Kirtland Air Force Base
Bulk Fuels Facility Leak Cleanup

Military Veterans' Affairs Committee
October 22, 2021

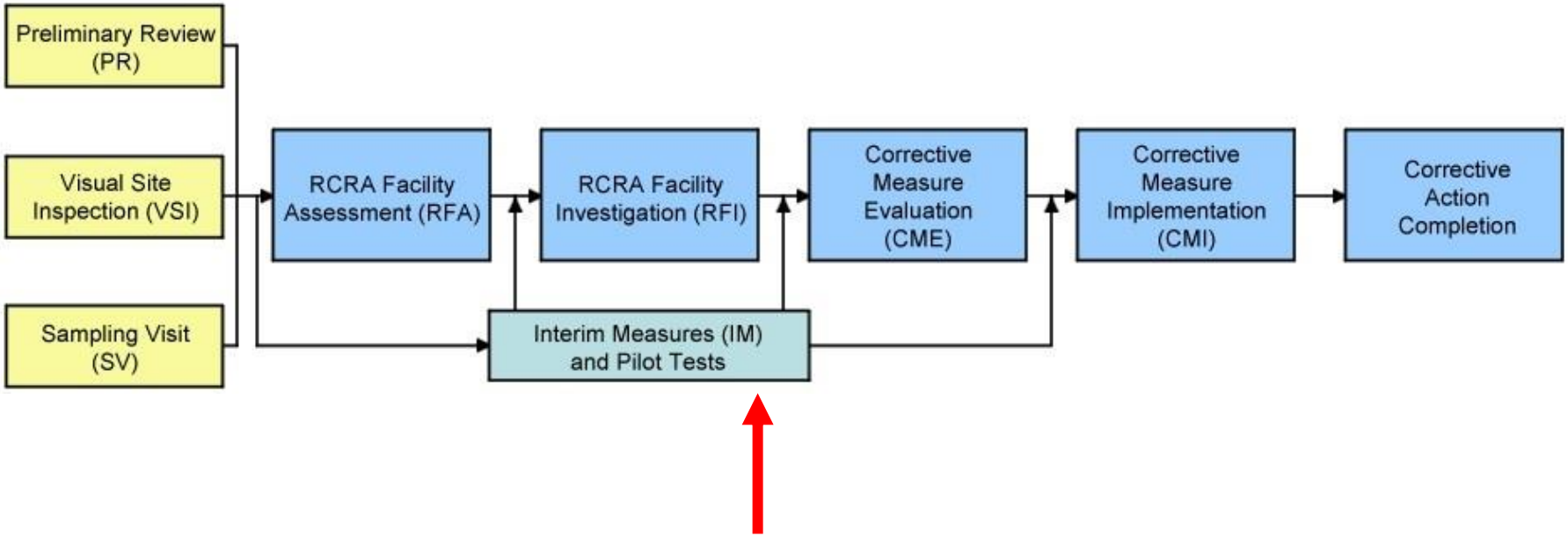
Ryan Wortman, Air Force Civil Engineer Center

Discussion Topics

- Resource Conservation and Recovery Act (RCRA) Process
- Project Status
  - Investigation Phase Complete- Pathway to RCRA Facility Investigation (RFI) Phase II Report
  - Pump and Treat System Status
  - Ongoing Monitoring
- Stakeholder Involvement
  - Commitment to Exceeding Permit Requirements for Stakeholder Engagement
  - Technical Working Group
- Funding
- Pilot Testing Status
- Questions

RCRA Corrective Action Process

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

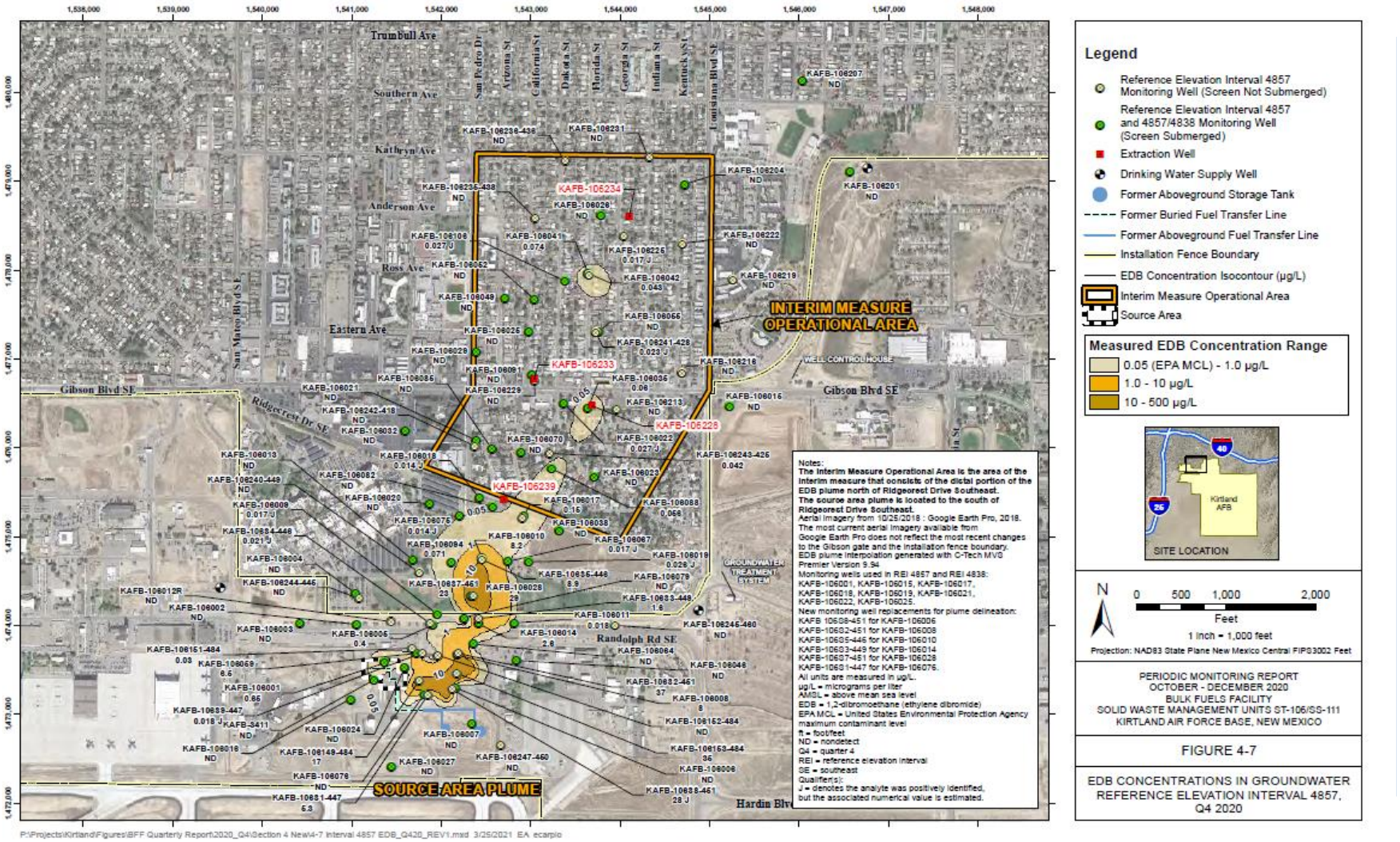


We Are Here

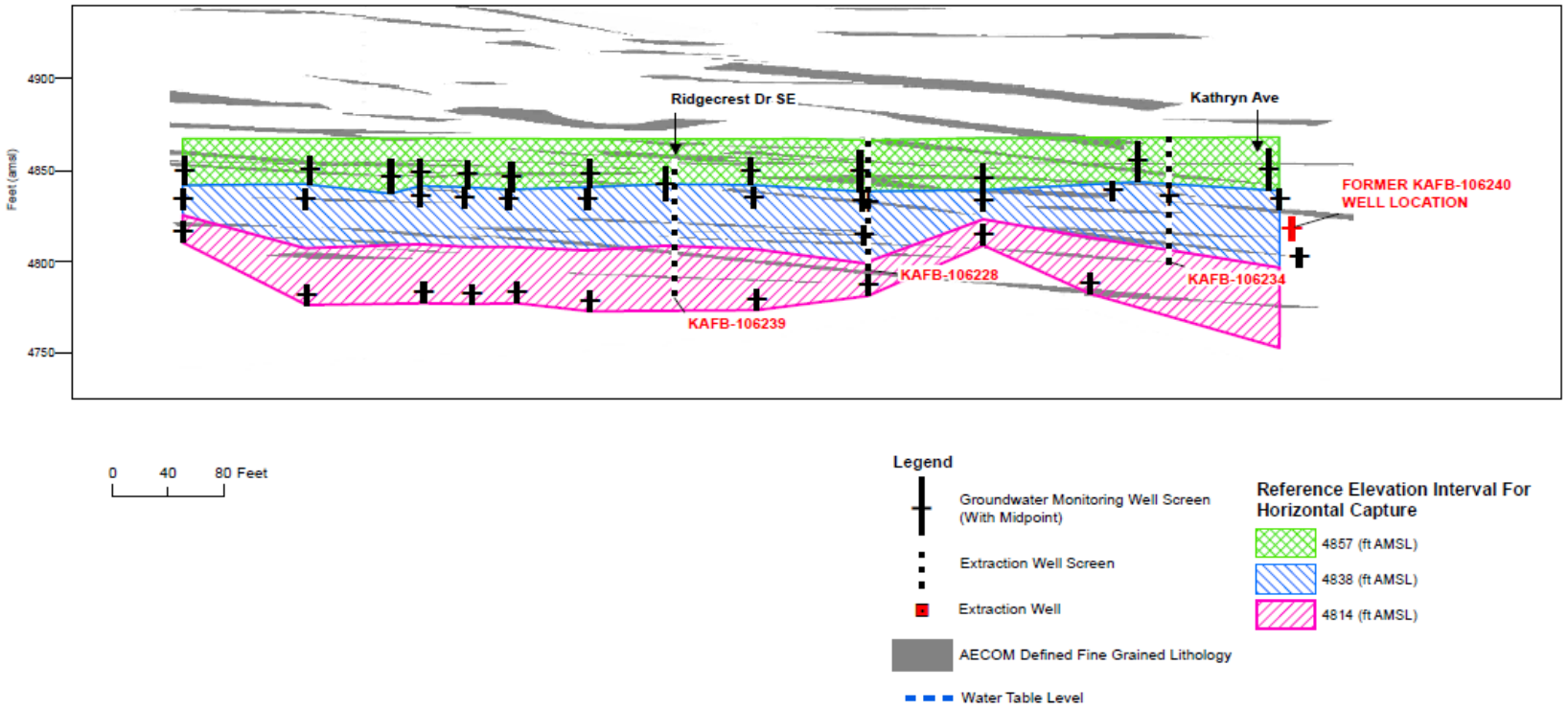
Pathway to RFI Phase II

- Air Force has defined nature and extent in all impacted media to the degree necessary to support the CME
- Groundwater
  - EDB Plume north of Ridgecrest Dr. NE
  - Source Area Plume south of Ridgecrest Dr. NE
- Surface Soil in Source Area
- Light non-aqueous liquid (LNAPL) in subsurface
- Soil Vapor

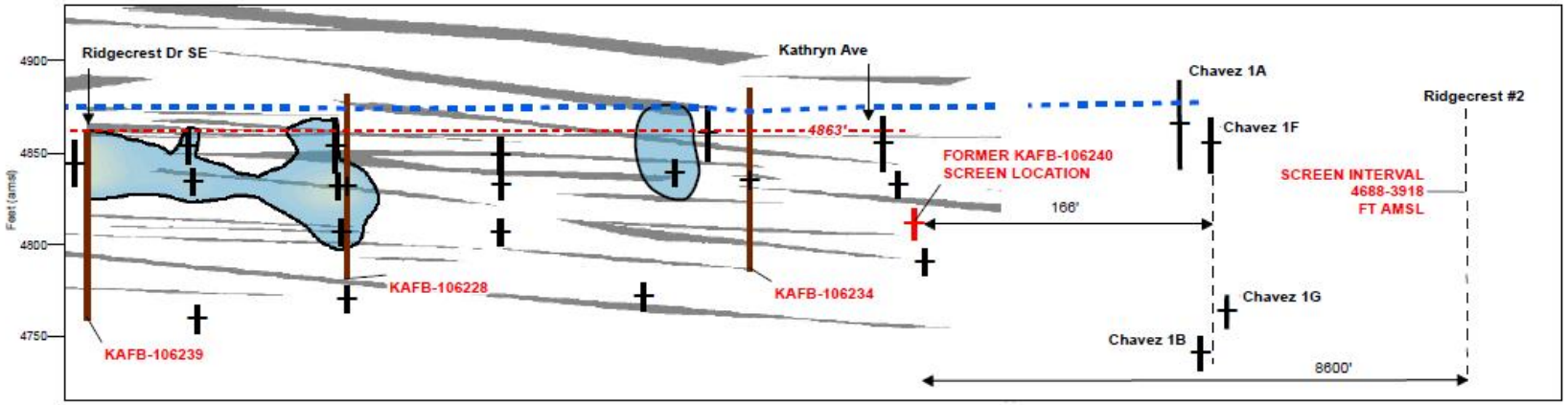
GWM Network (Horizontal)



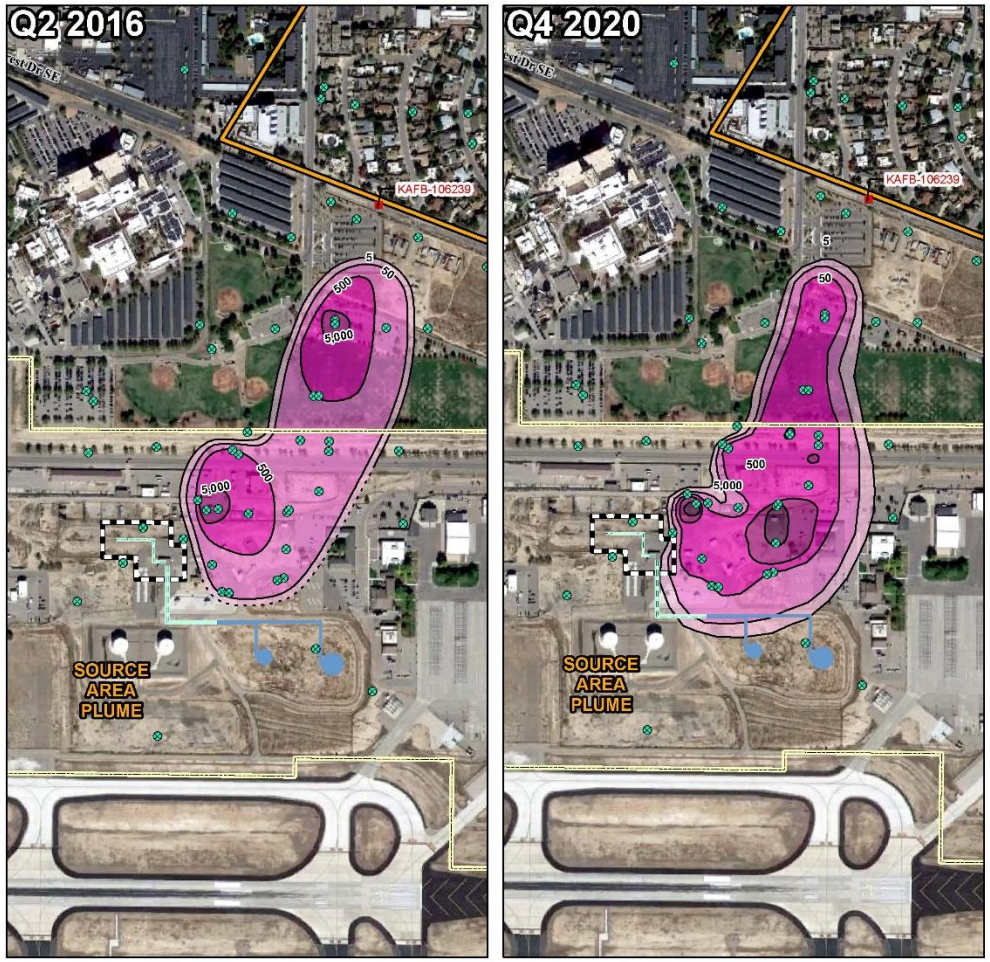
GWM Network (Reference Elevation Interval)



GWM Network (Vertical)



Source Area Plume – 2016 vs 2020



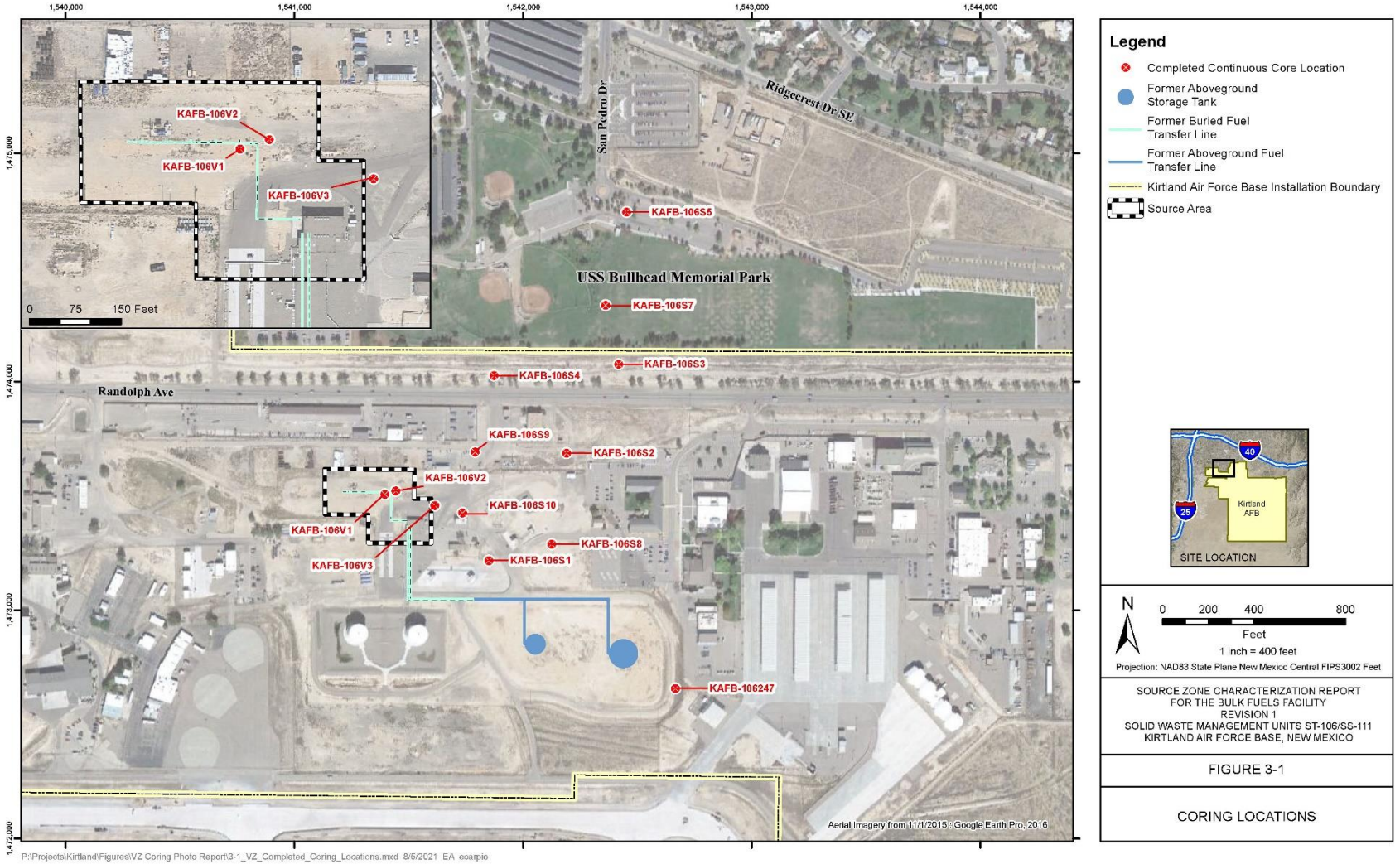
- Benzene plume located south of Ridgecrest Dr SE
- Benzene plume has been stable and does not threaten nearby receptors

Plume maps are based on actual measurements and not simulations

LNAPL Delineation

- Modified bioslurping removed approximately 225,000 gallons of free product from the groundwater (2007–2011)
  - An additional 500,000 equivalent gallons removed via Soil Vapor Extraction (SVE) Systems (see slide 13)
- A targeted LNAPL investigation was performed from October 5, 2018 to March 7, 2019
  - Two additional cores were drilled and sampled in 2020 as part of the second data gap well investigation
  - 204 samples were analyzed from a total of 13 soil cores (no mobile LNAPL detected)
- The results from these investigations and quarterly sampling for LNAPL demonstrate:
  - Laboratory analysis for soil properties indicate that the LNAPL is immobile.
  - Soil cores identified LNAPL in the saturated zone at a depth that coincides with the former lowest groundwater elevation from 2009
- In Q4 2020, residual fuel remains in the subsurface in the source area soils, measureable LNAPL ranges from sheens to 0.1 feet detected at KAFB-106150-484 on base, and LNAPL detections remain within the extent of the Benzene Plume south of Ridgecrest Dr NE

LNAPL Delineation



UNCLASSIFIED

LNAPL Delineation

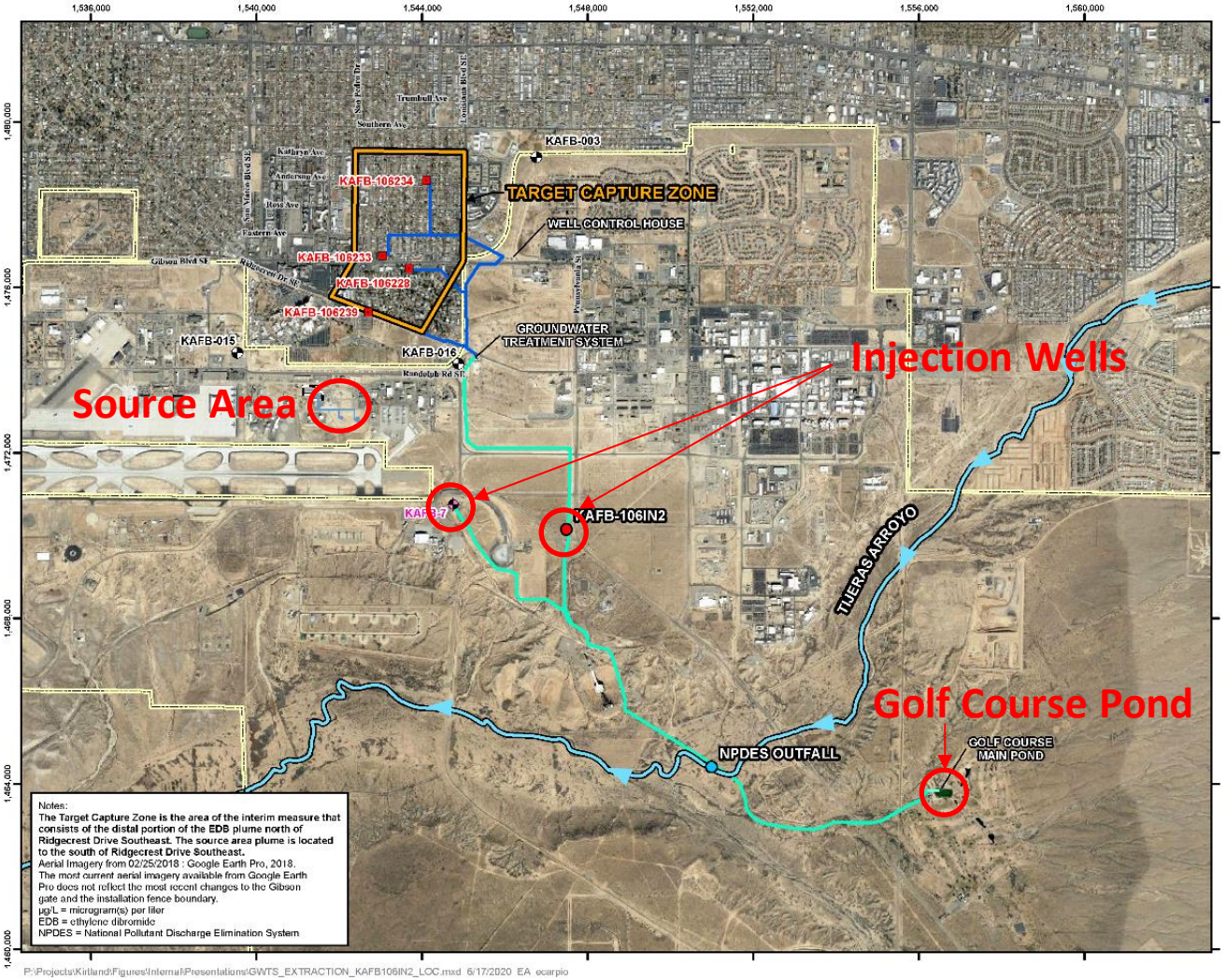
- The number of samples collected during the coring program consisted of the following:
  - KAFB-106S1 – 14 Samples
  - KAFB-106S2 – 17 Samples
  - KAFB-106S3 – 12 Samples
  - KAFB-106S4 – 18 Samples
  - KAFB-106S5 – 10 Samples
  - KAFB-106S7 – 8 Samples
  - KAFB-106S8 – 5 Samples
  - KAFB-106S9 – 21 Samples
  - KAFB-106S10 – 33 Samples
  - KAFB-106247 – 11 Samples
  - KAFB-106V1 – 30 samples
  - KAFB-106V2 – 16 samples
  - KAFB-106V3 – 9 samples

Laboratory Results Indicates LNAPL is Immobile

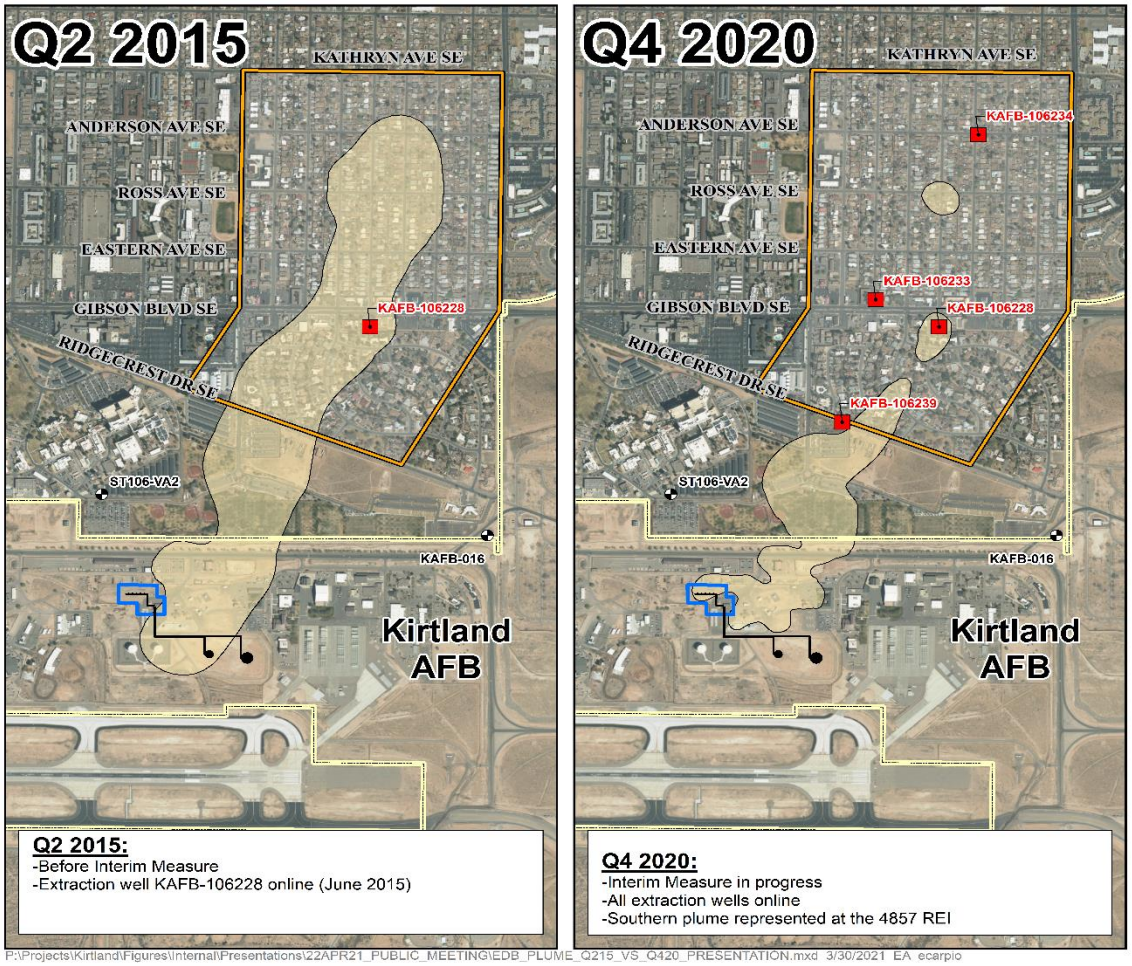
Soil Vapor Delineation

- Semi-annual soil vapor monitoring
  - 57 location comprised of 287 soil vapor monitoring points
  - 271 soil vapor monitoring points were sampled Q4 2020
- Implemented a soil vapor extraction (SVE) interim measure that removed approximately 500,000 equivalent gallons of jet fuel (2003–2015)
- Evaluated Soil Vapor Intrusion Risk in the 2017 BFF Risk Assessment
  - NMED requested additional shallow soil vapor points to confirm the conclusions of the 2017 BFF Risk Assessment
  - Shallow Soil Vapor Work Plan with NMED for Review and Approval
  - Data will be used to inform an updated Risk Assessment, which will be submitted prior to the CME

Groundwater Pump and Treat System Status



EDB Plume – 2015 vs 2020



Legend

N

- Drinking Water Supply Well
- Kirtland AFB Extraction Well
- Kirtland AFB Installation Fence Boundary
- Former Fuel Transfer Lines
- Former Aboveground Storage Tank
- Bulk Fuels Facility (SWMUs ST-106/SS-111)
- Interim Measure Operational Area
- Dissolved-Phase EDB ≥ 0.05 µg/L (EPA MCL)

0 700 1,400 2,800
Feet

General Notes:
-Aerial imagery provided by ESRI Online service
-EDB plume models generated with C-Tech MVS

Acronym(s):
AFB = Air Force Base
EDB = ethylene dibromide
EPA MCL = Environmental Protection Agency maximum contaminant level
REI = reference elevation interval
SWMU = solid waste management unit
WUA = Water Utility Authority
µg/L = microgram(s) per liter

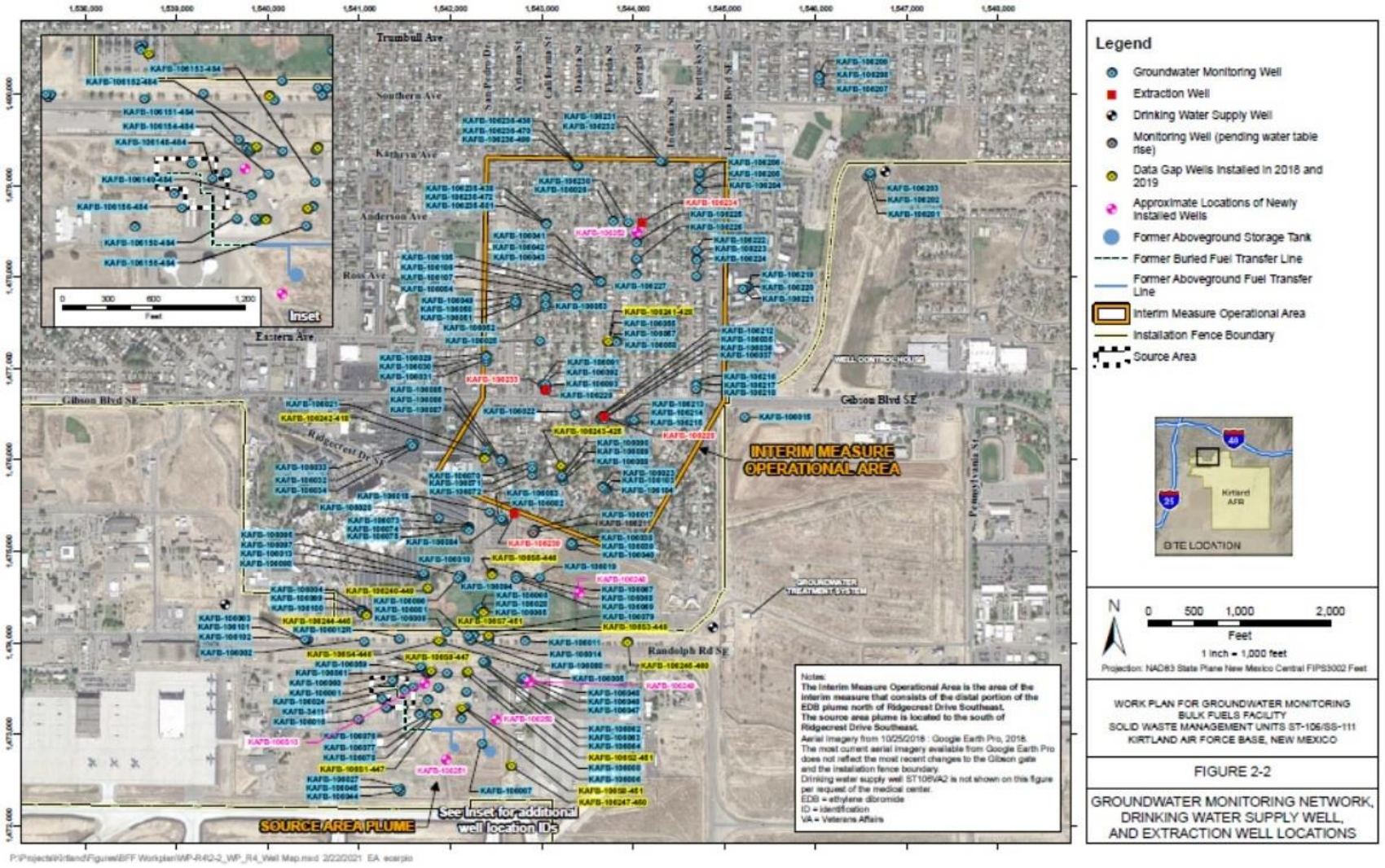
Groundwater Pump and Treat System Status (cont.)

- The pump and treat IM is operating, properly and successfully
- The goal of the IM is to remove EDB to below the Maximum Contaminant Limit (MCL)
- No drinking water wells have been impacted and a robust groundwater monitoring (GWM) program is in place

Ongoing Monitoring

- Routine monitoring
  - Monitoring network comprised of 172 GWM wells and quarterly or semiannual sampling of 167 wells
  - 14 sentinel wells monitored quarterly by the United States Geologic Survey (USGS), providing independent observation of water quality. To date no EDB detections in these wells (all results have been non-detect)
  - Monthly Drinking Water Supply Well Sampling
- The rising water table has not inhibited our ability to effectively monitor groundwater for contaminants
- GWM network has recently been updated with 21 additional wells with contingency screens to refine the plume extent and address rising water elevations
- Data from the GWM network is continuously evaluated and deficiencies will be addressed as needed

Groundwater Well Locations



UNCLASSIFIED

Commitment to Stakeholder Engagement

- RCRA Permit establishes a minimum of two public meetings per year for all restoration sites, and BFF holds three (April, July, and November)
- The Air Force maintained high level of stakeholder engagement throughout the pandemic
- In addition to public meetings, Air Force host monthly stakeholder meetings and have reinitiated the TWGs
- Air Force maintains the following:
  - BFF website (https://www.kirtland.af.mil/Home/BFF/)
  - Administrative Record (https://ar.afcec-cloud.af.mil/)
  - Public information center conveniently located at the New Mexico Veterans Memorial

Funding

- $130M has been provided to the project to date
- Air Force has always ensured sufficient funding is available as needed, and funding has never been in jeopardy on this project
- Funding amounts vary year-to-year based on project requirements (e.g., field investigations vs. operational activities)
  - The Future Years Defense Program projects funding and manpower needs over a five-year period
  - Capital Investment vs ongoing monitoring funding

Pilot Test Status

- A pilot test is a focused, limited-scale test of a technology that is used to determine potential effectiveness under field conditions and the feasibility of including the technology in the final remedy
- In-Situ EDB Pilot evaluated addition of amendments to stimulate anaerobic bacteria to biodegrade EDB in groundwater
- Bioventing Pilot evaluated addition of air (oxygen) and moisture to stimulate aerobic organisms to biodegrade fuel constituents in the vadose zone
- Pilots concluded data will be used to support CME

Questions?

Point of Contact:

Ryan Wortman, Air Force Civil Engineer Center, (505) 853-3484 – ryan.wortman.3@us.af.mil
Brannon Lamar, Public Affairs, (505) 639-8420 – brannon.lamar@us.af.mil
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