.
- Institutional controls are in place to control exposure pathways that could result in unacceptable risks.



Conclusion: Next Steps

- Completed remedies at the INL Site are protective of human health and the environment.
- O&M occur in accordance with requirements, and ICs are in place and effective.
- Issues are tracked to closure in the CERCLA Action Tracking System.
- Issues are resolved with continuous involvement by the Agencies.
- The next 5-Year Review will encompass FY2010 thru FY2014.
- The next final 5-Year Review is due to EPA by February 2016

