



New Mexico Environment Department

Kirtland Air Force Base – Bulk Fuels Facility Corrective Action

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New Mexico Environment Department
November 21, 2024



Background



CONTAMINATION SOURCE:

Aviation Gas (AVGAS)

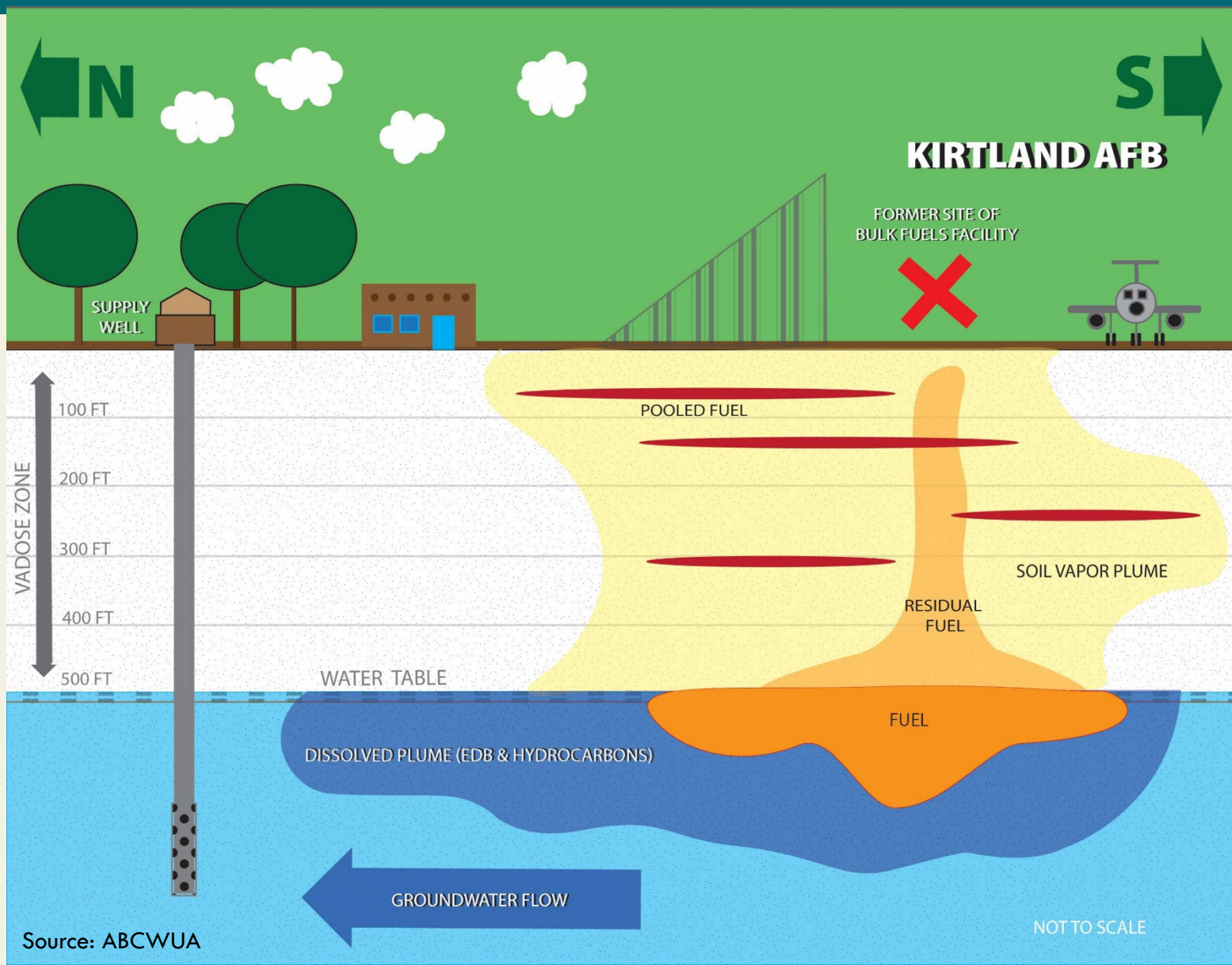
- Used up to the 1950s
- Contains Ethylene Dibromide (EDB)

Jet Propellants (JP-4 & JP-8)

- Used 1950s up today



KAFB Bulk Fuels Facility (BFF)



Source: ABCWUA



KAFB BFF Regulatory History

- November 1999, KAFB discovered leaked fuel associated with the off-loading rack to their former bulk fuels facility tanks.
- 2000 to 2010 preliminary investigations and interim measures were overseen by the NMED Ground Water Quality Bureau.
- 2010 to 2024 Expanded Investigation and Interim Measures overseen by the NMED Hazardous Waste Bureau



HWB Regulatory Authority

Regulations

- Federal Resource Conservation and Recovery Act (RCRA)
- New Mexico Hazardous Waste Act (HWA)
- New Mexico Hazardous Waste Permit and Corrective Action Fee Regulations [20.4.2 NMAC]

KAFB Permit

(EPA ID# NMD9570024423; NM ID 2400)

- Governs the Corrective Action Process
- Contains requirements for Corrective Action Process

<https://www.env.nm.gov/hazardous-waste/kafb/>



Corrective Action Process

Investigation



CM Evaluation



CM Selection



CM Implementation

Investigation – Determine the nature and extent of the contamination in all media at the site.

Corrective Measures Evaluation – Evaluate the potential methods to remediate the site.

Corrective Measures Selection – Propose the Cleanup technology with final selection by NMED with input from stakeholders and the public.

Corrective Measures Implementation – Selected Remedy is installed, operated, monitored, and maintained.



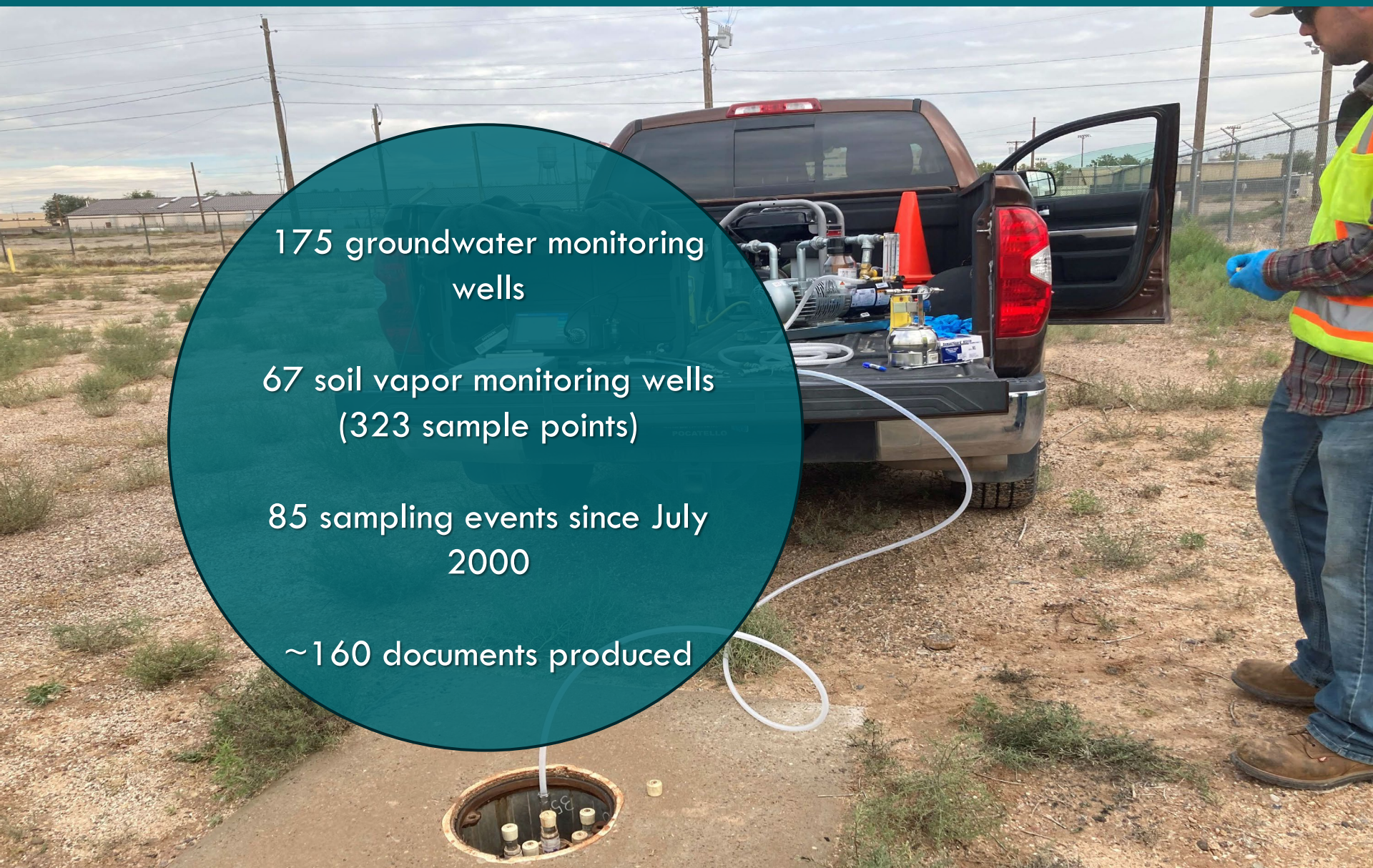
Investigation / Monitoring

175 groundwater monitoring wells

67 soil vapor monitoring wells
(323 sample points)

85 sampling events since July 2000

~160 documents produced

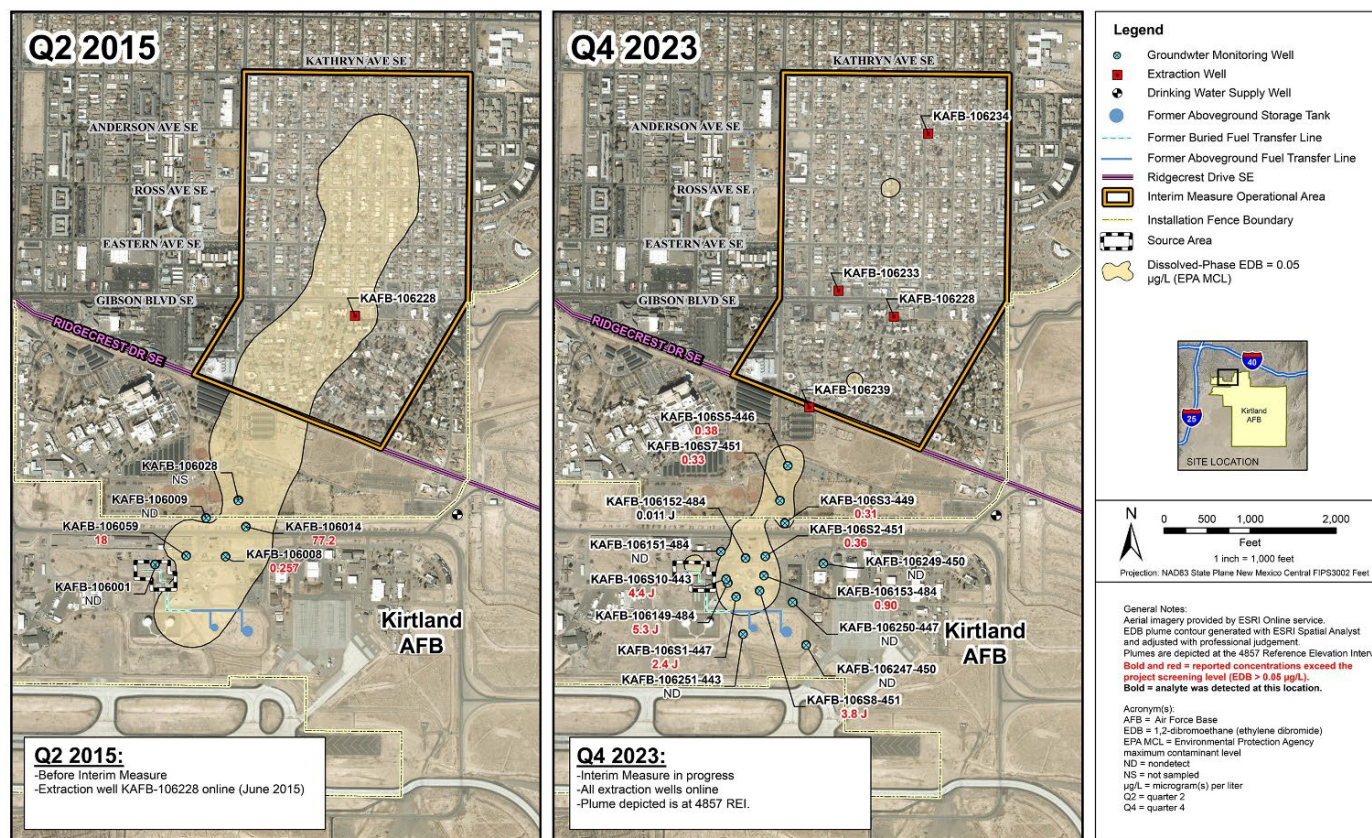




Progress – Offsite

EDB Plume Footprint (over time)

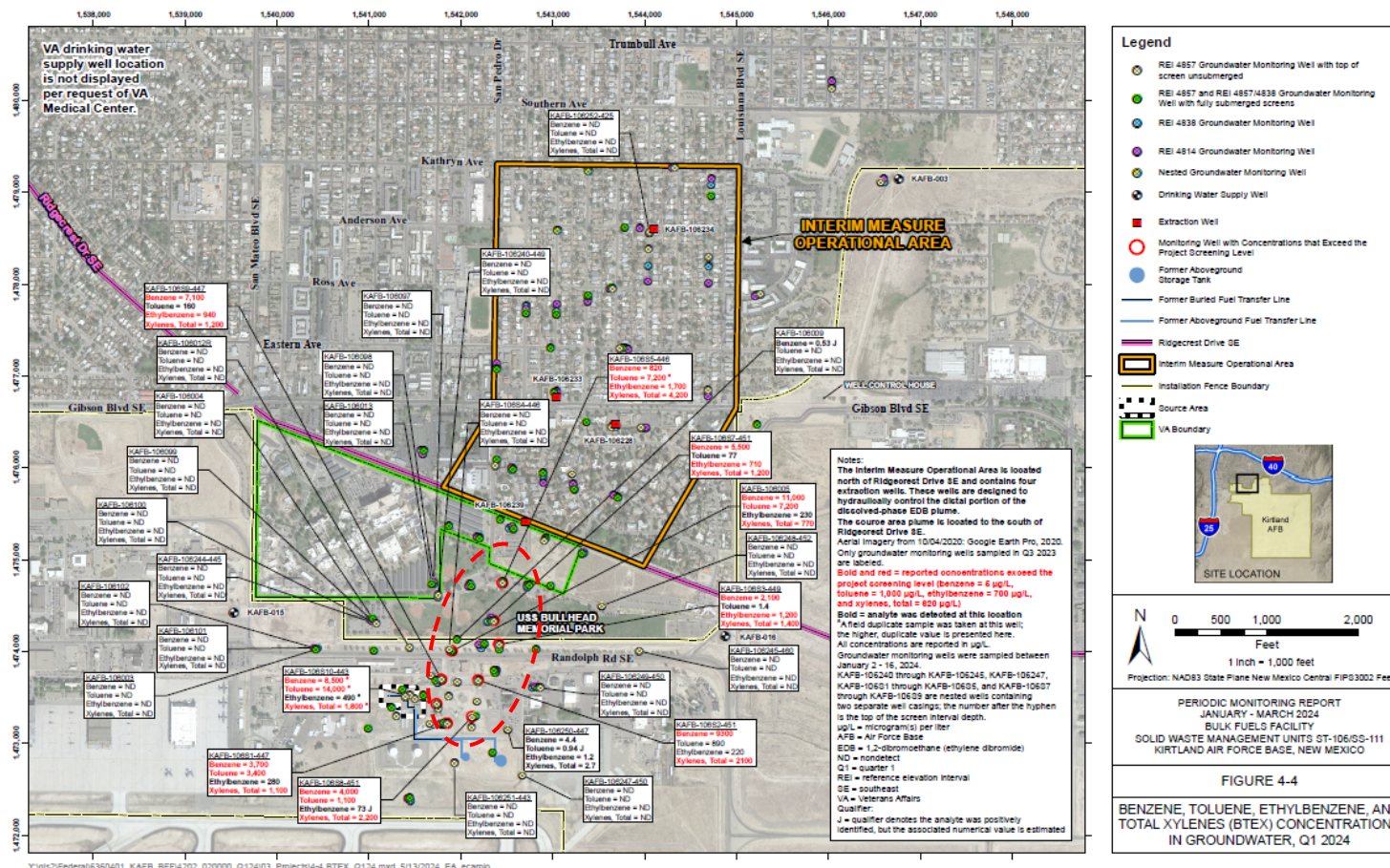
Comparison of Dissolved-Phase EDB in the Interim Measure Operational Area Between Q2 2015 and Q4 2023





Progress – Offsite (2)

Q1 2024 Benzene Detections





Progress – Onsite

- Onsite and Source Area Characterization
- Soil Vapor Extraction Activities (2005-2015)
- Pilot Studies (2015-2018)
- Ongoing monitoring of vapor and groundwater contamination





Current Status

Air Force proposed adjustments to the Interim Measures treatment system in July 2024

- Air Force presented proposed adjustments and modeling data to NMED and stakeholders
- Additional discussions followed regarding Stakeholder concerns and additional NMED monitoring and reporting requirements
- Air Force determined not to propose any adjustments until after the Phase II RCRA Facility Investigation (RFI) is approved



Current Status (2)

NMED approved the revised Soil Vapor Monitoring Plan in January 2024; sampling is now occurring under the new plan

NMED received the revised Groundwater Monitoring Plan in September 2024; currently in NMED review

NMED has reviewed four documents relating to installation of new soil vapor and groundwater monitoring wells and source zone characterization



Path Forward

New soil gas data will be used to supplement the risk assessment and conceptual site model.

- NMED will provide evaluation criteria to the Air Force to evaluate if historic soil gas data are quantitative.
- NMED will evaluate past data with newly collected data to determine if historic data are representative and complete.
- This evaluation will define which data used for nature and extent and direct the Phase II RCRA Facility Investigation how to proceed to the Corrective Measure Evaluation Phase.



Path Forward (2)

Phase II RCRA Facility Investigation will fill in remaining data gaps and allow KAFB to proceed towards Corrective Measure Evaluation and Corrective Remedy Selection

NMED continues to work with a third-party contractor to review the submitted monitoring reports and other documents, and to evaluate all past data



Path Forward (3)

NMED is communicating frequently with KAFB to identify data gaps and resolve issues in order to move toward a final remedy selection

NMED will continue to foster stakeholder engagement with the Air Force and build public confidence in our shared ability to safeguard the community



Thank you!



Kirtland Air Force Base (KAFB) Bulk Fuels Facility Leak Cleanup

***Public Meeting
November 21, 2024***

Ryan Wortman, Air Force Civil Engineer Center



Discussion Topics



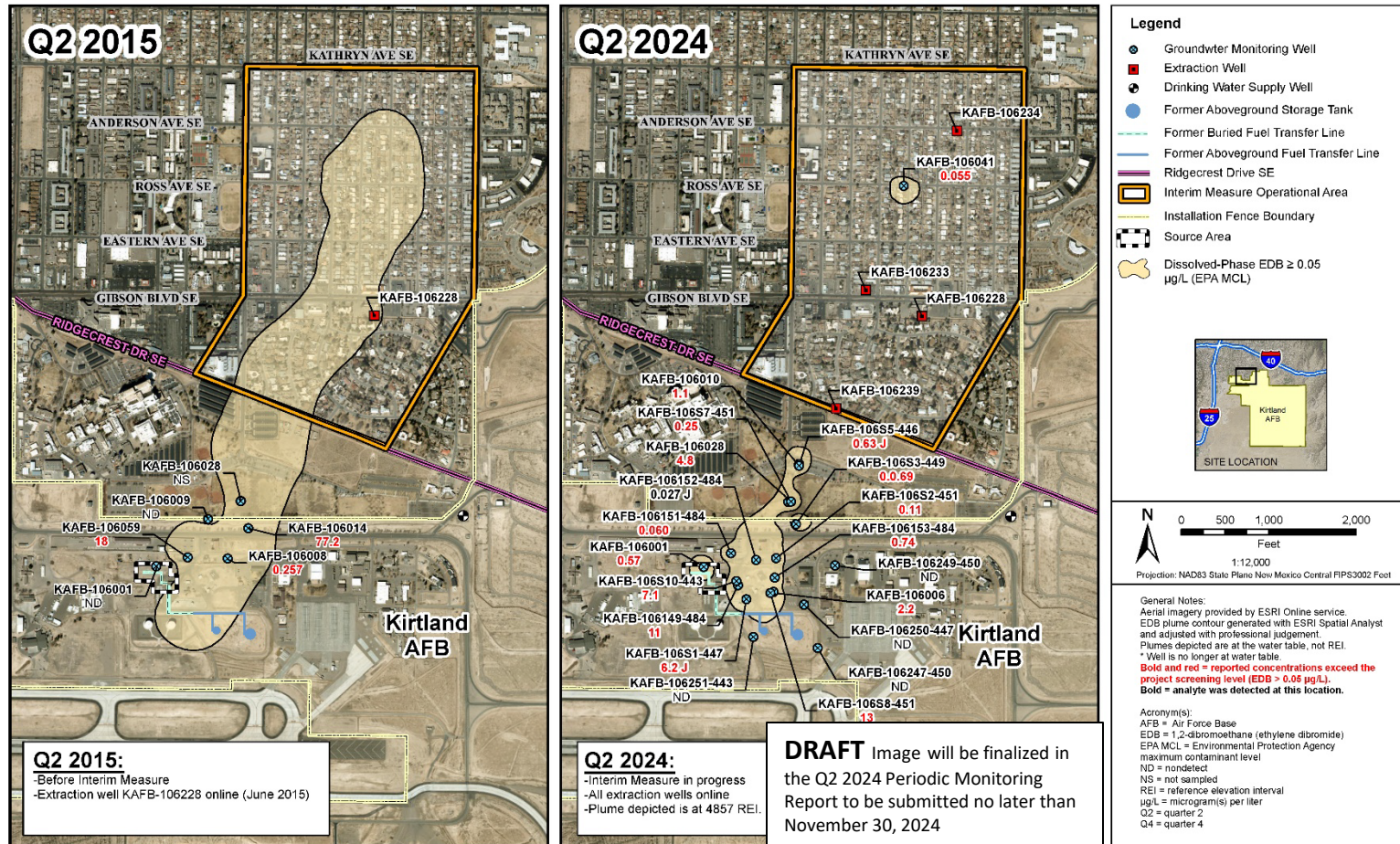
- Ethylene Dibromide (EDB) Plume
 - 2015 vs 2023
 - Interim Measure (IM) Status
- Benzene Plume Stability
- Resource Conservation and Recovery Act (RCRA) Corrective Action Process
- Vadose Zone Interim Measures Summary
- Site Activity Timeline
- Monitoring Work Plans Update
- New Groundwater Monitoring Well Installation Work Plan
- Phase II RCRA Facility Investigation (RFI) Report Update
- Path forward to Corrective Measures Evaluation (CME)



EDB Plume – 2015 vs 2024

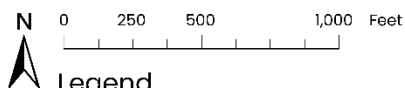


Comparison of Dissolved Phase EDB in the Interim Measure Operational Area Between Q2 2015 and Q2 2024



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The Kirtland Bulk Fuels Facility Leak: A Conceptual Model



Legend

- Sentinel Wells
- Monitoring Wells
- Extraction Wells (KAFB-106239 & KAFB-106228)
- Ethylene Dibromide (EDB) Q4 2023 Plume (at reference elevation interval 4857)
- Kirtland AFB

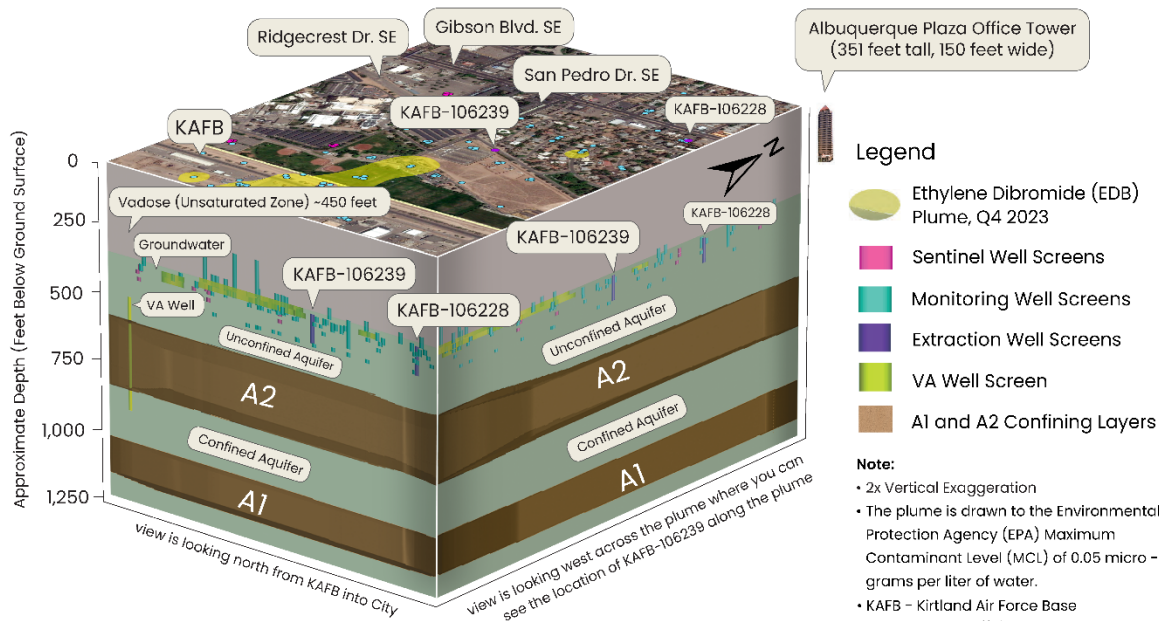
Note:

- VA Well location not shown.
- The plume is drawn to the Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) of 0.05 micrograms per liter of water. Plume data from Q4 2023

Key Elements to Monitor and Protect Our Water Supply

- VA drinking water is sampled on a monthly basis since March 2006 to present. No EDB contamination has been detected in any monthly drinking water sample. All sample results have met drinking water standards.
- Sentinel wells, installed between 2014 – 2016, are located between the plume and the VA drinking water well to provide an “early warning system.” No EDB contamination has been detected in any quarterly water sample. All sample results have met drinking water standards.
- Monitoring wells between the plume and the VA drinking water well are sampled multiple times each year and are used to identify horizontal and vertical plume boundaries.
- Groundwater flow is generally to the east, away from the VA drinking water well.
- A2 and A1 are “confining layers” of soil in deep groundwater. These layers provide a natural barrier for drinking water wells that are screened below these non-permeable layers.

Note: Block diagram (below) is represented in 2x exaggeration to help show plume thickness.



Legend

- Ethylene Dibromide (EDB) Plume, Q4 2023
- Sentinel Well Screens
- Monitoring Well Screens
- Extraction Well Screens
- VA Well Screen
- A1 and A2 Confining Layers

Note:

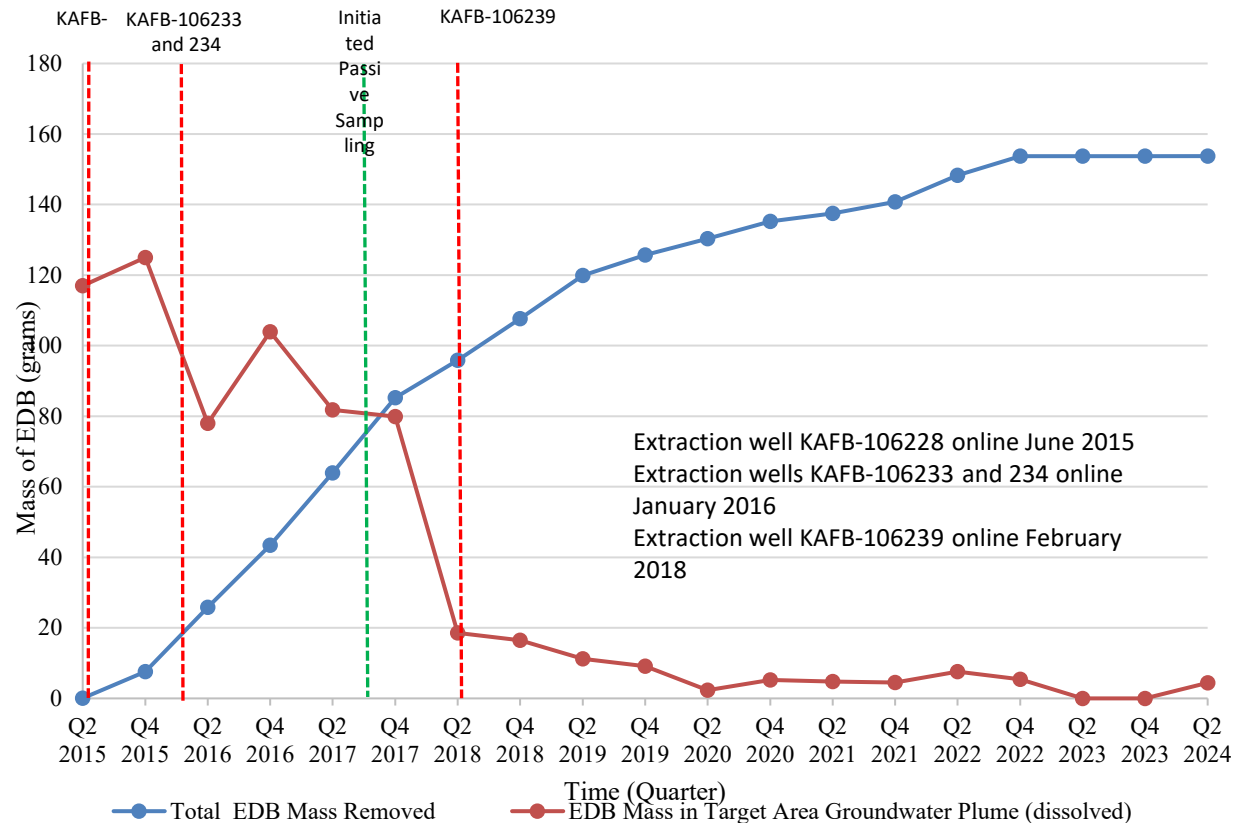
- 2x Vertical Exaggeration
- The plume is drawn to the Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) of 0.05 micrograms per liter of water.
- KAFB – Kirtland Air Force Base
- VA – Veterans Affairs
- Q4 – Fourth quarter



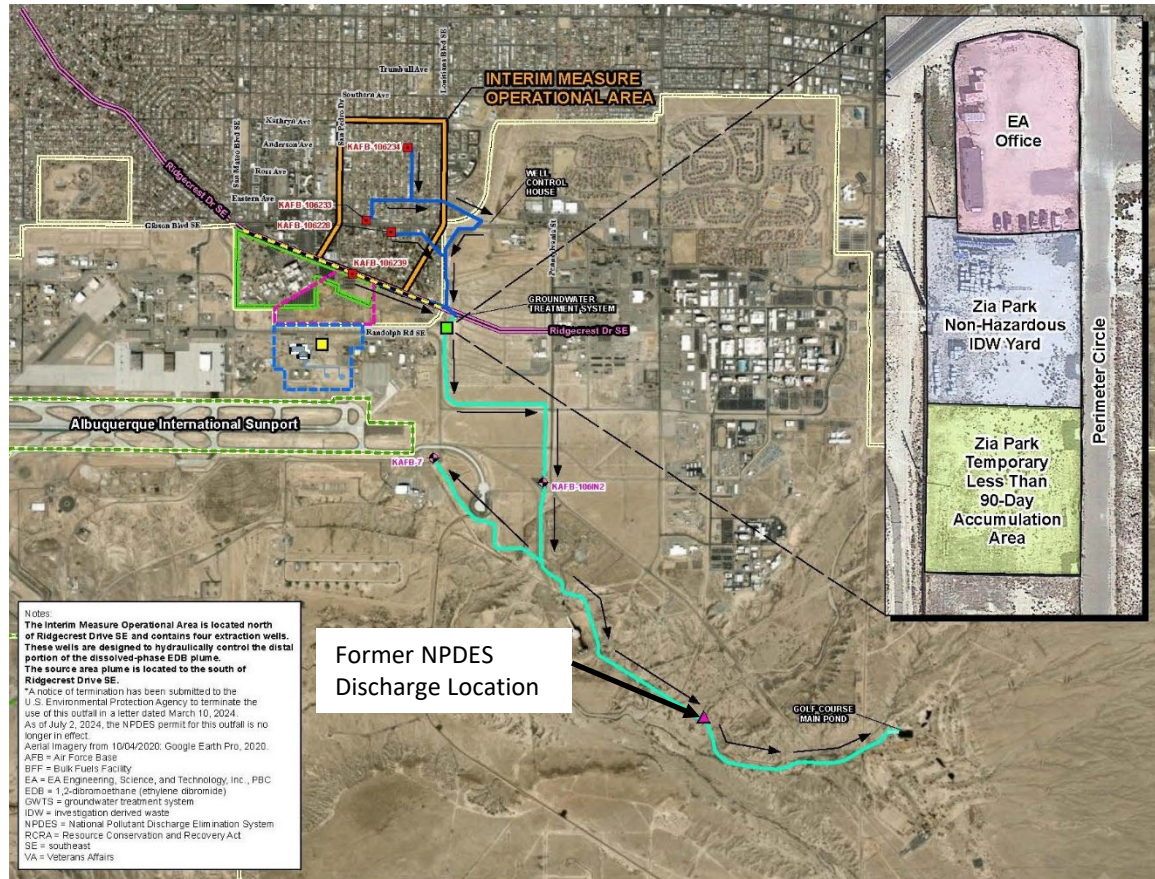
Status Update: EDB Interim Measure



EDB Mass in Groundwater vs. Time



Pump and treat interim measure has achieved an estimated 92.4% reduction in the interim measure operational area of the dissolved EDB mass since 2016. EDB was not detected in Q2 2024, indicating no mass was removed during the quarter.



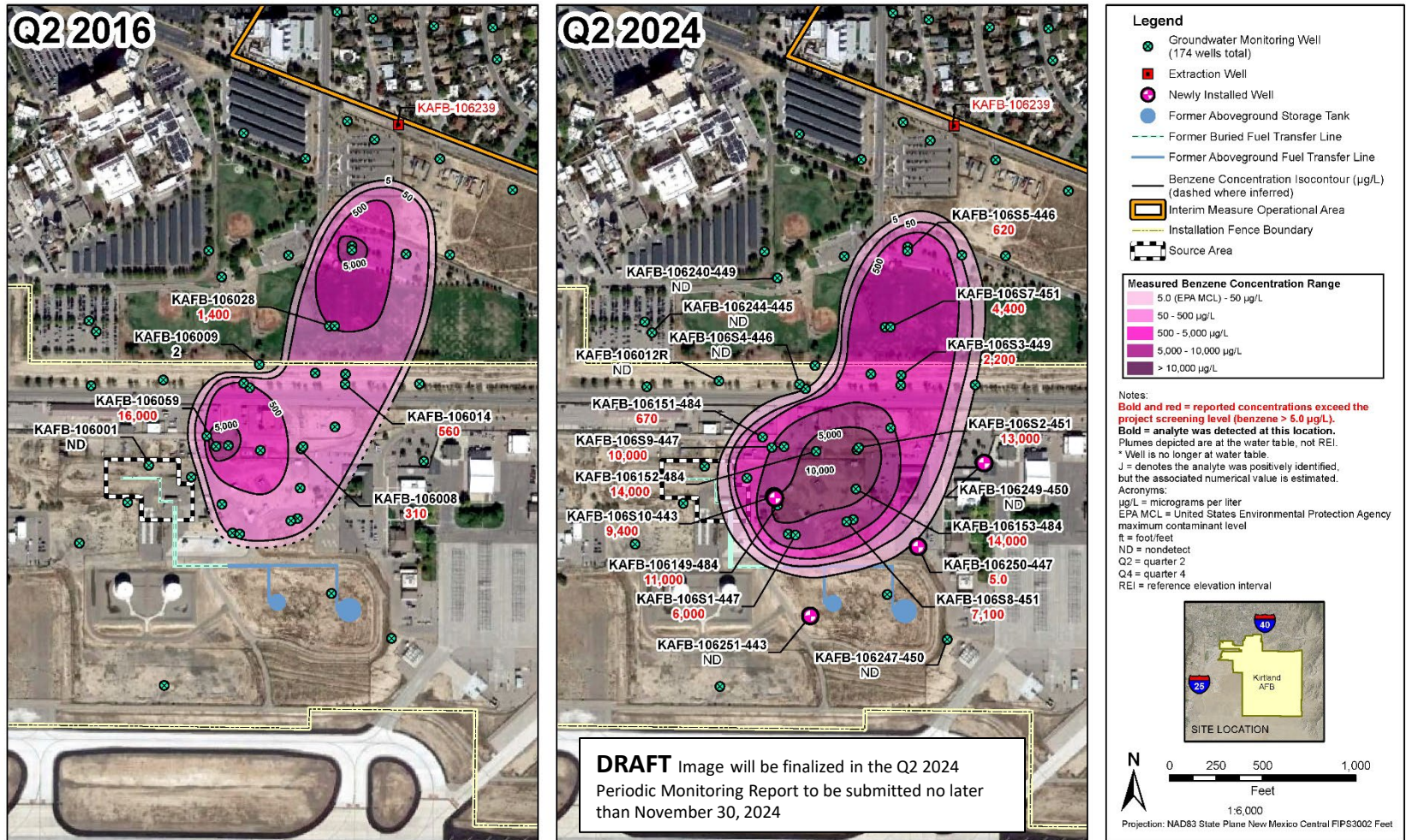
- A NPDES point source discharge location was permitted and installed in 2022. This discharge location was never used.
- A request to terminate the permit was submitted on March 10, 2024.
- The request for termination was approved by EPA on July 2, 2024.
- The discharge location has been welded shut to make sure it cannot be used inadvertently.



Benzene Plume Footprint (over time) Projected at the Water Table



Comparison of Benzene in the Interim Measure Operational Area Between Q2 2015 and Q2 2024



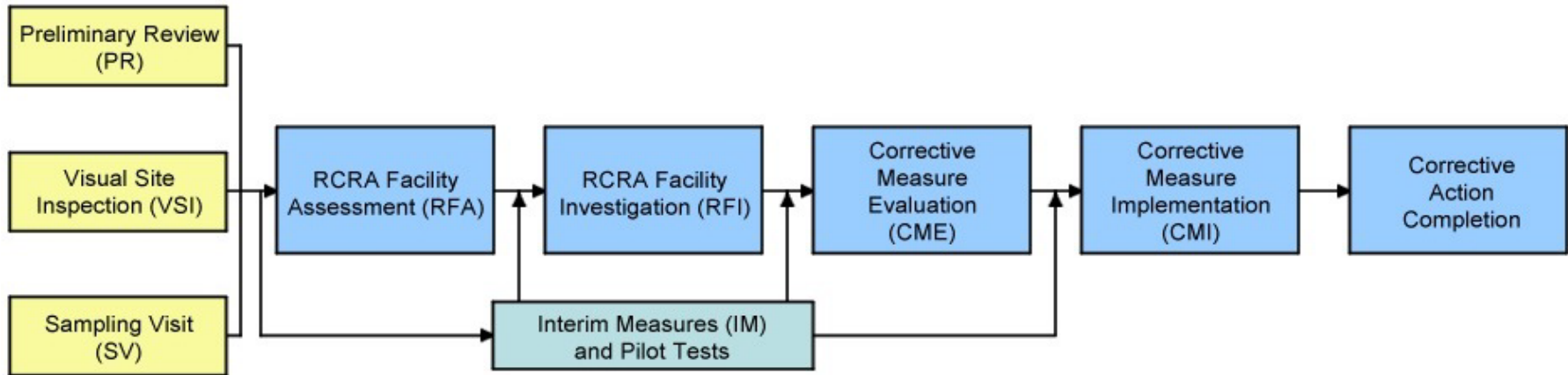
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RCRA Corrective Action Process



*Image adapted from California Department of Toxic Substances Control (<https://dtsc-topock.com/resource-conservation-and-recovery-act>)



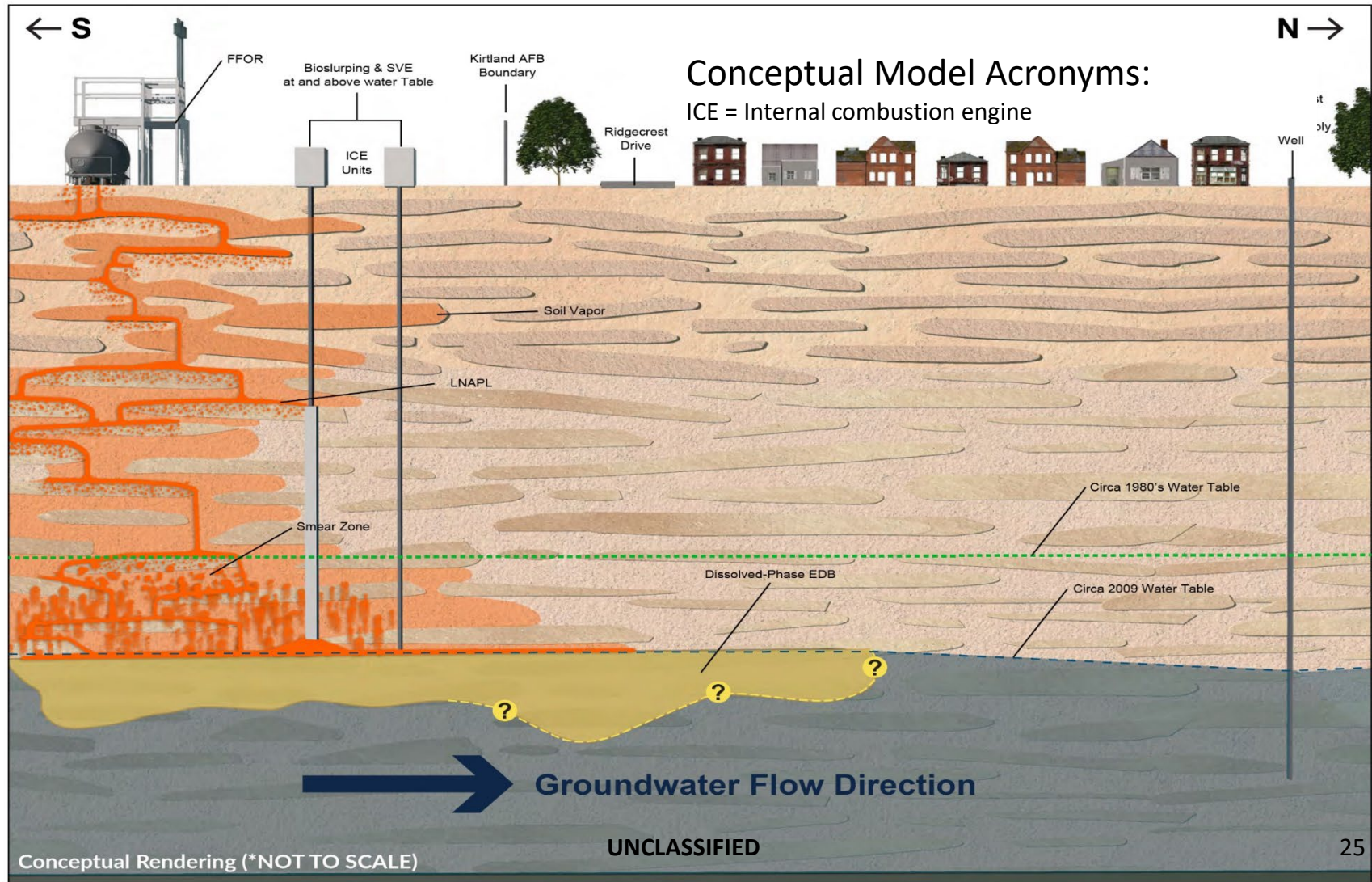
- Pace of cleanup is driven by the iterative corrective action (CA) process in KAFB's RCRA permit
- IMs are allowed under the permit when actions necessary to minimize or prevent the further migration of contaminants and limit actual or potential human and environmental exposure to contaminants before the CME and corrective measures implementation plan.
- All activities in the RCRA CA process inform the CME: IMs, pilot studies, RCRA Facility Investigation (RFI) I and II, and ongoing monitoring results



Conceptual Site Model 2009

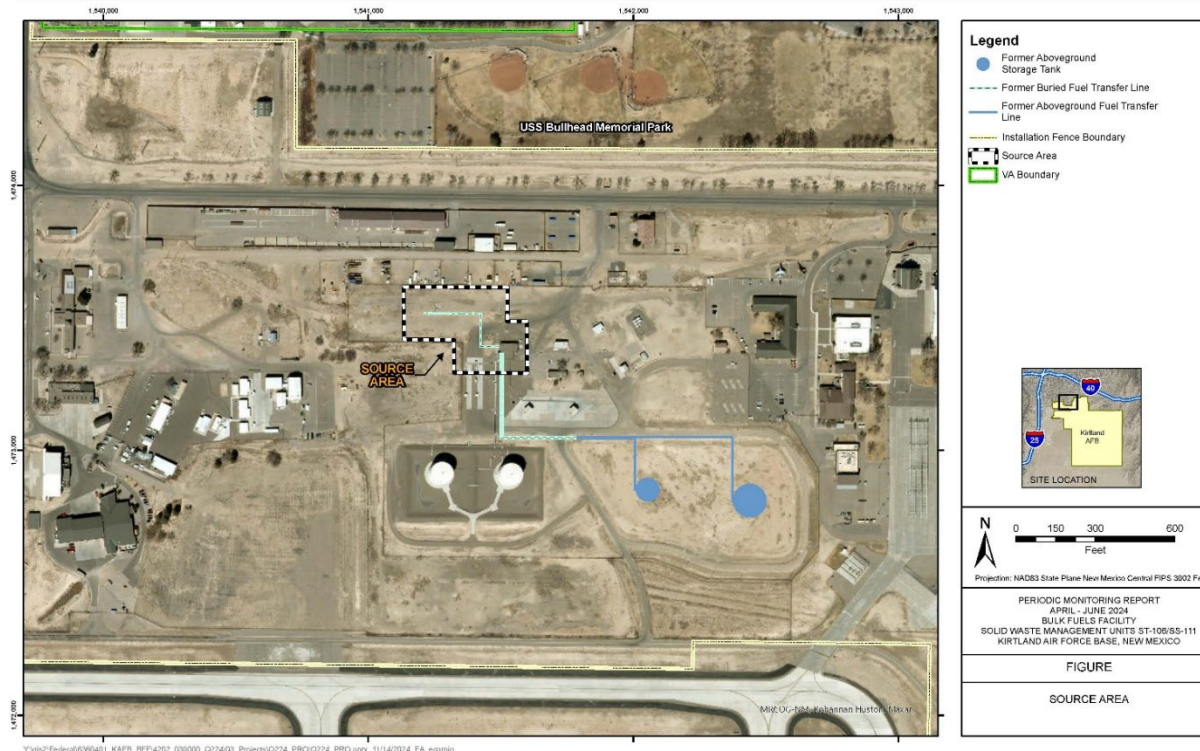


Figure ES-13. Groundwater Conceptual Model 2009





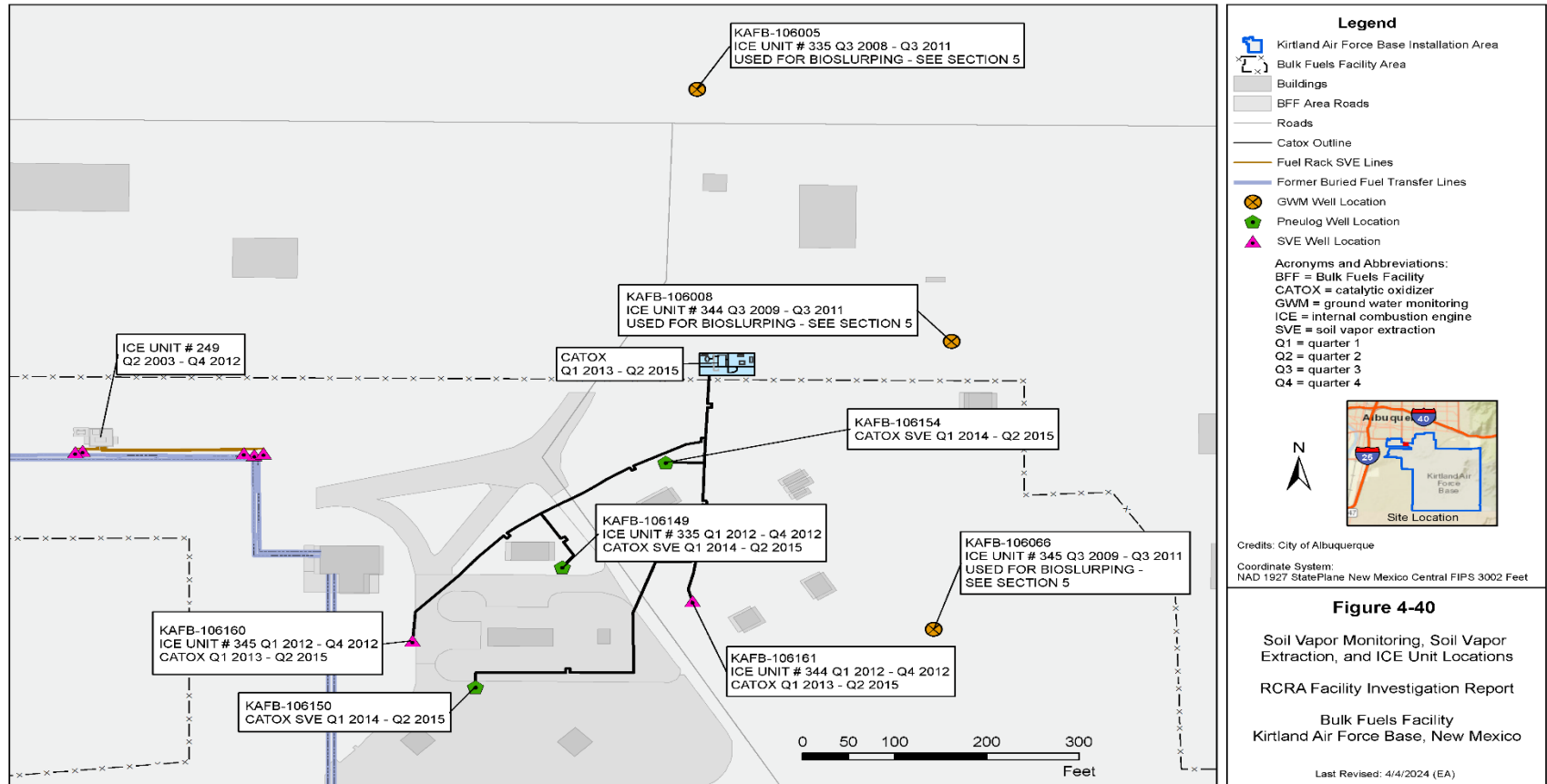
Vadose Zone IM Summary



- Approximately 775,000 equivalent gallons of fuel removed due to Soil Vapor Extraction Activities
- Three soil removal activities resulting in a total of approximately 4,786 tons (approximately 3,000 cubic yards) of contaminated soil removed.

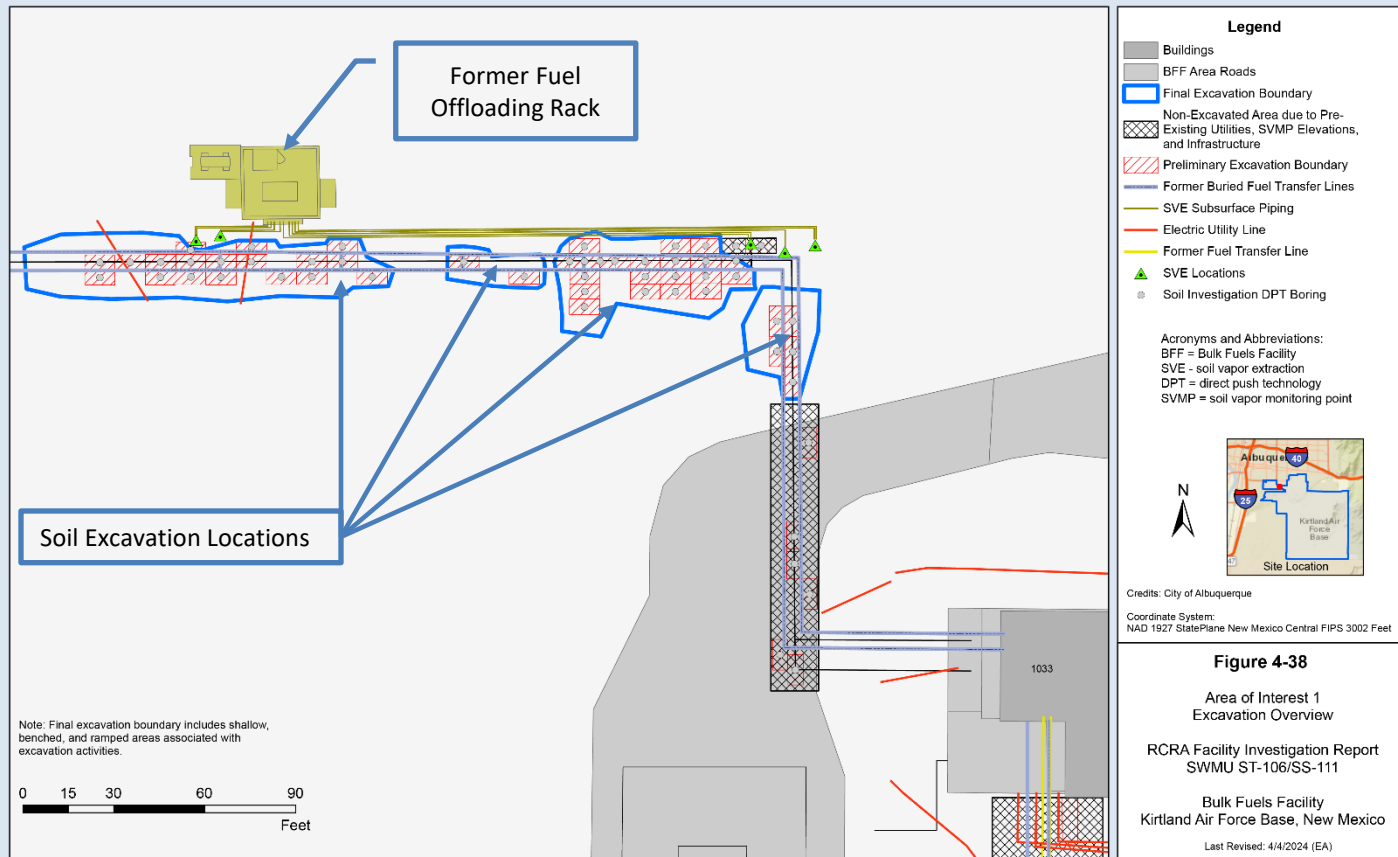


SVE Interim Measure (IM) Locations



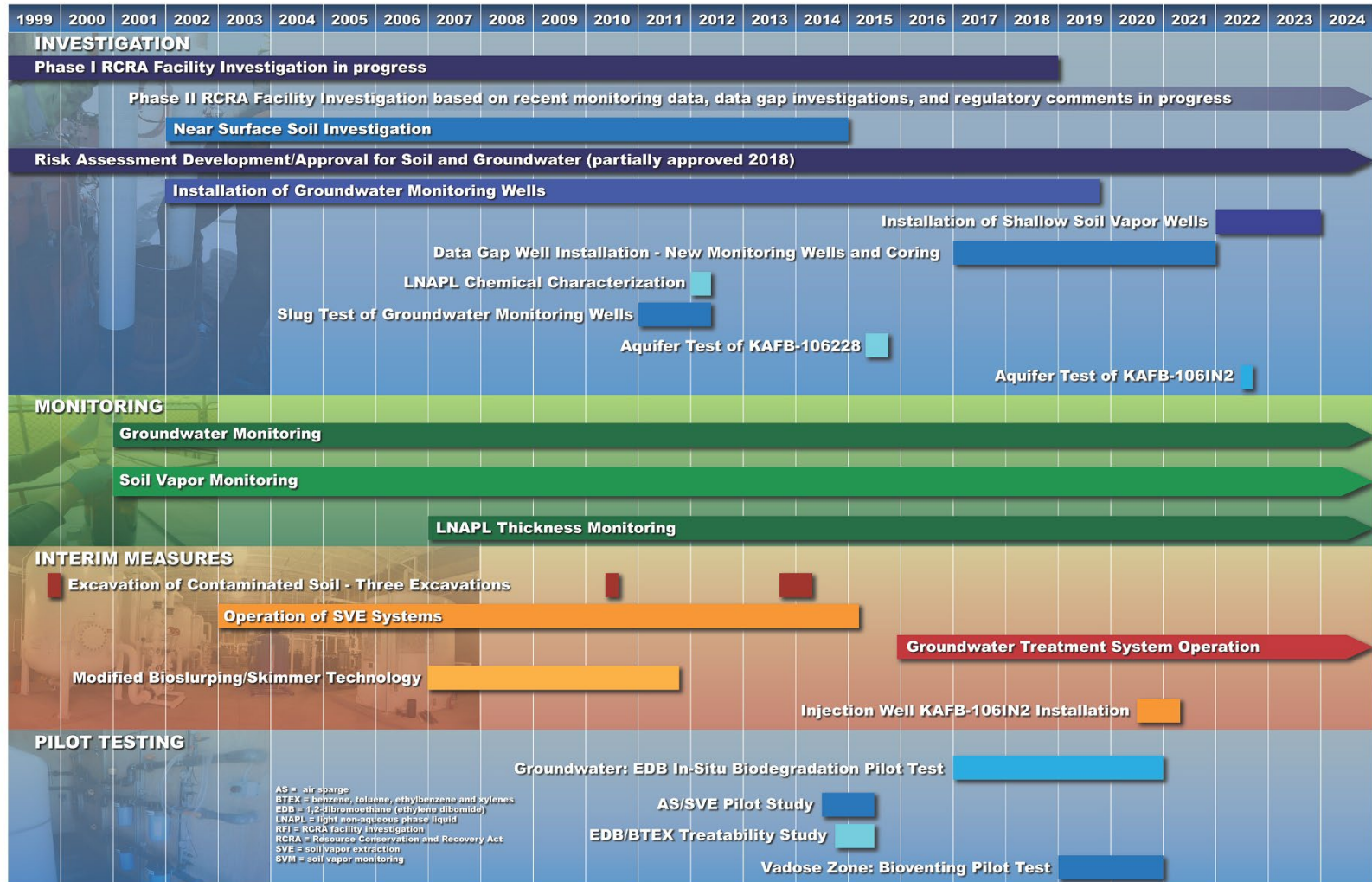


SOIL EXCAVATION LOCATIONS





Site Activity Timeline





Monitoring Work Plans Update



- On January 9, 2024, NMED submitted a letter approving the July 24, 2023, Soil Vapor Monitoring Work Plan (323 sample points)
 - The work plan documented the representativeness and decision making used for historical methods employed to collect soil vapor data
 - The approved work plan was first implemented in the Q2 2024 monitoring event
- KAFB submitted a letter in response to the required Annual Monitoring Work Plans Update/Notification on March 19, 2024
 - No changes to recently approved Soil Vapor Monitoring Work Plan
 - KAFB will perform evaluation of dual sampling methods (passive vs active) from select monitoring wells
 - KAFB submitted the 2024 Work Plan for Groundwater Monitoring dated August 2024 to NMED (174 groundwater wells), received NMED approval with modifications on November 12, 2024
 - To be implemented for 2025 Sampling Events



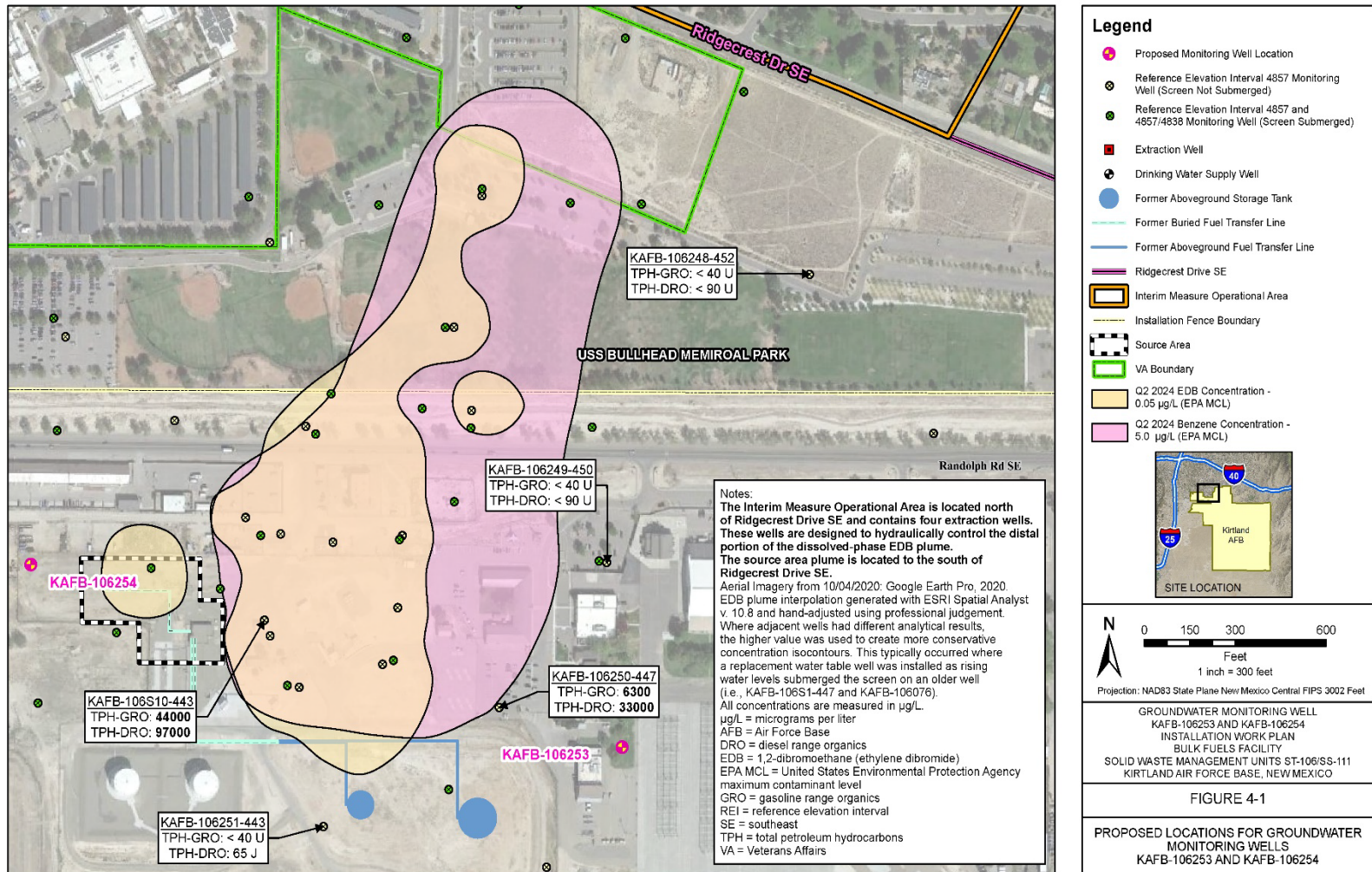
New Groundwater Monitoring Well Installation Work Plan



- In a letter dated April 4, 2024, the New Mexico Environment Department Hazardous Waste Bureau requested that additional groundwater monitoring (GWM) wells be installed to further refine the 1,2-dibromoethane (ethylene dibromide) (EDB), benzene, and total petroleum hydrocarbon (TPH) plumes
- Air Force is submitting a work plan that proposes to install two additional GWMs, anticipated submission November 30, 2024
 - GWM Well KAFB-106253 (east of well KAFB-106250) to further refine the EDB plume
 - GWM Well KAFB-106254 (west of the source area) to further refine the TPH and benzene plumes
 - Wells will be screened across the water table
 - Eight quarters of baseline sampling will be conducted
 - Data collected to further address changing site conditions (i.e. rising water table)



Proposed GWM Wells Locations



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Extraction Well Operational Adjustments



- Pump and treat interim measure has achieved an estimated 99.3% reduction in the interim measure operational area of the dissolved EDB mass since 2015.
- Influent concentrations have been below the limit of detection (0.019 ug/L) in Train 1 since October 2020 and Train 2 since September 2023.
- The extraction well operational adjustments would remove more EDB mass and ensure protection of drinking water wells.
- Actions deferred to focus resources on reaching the CME phase of the project.
- NMED staff agreed that the current extraction well rates under the Interim Measure are adequate to remove EDB from groundwater and are protective of the aquifer within the Interim Measure Operational Area. Both parties agreed to revisit the extraction well adjustments in the future.



Phase II RFI Report Update



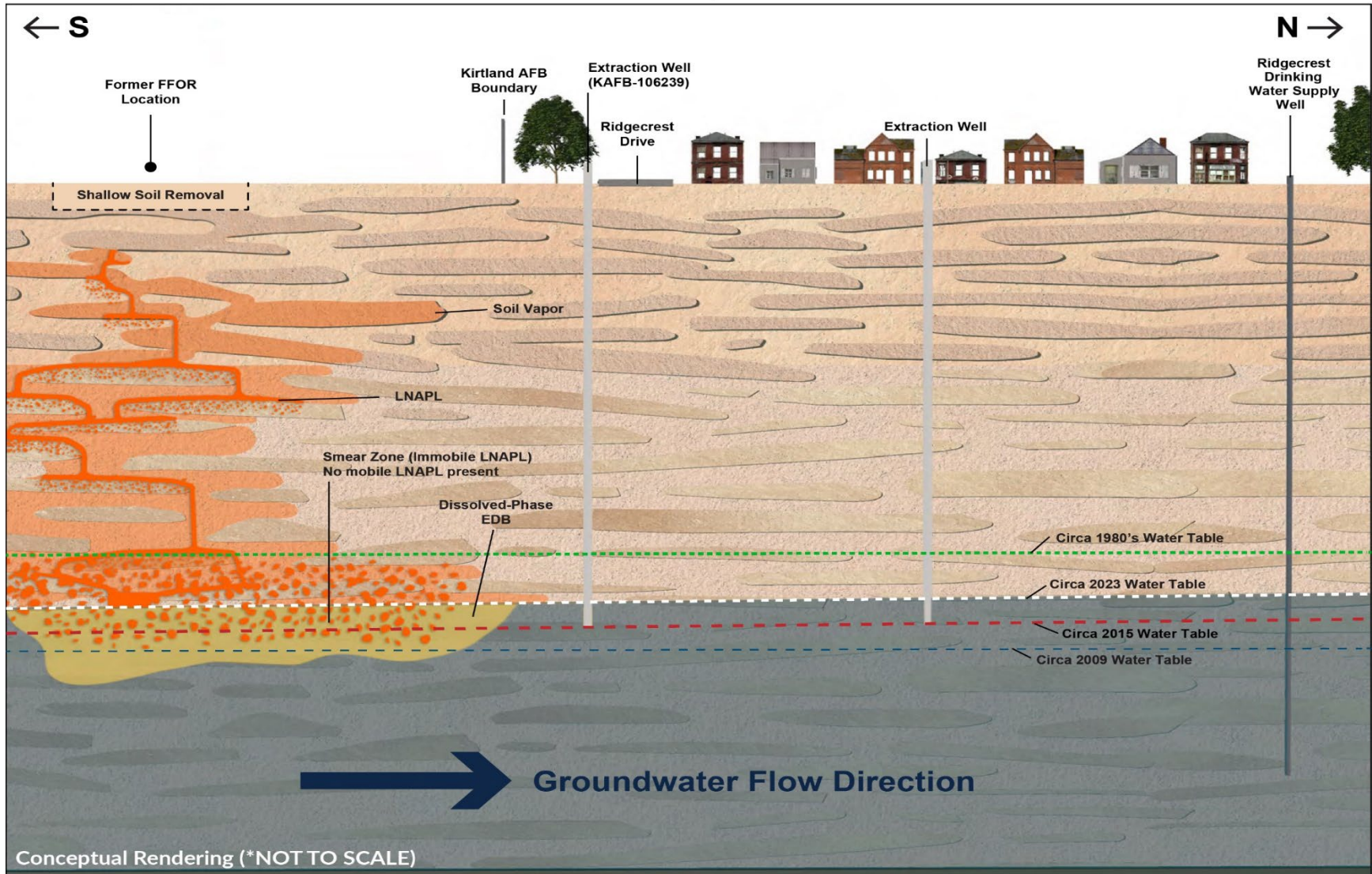
- Phase II RFI Report will define nature and extent of contamination to the degree necessary to conclude the investigation phase
- Phase II RFI Report includes the following:
 - The 2016 to 2023 monitoring data collected under NMED-approved work plans and reported in Periodic Monitoring Reports (approximately 4,800 soil vapor samples and 2,800 groundwater samples)
 - Three data gap investigation results
 - Addresses 122 regulatory comments and all regulatory concerns
 - Delineation of soil vapor and groundwater contamination to the degree necessary to inform the CME
 - Updated the conceptual site model
- An extension request was submitted to NMED on September 24, 2024
 - Clarification and justification was requested for the approximately 4,800 soil vapor samples that NMED has asserted to be unrepresentative
 - Soil vapor data is required to meet Phase II RFI Report objectives
 - The Air Force requested the specific evaluation method or guidance document that NMED plans to implement to compare new soil vapor data to soil vapor data utilized in the Phase II RFI Report to ensure report objectives can be met



2023 Conceptual Site Model



Groundwater Conceptual Model 2023





3-Dimensional Visualization for EDB Through Time



EDB in Soil Vapor (ug/m3)

- Not detected
- 0.01 - 1.56 (VISL)
- 1.57 - 15.6
- 15.61 - 156
- 156.01 - 1,560
- >1,560

Notes:

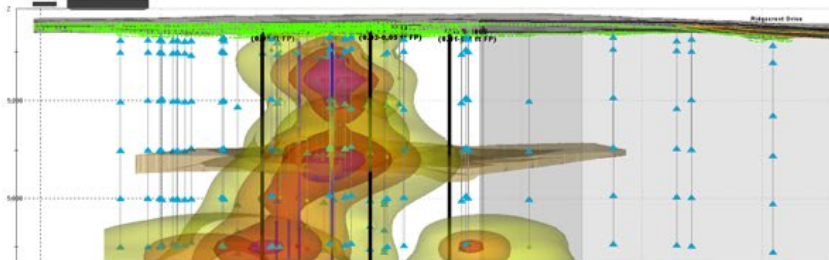
> = greater than

EDB = 1,2-dibromoethane

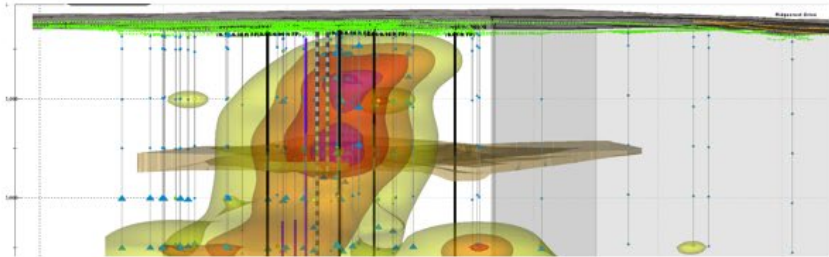
ug/m3 = micrograms per meter cubed

VISL = vapor intrusion screening level

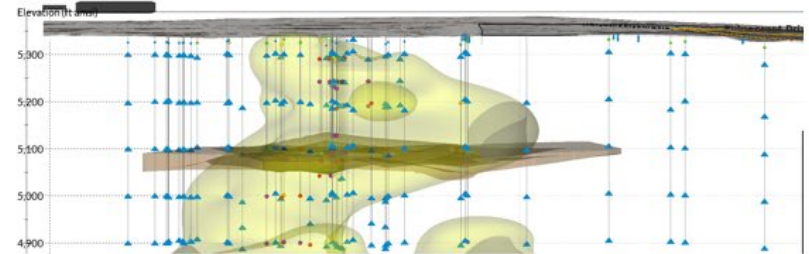
2nd Quarter 2016: 4.11E+08 cubic feet



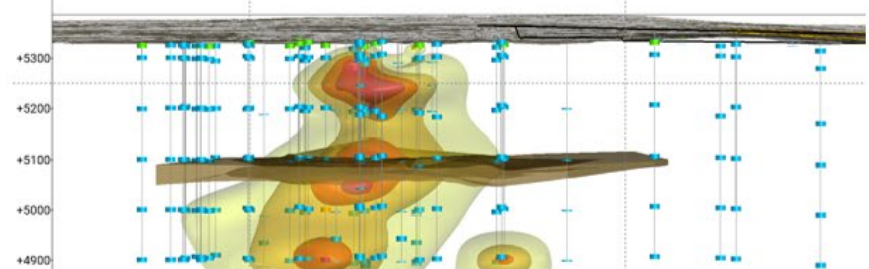
2nd Quarter 2020: 3.10E+08 cubic feet



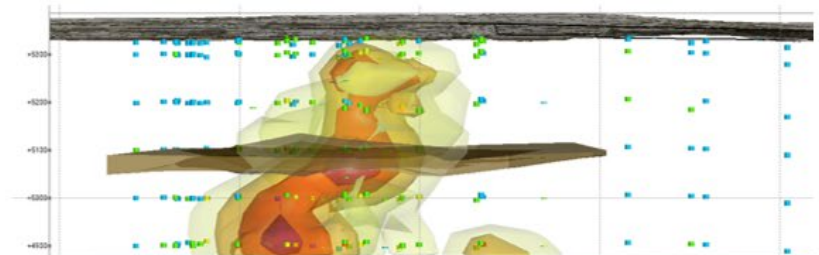
2nd Quarter 2022: 6.79E+07 cubic feet



4th Quarter 2023: 2.2E+08 cubic feet



2nd Quarter 2024: 1.89E+08 cubic feet

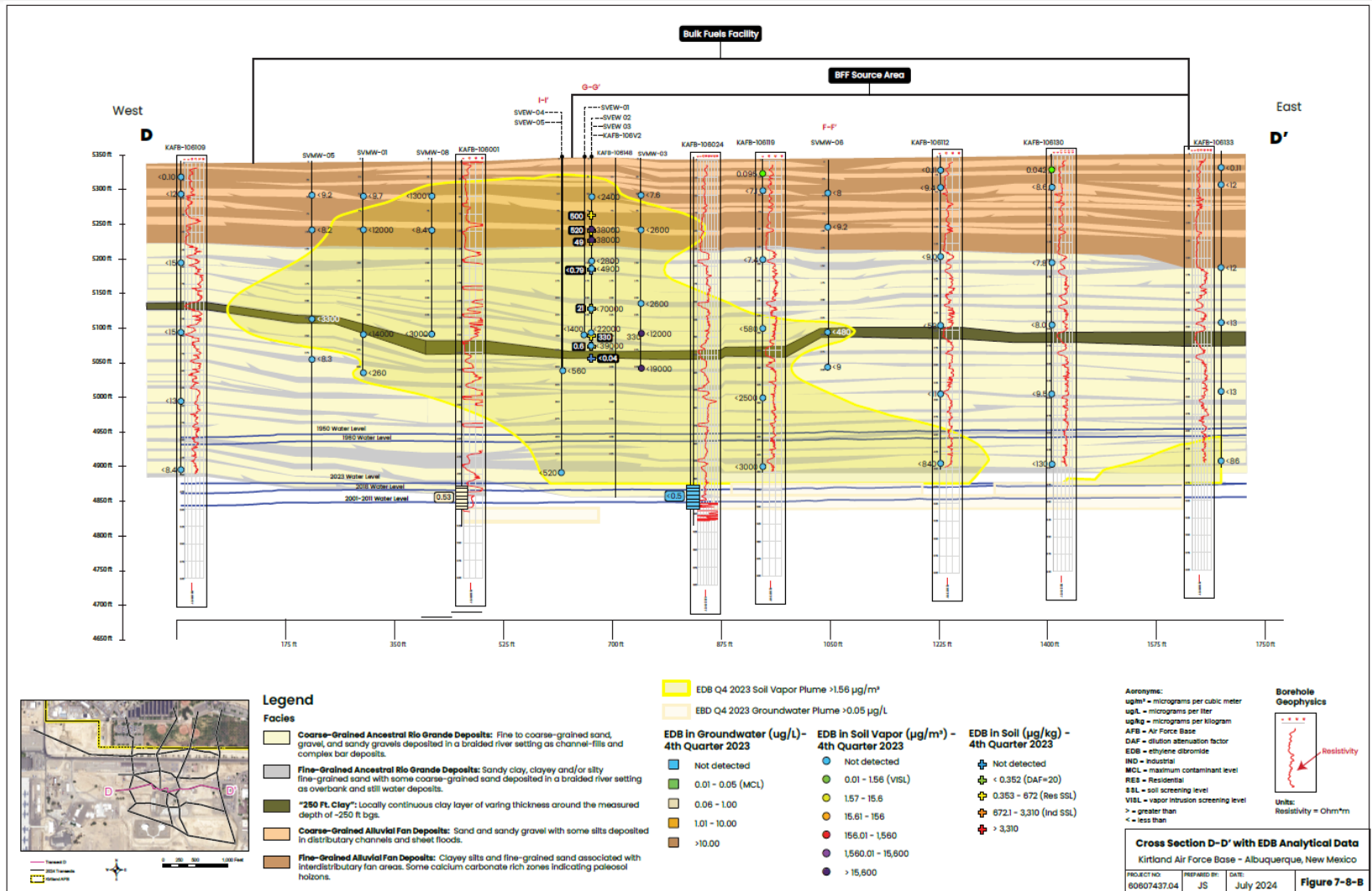


2x vertical exaggeration

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Cross Section D-D' with EDB Analytical Data



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Path Forward to Corrective Measures Evaluation



- In a project planning meeting, NMED has directed the Air Force to re-focus on getting the CME by concluding the investigation phase
- Air Force to draft a Phase II RCRA Facility Investigation (RFI) and an Update to the Risk Assessment (RA)
 - Updated RA will include the same methods as the approved 2017 RA while utilizing the additional shallow soil vapor data to strengthen the soil vapor human health RA
- NMED to provide input on key data sets to inform both the Phase II RFI and Updated RA
- Transitioning to CME does not mean additional data will not be collected. Air Force will continue periodic monitoring and addressing changes in site conditions.



Questions?



Point of Contact:

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Kirtland AFB Public Affairs, (505) 846-5991 - 377ABW.PA@us.af.mil

Additional information:

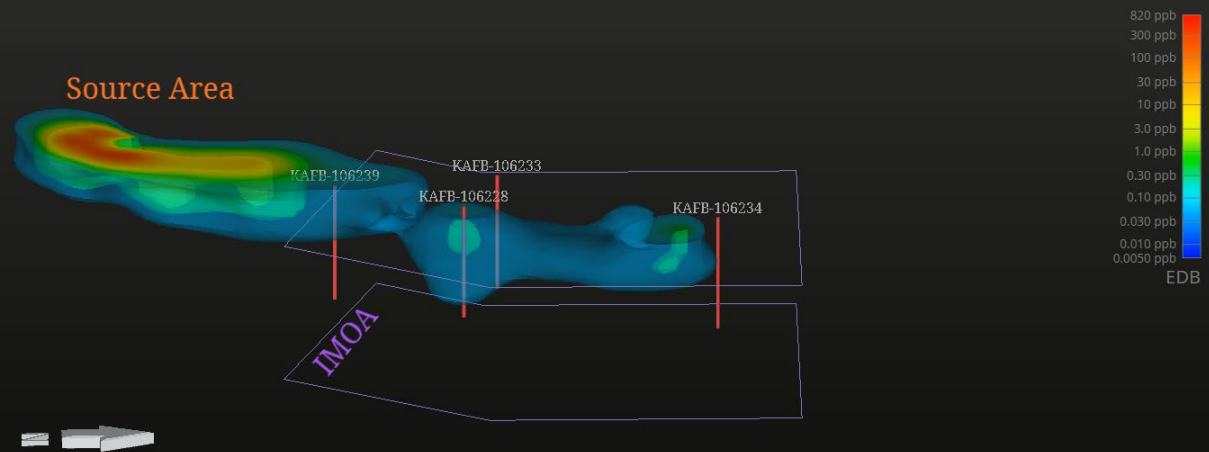
Online at <https://www.kirtland.af.mil/Home/BFF/> and <https://ar.afcec-cloud.af.mil/> or visit our New Information Station at the New Mexico Veterans Memorial at 1100 Louisiana Blvd SE, Albuquerque, NM

Upcoming 2025 Public Events:

- April Public Meeting
- July Groundwater Treatment System Open House
- November Public Meeting



EDB Plume Morphology



KAFB EDB Plume Morphology
Concentration Greater Than or Equal to 0.05 ug/L in Apr-2015