

Kirtland Air Force Base Fuel Leak Cleanup

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



Project Status Update
November 14, 2017



Welcome



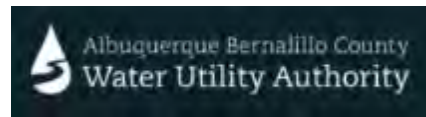
Kate Lynnes
Air Force Senior Advisor



Col Nickell
Air Base Vice-Wing Commander

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
Community

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

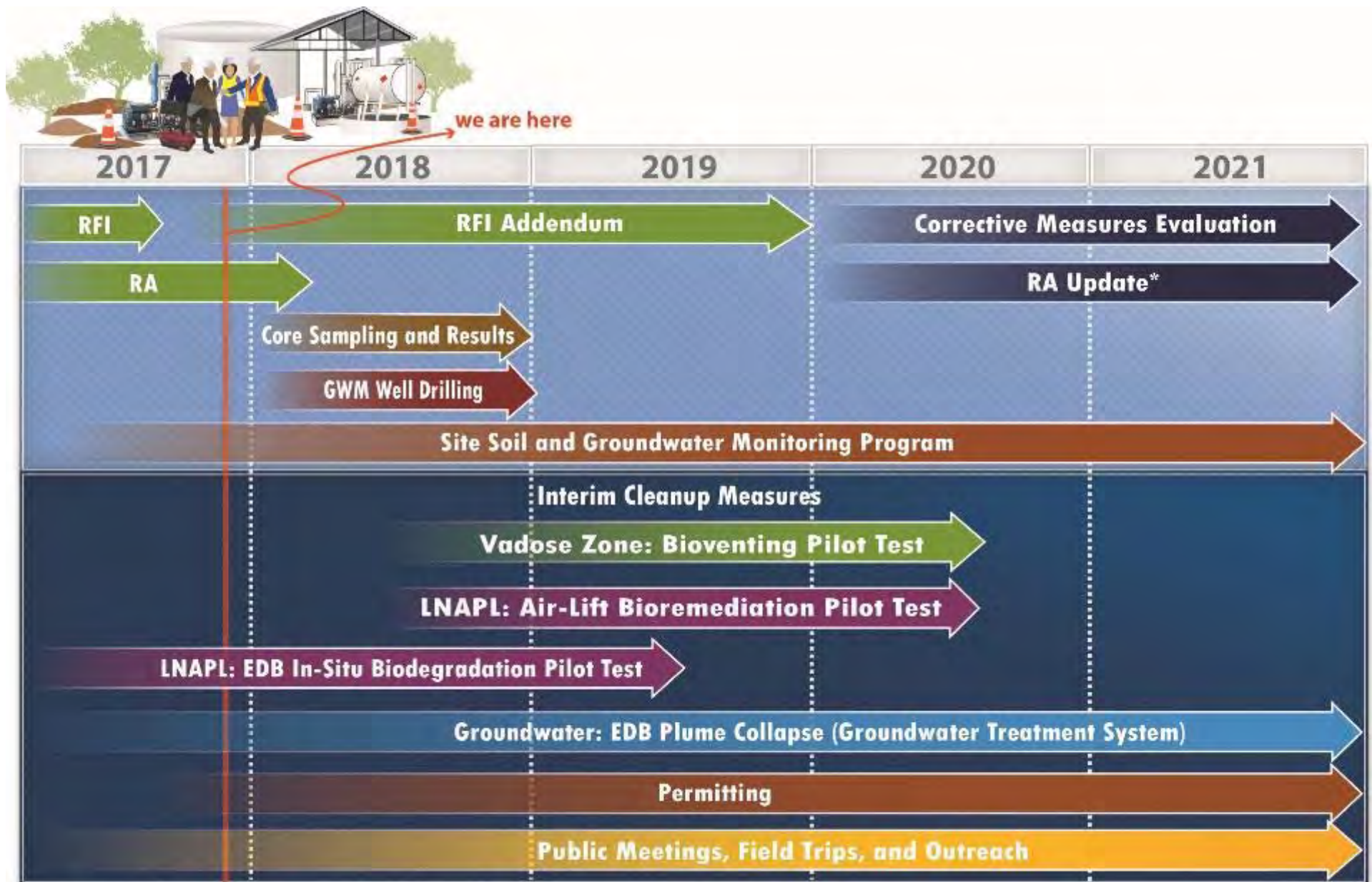
Project Progress



Diane Agnew

New Mexico Environment
Department (NMED)

Hydrologist



>> EDB - Ethylene Dibromide • LNAPL - Light Non-Aqueous Phase Liquid • RA - Risk Assessment • RFI - RCRA Facility Investigation Report
 * Risk numbers may be re-evaluated during CME if necessary

2017 Strategic Plan

NMED Final 2017 Strategic Plan was posted at end of 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:

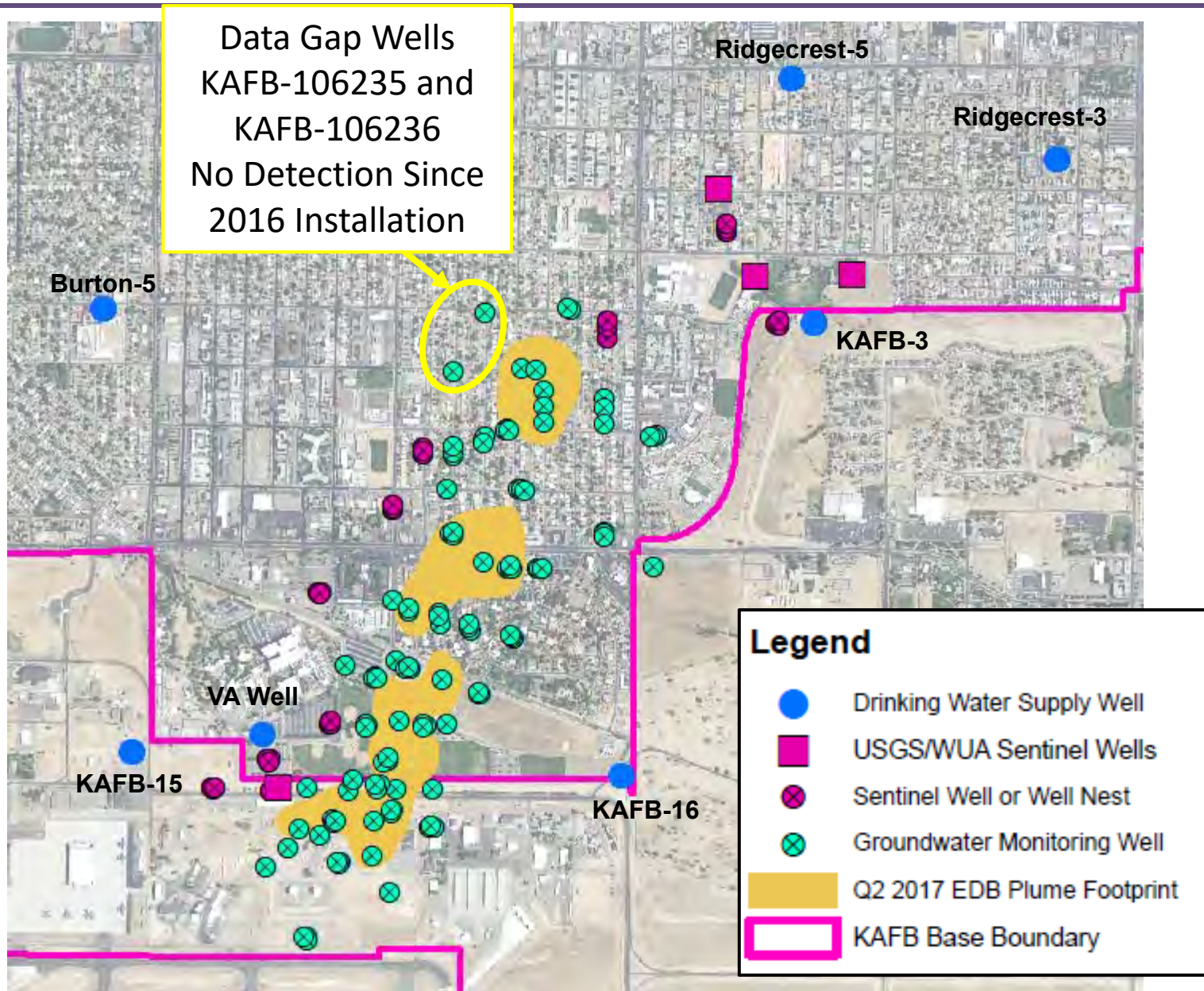
1. Implement a robust site monitoring & wellhead protection program
2. Deploy multiple cleanup strategies, both simultaneously and sequentially, to cleanup soil and groundwater
3. Meet or exceed all requirements for providing public comment, information and involvement

2017 Strategic Plan – How did we do?

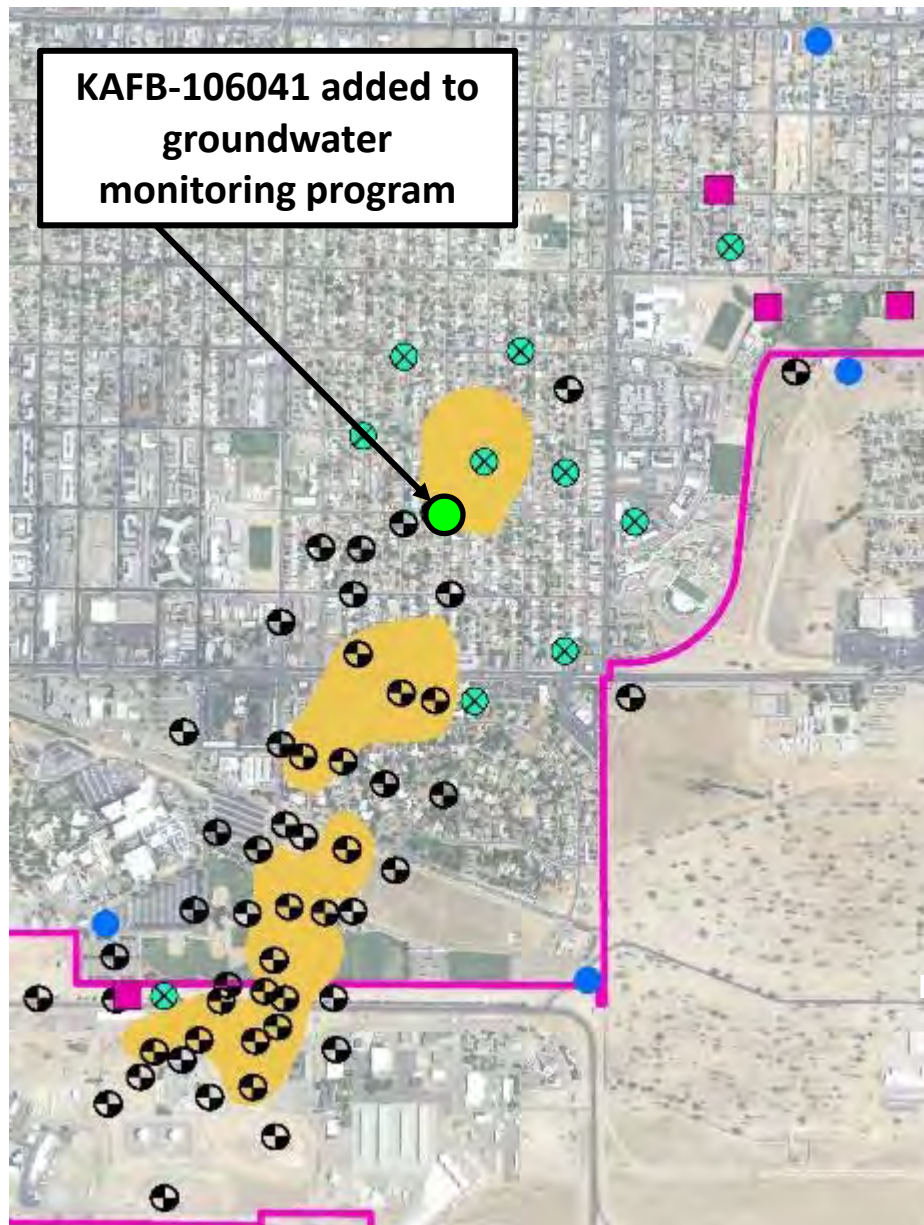
Strategy #1: Implement a robust site monitoring and wellhead protection program

- 2017 groundwater data gaps
 - Installed and sampled two data gap groundwater monitoring well nests
 - No EDB detected to date
- Quarterly testing of sentinel wells shows no detections of EDB
- Monthly testing of drinking water supply wells shows no actionable detections of any fuel constituents

Site Monitoring & Wellhead Protection



Rising Water Levels



- Rapid rise in water table observed in Q2 2017
- Reduction in number of monitoring wells screened at the water table
- Technical working groups to scope additional wells

Legend

- Drinking Water Supply Well
- USGS/WUA Sentinel Wells
- Shallow Groundwater Monitoring Well (submerged)
- Shallow Groundwater Monitoring Well (not submerged)
- Q2 2017 EDB Plume Footprint
- KAFB Base Boundary

2017 Strategic Plan – How did we do?

Strategy #2: Deploy multiple cleanup strategies, both simultaneously and sequentially, to cleanup soil and groundwater

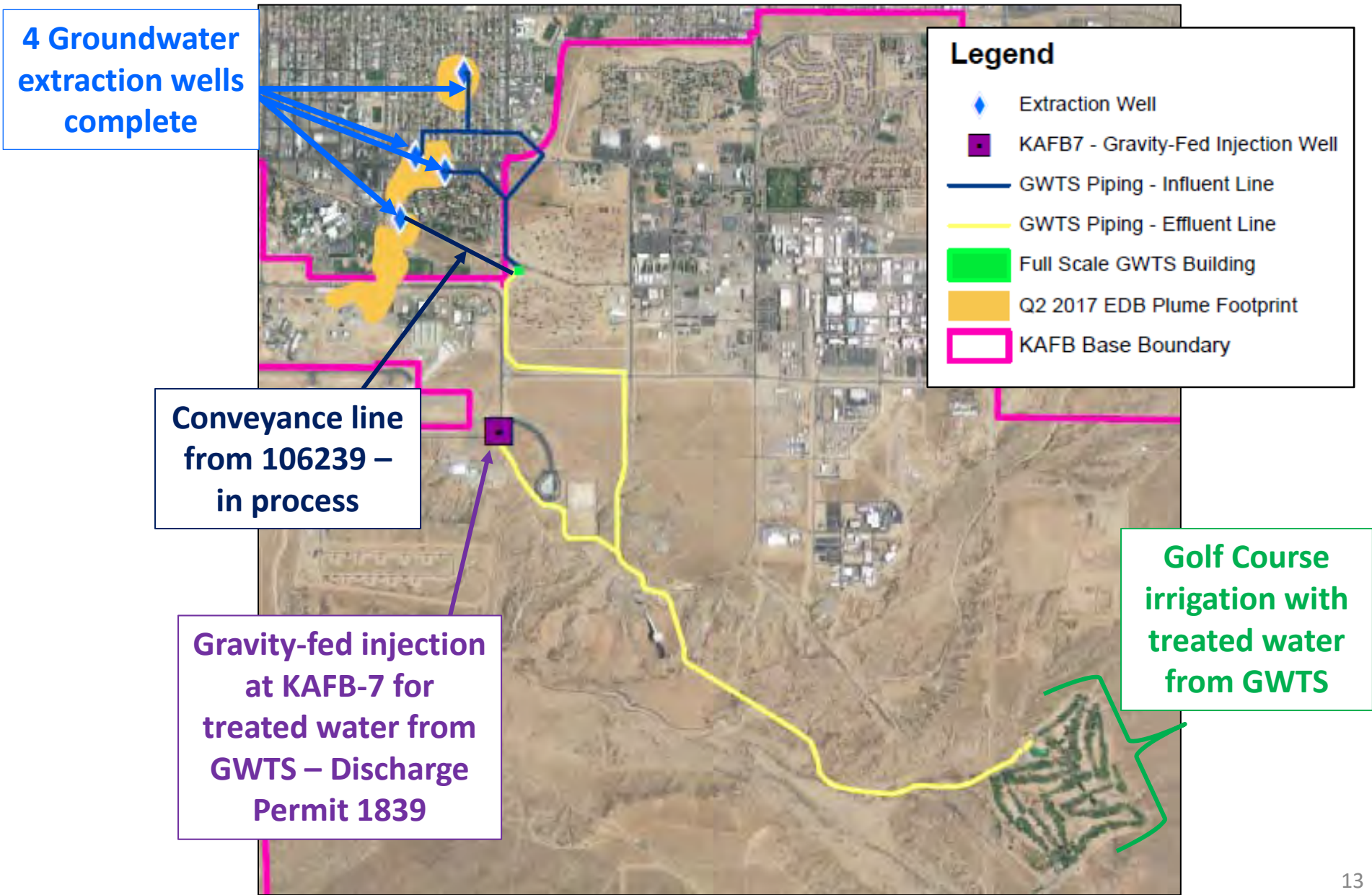
- Began EDB In-Situ Bioremediation Pilot Test interim measure
 - Phase 1 to be completed December 2017 with Phase 2 to follow
- Work plan for vadose zone continuous coring submitted
 - September 2017 technical working group confirmed locations and coring depths

2017 Strategic Plan – How did we do?

Strategy #2: Deploy multiple cleanup strategies, both simultaneously and sequentially, to cleanup soil and groundwater

- Continued operation of EDB interim measure
 - Extraction well 228 has been operating for 25 of 29 months (operation began July 2015)
 - Extraction well 233 has been operating for 9 of 22 months (operation began February 2016)
 - Extraction well 234 has been operating for 20 of 22 months (operation began February 2016)
- Installation of 4th extraction well, 239, completed January 2017
- Began construction of conveyance line from 239 to Groundwater Treatment System (GWTS)
- Began construction of pre-treatment at GWTS
- Issuance of final discharge permit (DP 1839) for gravity-fed injection at KAFB-7
- Treated groundwater contains no detectable fuel contaminants and meets drinking water standards

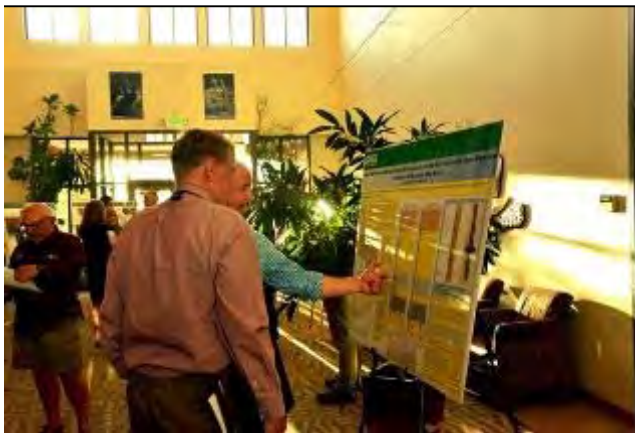
Groundwater Interim Measure



2017 Strategic Plan – How did we do?

Strategy #3: Meet or exceed all requirements for providing public comment, information, and involvement

- NMED and Air Force have exceeded all regulatory requirements for providing public comment, information, and involvement
- By the end of November, a total of 19 presentations or outreach events in 2017 and 65 GWTS tours will have been conducted



2017 Public Outreach To-Date

Date	Description
January 10, 2017	Water Quality Control Commission: Provided project update
March 9, 2017	Regular Public Meeting with Technical Poster Session
March 10, 2017	Water Protection Advisory Board: Provided project update
March 11, 2017	Public Technical Workshop
March 22, 2017	Water Utility Authority Governing Board: Provided project update
July 19, 2017	Kiwanis Club: Provided project update
August 9, 2017	District 6 Neighborhood Coalition: Provided project update
September 25, 2017	UNM Water and Energy in NM Guest Lecture: Presented to graduate and undergraduate students on the project
September 28, 2017	Public Meeting and Poster Session
September 30, 2017	Albuquerque International District Fair: Provided project information
November 3, 2017	New Mexico Radioactive and Hazardous Materials Committee: Provided project update
November 9, 2017	AWWA/WEA Luncheon; Siesta Hills Neighborhood Assoc.: Provided project update

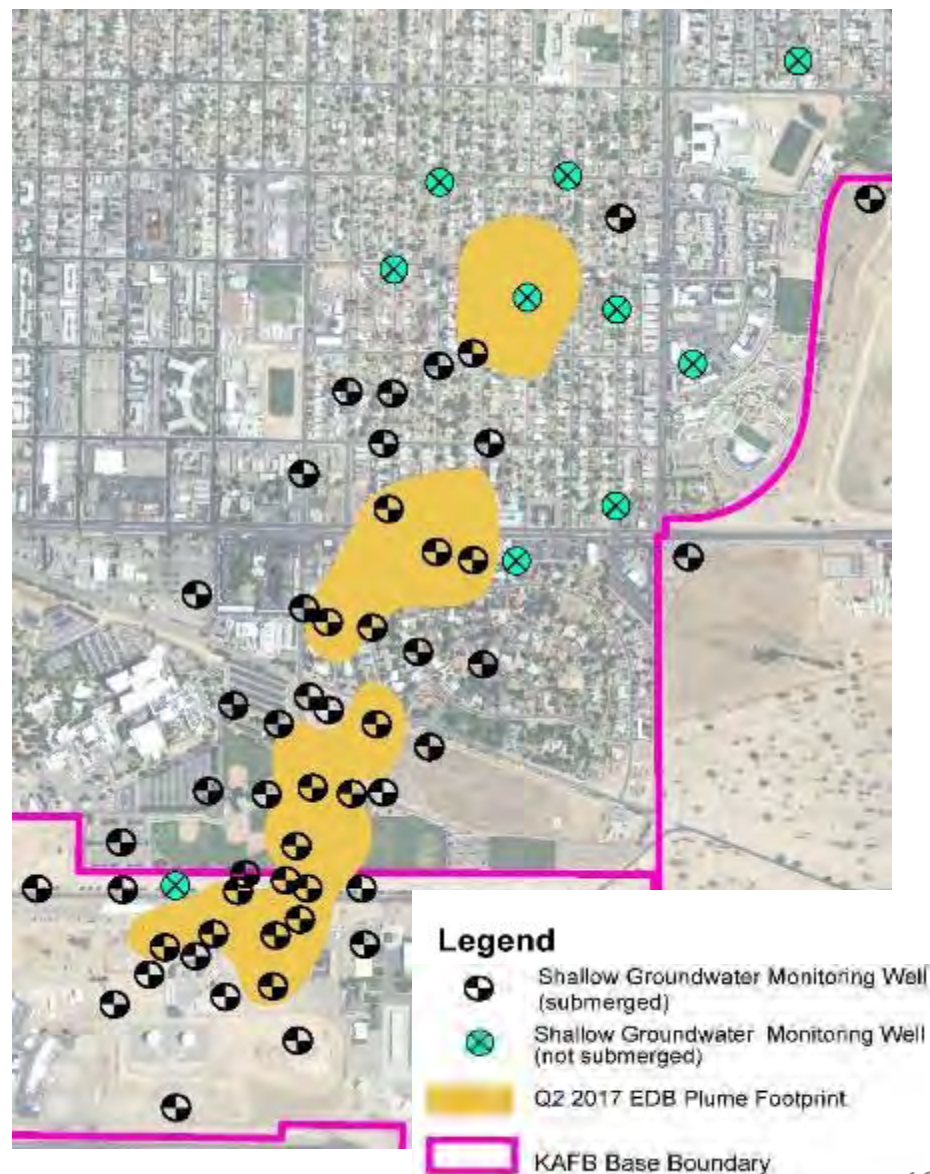
Site Characterization – More to be done!

Vadose Zone and LNAPL:

- Interim measures removed light non-aqueous phase liquid (LNAPL) and impacted soil
- Understand how the historic rise and fall of water table affected LNAPL
- Need to estimate mass of LNAPL remaining in vadose zone and submerged subsurface

Groundwater

- Rapid rise in water table observed in Q2 2017
- Reduction of water table monitoring network as water table rises



What's next for the RFI Report?

- RFI Report will be refined and improved including:
 - Revisions to January 2017 RFI report; and
 - Submittal of an RFI Addendum Report with additional data to be collected to close data gaps and update site conceptual site model
- Data collection will be based on a series of work plans currently in production that will be submitted for NMED review and approval
- This approach allows the RFI Report to be dynamic and reflect 2017 site conditions, and current and planned activities

2018 Strategic Plan

NMED Draft 2018 Strategic Plan will be posted by the end of December 2017 for public comment (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

Project Progress



Mr. Brian Renaghan

Air Force Civil Engineer Center
(AFCEC)

Program Manager

THANK YOU NEIGHBORHOODS!

The Air Force, NMED, and all of the collaborating organizations sincerely thank the neighborhoods for putting up with the road blocks and noise associated with drilling and construction activities in your neighborhoods.



Planned Additional Monitoring Wells



- Work plan for new wells to be submitted for NMED review and approval
- Soil core locations to be completed as monitoring wells
- Existing soil vapor monitoring wells to be incorporated into groundwater monitoring network

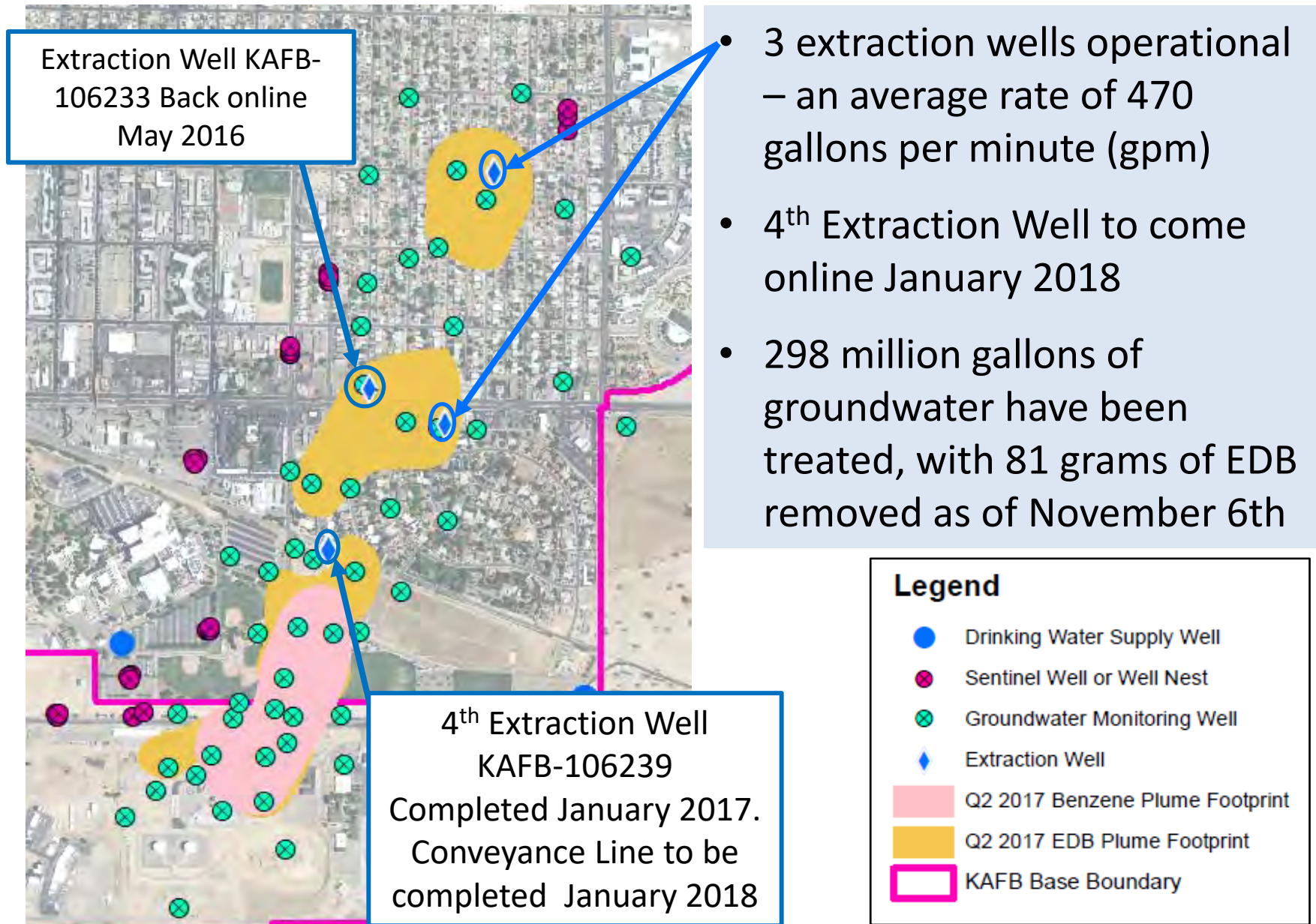
Legend	
★	Proposed Coring Locations
★	New Monitoring Well
★	Existing Monitoring Well
■	Q2 2017 EDB Plume Footprint
■	KAFB Base Boundary

Groundwater Sampling Optimization



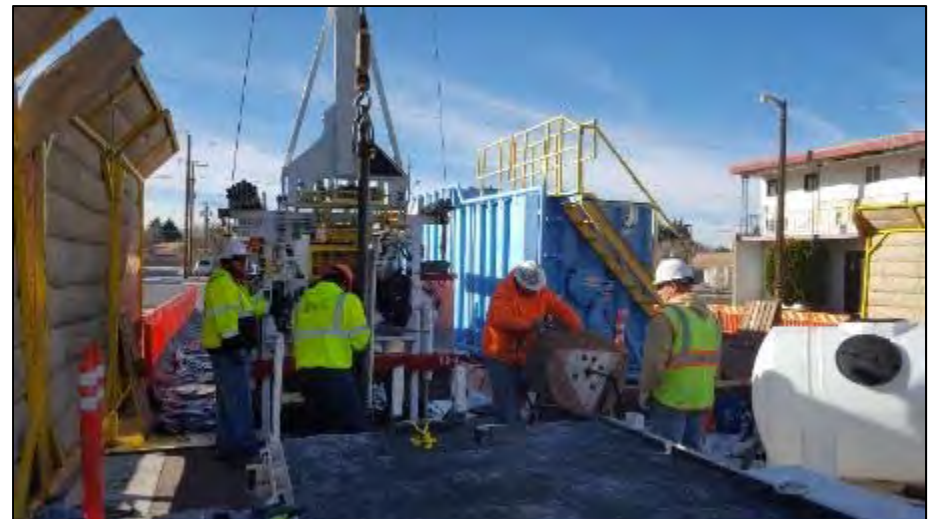
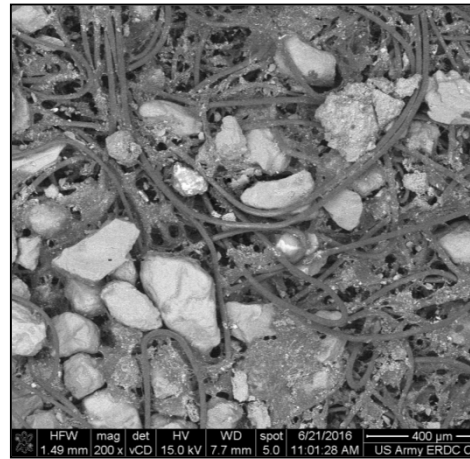
- Optimize monitoring program through a data-driven iterative process
- Change to passive samplers at 75 EDB groundwater monitoring wells north of Ridgecrest
 - Evaluated passive samplers vs low-flow pump performance in Q2 and Q3 2016 at wells both in and outside of the EDB plume
 - Use of passive samplers reduces investigation derived waste (IDW) and disruption to neighborhoods, while maintaining data quality
 - Passive samplers being evaluated in higher concentrated areas (on-base plume)

Pump and Treat Interim Measure



Extraction Well KAFB-106233

- Redeveloped in April 2017 to improve operation
- Resumed well operation in May 2017
- 19% improvement in specific capacity of well
- In addition to well redevelopment and rehab, pre-treatment is necessary at the GWTS



Groundwater Treatment System (GWTS)

Operation

Activities completed in 2017 :

- Continued system upgrades and maintenance.
- Installed Treatment Train #2 with additional 400 gpm treatment capacity
- Installed new displays and updated programming for more efficient system operation
- Retrofitted Treatment Train #1 controls, sensors and meters
- Performed maintenance and equipment upgrades at all three extraction wells and KAFB-7
- On-going upgrades to be completed in early 2018 include:
 - Complete sand filter installation
 - Telemetry upgrade and new flow meter at KAFB-7
 - Tie-in of new extraction well KAFB-106239

Groundwater Treatment System (GWTS) Operation



Road Map for Plume Capture Analysis

- EPA guidance, *A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems*, outlines the criteria used to evaluate a capture zone
 - Review site data, CSM, remedy objectives
 - Define target capture zone(s)
 - Water level maps and pairs
 - Numerical analysis and particle tracking
 - Concentration trends
 - Interpret actual capture and compare with target capture zone(s)

[EPA 600/R-08/003, January 2008](#)

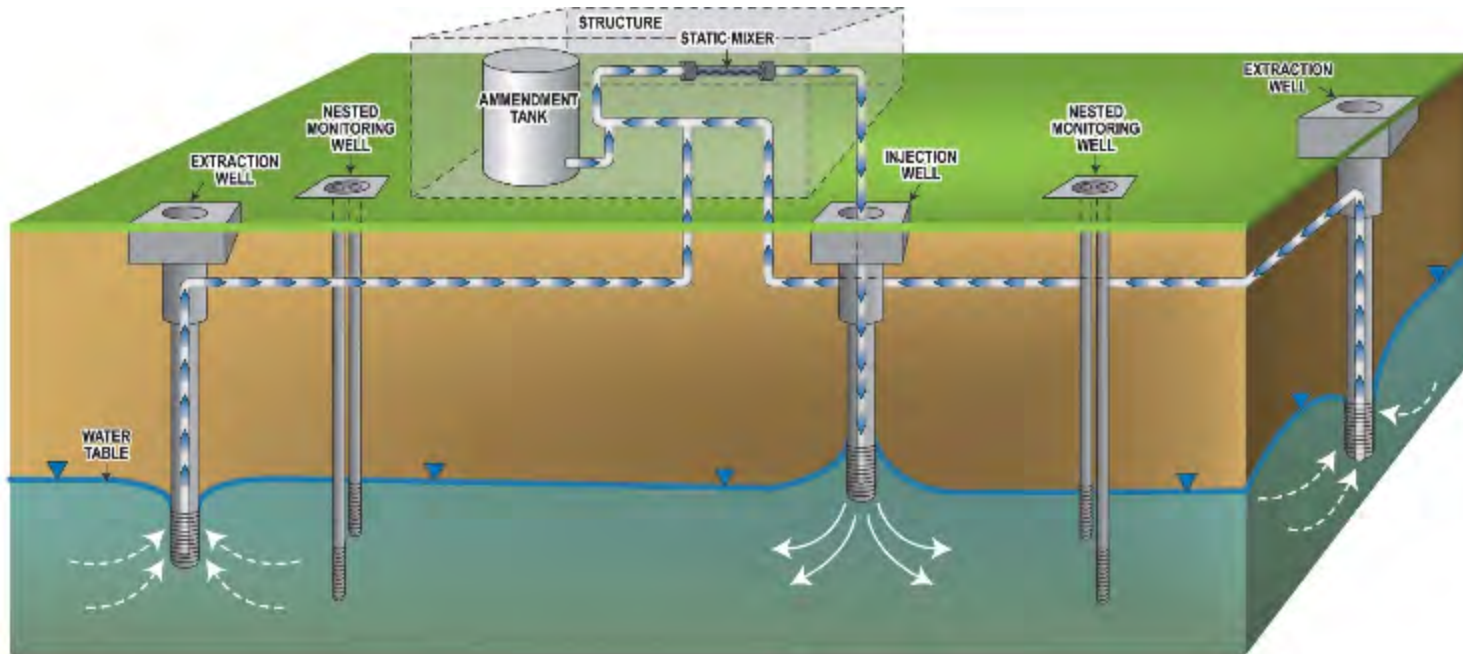
Plume Capture Analysis for BFF

- The EPA process is performed semi-annually to incorporate field data and continue to evaluate the capture zone
- Distal, or northern, end of plume boundary is delineated with unsubmerged wells - no data gaps in this area
- The Air Force is working with NMED and other members of the technical working group to address data gaps from submerged well screens and to include additional lines of evidence in the ongoing evaluation of the plume capture

Pump and Treat Take-Away

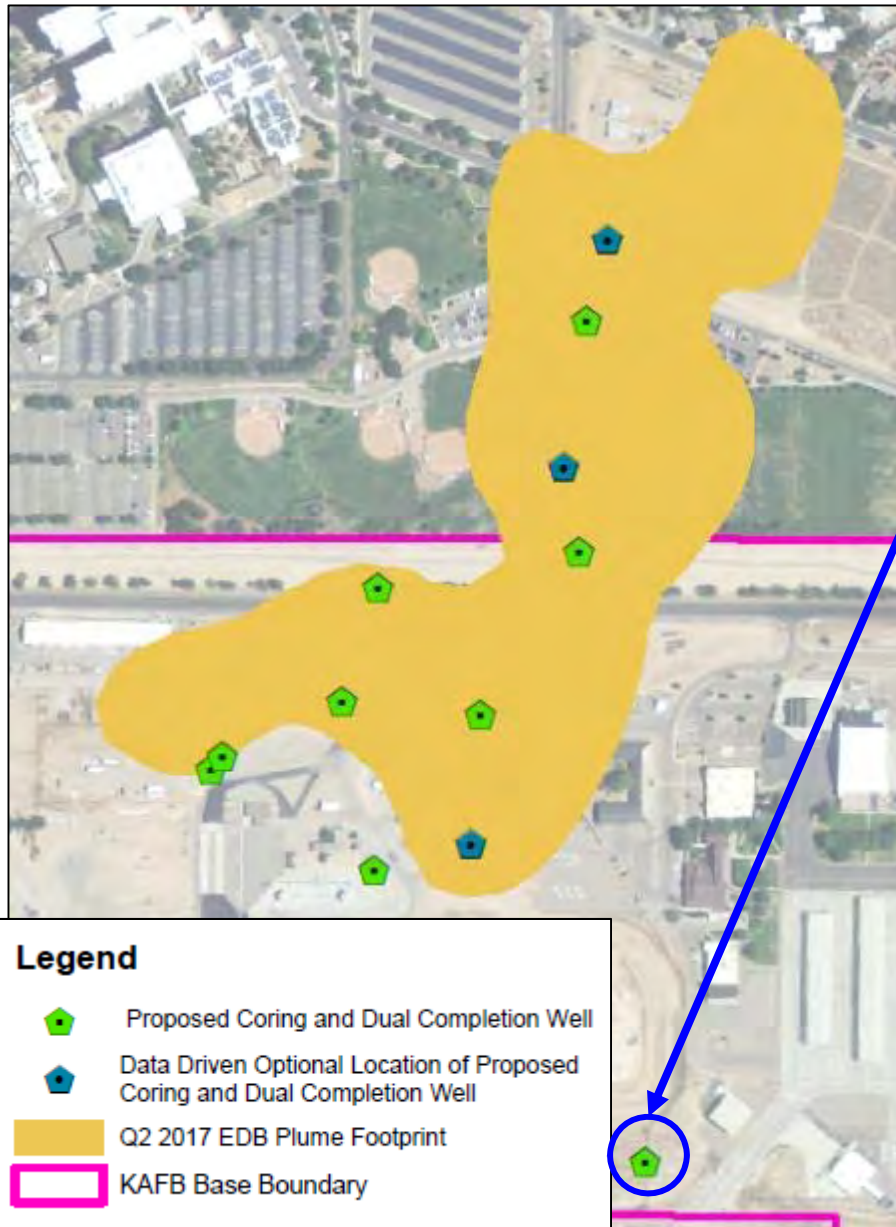
- Bring 4th groundwater extraction well online (January 2018)
- Complete installation of pre-treatment sand filters (January 2018)
- Continued discharge of treated groundwater to KAFB-7 and Golf Course
- Refinement of plume capture evaluation through tracking multiple lines of evidence which will provide feedback to GWTS operations

EDB In Situ Biodegradation Pilot Test



- Multi-phase data driven pilot test. Field activities began in January 2017 with installation of wells and system
- Collected baseline samples in July and Sept 2017
- Began Phase 1 in October 2017 - GW extracted and injected for 30 days with tracer to evaluate transport times throughout the pilot test area
- Phase 2, nutrient addition, anticipated to begin in December 2017

Soil Cores to Evaluate LNAPL



- 8 soil cores to be drilled in 2018 to determine extent of remaining LNAPL in the source area
- 1 background location
- 3 optional locations that may be drilled pending results of other cores
- 6 drilled boreholes will be completed as groundwater monitoring wells and 2 boreholes will be for soil vapor monitoring

Soil Cores to Evaluate LNAPL

- Core samples serve two purposes:
 - Fill RFI data gap for extent of LNAPL
 - Field/laboratory analyses of core samples will characterize LNAPL physical/chemical properties for remedial alternatives in CME
- 100 to 510 feet of core collected per boring
- Extensive field and laboratory analysis to identify LNAPL properties and components such as EDB and other fuel-related compounds, describe geology, and evaluate presence of bacteria that could degrade LNAPL
- Cores will be logged, photographed, and stored at KAFB

What to expect in 2018?

- Continue monitoring soil vapor, groundwater, and drinking water supply wells, rising water levels
- Continue GWTS operation
- Obtain continuous cores from source area to address LNAPL data gaps
- Drill new data gap wells, and incorporate existing monitoring points into monitoring program to account for rising water levels
- Operate EDB in situ biodegradation pilot test
- Implement bioventing and air lift pilot tests to target residual fuel hot spots
- Continued public outreach at public meetings, and with neighborhood associations and various community groups

Questions and Answers

- One question/comment per turn at the microphone
- We request that each question/comment be limited so that everyone has an opportunity to be heard
- Comment cards have been made available:
 - Return completed comment cards to NMED and/or Air Force staff
 - Questions will be incorporated into the Kirtland AFB BFF project website:

www.kirtlandjetfuelremediation.com

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

THANK YOU!

Community Outreach



Pilot Test Implementation



GWTS Expansion

Monitoring Program

