



Meeting Date: March 21, 2018

Staff Contact: Rick Shean, Water Rights Program Manager

TITLE: OB-18-4 – Status Update for the Kirtland Air Force Base Bulk Fuels Facility Fuel Leak Cleanup

ACTION: Received

SUMMARY:

The New Mexico Environment Department (NMED) released their “2018 Strategic Plan” for the Kirtland Air Force Base (KAFB) Bulk Fuels Facility (BFF) Leak on March 6, 2018, incorporating four strategies to protect the Water Authority’s drinking water supply in the area of the contamination plume. The strategies include implementing a robust monitoring and wellhead protection program, collapsing the dissolved phase plume, and meet or exceed all public involvement requirements. In a shift from previous years, the NMED has revised Strategy 2 is now specific to monitoring natural attenuation of fuel contamination; this strategy was previously focused on characterization of light non-aqueous phase liquid (LNAPL) at the site.

The Air Force has two work plans approved with conditions by the NMED that will collect data to address LNAPL at the site and take steps to address the reduction in the number and location of groundwater monitoring wells screened at the water table. The Air Force brought online a fourth groundwater extraction well in February 2018 and added pre-treatment infrastructure at the groundwater treatment system. The pre-treatment addresses sediment and bacterial biofilm that may enter the system. The Air Force has treated over 350 million gallons of water contaminated by ethylene dibromide (EDB) since the extraction system began operation in June 2015. All four groundwater extraction wells are currently operation and treated effluent is either used for irrigation at the KAFB golf course or is injected at former water supply well KAFB-7.

NMED, the Air Force, and other stakeholders and their contractors meet periodically as technical working groups. The technical work groups are focused on the discussion of technical details regarding plume capture analysis and groundwater modeling as well as expanded investigation activities to fill data gaps in the source area and groundwater plume. The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report submitted by the Air Force in January 2017 is currently in NMED review. A Risk Assessment was also submitted by the Air Force in July 2017 and that document is also currently in NMED review.

NMED and the Air Force have lead three informational meetings and one public meeting since their last presentation to the Water Authority governing board in November 2017.

STAFF COMMENTS:

The NMED 2018 Strategic Plan includes a revised strategy for the site that focuses on monitoring natural attenuation (also known as “monitored natural attenuation” or “MNA”). This is a passive remediation approach that requires an extensive monitoring well network. Additionally, natural attenuation is typically applied at sites with decreasing concentrations, following a robust technical analysis of degradation rates. Currently, 85% of the monitoring well network is submerged and not viable for monitoring natural attenuation and increasing concentrations are observed in the source area. Water Authority staff are not supportive of an MNA approach for any site, particularly the BFF site, in the service area.

The NMED strategic plan also reflects recent correspondence from the NMED to the Air Force that downplays the need for a revised plume capture analysis and no longer includes key stakeholder agreements such as RFI Addendum to address the numerous technical issues in the 2017 RFI Report. The Water Authority’s independent contractor, INTERA, Incorporated, provided their review of the RFI and the Water Authority’s concerns for the document at the Nov. 16, 2017, Water Authority Board Meeting.

FISCAL IMPACT:

None

**Kirtland Air Force Base
Fuel Leak Cleanup
Status Update – 21 March 2018**



Kate Lynnes
Air Force Senior Advisor
Scott Clark
Restoration Program Manager

Updates:

- Notice of Deficiency (NOD) of 16 Nov has been resolved
- Overview of new Data Gap Monitoring Wells
- Upgrades to the GWTS
- New Extraction Well KAFB-106239 up and running

NOD Update

NOD resolved per 06 March letter from NMED. Of note:

- Vadose Zone Coring Workplan submitted 15 December, conditionally approved on 23 February
- Data Gap Monitoring Well Workplan submitted 20 December, conditionally approved on 28 February
- USGS Sampling data to now be included in Quarterly reports
- All 4 extraction wells are now up and running

NOD Update (cont'd)

Modeling Tech Working Group (TWG)

- Charter is to develop a robust plume capture model that is agile enough to address changing site conditions and will support the development of a CME in the future.
- Members include the AF, NMED, ABCWUA & consultant, USGS, EPA, and City of ABQ.
- In collaboration with the TWG, the AF will submit a six-step capture and analysis to NMED that will include the selected model(s)

Data Gap Monitoring Wells

- Unexpected rapid rise in water table has resulted in 53 submerged shallow well screens. (did not affect other screened intervals)
- Not a data driven need to replace all wells – this is a focused effort; well locations were selected to further evaluate plume location and plume capture.
- New well locations selected through collaboration with NMED, also identified other monitoring wells that could be incorporated into sampling network.

Screened Monitoring Well Zones



Shallow Well:

Screened 15 ft
below water
table and 10
feet above
water table



Intermediate Well:

Screened 15 to 30 ft
below water table



Deep Well:

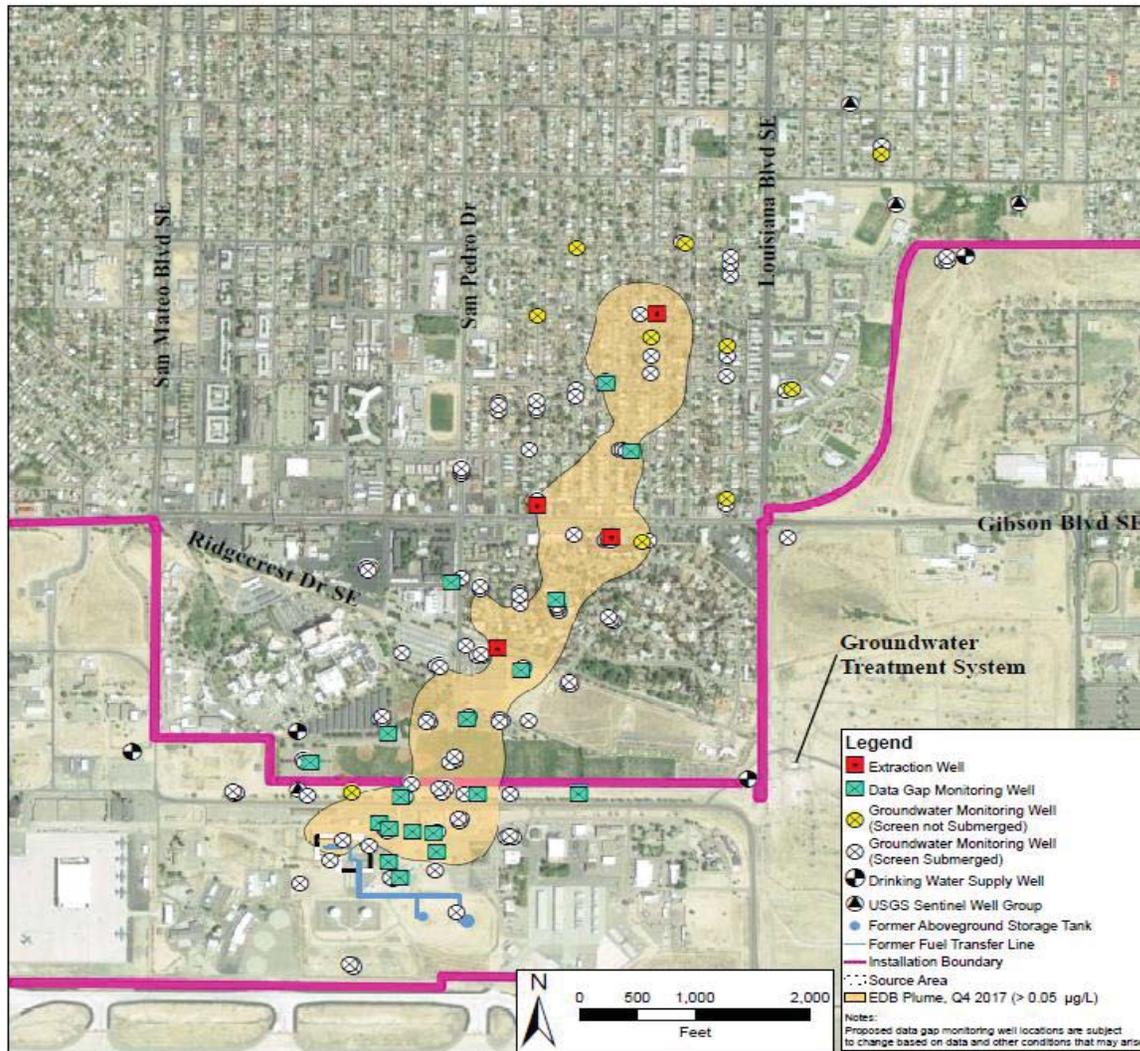
Screened 30 to
130 ft below
water table

Data Gap - Summary of New Wells

- 6 new monitoring wells (1 on-Base; 5 off-Base)
- 5, and possibly up to 8 LNAPL coreholes will be completed as monitoring wells
- At least 7, and up to 12 previously soil-vapor or groundwater monitoring wells will be brought into GWM network as a result of rising groundwater

**Total of 18 GWM locations to be added to
existing 143 well GWM network**

Extraction and New Monitoring Well Locations



Groundwater Treatment System

- Existing Extraction Wells (North of Ridgecrest):
 - KAFB-106228 (144 gpm)
 - KAFB-106233 (160 gpm)
 - KAFB-106234 (164 gpm)
- New Extraction Well (on Ridgecrest):
 - KAFB-016239 (75 gpm)
- 2 Treatment Trains - Total Capacity up to 800 gpm
- Discharge Treated Effluent:
 - KAFB-7 Injection Well
 - Tijeras Arroyo Golf Course Main Pond

Upgrades to Groundwater Treatment System

- Two full treatment trains up and running. To date, have treated ~364 million gallons.
- Installed sand filters that contain a catalyzed media to capture any bacterial biofilm that may enter system
- Effluent is non-detect for all fuel constituents and meets all SDWA requirements

Upgrades to Groundwater Treatment System

- Sand filters installed at GWTS



4th Extraction well up and running

- New extraction well designed to cut off the migration of the plume at the root.
- Pumping at 75 GPM, location was selected collaboratively with stakeholders and approved by NMED
- Pump came online 05 February 2018

Questions?



New Mexico Environment Department 2018 Strategic Plan (Revised Draft) For Kirtland Air Force Base Aviation Fuel Cleanup



March 21, 2018
Dennis McQuillan, NMED Chief Scientist



Sand and gravel deposited by the ancestral Rio Grande is the host material for a major aquifer in the Albuquerque area

2018 Strategic Plan

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

Strategies to Achieve the Goal

In 2018, NMED and the Air Force will continue to:

- 1. Implement a robust site monitoring and wellhead protection program**
- 2. Monitor the natural attenuation of fuel contamination in soil and groundwater, and identify potential opportunities for enhancement thru interim corrective measures**
- 3. Deploy multiple engineered technologies, both simultaneously and sequentially, as interim corrective measures to clean up soil and groundwater**
- 4. Meet or exceed all requirements for providing public information and involvement**

Strategy 1 – Implement Robust Site Monitoring and Wellhead Protection

- No detections of EDB in drinking water wells or sentinel wells
- Cone of depression persists in groundwater extraction area
- EDB plume capture analysis is being rigorously updated
- Effects of rising water level on direction of groundwater flow and contaminant migration are being evaluated
- Data gaps caused by water level rise are being filled by:
 - Drilling new monitoring wells
 - Monitoring previously dry soil-vapor wells that now contain groundwater

EDB will not be allowed to adversely impact any drinking water supply wells

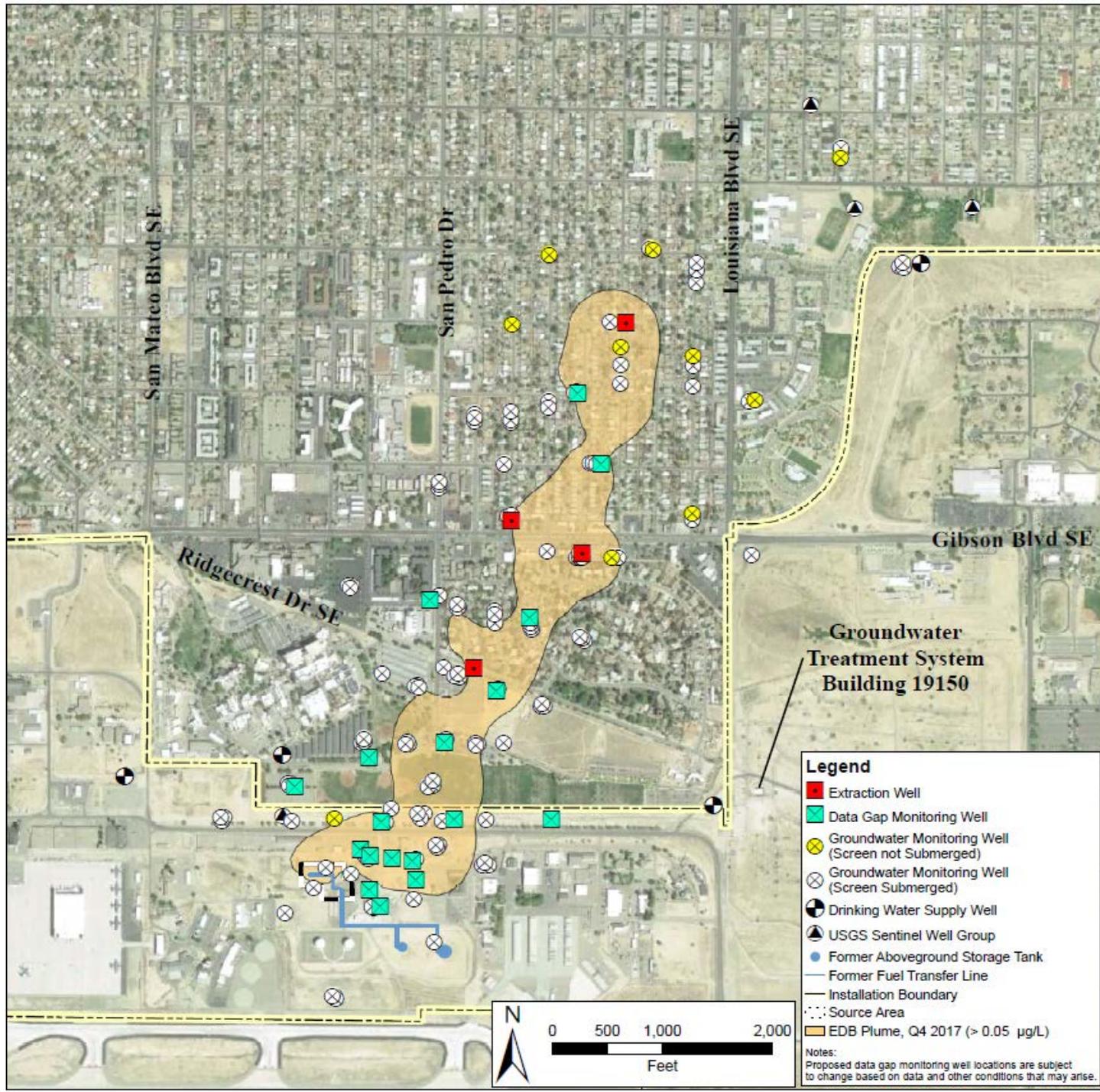
At Least 18 (up to 26) New Wells to Fill Data Gaps

Six monitoring wells will be drilled.

Five, and possibly up to 8, LNAPL coreholes will be completed as monitoring wells.

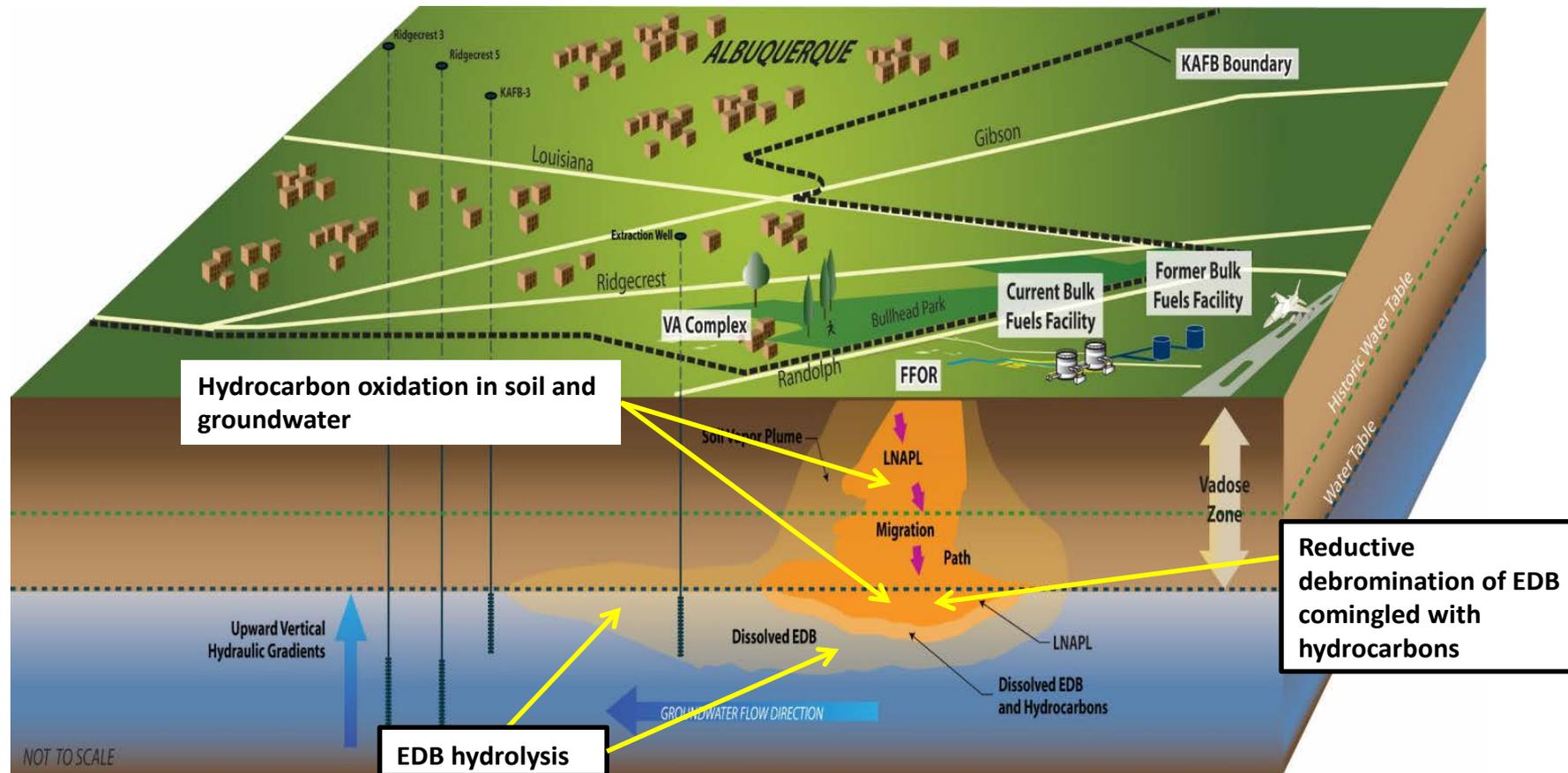
At least seven, and likely up to 12, previously dry soil-vapor or groundwater wells now have water due to rising water table (using these existing wells will save up to \$5.25 million in drilling costs).

Thanks to the Air Force and Army Corps of Engineers for thinking outside the box to fill data gaps and reduce cost to taxpayers!



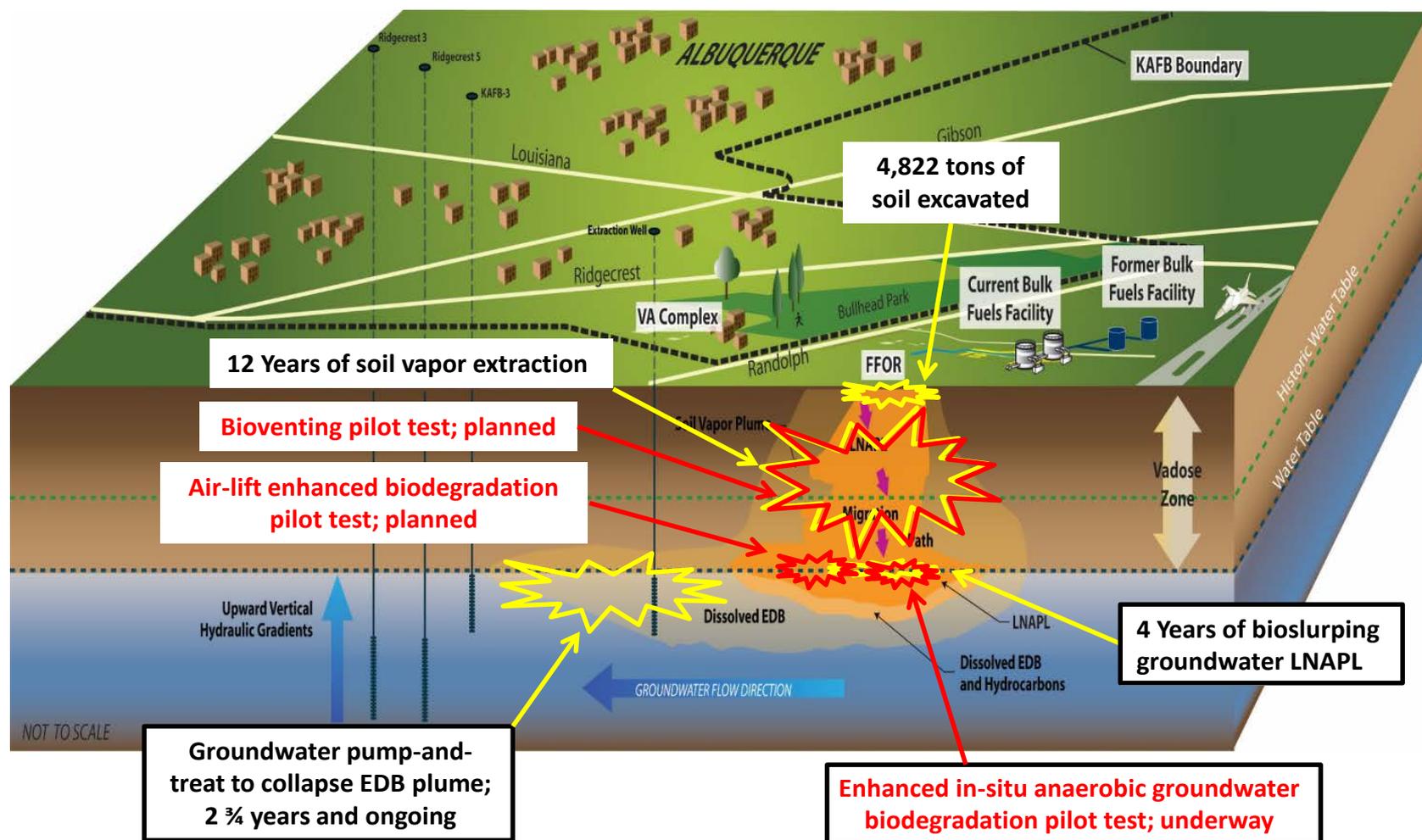
Strategy 2 – Monitor Natural Attenuation & Identify Opportunities for Enhancement

- Site monitoring has identified ongoing natural degradation processes including hydrocarbon oxidation, EDB hydrolysis, and EDB reductive debromination.
- Interim corrective measures include engineered cleanup technologies to enhance natural degradation processes.



Strategy 3 – Deploy Multiple Engineered Cleanup Technologies, Simultaneously and Sequentially

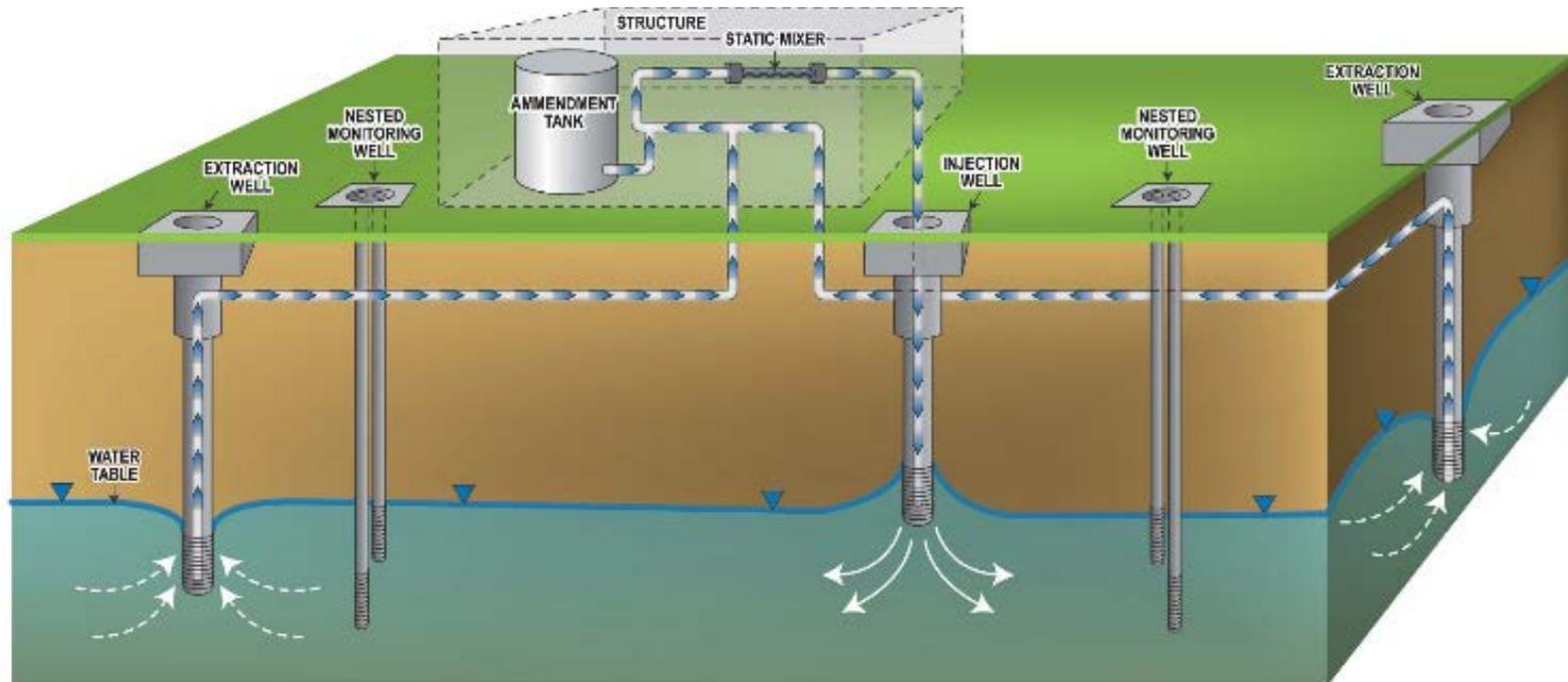
Activities in 2018 will include additional interim corrective measures such as: **enhanced in-situ anaerobic groundwater biodegradation, soil bioventing, and air-lift enhanced biodegradation.**



3. Anaerobic Biodegradation Pilot Test

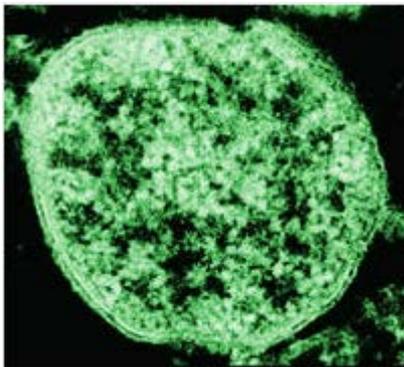
Groundwater Recirculation

- Pump groundwater and add amendments in phases
- Inject amended water to create a recirculation cell
- Supports anaerobic degradation of EDB



3. Anaerobic Biodegradation Pilot Test

- Phase 1 – Baseline definition, tracer test circulation, passive monitoring (completed)
- Phase 2 – Bio-stimulation by adding nutrients and lactate (commenced December 2017)
- Phase 3 – Bio-augmentation by adding bacteria such as dehalococcoides (scheduled for summer 2018)
- Phase 4 – Long-Term Passive Monitoring

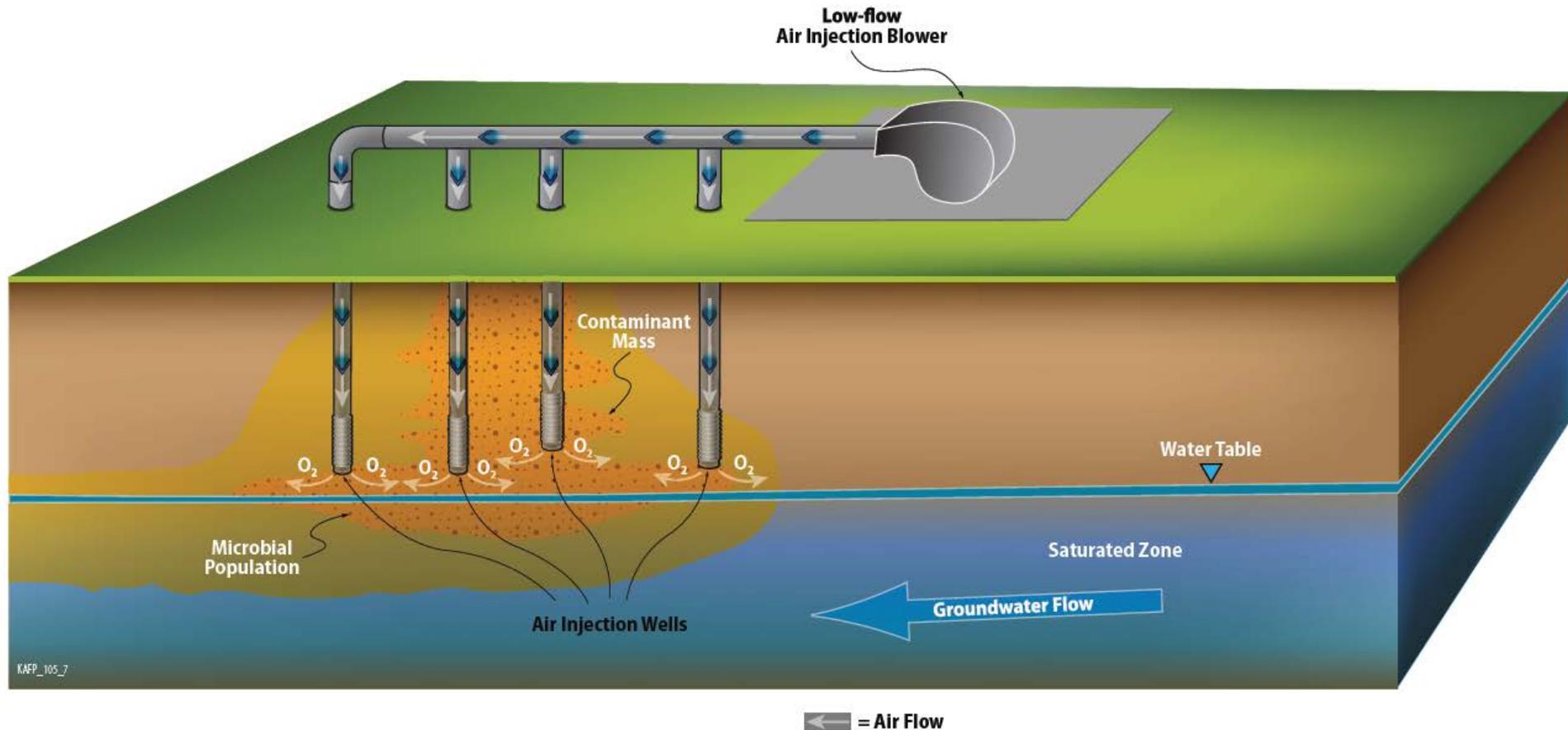


Dehalococcoides – a bacterium known to degrade halogenated pollutants including EDB

(University of Alberta BacMap Genome Atlas, <http://wishart.biology.ualberta.ca/BacMap/index.html>)

3. Bioventing

Air will be blown into the soil to deliver oxygen to naturally occurring bacteria and enhance their ability to biodegrade petroleum hydrocarbons



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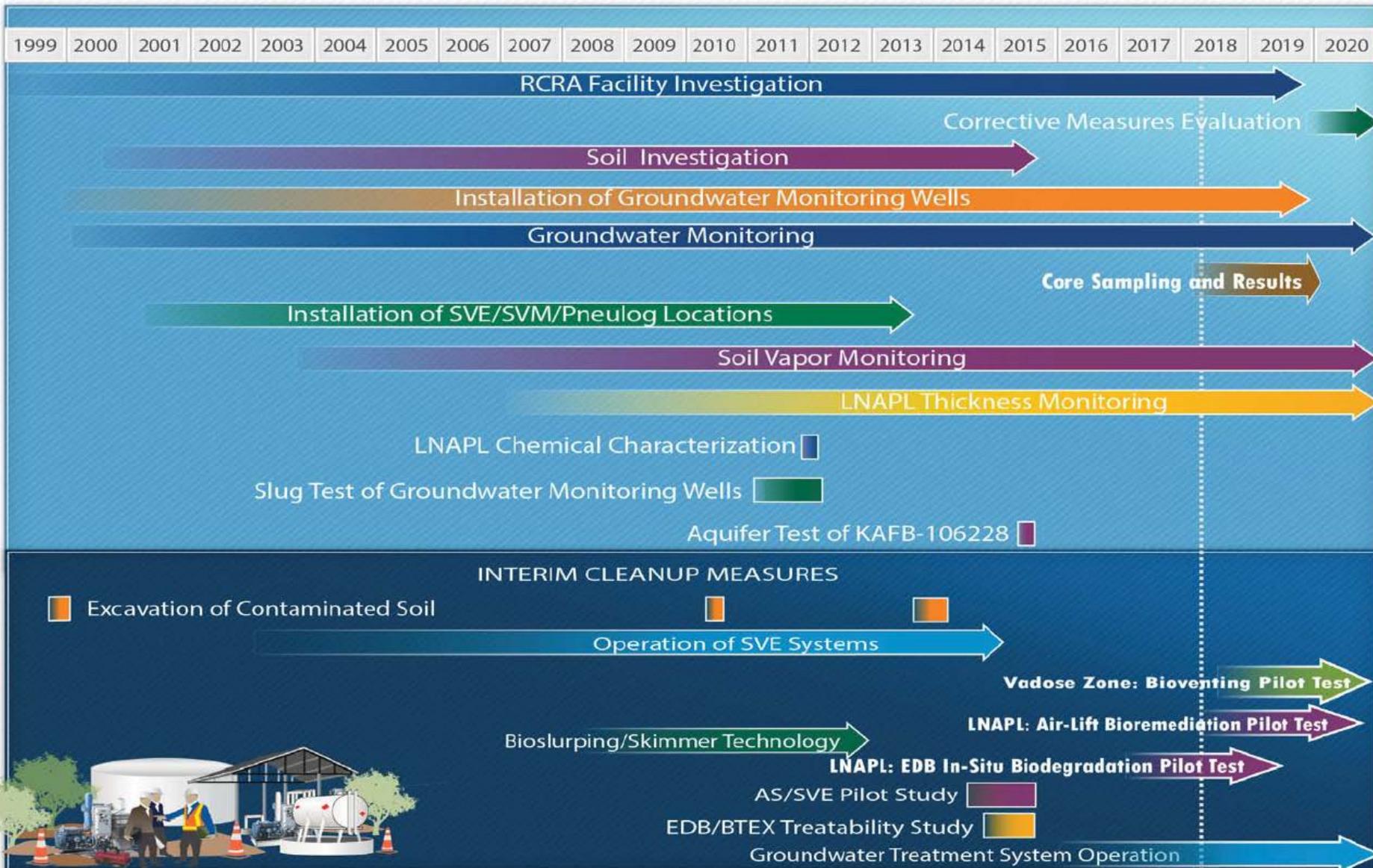
Strategy 4 - Public Outreach Schedule

The Air Force and NMED are conducting public outreach and involvement activities related to investigation and cleanup of the Kirtland Air Force Base aviation fuel contamination in accordance with the public notice and community relations requirements of the N.M. Water Quality Control Commission and federal Resource Conservation and Recovery Act Permits. Additionally, NMED will prepare and implement a Public Involvement Plan pursuant to NMED Policy 07-13, <https://www.env.nm.gov/wp-content/uploads/2018/02/NMED-Policy-and-Procedure-07-13.pdf>.

Date	Description
March 21, 2018	ABCWUA Governing Board Meeting, project update
March 22, 2018	Regular Public Meeting with Technical Poster Session
March 24, 2018	Groundwater Treatment System Open House
April 13, 2018	New Mexico Geological Society, Spring Conference, Socorro, NM
June 29, 2018	NMED Public Involvement Plan to be finalized
July 12, 2018	Regular Public Meeting with Technical Poster Session
November 15, 2018	Regular Public Meeting with Technical Poster Session

NMED and the U.S. Air Force welcome invitations from neighborhood associations, civic organizations, environmental groups, and local government agencies.

Site Activity Timeline



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