



Kirtland Air Force Base Fuel Leak Cleanup

November 12, 2015



Kate Lynnes, U.S. Air Force Highly Qualified Expert
Dennis McQuillan, NMED Chief Scientist
Diane Agnew, NMED Hydrologist



Highly Qualified Expert

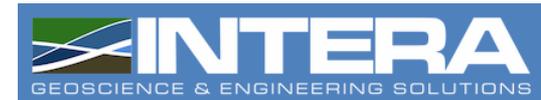
- **The Highly Qualified Expert position was created by Air Force to provide local oversight of the Kirtland Air Force Base (KAFB) Bulk Fuels Facility cleanup project**
- **Kate Lynnes works directly for Pentagon**
- **She joins the existing team of experts**

A Partnership for Success

A collaborative technical team is solving the complex hydrogeologic and engineering challenges posed by fuel leak



US Army Corps of Engineers



Major Progress in 2015

- 20 new groundwater monitoring wells drilled
- Northeastern extent and bottom of the dissolved ethylene dibromide (EDB) plume defined
- First extraction well was drilled and is pumping
- Temporary EDB treatment system began operating in June
- Treated water contains no EDB and is used to irrigate the KAFB golf course
- Two additional extraction wells drilled and developed
- Full-scale groundwater treatment system (GWTS) constructed by December
- Work plans being developed for 2016 interim measures:
 - Expansion GWTS
 - Anaerobic recirculation biodegradation pilot
 - Soil bioventing pilot
 - Targeted residual LNAPL coring



NMED's 2015 Strategic Plan

How Did We Do?

Goal: Protect Albuquerque's aquifer and the drinking water supply wells in the area of the fuel leak

Strategies to Achieve the Goal:

- 1) Continue robust groundwater and wellhead monitoring**
- 2) Collapse the dissolved EDB Plume away from the Albuquerque Bernalillo County Water Utility Aquifer Wells**
- 3) Clean up soil in the leak area**
- 4) Remediate Light Non-Aqueous Phase Liquid (LNAPL) and associated dissolved phases in the LNAPL area**
- 5) Meet or exceed all requirements for providing public information and involvement**

Regulatory Basis

The New Mexico Environment Department (NMED) has been granted primacy by the U.S. Environmental Protection Agency to administer:

- **The Safe Drinking Water Act (SDWA) program; and**
- **The Resource Conservation and Recovery Act (RCRA) program**

Public water systems, the Albuquerque Bernalillo County Water Utility Authority (ABCWUA), Kirtland AFB and the VA Hospital, must deliver water to consumers that meets SDWA standards.

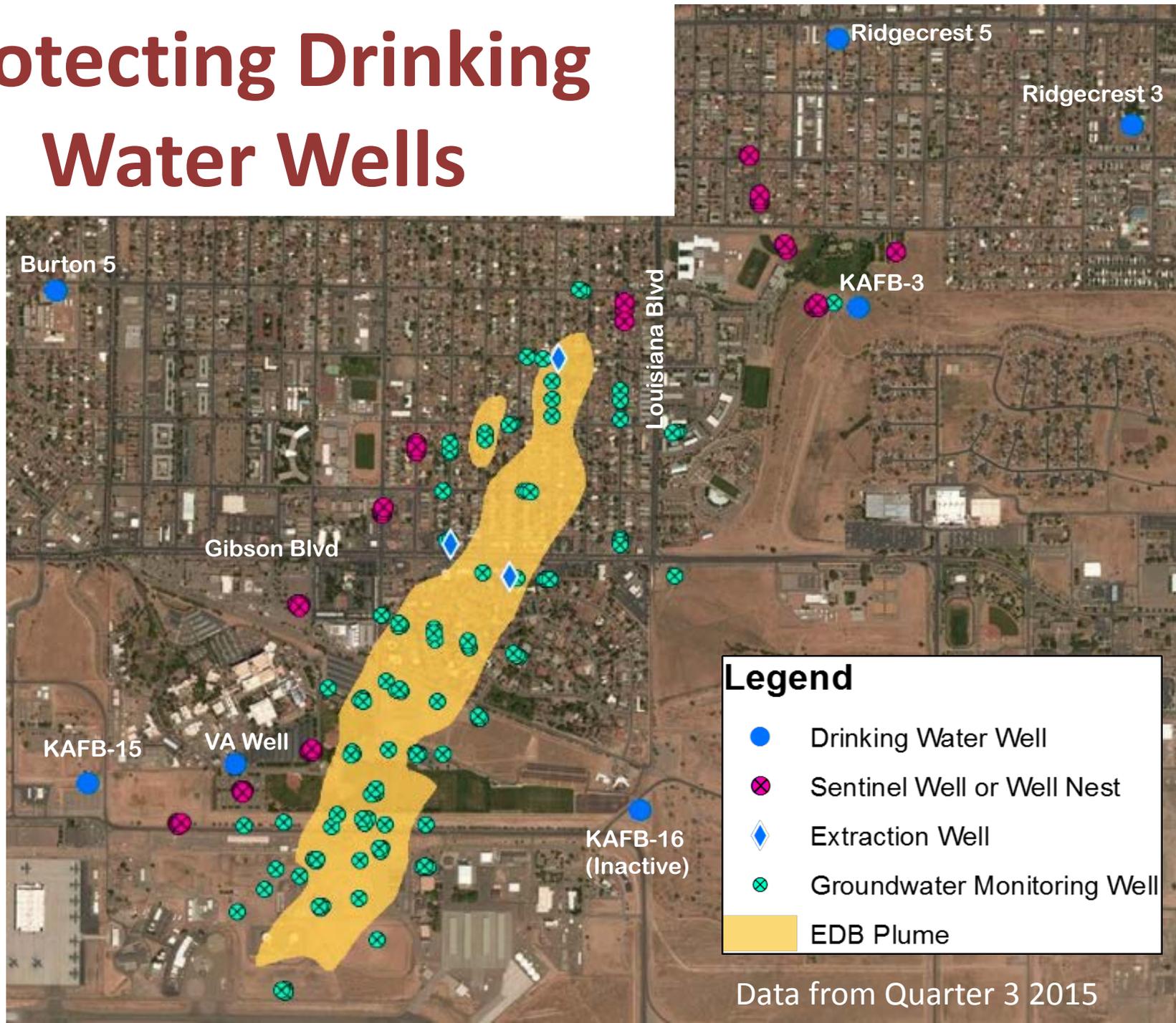
Kirtland AFB must comply with their RCRA Hazardous Waste Permit, including the Corrective Action Process.

Monthly Well Testing

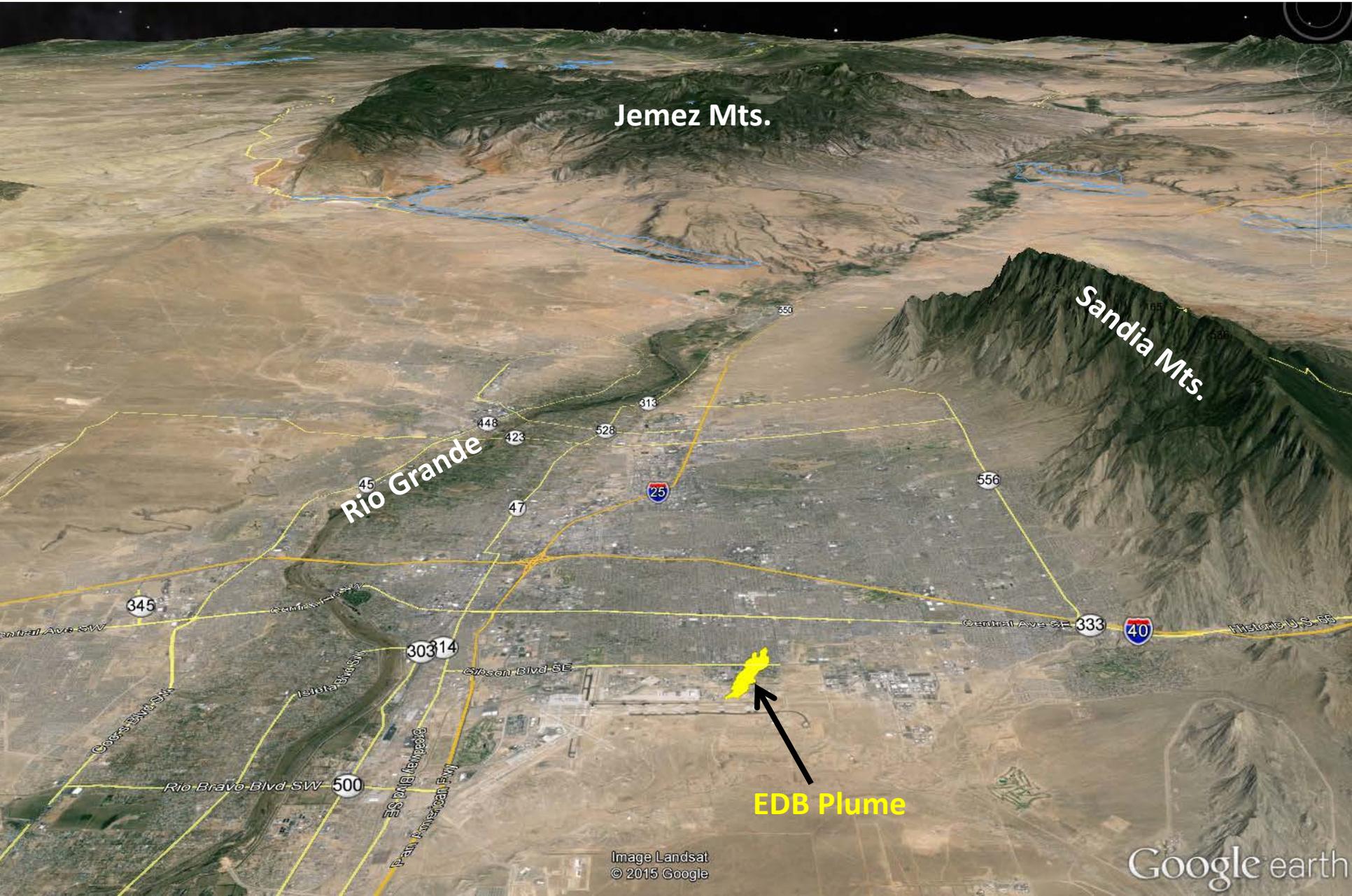
No detections of fuel contaminants in drinking water supply wells



Protecting Drinking Water Wells



EDB Plume After Decades



Jemez Mts.

Sandia Mts.

Rio Grande

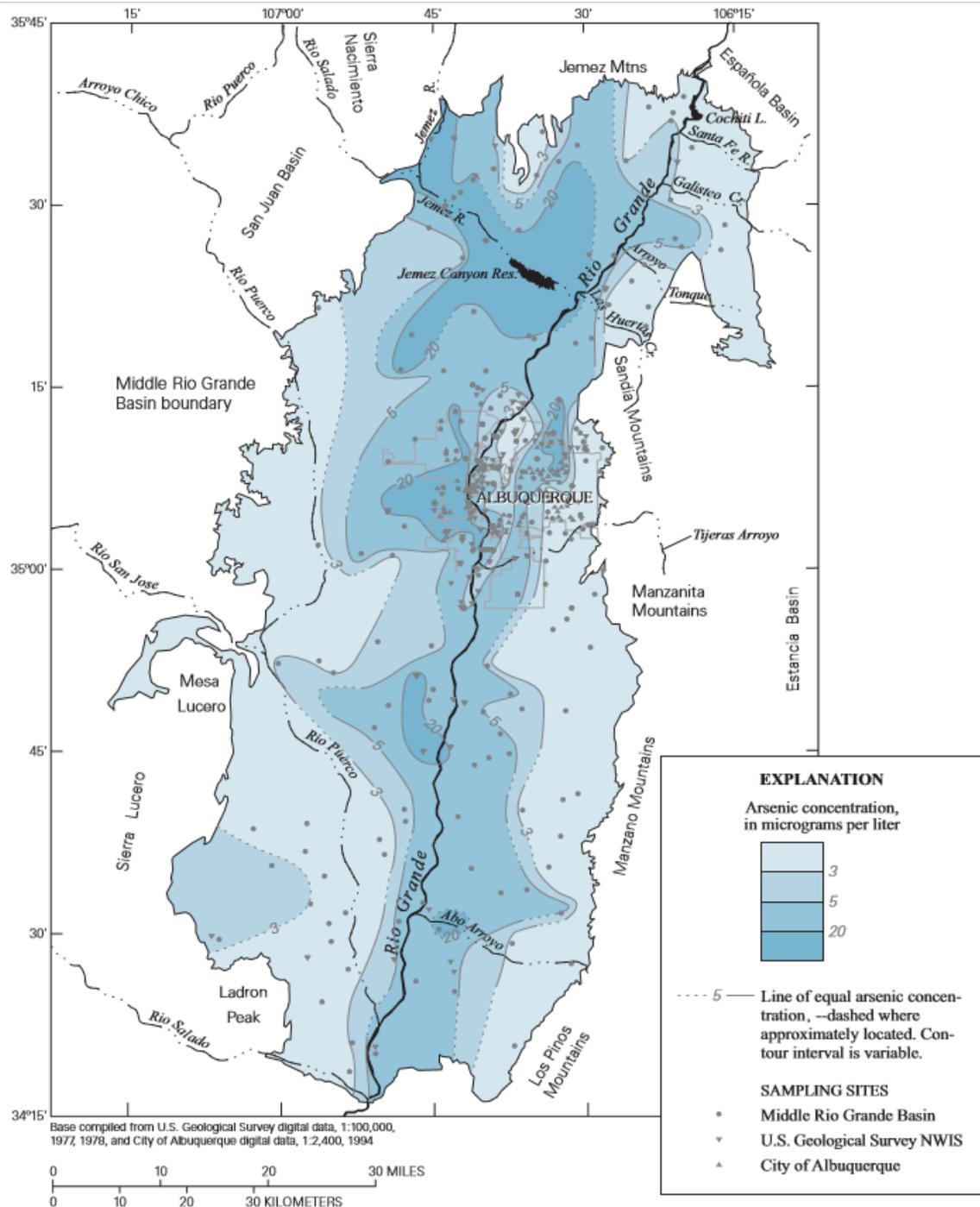
EDB Plume

EDB Plume

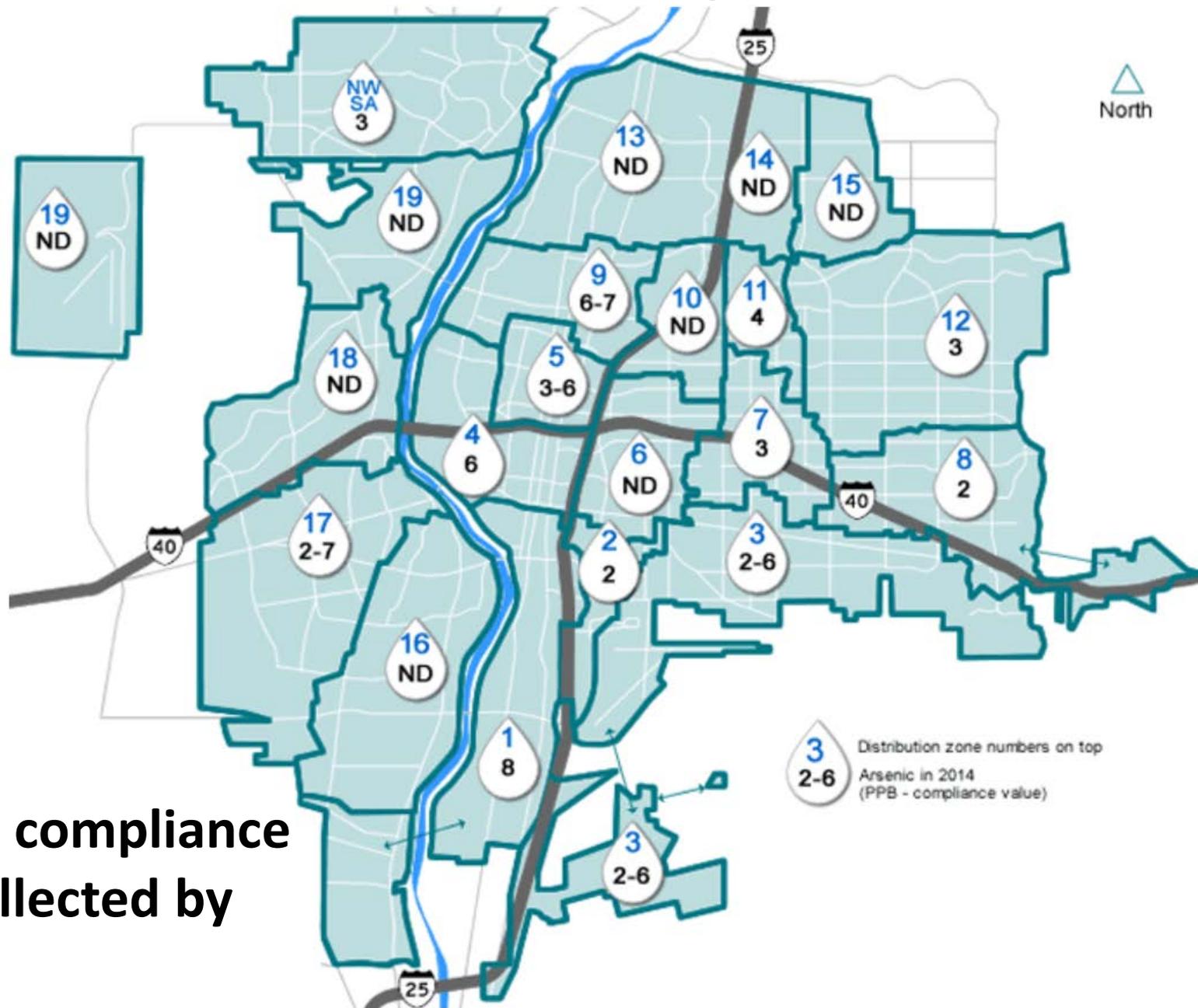
- **Is relatively stable.**
- **Will not be allowed to contaminate any drinking water well.**
- **Will not affect ABCWUA ability to deliver water that meets the arsenic drinking water standard.**

Arsenic in Groundwater

A Manageable Issue for Public Water Systems in the Middle Rio Grande Basin



Arsenic in ABQ Drinking Water



Entry point compliance samples collected by NMED

Plume Anatomy

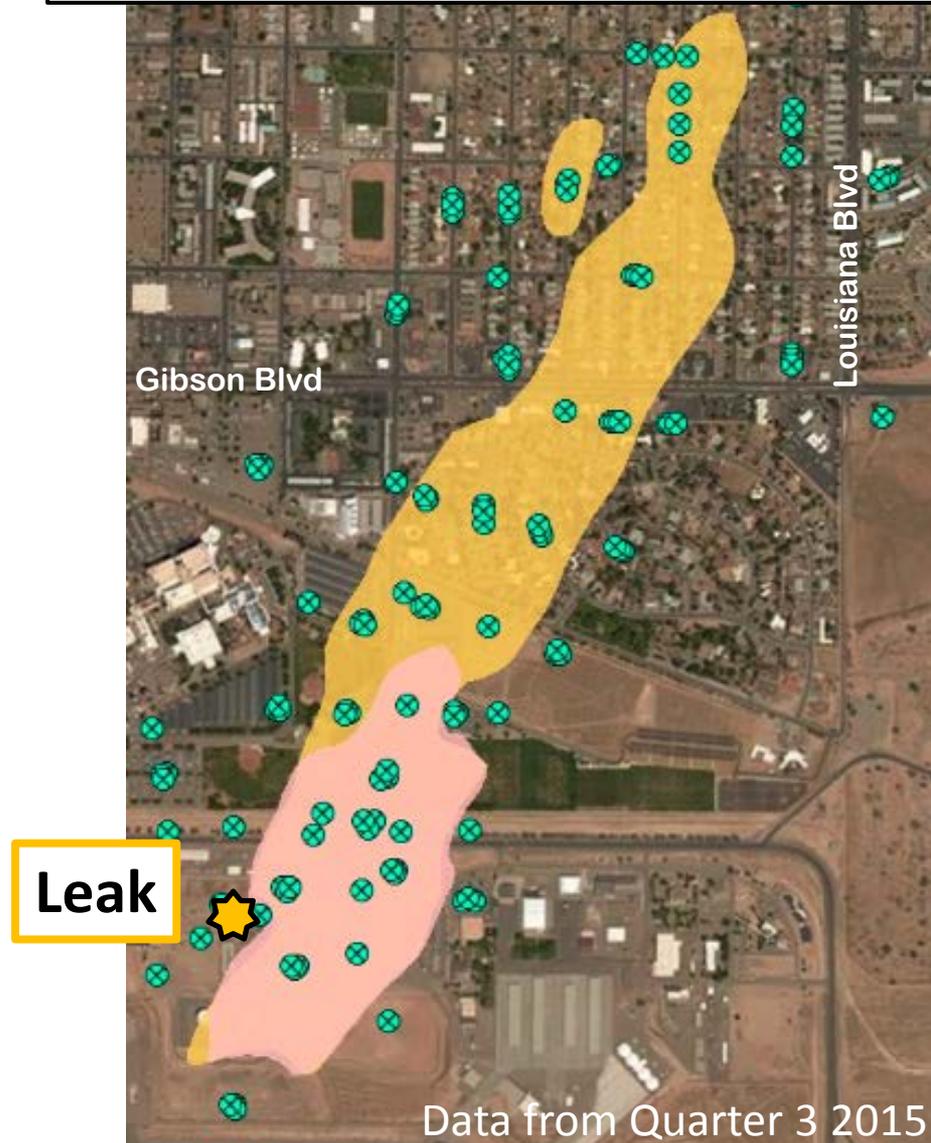
Source Area:

- Highest fuel concentrations
- Residual LNAPL
- Dissolved Hydrocarbons
- Dissolved EDB

Elevated alkalinity and bromide from biodegradation

Distal Plume:

- Only dissolved EDB @ low ppb
- No biodegradation



Interim Measure Cleanup Strategies

Collapse EDB Plume:

- Away from drinking water supply wells
- To contain EDB mass

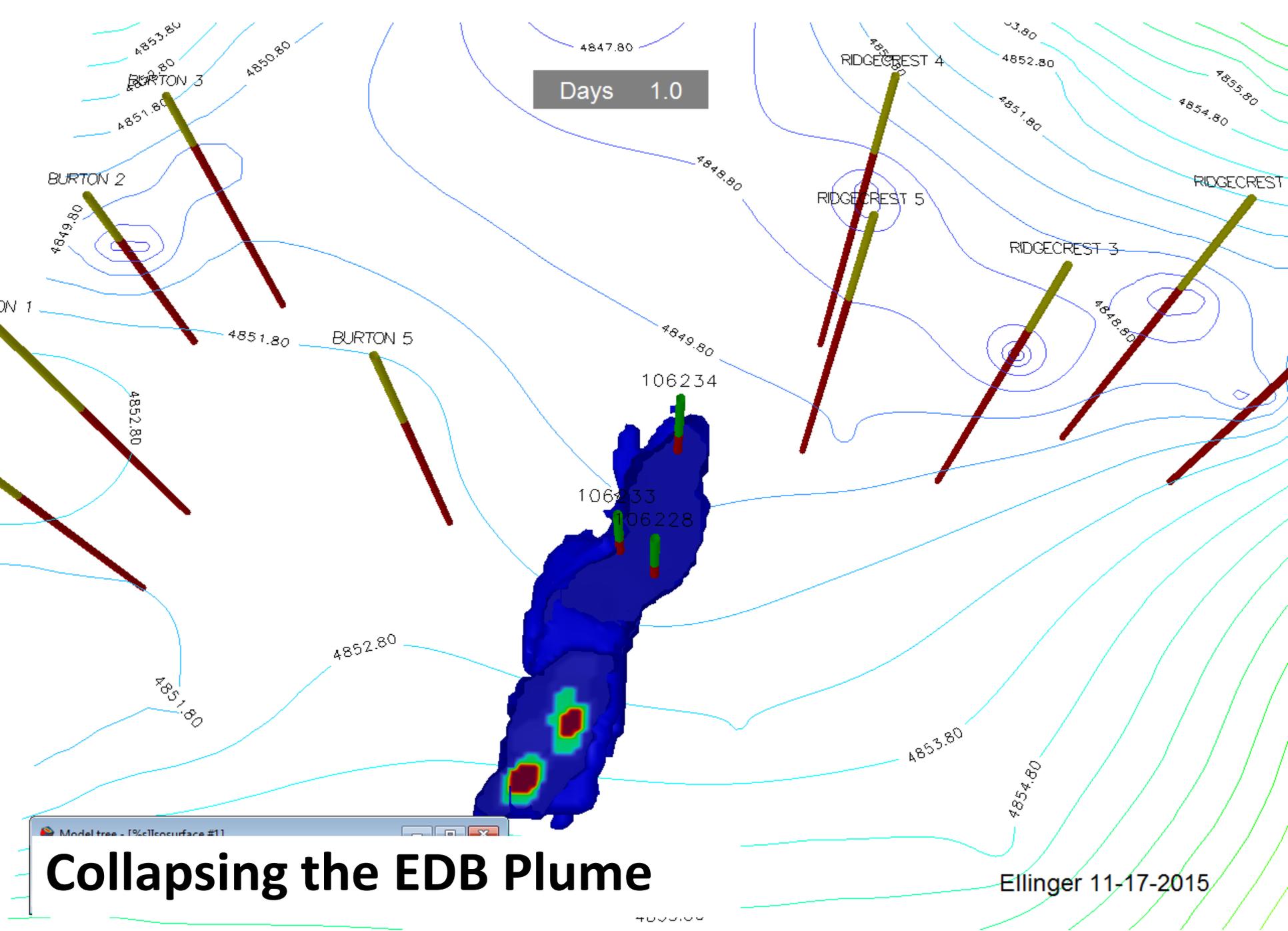
Pilot Tests:

- Enhanced biodegradation
- Bioremediation sparging
- Bioventing



Completed:

- Soil excavation
- Soil Vapor Extraction

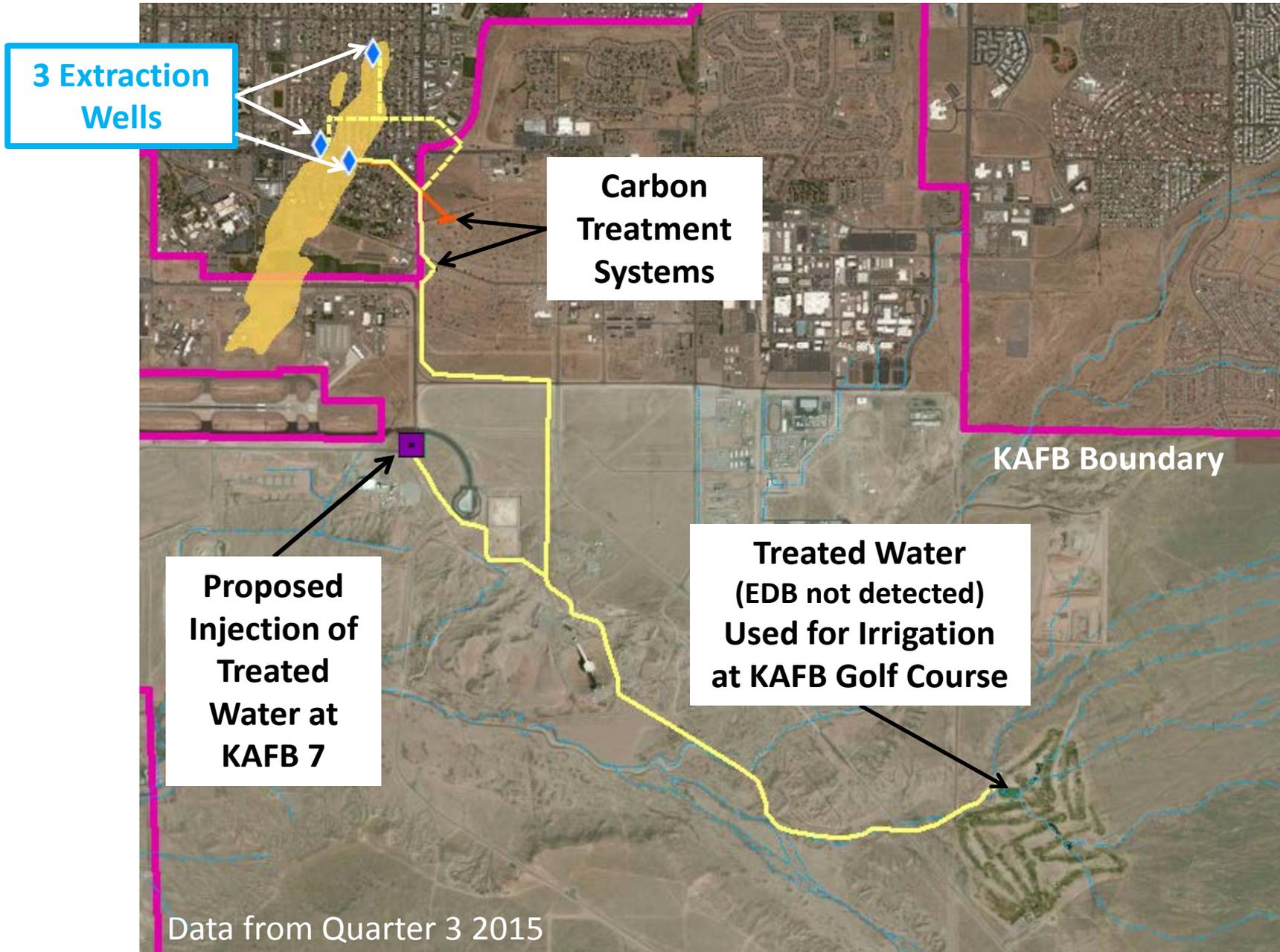


Days 1.0

Collapsing the EDB Plume

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Groundwater Treatment System



Groundwater Treatment System Construction

Mason Wall Grout Placement for GWTS Building



Installation of Discharge Pipe



Extraction Wellhead Construction

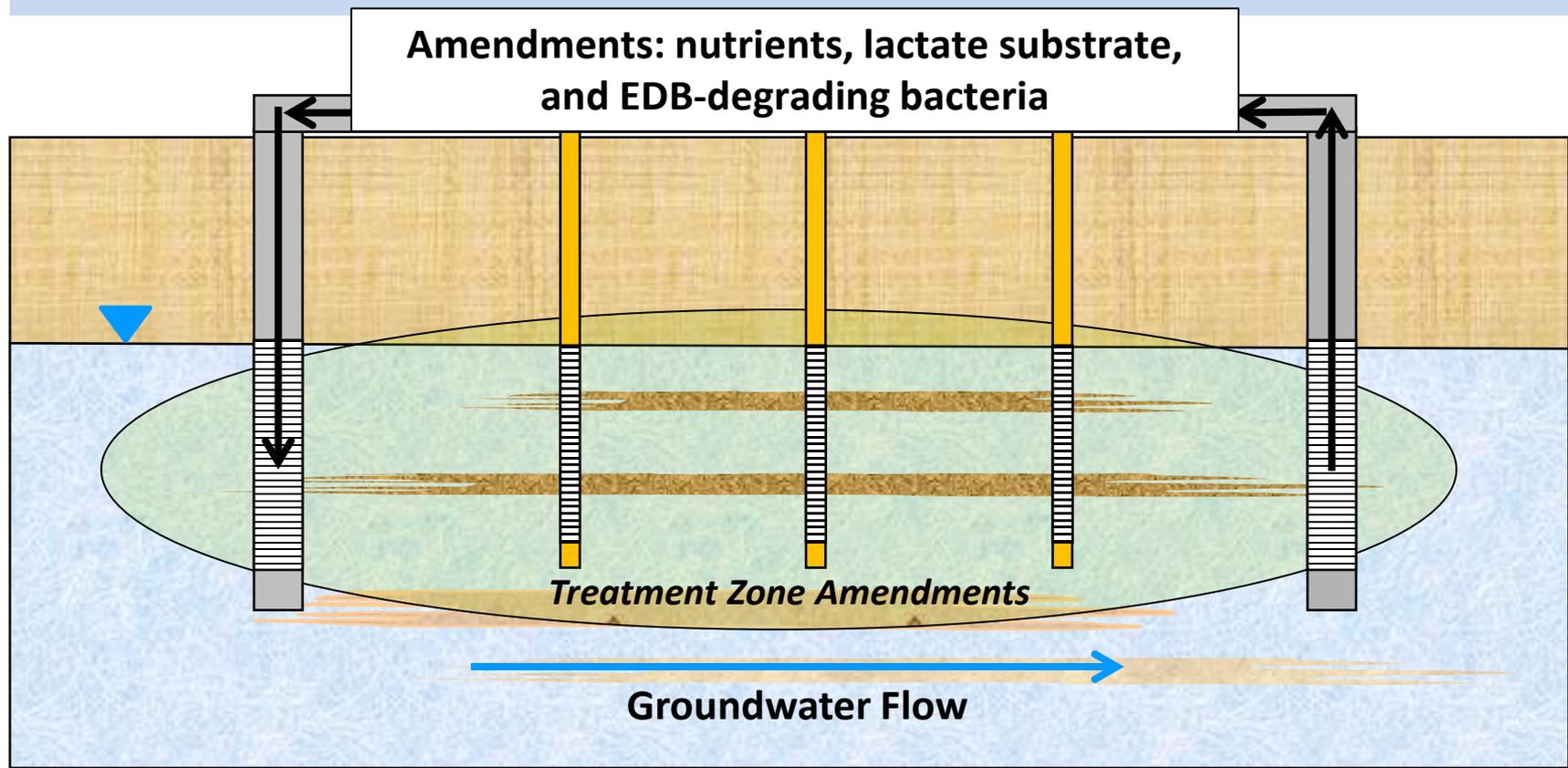


Welding Pipe Supports inside GWTS Building

Anaerobic Biodegradation Pilot Test

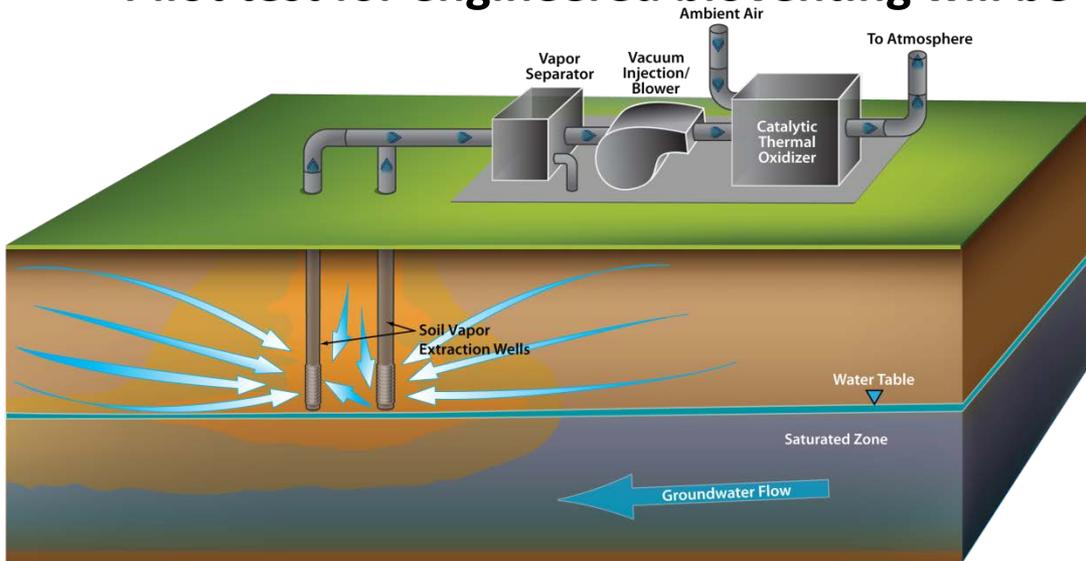
Groundwater Recirculation

- Pump groundwater - Add amendments in phased approach
- Inject amended water up-gradient to create recirculation cell to support anaerobic biodegradation EDB

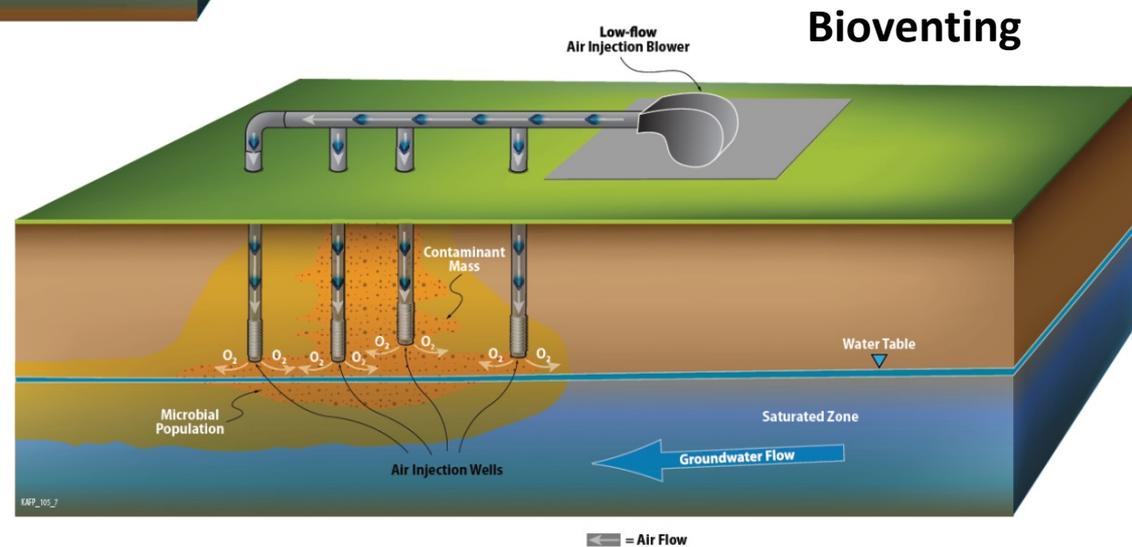


Soil Cleanup Progress

- More than 750,000 gallons of fuel have been vacuumed or biodegraded
- Pilot test for engineered bioventing will be conducted



Soil Vapor Extraction



Bioventing

Thank You Neighborhoods!



The Air Force, NMED, and all the collaborating organizations sincerely thank the neighborhoods for putting up with the temporary road blocks and noise from the well drilling rigs

Questions & Answers

- One question/comment per turn at the microphone
- Each question/comment will be allotted 3 minutes – please respect this time limit so others will have an opportunity to be heard
- In addition, comment cards have been made available
 - Return completed comment cards to Air Force staff
 - Questions will be incorporated into the FAQ portion of the Kirtland AFB BFF leak project website:
www.kirtlandjetfuelremediation.com

How do I get more information?

Contact NMED:

Dennis McQuillan,
KAFB project technical lead
dennis.mcquillan@state.nm.us
505-827-2140

Jill Turner,
KAFB project communications lead
jill.turner@state.nm.us
505-222-9548

NMED Website and Listserv: <http://www.nmenv.state.nm.us/>

Contact the Air Force:

Kate Lynnes
Highly Qualified Expert
Kirtland Air Force Base, NM 87117
505-846-8707
Email: kathryn.lynnes@us.af.mil

Air Force BFF-specific leak website: www.kirtlandjetfuelremediation.com

Kirtland AFB website at <http://www.kirtland.af.mil> in the Environmental Issues section for Public Records.