

Kirtland Fuel Leak Cleanup Project Update



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Kirtland Partnership Committee January 12, 2016



A Partnership for Success

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



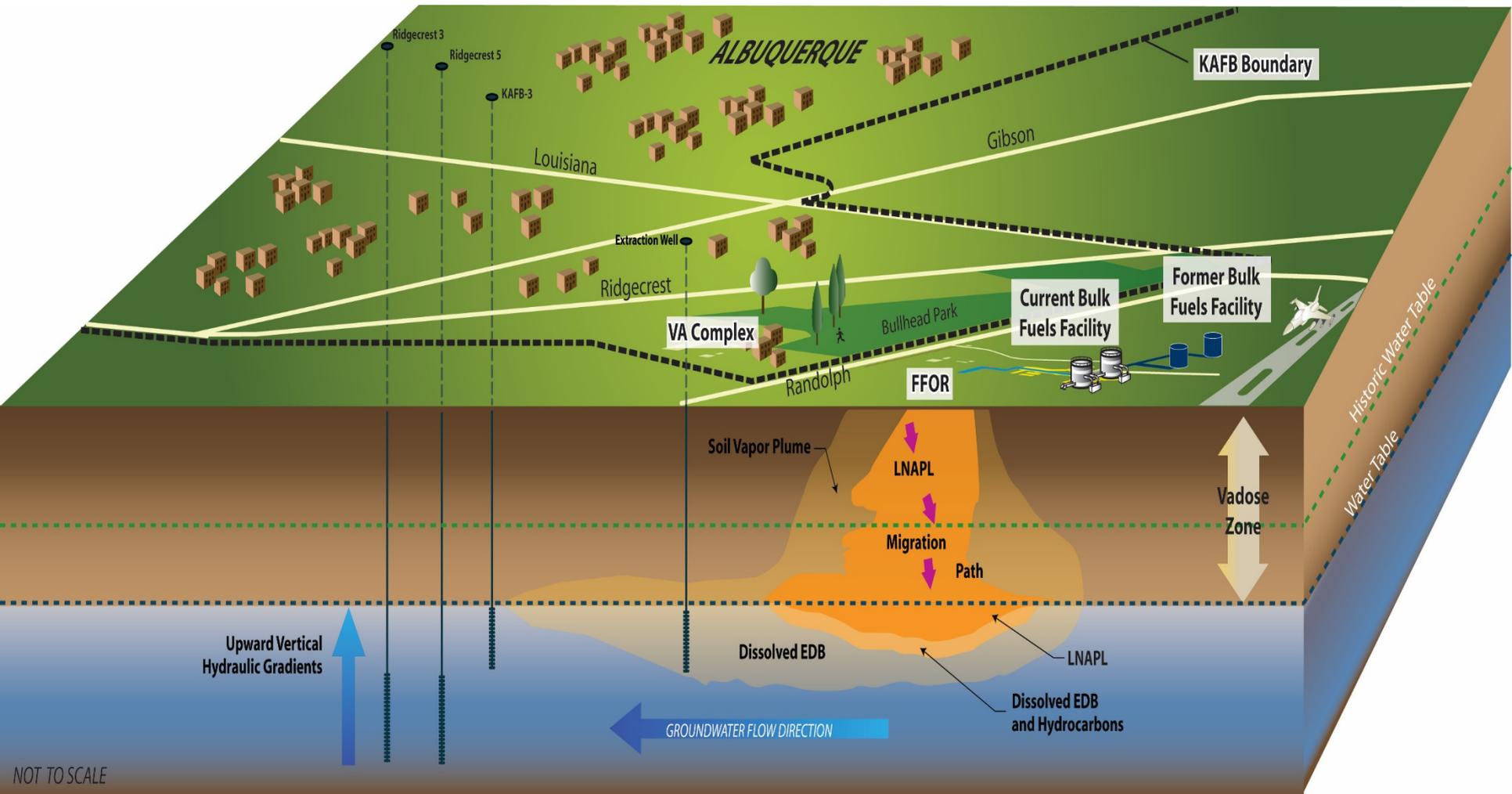
US Army Corps of Engineers



For the best of reasons

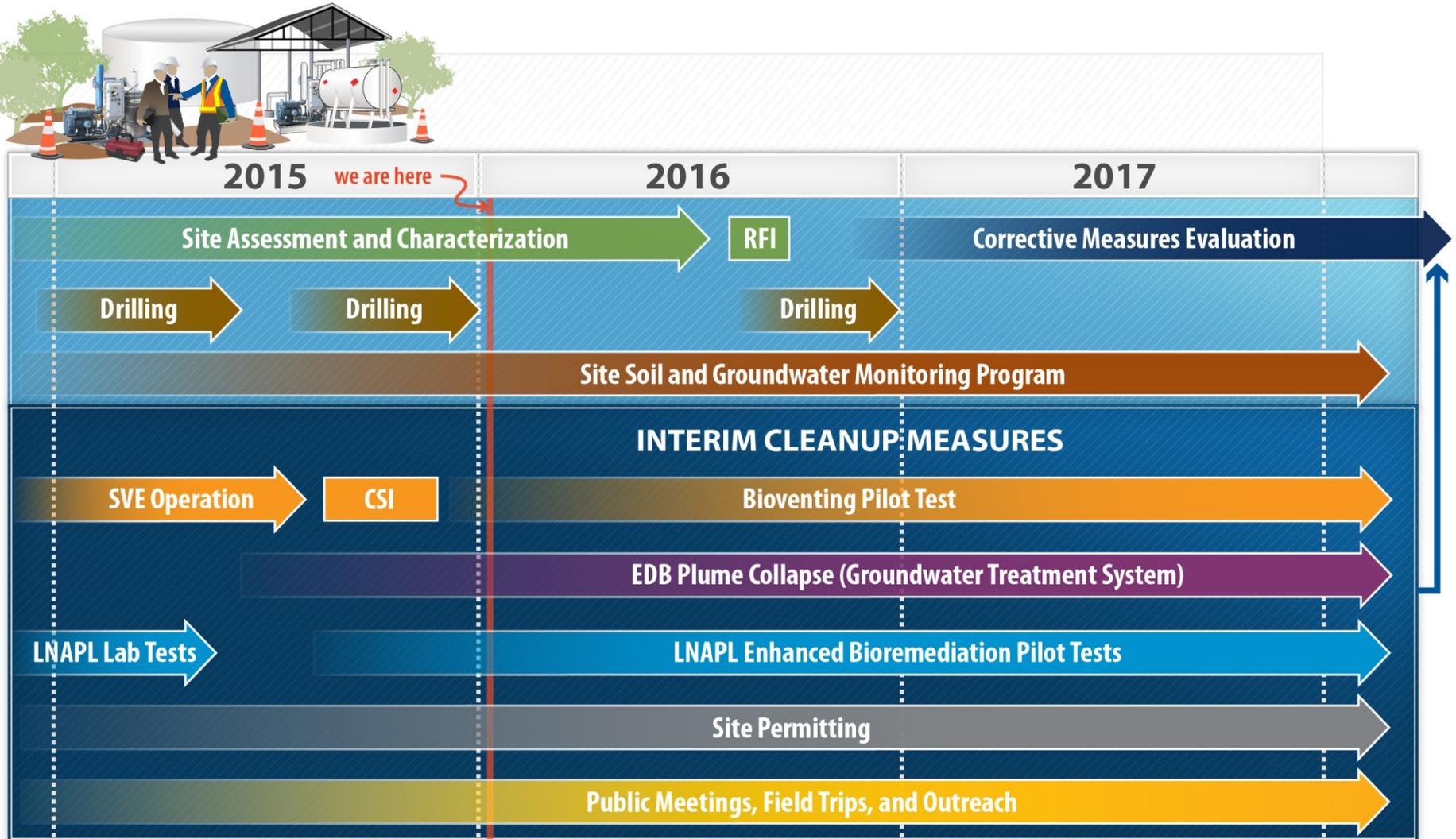
Thomson and Associates

Conceptual Site Diagram



NOT TO SCALE

Current Timeline



BFF Cleanup Three Prong Approach

- 1. Define the nature and extent of the vapor and fuel in the source area and dissolved benzene and ethylene dibromide (EDB) plumes in groundwater**
 - 135 groundwater monitoring and observation wells from 2000-2015**
 - 284 soil vapor monitoring points from 2000-2011**
- 2. Interim measure to collapse and treat dissolved EDB plume**
 - Extraction wells**
 - Groundwater Treatment System (GWTS)**
 - Disposition of treated water**

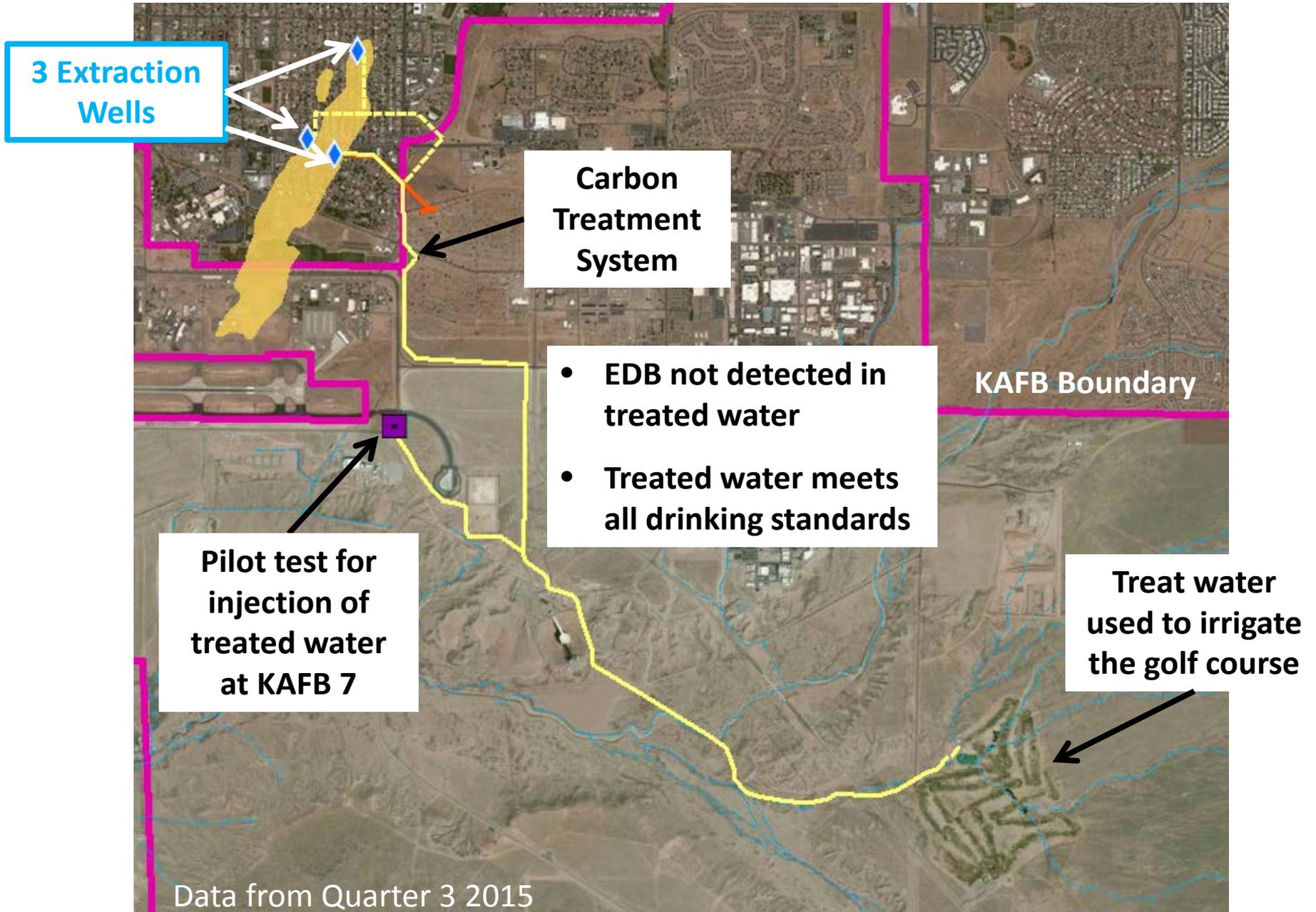
BFF Cleanup Three Prong Approach

- 3. Implemented interim measures to remediate the vapor and fuel in the source area**
 - **Excavated fuel contaminated soil between 2000-2014**
 - **Approximately 4,822 tons soil removed**
 - **Soil vapor extraction (SVE) removed, treated, and degraded vapor and fuel between 2003-2015**
 - **Over 550,000 gallons of fuel**
 - **SVE enhanced biodegradation treated more than 200,000 gallons of fuel**

2015 Highlights

- **Further characterized dissolved EDB plume defined the northern end**
- **Started extracting and treating EDB in June 2015**
 - **Approximately 18 M gallons of groundwater were treated; removing 7,658 mg of EDB**
 - **Completed aquifer performance test**
- **Constructed and fully operational GWTS online in December 2015**
- **Treated water will be used for irrigation and regional injection as beneficial reuse**
- **Evaluated SVE technology effectiveness by performing rebound test**
- **Public outreach: three meetings, two field trips, numerous presentations to colleges, professional organizations, and community events (~10 events attended), and NMED published 2015 Strategic Plan**

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

Groundwater Treatment System



NMED 2016 Strategic Plan

- **Continues Three Prong Approach initiated in 2014 to cleaning up the BFF**
- **Updated annually to reflect project status and to state goals for the upcoming year**
- **Comment period closes on 15 January 2016**
- **Final will be available by the end of February**

2016 Draft Strategic Plan is available to review at
<http://www.nmenv.state.nm.us/>

Plume Anatomy

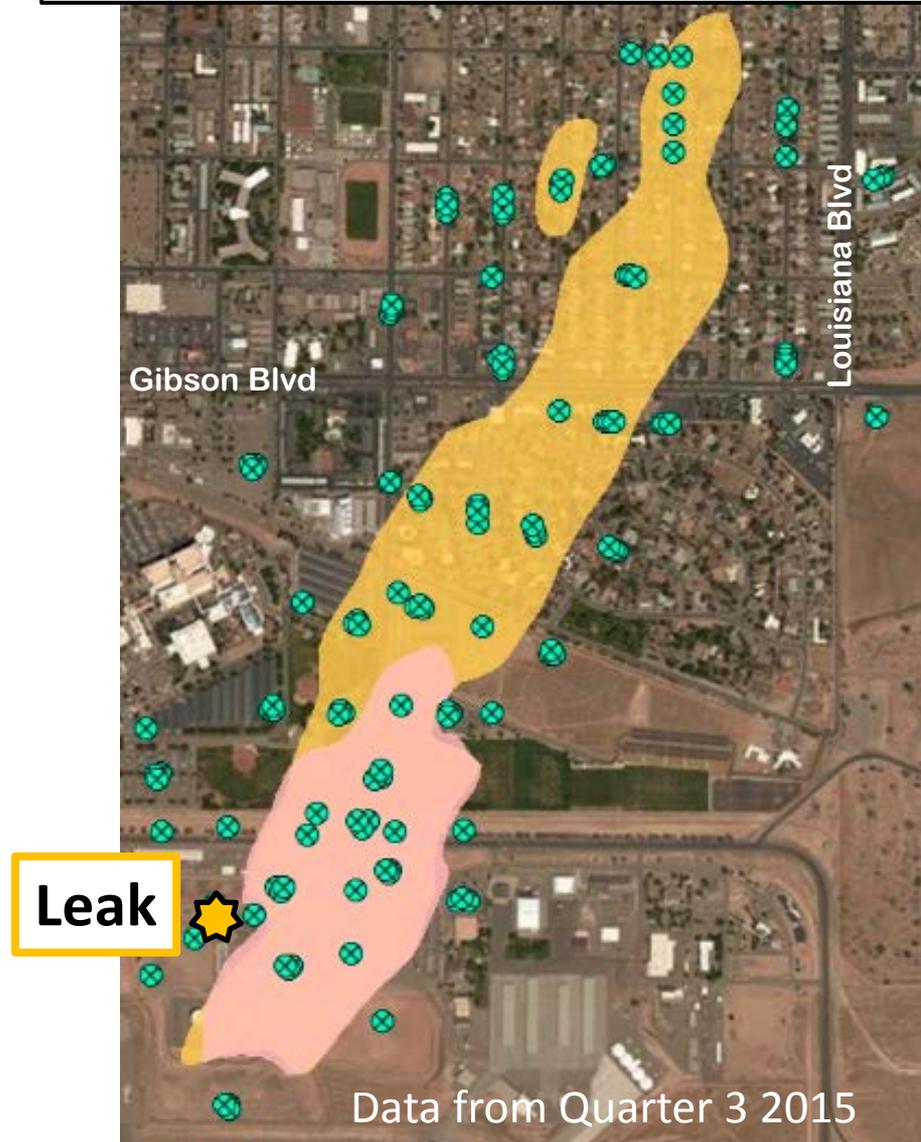
Source Area:

- 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



**Groundwater
Extraction
Wells**

Gibson

Louisiana

Completed:

- Soil excavation
- Soil Vapor Extraction (SVE)

Drinking Water Protection

Monthly testing of drinking water supply wells in the vicinity of the plume shows no detections of fuel contaminants

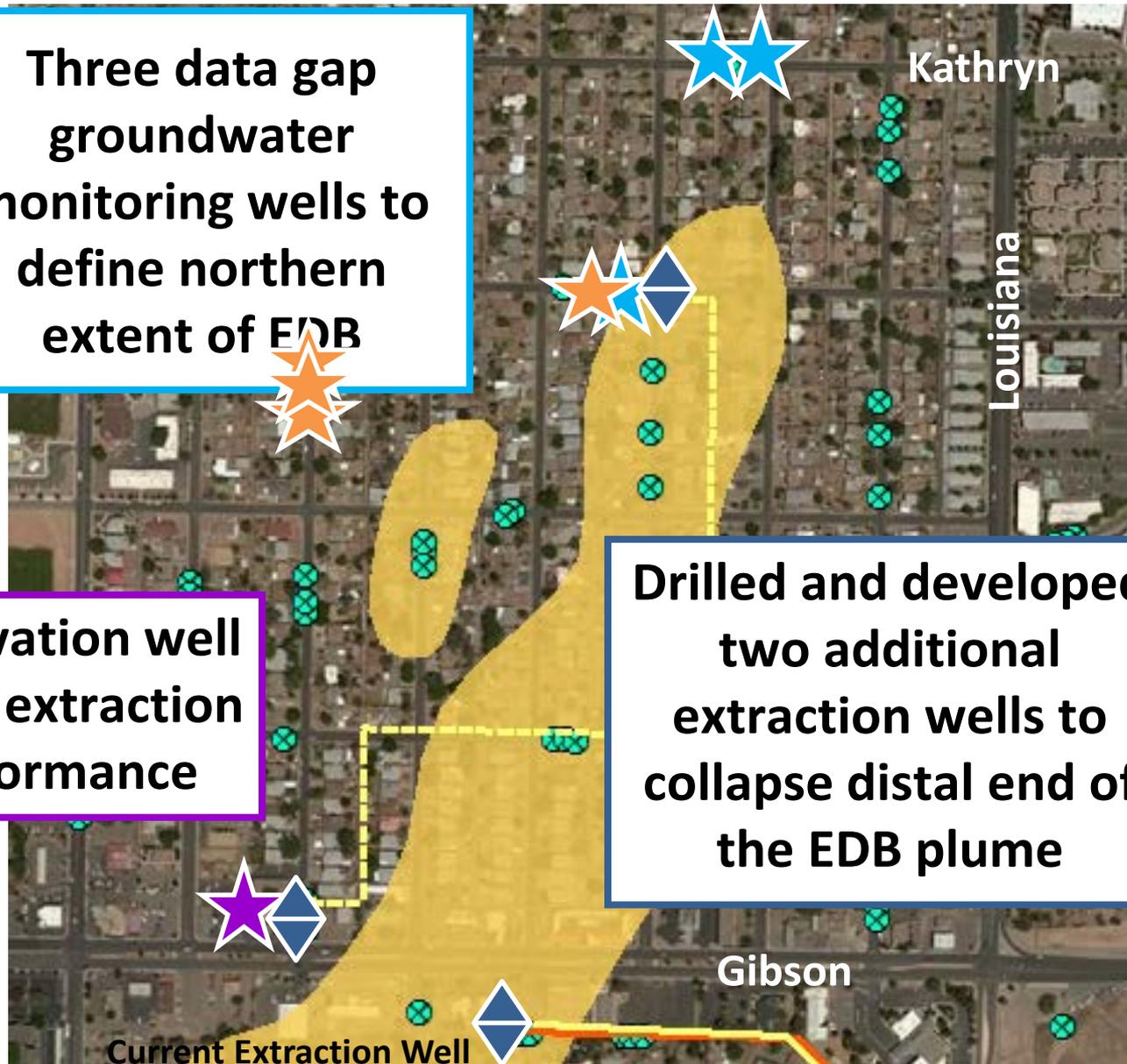


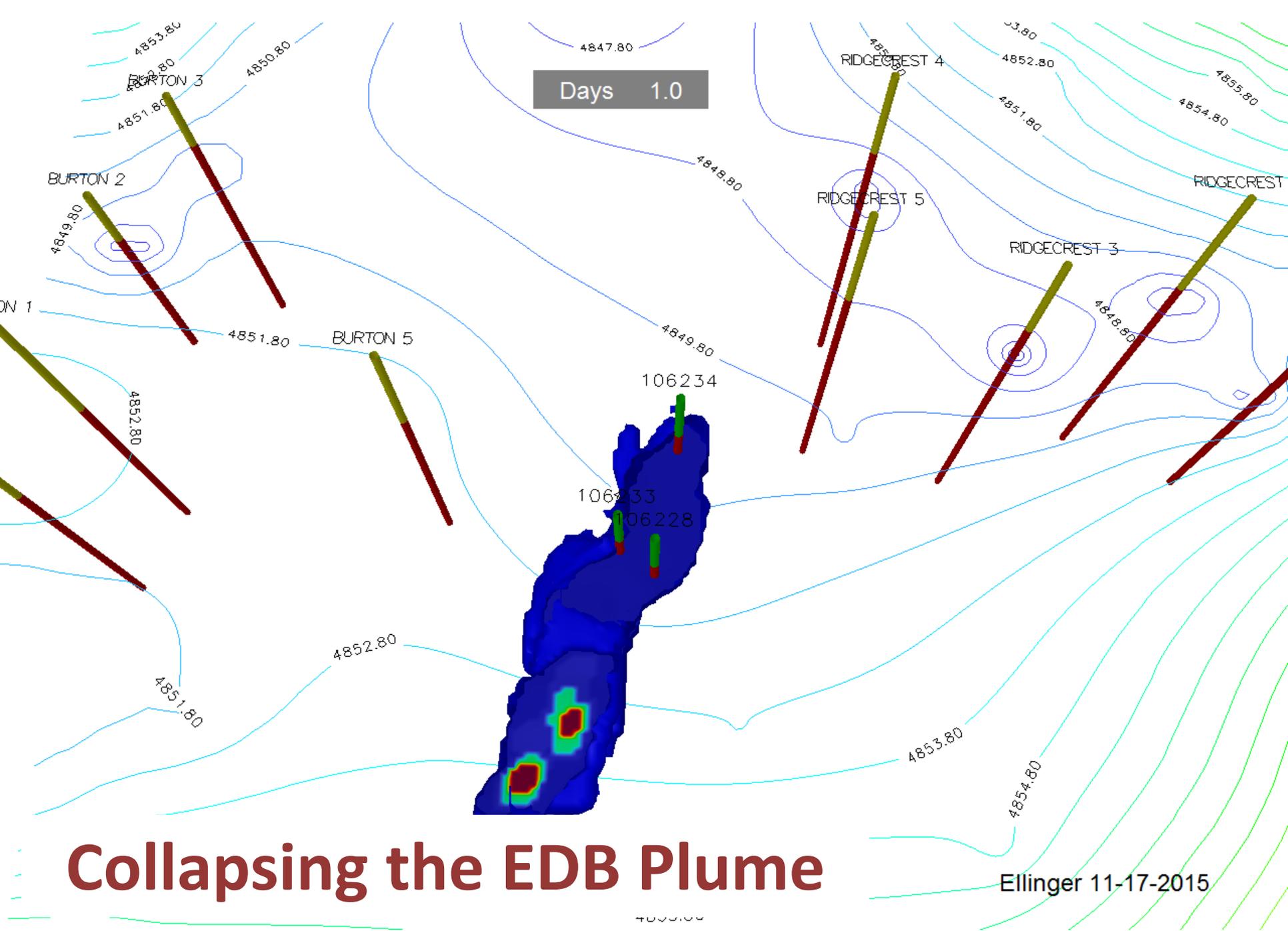
Additional Well Drilling Completed

Three data gap groundwater monitoring wells to define northern extent of EDB

One observation well to monitor extraction well performance

Drilled and developed two additional extraction wells to collapse distal end of the EDB plume



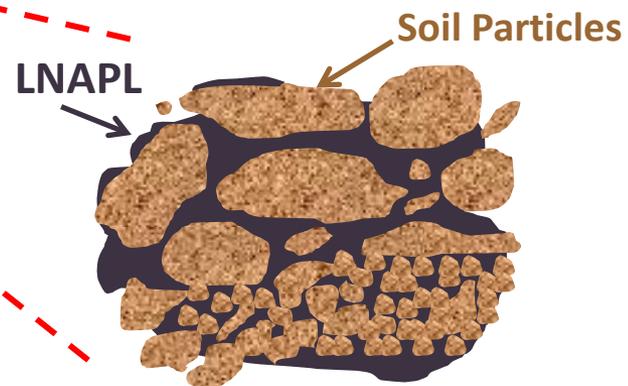
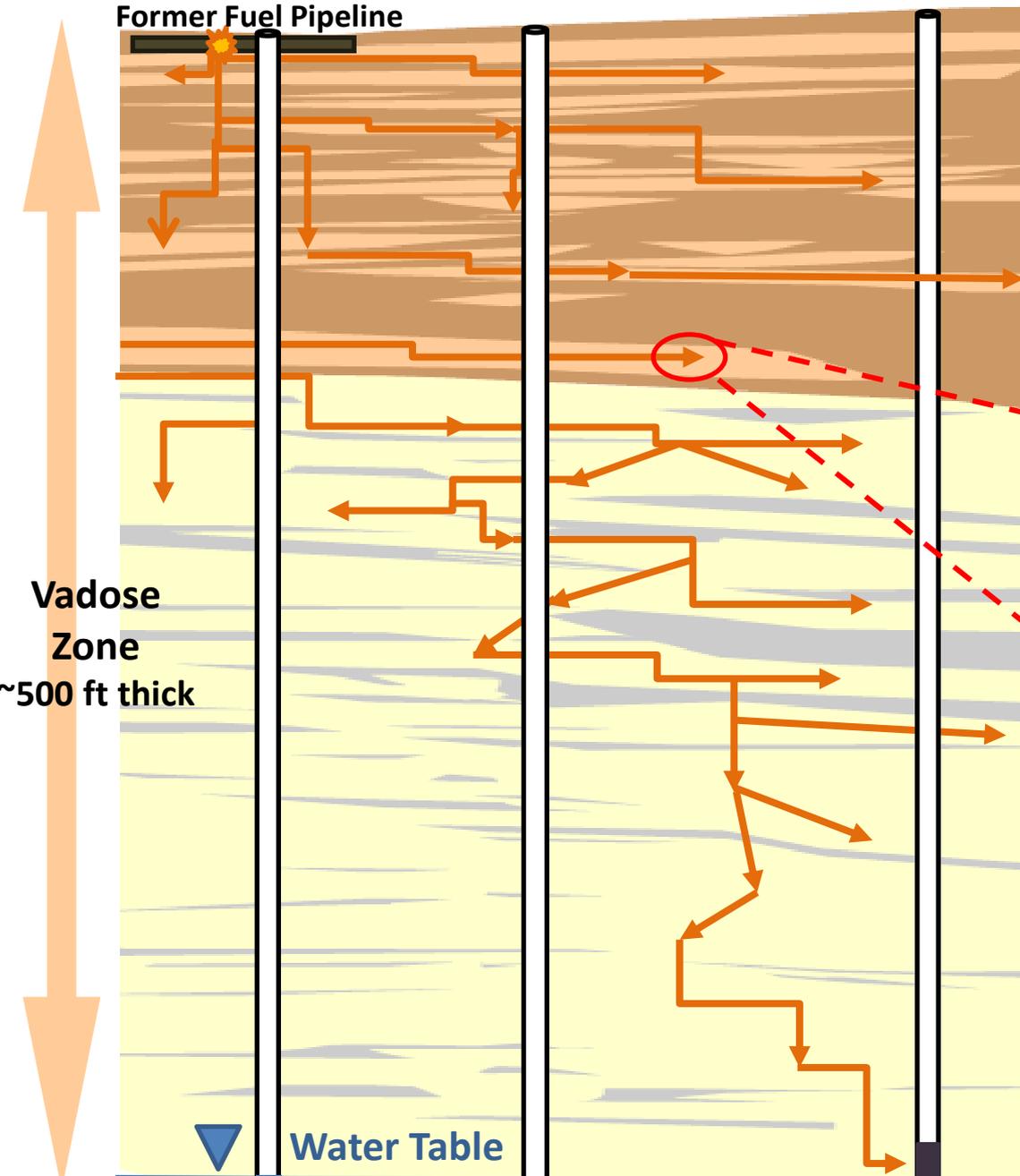


Days 1.0

Collapsing the EDB Plume

Ellinger 11-17-2015

Former Fuel Pipeline



Alluvial Fan Sediments



Ancestral Rio Grande Sediments



Conceptual Example;
Not to Scale (T9)

LNAPL detected on water table in the past

Soil Vapor Extraction Shutdown Test



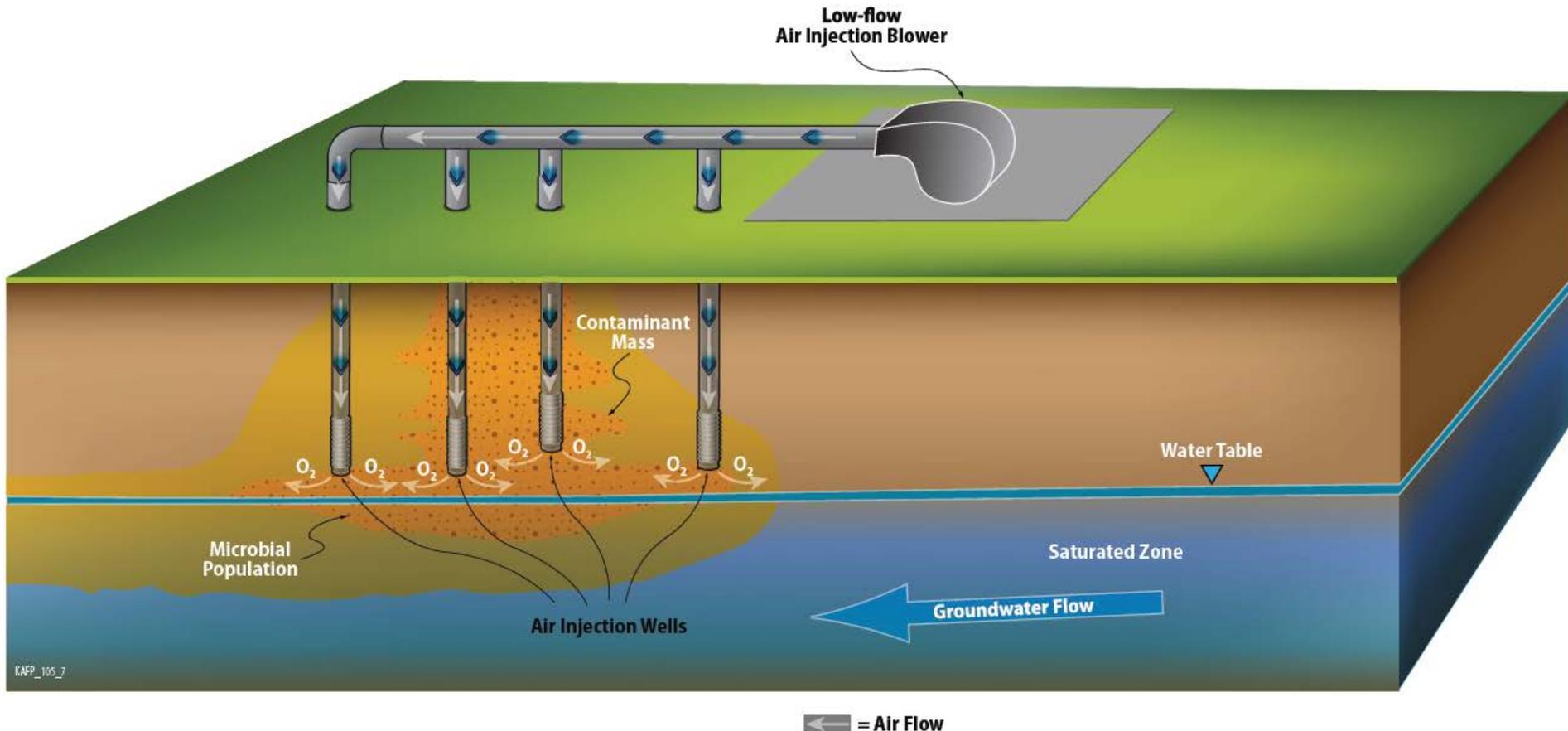
Objective: Monitor in situ respiration and hydrocarbon rebound in the vadose zone over several months (April to December 2015)



- **Evaluated fuel vapor, oxygen, and carbon dioxide concentration trends from soil vapor monitoring points**
- **Assessed fuel for increasing, stabilizing, and decreasing trends**
- **Determine technology effectiveness and what best path forward**

Bioventing Pilot Test

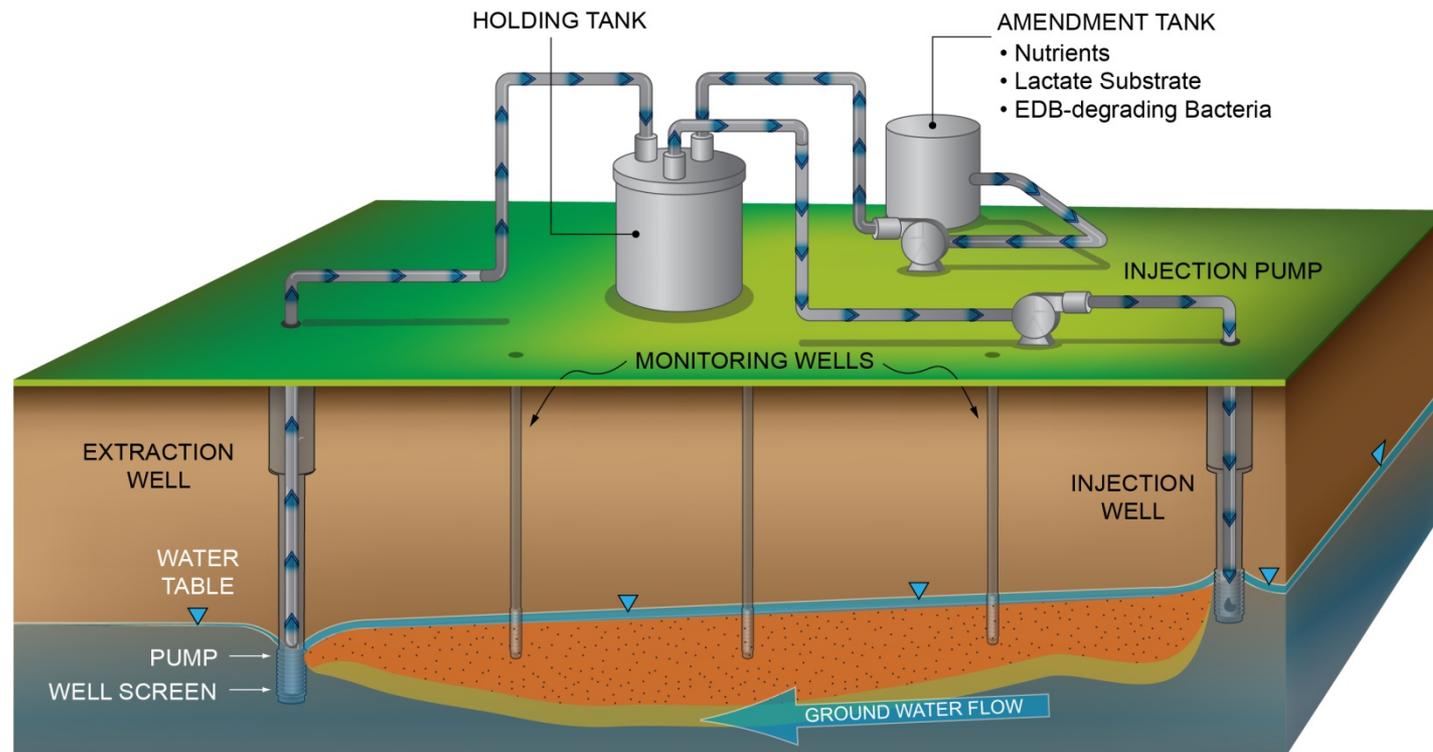
Air is injected into the vadose zone to deliver oxygen to soil bacteria to help them biodegrade contaminants



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



Critical Work for 2016

- **Installation of two additional groundwater extraction wells**
- **Installation of data gap groundwater monitoring wells**
- **Ongoing extraction and treatment of dissolved EDB**
- **Collect continuous core in source area**
- **Design, build, and operation of bioventing pilot test in source area**
- **Begin anaerobic biodegradation pilot test**



Public Outreach for 2016

- **NMED to publish 2016 Strategic Plan end of February**
- **Public Meetings**
 - **March 31**
 - **July 14**
 - **November 10**
- **Field Trips**
 - **April 23**
 - **October 15**
- **Continue presenting and attending events to further communication and education**



Drilling & Hydrologic Investigations



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

How do I get more information?

Contact the Air Force:

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Air Force Bulk Fuels Facility website: www.kirtlandjetfuelremediation.com

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

Contact NMED:

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