



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
ENVIRONMENTAL
MANAGEMENT

INL CERCLA Five-Year Review 2010-2014

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Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
DEQ	Idaho Department of Environmental Quality
DOE-ID	U.S. Department of Energy Idaho Operations Office
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FFA/CO	Federal Facility Agreement and Consent Order
ICP	Idaho Cleanup Project
ISB	in situ bioremediation
INL	Idaho National Laboratory
NPTF	New Pump and Treat Facility
MNA	monitored natural attenuation
OU	operable unit
ROD	Record of Decision
TAN	Test Area North
TCE	trichloroethene
UU/UE	Unrestricted Use/Unrestricted Exposure
WAG	Waste Area Group

Working Schedule

Activity	Deadline	
Publish public notice	October 2014	✓
Brief the CAB at the beginning	November 2014	✓
	January 2015	✓
Compile data	2 Quarter 2015	✓
Prepare draft for DEQ and EPA review	4 Quarter 2015	✓
Submit draft to DEQ and EPA review	4 Quarter 2015	✓
Finalize and publish report	2 Quarter 2016	✓
Receive EPA's letter of concurrence	February 2016	✓
Publish public notice	February 2016	✓
Brief CAB at completion	February 2016	✓

Five-Year Review Requirement and Purpose

- Required by CERCLA Section 121 (c)
- Is required for sites where *the selected remedial action results in hazardous substances, pollutants or contaminants remaining on site in concentrations that preclude unlimited use and unrestricted exposure (UU/UE)*
- Evaluates the implementation and performance of a remedy
- Determines if the remedy is or will be protective of human health and the environment

Scope of this Five-Year Review



G14 3001-03

- Examine OUs in 9 WAGs
 - Exclude WAG 8—NRF submits a separate report
- Assess CERCLA response actions at OUs that are subject to 5-year reviews
- 12 OUs required evaluation
- Collectively review Site-wide elements, including:
 - Changes in standards
 - Toxicity review
 - Ecological review
 - Removal actions implemented under the Action Memorandum for General Decommissioning

- EPA guidance for a Five-Year Review provides instruction for evaluation process
 - Gather and review information
 - Conduct Technical Assessment
 - Develop conclusions
 - Identification of Issues
 - Recommendations and follow up actions
 - Protectiveness Statements



United States
Environmental
Protection Agency

Office of Emergency
and Remedial
Response (5204G)

EPA 540-R-01-007
OSWER No. 9355.7-03B-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

Technical Assessment

A

Is the remedy
working?

B

Are exposure
assumptions still
valid?

C

Is there anything
else to
consider?

Issues

- Logical outcome of the technical assessment
- Must have the potential to effect current or future protectiveness

Issue

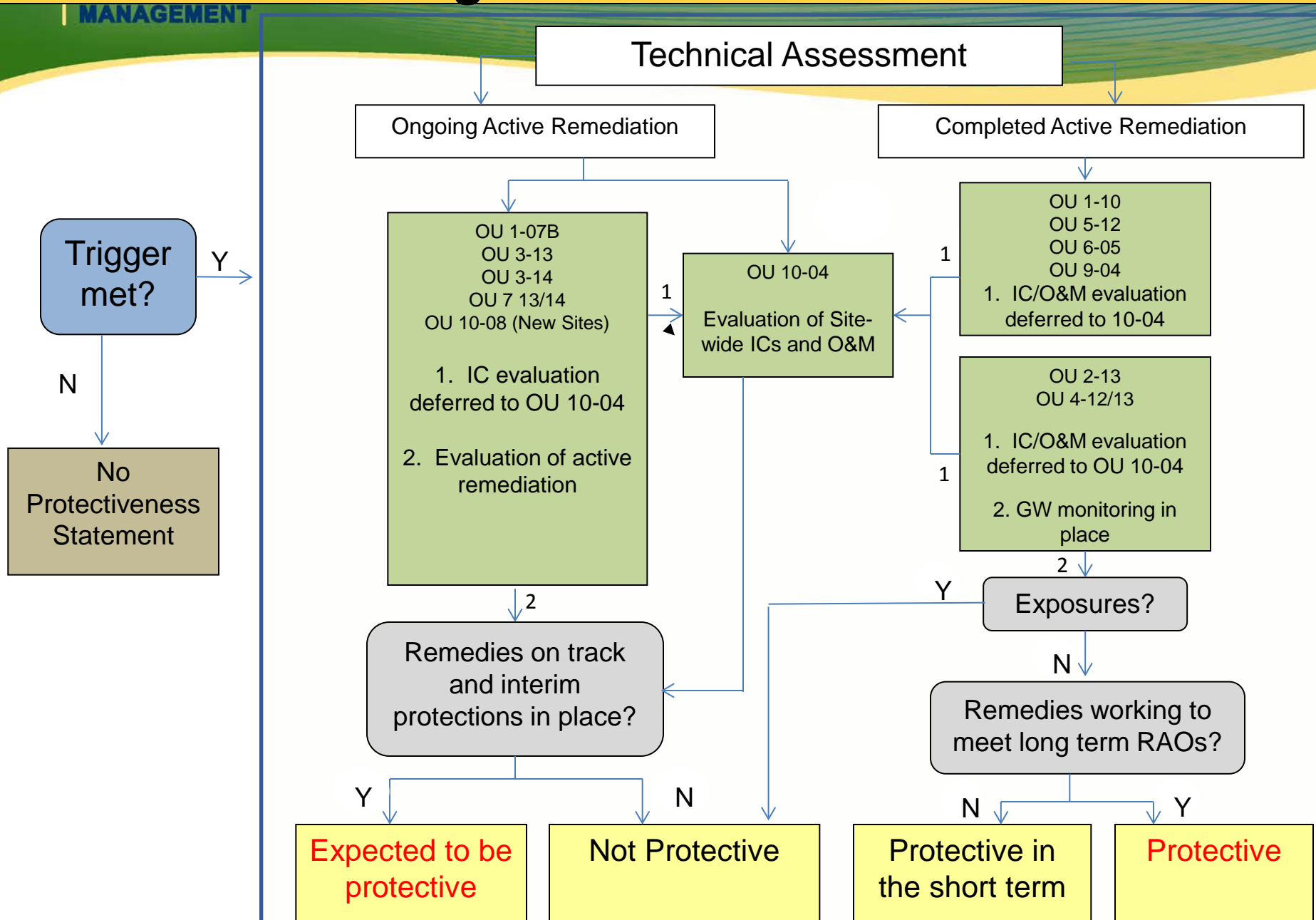
Recommendations
and Actions

Tracked by EPA

Protectiveness Statement

- Determination of whether the remedy is, or is expected to be protective of human health and the environment
- One protectiveness statement required per Operable Unit
- Ongoing Remedies
 - Expected to be Protective
 - Protectiveness Deferred
 - Not Protective
- Completed Remedies
 - Protective
 - Protective in the Short Term
 - Not Protective

Determining Protectiveness Statement



Operable Units Reviewed

OU	Description	Action Status	FYR Evaluation	Protectiveness Statement
OU 1-07B	TAN Groundwater Remediation	Remediation ongoing	<ul style="list-style-type: none"> Fully developed technical assessment ICs addressed under OU 10-04 (except for effectiveness of IC boundary) 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 1-10	TAN Comprehensive	Remediation complete with ongoing ICs and O&M	<ul style="list-style-type: none"> ICs/O&M deferred to OU 10-04 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 2-13	ATRx Comprehensive	Remediation complete . Remedies working to meet longterm RAOs Ongoing ICs, O&M, and monitoring	<ul style="list-style-type: none"> Fully developed technical assessment that focuses on monitoring data ICs/O&M deferred to OU 10-04 	The remedy is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. (See 10-04 Protectiveness Statement for IC/O&M)
OU 3-13	INTEC soil under buildings /ICDF	Remediation ongoing	<ul style="list-style-type: none"> Fully developed technical assessment that focuses on O&M at ICDF ICs addressed under OU 10-04 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 3-14	INTEC Tank Farm Soil and Groundwater	Remediation ongoing	<ul style="list-style-type: none"> Fully developed technical assessment that focuses on monitoring data/ and O&M ICs addressed under OU 10-04 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OUs 4-12 and 4-13	CFA Landfills I, II, and III and CFA Comprehensive	Remediation complete . Remedies working to meet longterm RAOs Ongoing ICs, O&M, and monitoring	<ul style="list-style-type: none"> Fully developed technical assessment that focuses on monitoring data ICs/O&M deferred to OU 10-04 	The remedy is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. (See 10-04 Protectiveness Statement for IC/O&M)
OU 5-12	ARA/CITRC Comprehensive	Remediation complete with ongoing ICs and O&M	<ul style="list-style-type: none"> ICs/O&M deferred to OU 10-04 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 6-05	BORAX/EBR-I	Remediation complete with ongoing ICs and O&M	<ul style="list-style-type: none"> ICs/O&M deferred to OU 10-04 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 7-13/14	RWMC	Remediation ongoing	<ul style="list-style-type: none"> Fully developed technical assessment ICs addressed under OU 10-04 (except for effectiveness of IC boundary) 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 9-04	MFC Comprehensive	Remediation complete with ongoing ICs and O&M	<ul style="list-style-type: none"> Fully developed technical assessment ICs deferred to OU 10-04 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 10-04	Site-wide Miscellaneous Sites	Remediation complete with ongoing ICs and O&M	<ul style="list-style-type: none"> Fully developed technical assessment IC/O&Ms from other OUs addressed here 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.
OU 10-08	Site-wide Groundwater, Miscellaneous Sites, and Future Sites	Remediation ongoing	<ul style="list-style-type: none"> Fully developed technical assessment ICs/O&M addressed under OU 10-04 	Expected to be protective upon completion; and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.

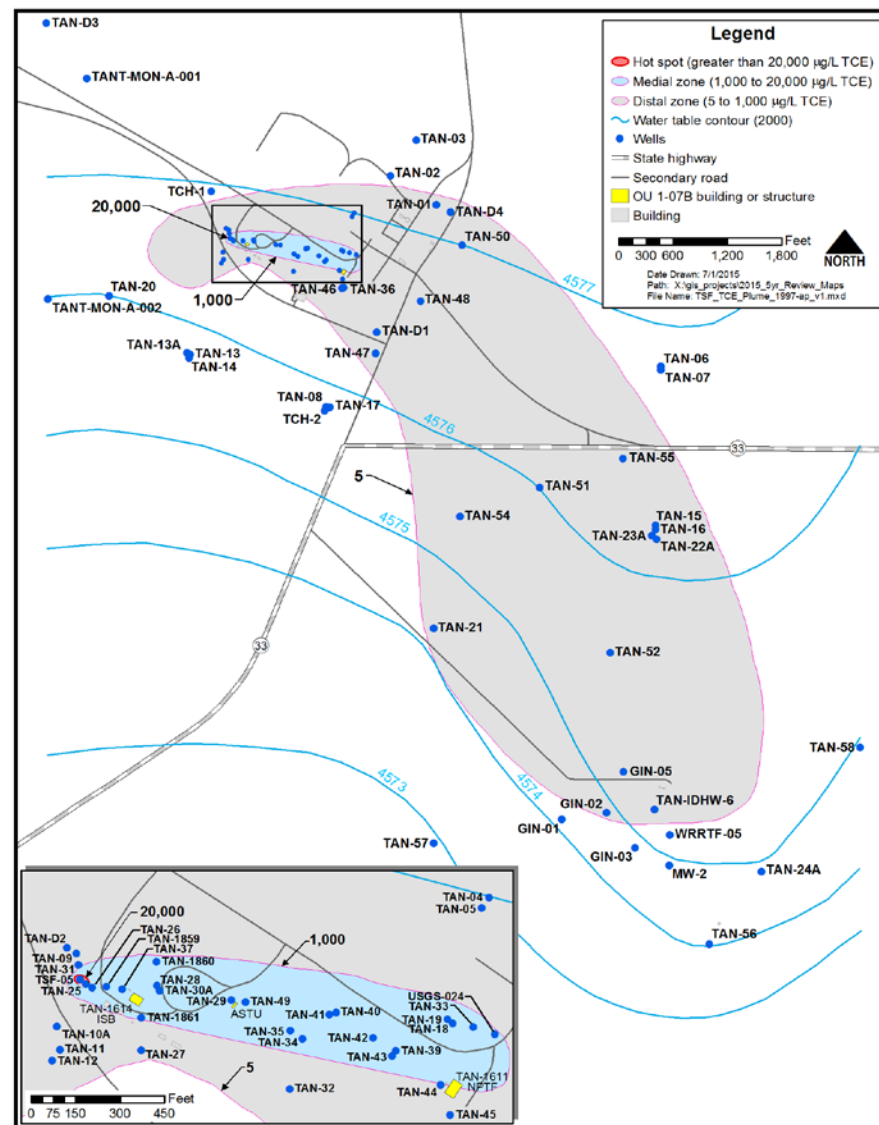
Issues Summary

- WAG 1 OU 1-07B—TAN Groundwater Remediation
 - **Issue #1**—TCE concentrations have not decreased as expected at aquifer monitoring well TAN-28 downgradient of the hot spot
 - **Issue #2**—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 #3**—Existing monitoring network may not be adequate to assess plume expansion in the distal zone
- WAG 10 OU 10-04—Site-wide Miscellaneous Sites
 - **Issue #4**—Asbestos is not identified as a driver for ICs at BORAX-09 (former BORAX II-V reactor building), and the site is not subject to routine O&M required for other barrier sites
 - **Issue #5**—Radiological surveys were required by the OU 4-13 ROD at CFA-08 (former CFA Sewage Drainfield), but surveys were eliminated without explanation or supporting documentation in revisions to the Site-wide IC/O&M Plan
- DOE is implementing FYR recommended actions to resolve these issues

WAG 1—OU 1-07B

FYR Evaluation

- Three Issues identified for OU 1-07B
- OU 1-07B addresses TAN groundwater contamination from an injection well used from 1953 to 1972
- Remediation is ongoing
- Technical assessment evaluated three remedy components
 - **Hot Spot - In Situ Bioremediation (ISB)**—injects food source (whey/lactate) into hot spot to feed naturally occurring microbes that degrade VOCs in the aquifer
 - **Medial Zone - Pump and Treat**—treats VOC concentrations in the medial zone using the New Pump and Treat Facility (NPTF)
 - **Distal Zone – Monitored Natural Attenuation (MNA)**—monitors distal zone contaminant concentrations to determine if natural declines are on track to meet RAOs



- **Issue # 1: TCE concentrations have not decreased as expected at monitoring well TAN-28 downgradient of the hot spot**
- Carried forward from last FYR
- Action from previous FYR was to implement ISB rebound test
 - Conditions are slowly changing but more time is needed for conditions to return to background (i.e., ISB amendment to dissipate) so that effectiveness of treatment can be assessed
 - Agencies agreed to
 - (1) continue partial ISB rebound test
 - (2) install two wells near the untreated TCE source and conduct ISB in one or both wells

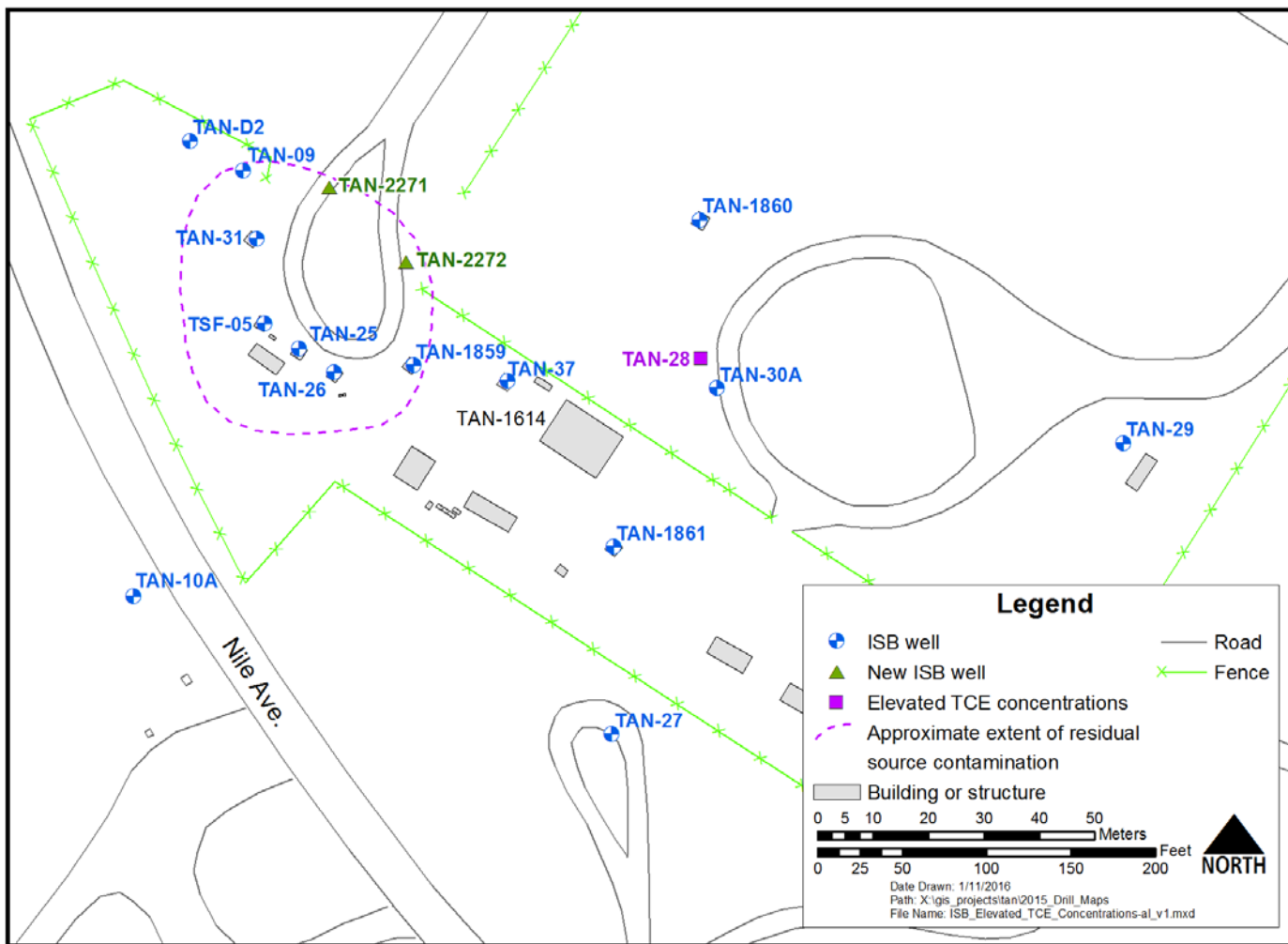
Recommended Actions from this FYR:

- Evaluate data collected from the injections in new wells and continued ISB rebound test to confirm assumptions are still valid.
- If assumptions are no longer valid, then other actions to address the source will be needed
- Milestone date to complete actions: Before the next FYR (9/30/2019)

WAG 1—OU 1-07B

Location of New Wells

- FY 2015—Drilled new wells TAN-2271 and TAN-2272 to address TCE source impacting TAN-28
- FY 2016—Restarted ISB injections on January 13, 2016

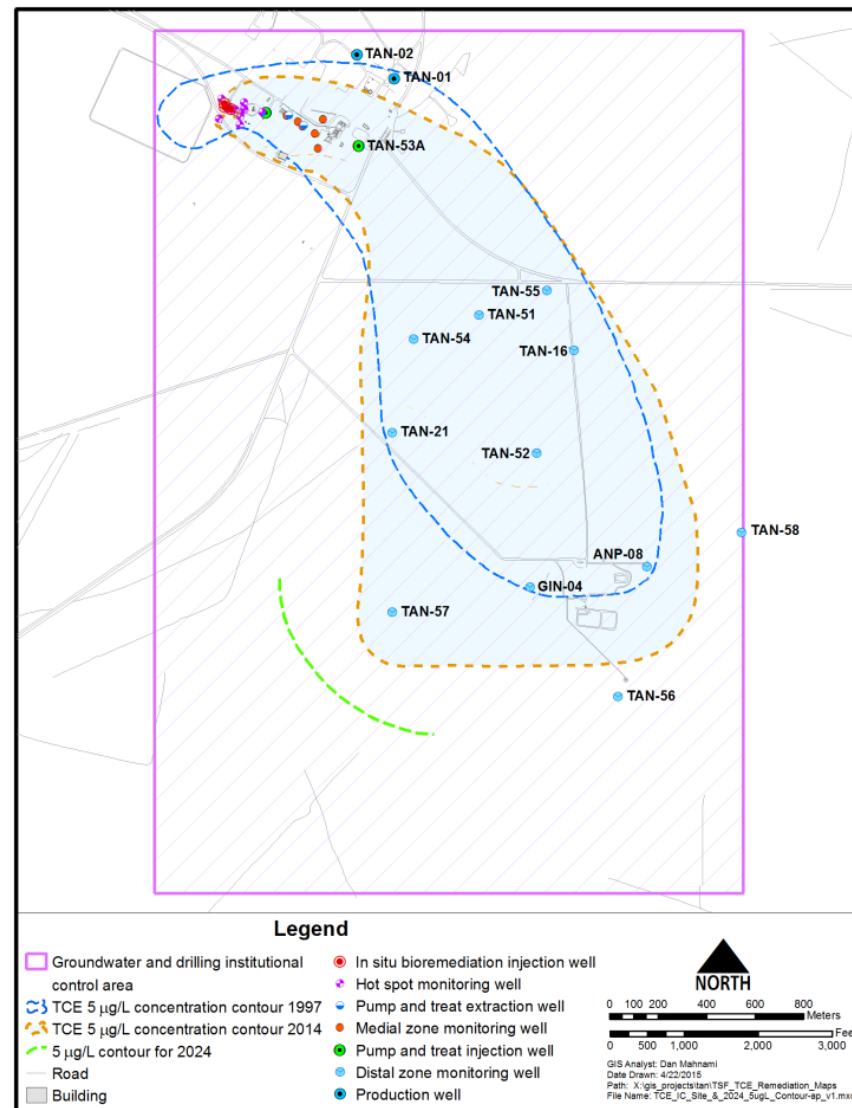


- **Issue # 2: Cs-137 concentrations have been increasing at the hot spot, and Sr-90 concentrations remain high in the hot spot and several locations in the medial zone**
- Carried forward from last FYR
- Recommended Actions:
 - Continue ISB rebound test and when ISB-created conditions dissipate in the aquifer, evaluate Cs-137 and Sr-90 concentrations
- Milestone date to complete actions: Before the next FYR (9/30/2019)

- **Issue # 3: The existing monitoring network may not be adequate to measure plume expansion as specified in the ROD Amendment**
- New issue identified in this FYR
- Recommended Actions:
 - Perform snapshot sampling event to gather additional water quality data
 - Install an additional well in the distal zone
- Milestone date to complete actions: Before the next FYR (9/30/2019)

Snapshot Sampling and New Distal Zone Well

- Plume center line has shifted to the southwest towards TAN-57
- Plume expansion is expected to occur through at least 2024
- Predicted expansion is within 30% limit of ROD Amendment
- Plume expansion is not occurring outside IC area
- 16 wells in addition to routine monitoring wells proposed for snapshot sampling
- Data from the snapshot sampling event will be used to:
 - Evaluate the existing monitoring network to measure plume expansion
 - Define objectives and location for an additional well in the distal zone





ISB Injection Facility



New Well TAN-2271

WAG 10—OU 10-04

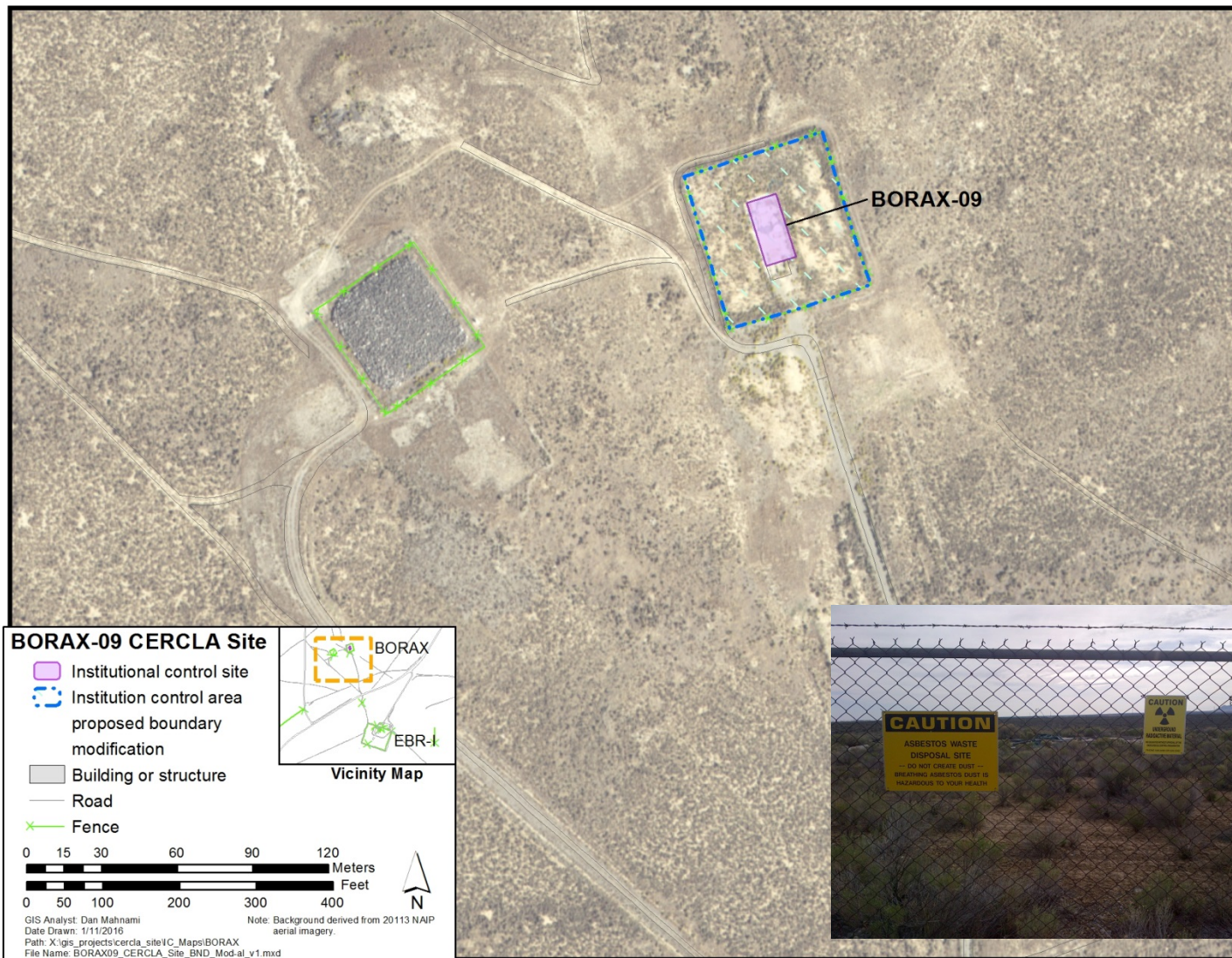
FYR Evaluation

- Two Issues identified for OU 10-04
- OU 10-04 addresses miscellaneous sites outside facility boundaries, sites transferred from other WAGs and IC/O&M implementation
 - IC's -controls that help to minimize potential for exposure and protect integrity of a remedy
 - O&M - activities to maintain remedy components to ensure remedy remains protective
- FYR administratively consolidates the evaluation of IC/O&Ms under this OU
- FYR evaluated 145 IC sites and 17 O&M sites
- Assessment identified issues at two IC/O&M sites:
 - BORAX-09—former BORAX II-V Reactor Facilities
 - CFA-08—former CFA Sewage Plant Drainfield

- BORAX-09 became a landfill that was contaminated with rad and asbestos after the reactor building was decommissioned and demolished in 1997.
- Site evaluated under the Comprehensive OU 10-04
- **Issue # 4: Asbestos is not identified as the driver for ICs and the site is not subject to routine O&M activities required for other barrier sites**
- Recommended Actions:
 - Identify asbestos as the IC driver to ensure ICs remain in place in perpetuity
 - Expand the site boundary to include the entire area within the current fence line
 - Add O&M requirements for a barrier site
- Milestone date to complete actions: 9/30/2016

BORAX-09

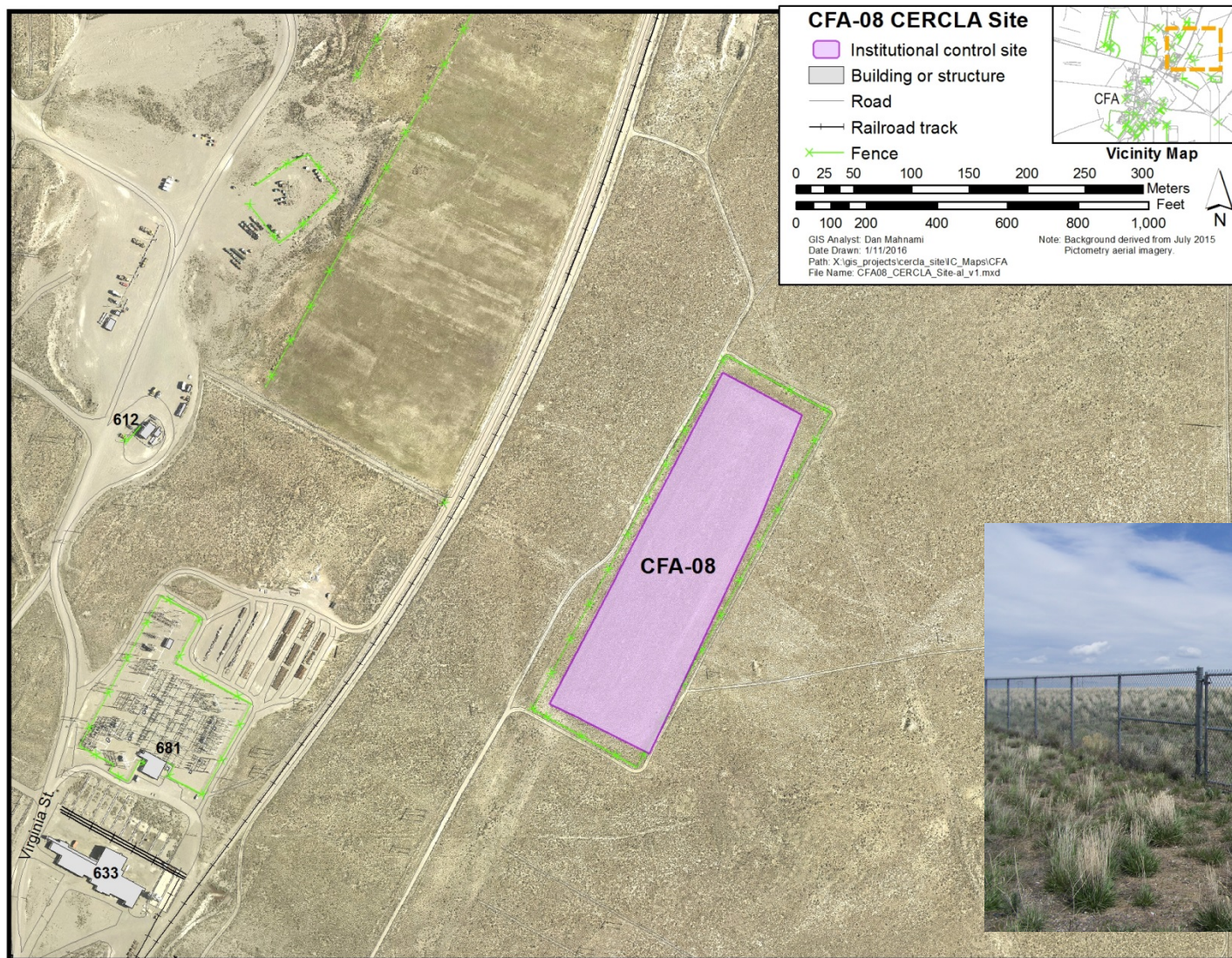
Former BORAX II-V Reactor Facilities



- CFA sewage treatment facility received effluent from laundry facilities that processed low-level radiologically contaminated clothing. The selected remedy for the drainfield (CFA-08) is an engineered cover to prevent exposure to Cs-137 and ICs and O&M
- **Issue # 5: Radiological surveys were required by the OU 4-13 ROD, and, in 2007, the frequency was reduced to once every 5 years to support the 5-year review. However, radiological surveys were eliminated without explanation or supporting documentation in revisions to the Site-wide IC/O&M Plan**
- Recommended Actions:
 - Determine if eliminating radiological surveys at CFA-08 was appropriate
 - Prepare suitable documentation
 - Conduct radiological survey with other routinely scheduled radiological surveys as identified in the IC/O&M Plan until the Agencies approve survey requirements
- Milestone date to complete actions: 9/30/2016

CFA-08

Former CFA Sewage Drainfield



Conclusions: Next Steps

- Remedies at the INL Site are, or are expected to be, protective of human health and the environment.
- Ongoing remedial actions at OU 1-07B, OU 3-13, OU 3-14, OU 7-13/14, OU 10-04 and OU 10-08 will continue and be evaluated as remediation progresses.
- IC's, O&M and groundwater monitoring are in place and effective and will continue to be evaluated until sites achieve UU/UE.
- DOE and EPA tracks issues to closure.
- Next FYR is due to EPA by February 2021.