

Kirtland Air Force Base Fuel Leak Cleanup

Presenters: Kathryn Lynnes, Air Force
Diane Agnew, New Mexico Environment Department
Adria Bodour, Air Force Civil Engineer Center



**Water Protection Advisory Board
Project Status Update
March 10, 2017**



Welcome



Kate Lynnes
Air Force Senior Advisor

Public Workshop

March 11, 2017

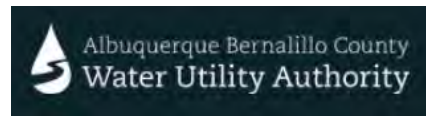
9 am to 12:00 pm

**Christ United Methodist Church
6200 Gibson Blvd. SE**

9 - 9:15 am	Meet and Greet along with Poster Session
9:15 - 11:30 am	Workshop Topic Sessions
11:30 - 12:00 pm	Final Discussions and Wrap-up

A Partnership for Success

A collaborative technical team is solving the complex hydrogeologic and engineering challenges posed by the fuel leak with support from Albuquerque's neighborhood groups



US Army Corps of Engineers



Sundance Consulting Inc.

Westside Coalition
Neighborhood Assoc.

Siesta Hills
Neighborhood Assoc.



ABQ City Council
District 6 Coalition of
Neighborhood Assocs.



Elder Homestead
Neighborhood Assoc.

Christ United Methodist Church

HAWLEY GEOMATTERS

Thomson and Associates

Citizen Action
New Mexico

Project Update



Diane Agnew

New Mexico Environment
Department
Hydrologist



Dr. Adria Bodour

Air Force Civil Engineer Center
Environmental Remediation Specialist

2016 Strategic Plan

New Mexico Environment Department (NMED) Final 2016 Strategic Plan is available online (www.env.nm.gov/kafbfuelplume/kafb-fuel-plume-documents/)

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

Strategies to Achieve the Goal:

1. Implement a robust site monitoring & wellhead protection program
2. Characterize and remediate Light Non-Aqueous Phase Liquid (LNAPL), impacted soil, and associated dissolved phases in the source area
3. Collapse the dissolved ethylene dibromide (EDB) plume
4. Meet or exceed all requirements for providing public comment, information and involvement

2016 Strategic Plan Highlights

Strategy #1 Highlights:

- Quarterly monitoring of monitoring well network shows a relatively stable plume
- Sentinel wells show no detections of EDB
- Monthly testing of drinking water supply wells show no detections of any EDB

Strategy #2 Highlights:

- Work plan approval of LNAPL interim measure for in situ bioremediation
- Working group discussions to evaluate data and scope 2017 pilot tests and LNAPL continuous coring locations

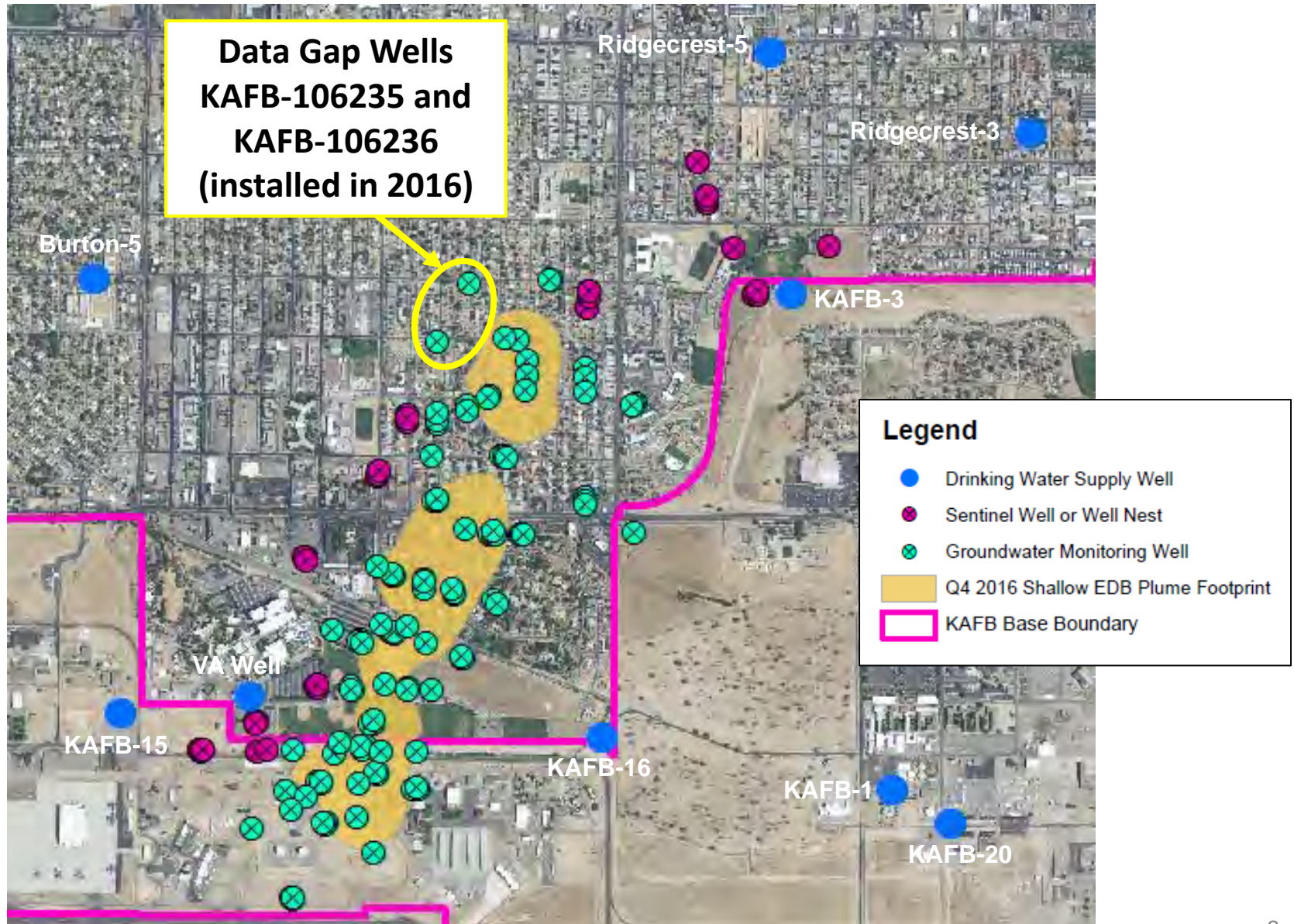
Strategy #3 Highlights:

- Treated groundwater contains no detectable fuel constituents
- Expanded groundwater treatment system (GWTS) capacity to 800 gallons per minute (gpm)
- 2-3 extraction wells operational throughout 2016

Strategy #4 Highlights:

- NMED and the Air Force conducted a total of 20 presentations or outreach events

Site Monitoring & Wellhead Protection



EDB Plume Data Gap Wells

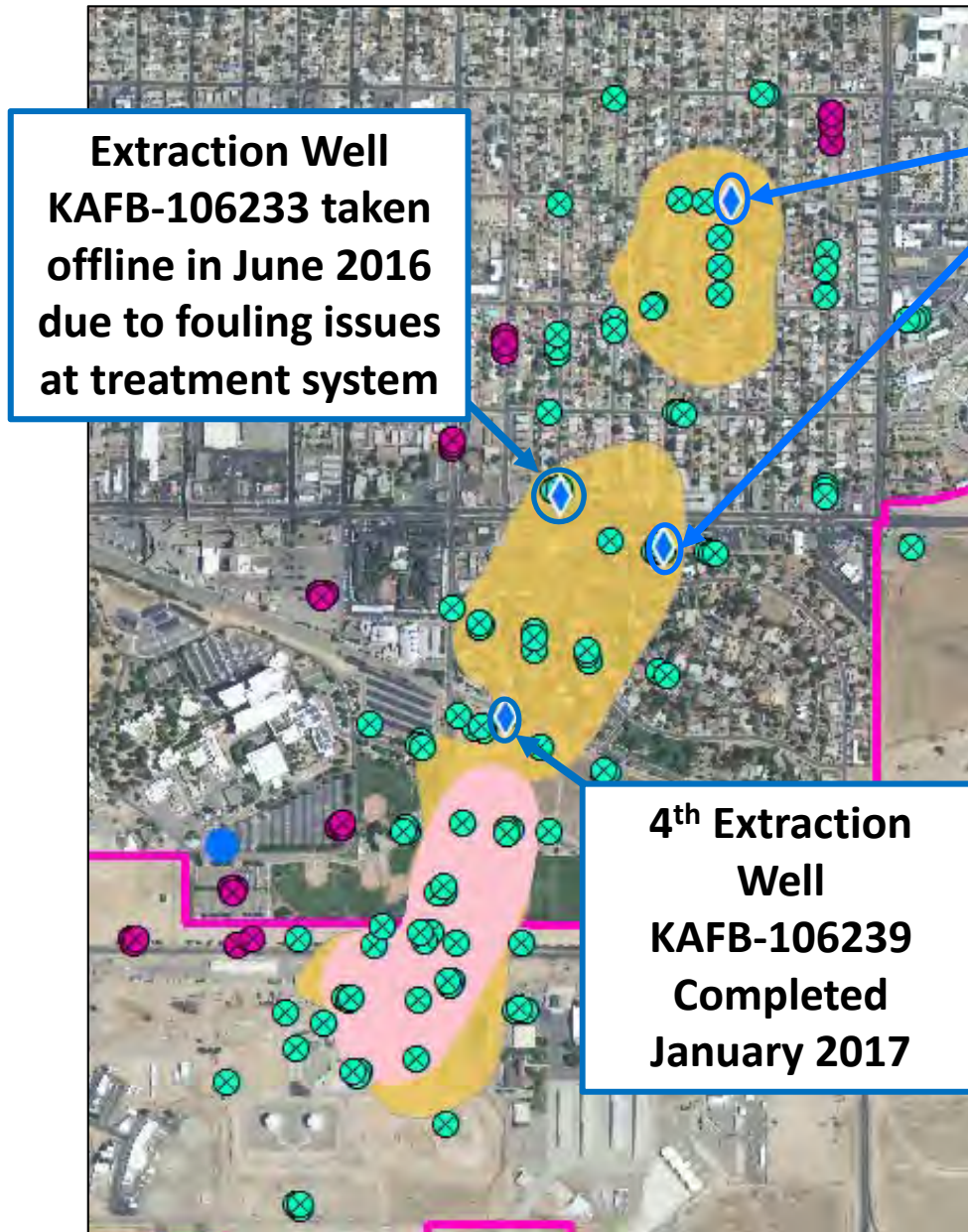
- Installed two data gap groundwater monitoring wells nests
- Nested well design provides:
 - Better vertical definition
 - Reduced impact to neighborhoods
 - Installation of “contingency well” to account for continued rising water table
- 1st samples collected January 2017; no EDB was detected



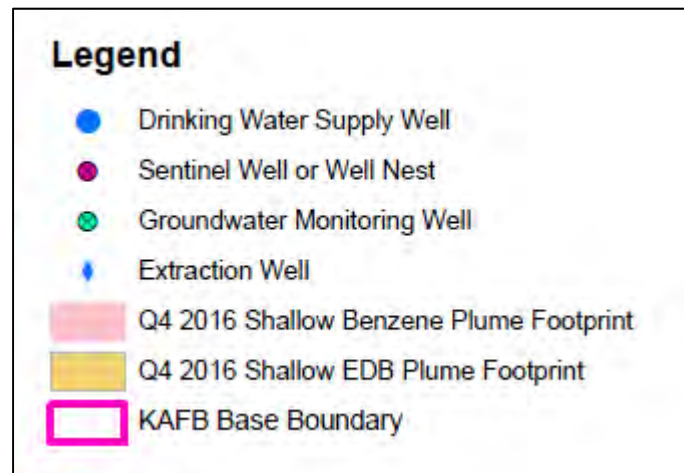
Groundwater Sampling Optimization

- Collect high quality data while reducing cost, minimizing neighborhood impacts, and increasing worker health and safety
- Data-based iterative process to optimize monitoring program
- Changing to passive diffusion bag (PDB) sampling at 75 residential groundwater monitoring wells
 - Pilot test results demonstrated PDB sampling was similar to mechanical pump sampling

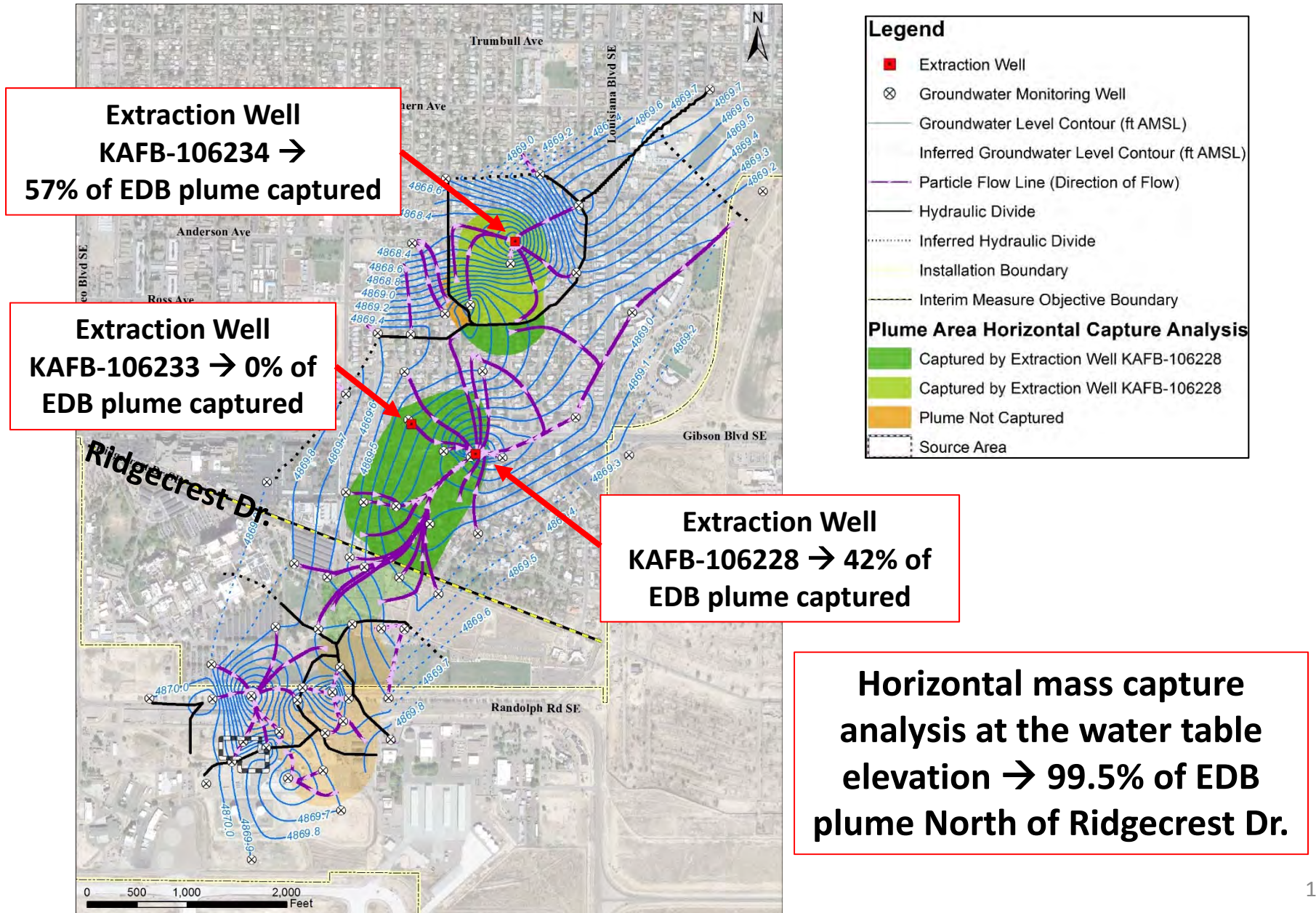
EDB Plume Collapse



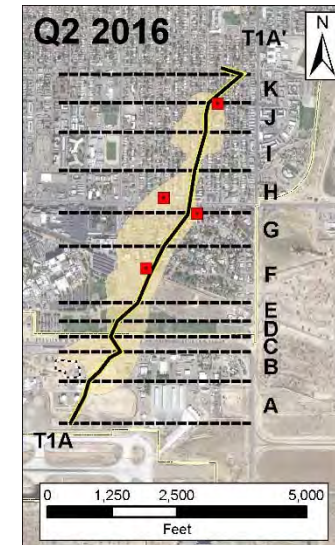
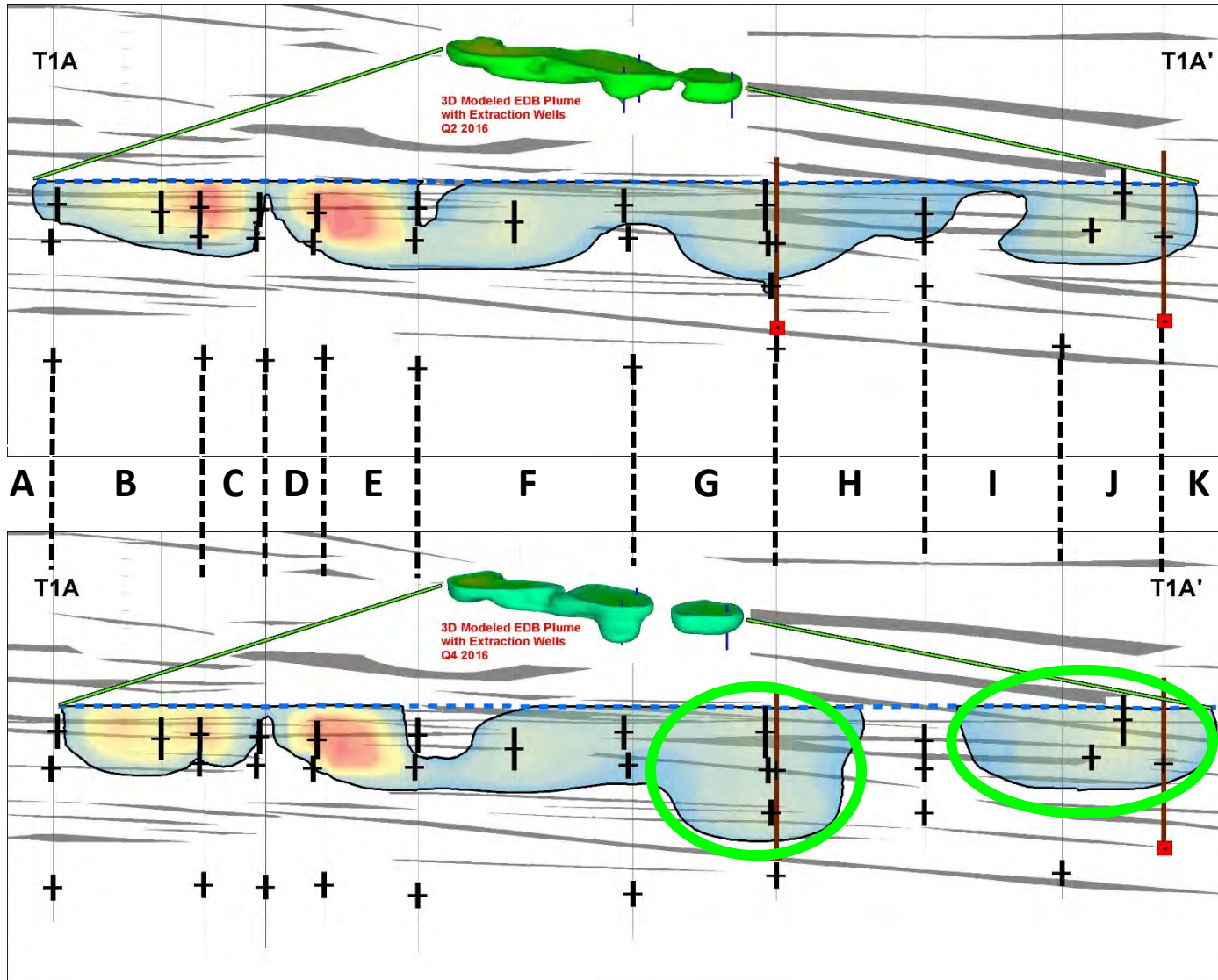
- 2 extraction wells operational – total rate of 300 gpm
- 151.7 million gallons of groundwater has been treated, with 48.4 grams of EDB removed



Plume Capture Update



Plume Reduction Analysis



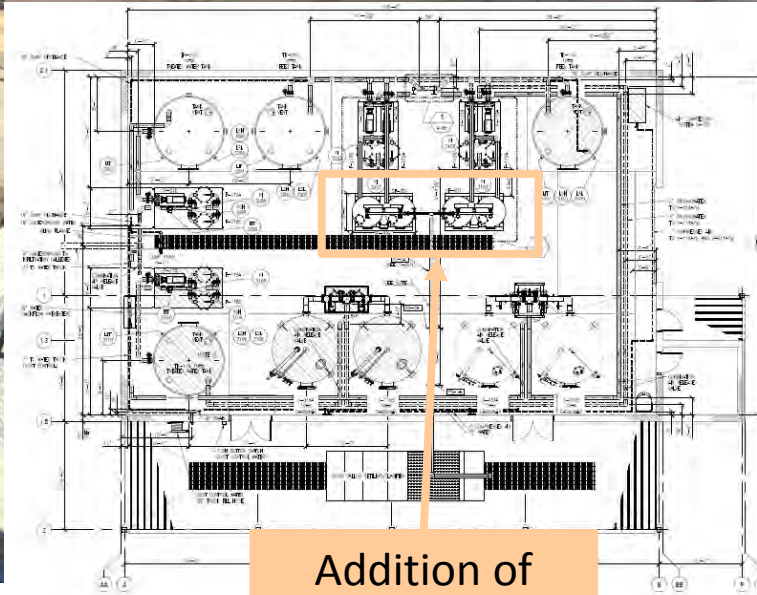
- Data Demonstrates**
- EDB mass is moving towards extraction wells
 - Increased mass concentrations at extraction wells

GWTS Expansion

2 New 20,000 pound granular activated carbon (GAC) Tanks added



Sacrificial anode added to extraction wells to prevent corrosion

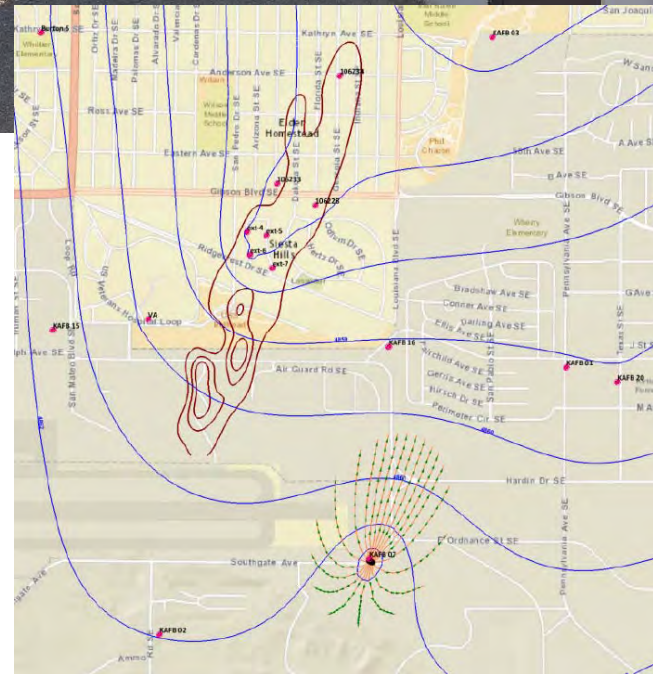


Addition of Sand Filters Pre-Treatment



KAFB-7 Injection Pilot Test

- Pilot test gravity-fed injection at KAFB-7 from February 20 thru June 21, 2016
- No contaminants in treated effluent
- Initial vs. steady-state operations during injection
 - Groundwater rose with injection into KAFB-7
 - 2-14 feet vs 3-6 feet
- Minimal aquifer response to observation wells surrounding KAFB-7



UIC Discharge Permit

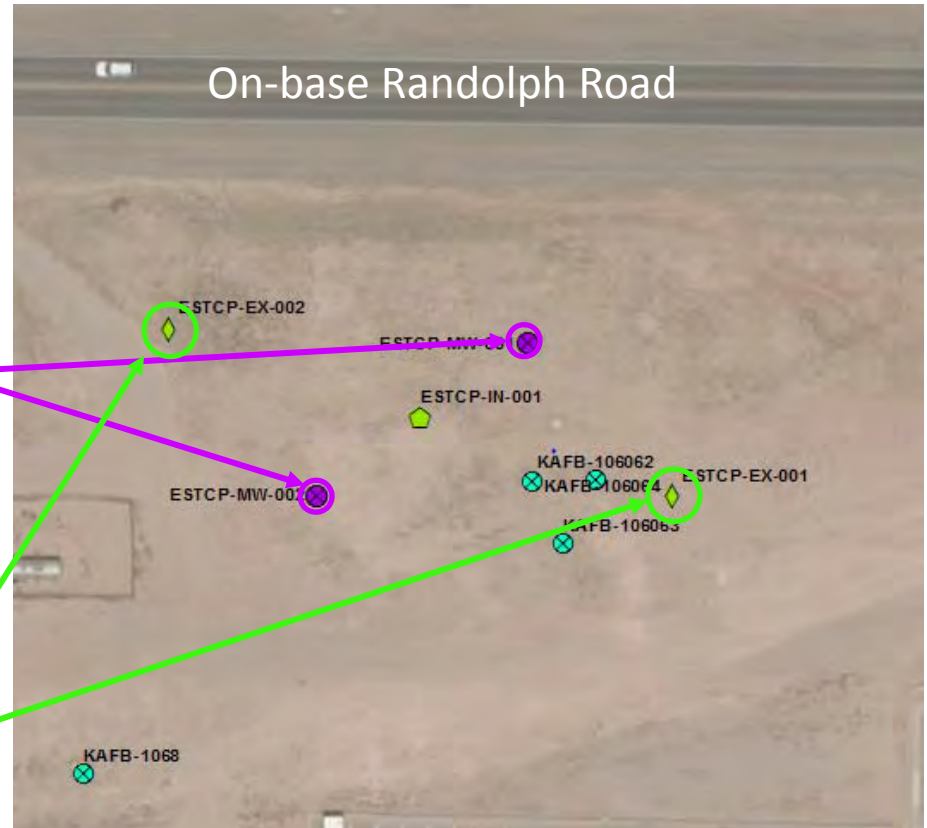
- Air Force has applied for a Class V Underground Injection Control (UIC) discharge permit from the NMED Ground Water Quality Bureau (GWQB) for KAFB-7 and up to four additional UIC wells
- Draft permit was out for public comment which ended on February 13, 2017 for 90-day public comment period
- Revised draft permit was streamlined and re-posted on March 3, 2017 for a additional 30-day public comment period
- Air Force is currently discharging to KAFB-7 under a Temporary Permission issued by the NMED GWQB

What's next for EDB Plume Collapse?

- Rehabilitate and redevelop extraction well KAFB-106233 on California St./Gibson Blvd.
- Design and construct conveyance pipeline from new extraction well KAFB-106239 on Ridgecrest Dr. to GWTS
- Operate GWTS with all 4 extraction wells
- Continue plume capture evaluation through tracking multiple lines of evidence which will feedback to GWTS operations

EDB In Situ Biodegradation Pilot Test

- Field activities began in January 2017
- Drilled and installed two groundwater monitoring well nests
- Drilling extraction wells; one extraction well installed
- Pilot test Phase 1 target start date May 2017



Legend	
	Groundwater Monitoring Well
	ESTCP Proposed Injection Well
	ESTCP Proposed Observation Monitoring Well
	ESTCP Proposed Extraction Well

RCRA Facility Investigation (RFI) Report

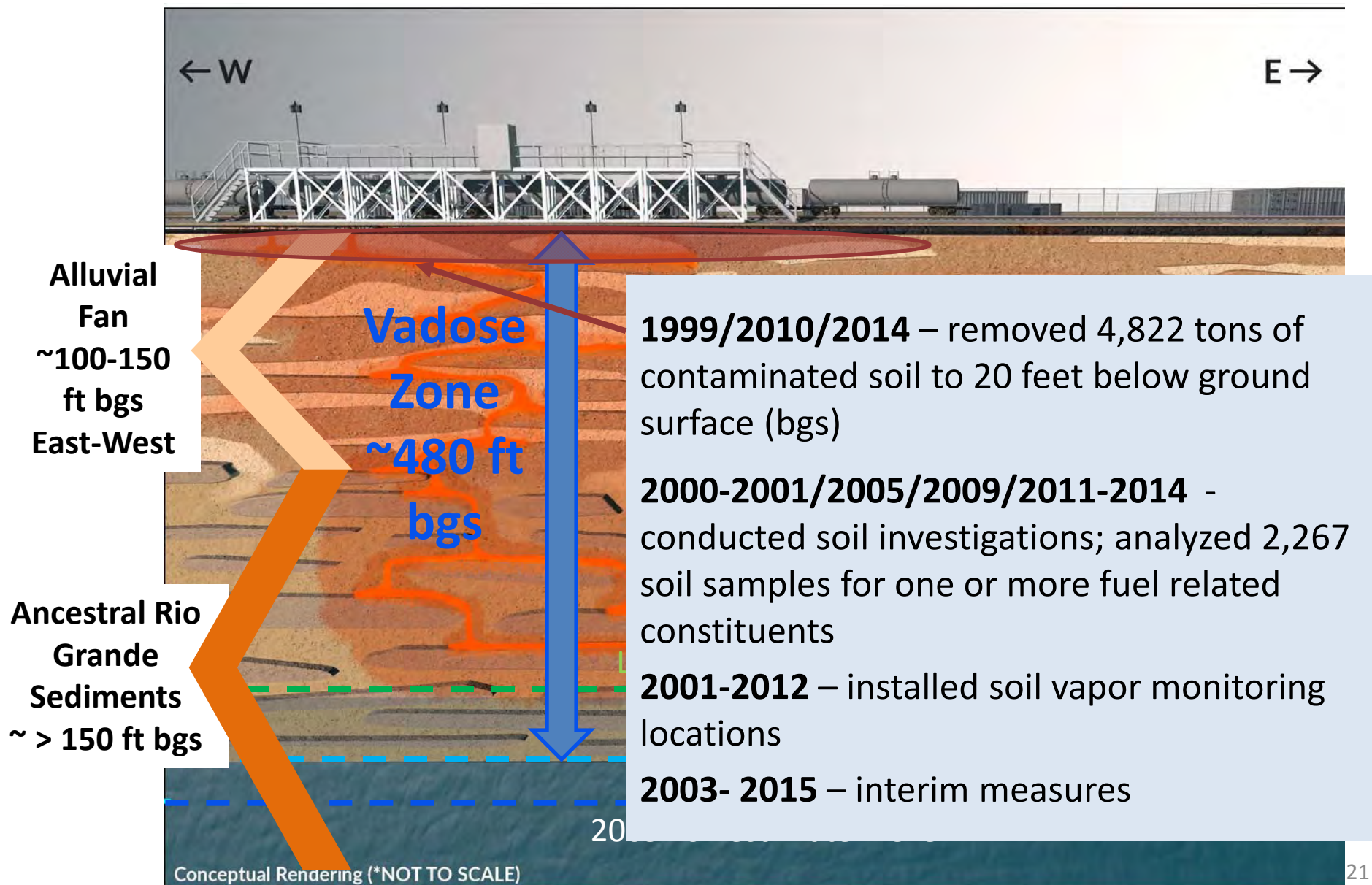
Air Force officially submitted the RFI Report on January 31, 2017:

- Describes nature and extent of contamination in the soil and groundwater
- Provides a comprehensive evaluation of site data from discovered release 1999 to December 2015
- Follows regulatory process to define nature and extent
- Presents data based on media (soil, vapor, and groundwater)
- Presents the conceptual site model (CSM) showing the fate and transport of contamination through media

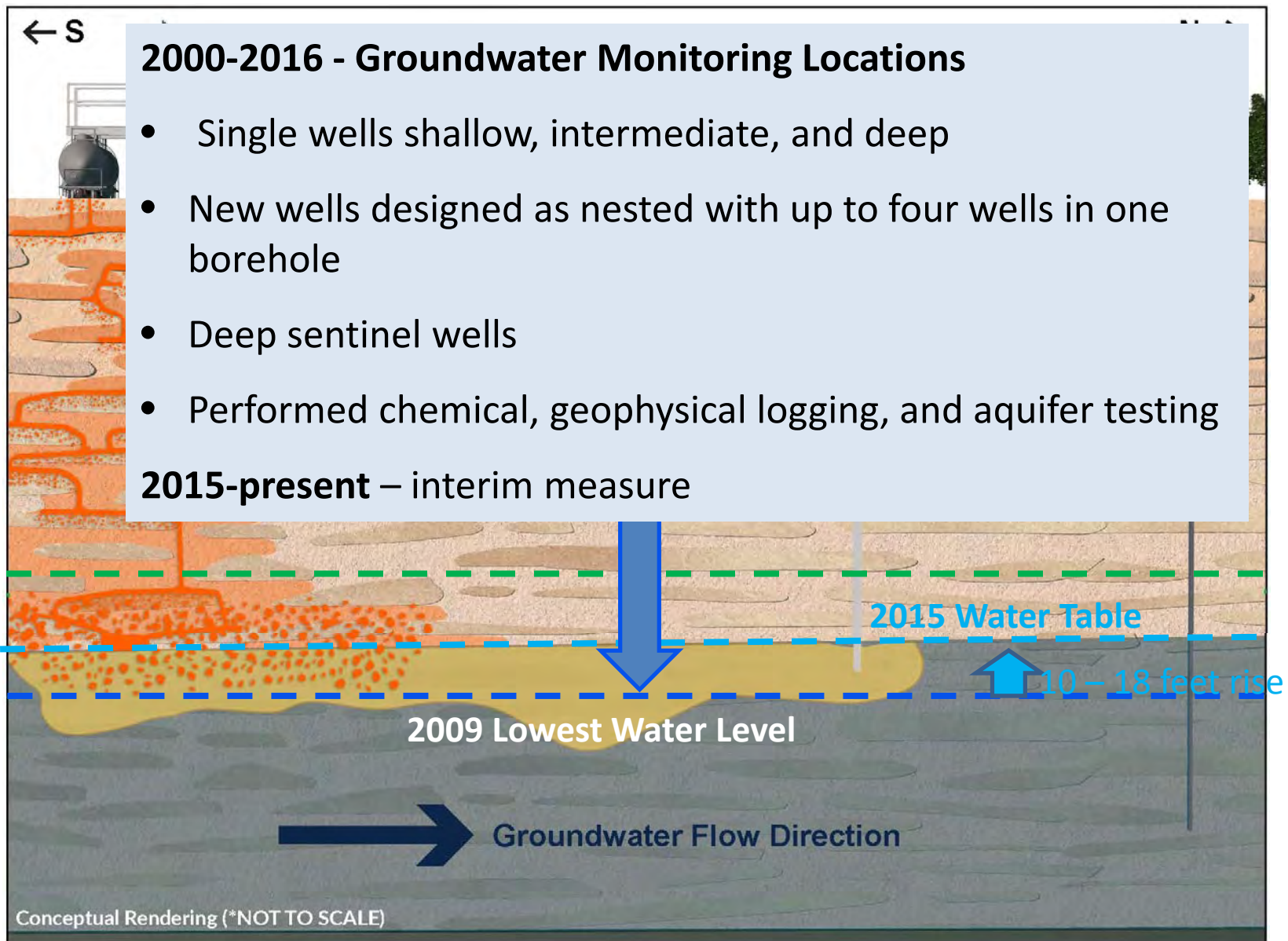
Fate and Transport

- Jet fuel in pipe changes when it enters the environment
- Factors and processes that affect jet fuel change
 - Physical (e.g., air, water, soil, advection, diffusion, etc)
 - Chemical (e.g., zinc, sodium, calcium, hydrolysis, etc)
 - Biological (e.g., worms, amoebas, bacteria, biodegradation, etc)
 - Time
 - Complexity
- Jet fuel is composed of many constituents and their behavior in the environment varies

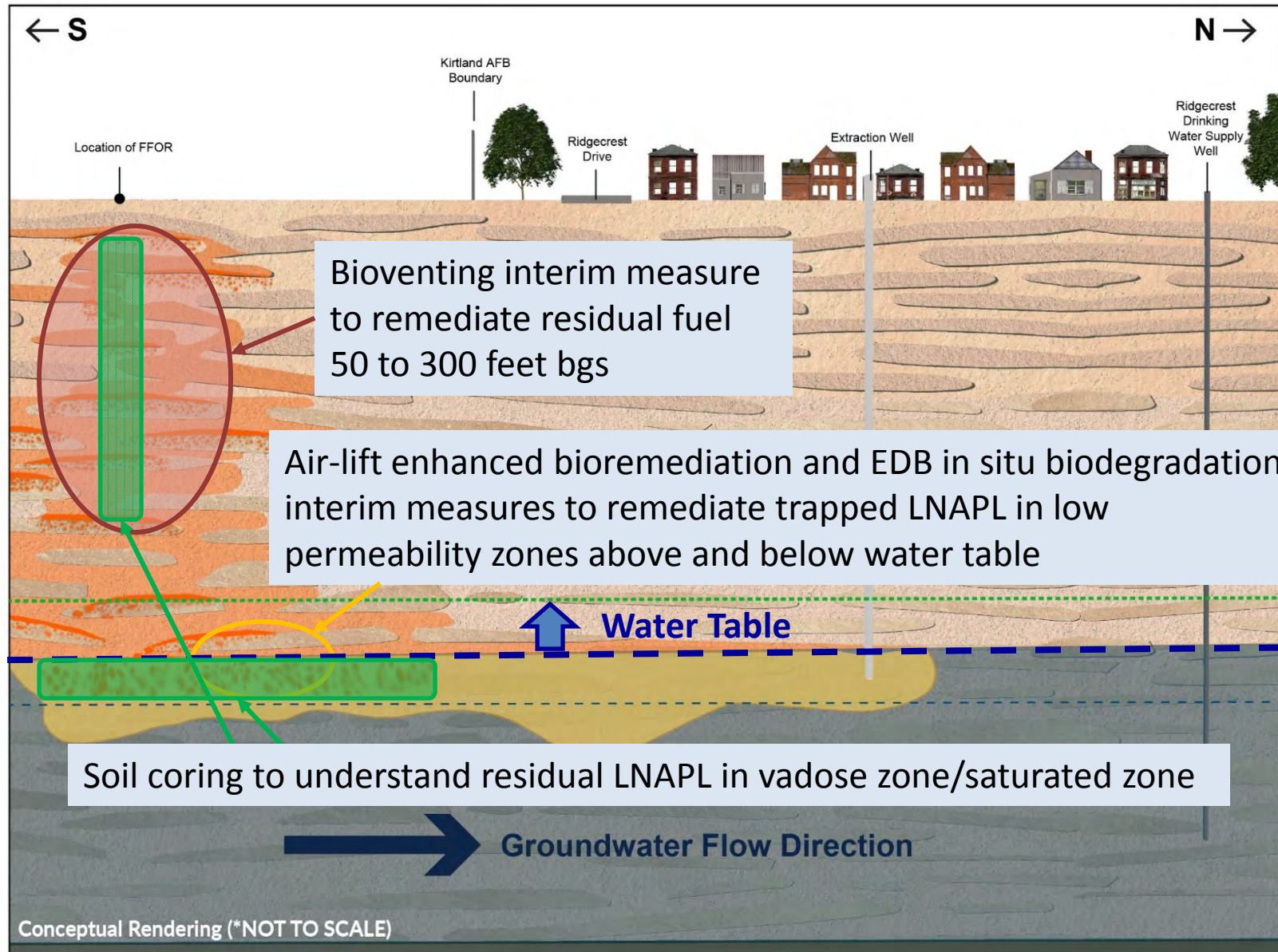
Media – Vadose Zone



Media – Groundwater



Current Conceptual Site Model



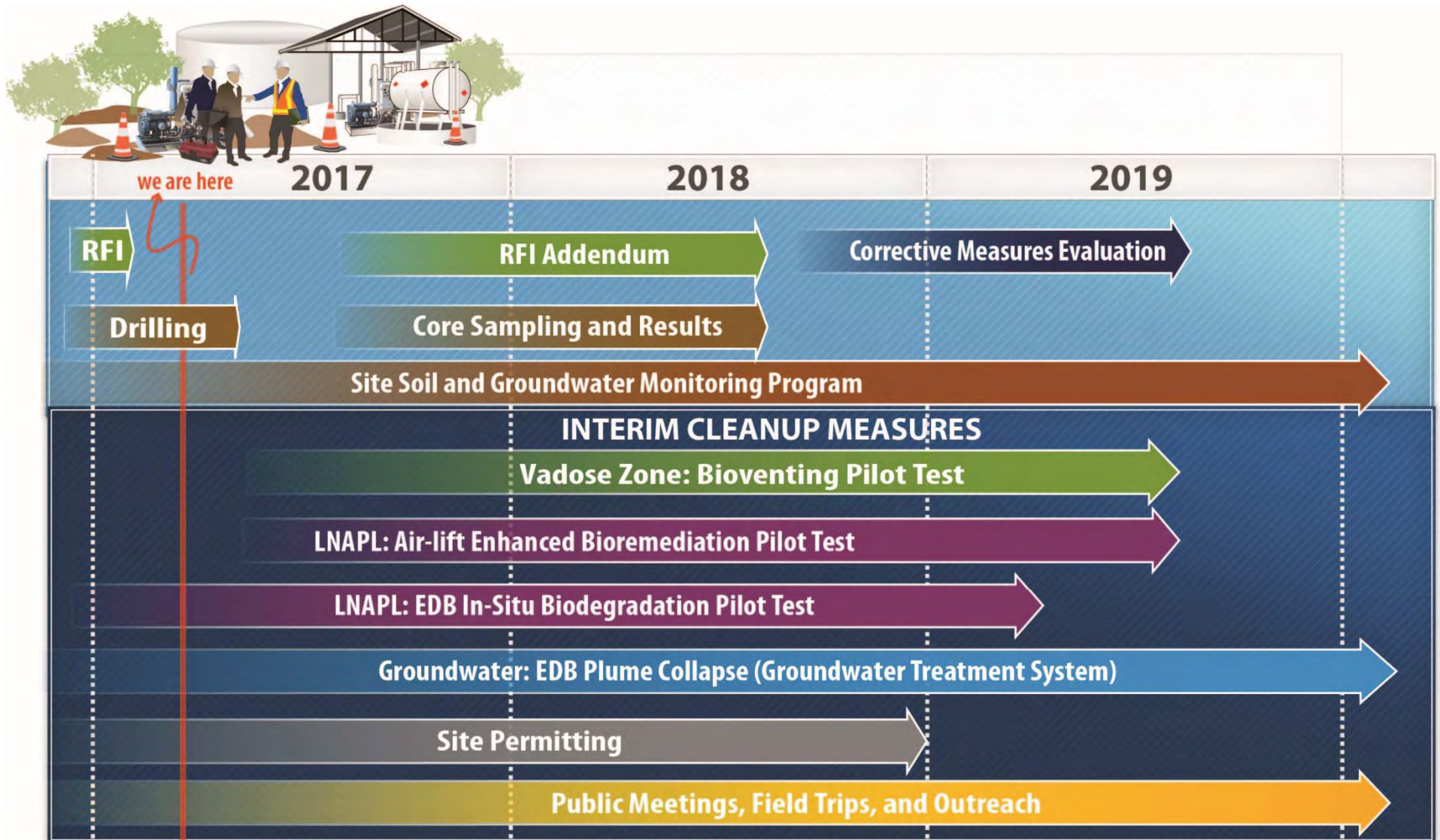
RFI Key Findings

- Fuel contamination nature and extent has been defined for soil, soil vapor, and groundwater
- Underground pipelines associated with former offloading rack were the sources of the jet fuel release
- Data gaps that need to be resolved
 - EDB dissolved-phase plume delineation in the northwest toe of the plume
 - Vertical extent of the LNAPL

RFI Path Forward

- RFI Addendum Report expected 2018 to include:
 - Data from recently installed data gap groundwater monitoring wells
 - Continuous cores from source area to fill LNAPL data gap
- Risk assessment to be submitted as a separate document

Current Project Timeline



» CSI - Complex Site Initiative • EDB - Ethylene Dibromide • LNAPL - Light Non-Aqueous Phase Liquid • RFI - RCRA Facility Investigation Report • SVE - Soil Vapor Extraction

2017 Strategic Plan

NMED Final 2017 Strategic Plan will be posted by the end March 2017 with comments received (www.env.nm.gov/kafbfuelplume)

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

Strategies to Achieve the Goal:

1. Implement a robust site monitoring & wellhead protection program
2. Deploy multiple cleanup strategies, both simultaneously and sequentially, to cleanup soil and groundwater
3. Meet or exceed all requirements for providing public comment, information and involvement

What to expect in 2017?

- Continue monitoring soil vapor, groundwater, and drinking water supply wells including rising water levels
- Continue operations of the GWTS
- Obtain continuous cores from source area to address LNAPL data gaps
- Construct EDB in situ bioremediation pilot test
- Design and implement bioventing pilot test to target residual fuel hot spots in vadose zone
- Design and implement air-lift enhanced bioremediation pilot test
- Continued public outreach at public meetings, and with neighborhood associations and various community groups

QUESTIONS

Field Trips



Well installation in neighborhoods



Source Area Cleanup



GWTS

How do I get more information?

Contact NMED:

Allison Majure	Communications Lead	(505) 827-2855	Allison.majure@state.nm.us
Diane Agnew	Technical Lead	(505) 222-9555	diane.agnew@state.nm.us

NMED Website and Listserv: www.env.nm.gov/kabfuelplume

Contact the Air Force:

Kathryn Lynnes	Senior Advisor	(505) 846-8707	kathryn.lynnes@us.af.mil
AFCEC Public Affairs		(866) 725-7617	afcec.pa@us.af.mil
Kirtland AFB Public Affairs		(505) 846-5991	377ABW.PA@us.af.mil

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

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