



Kirtland Air Force Base Bulk Fuels Facility Leak Cleanup

***Public Meeting
April 22, 2021 (6:00—7:30 PM)***

Kathryn Lynnes, Air Force, Office of the Secretary

Sheen Kottkamp, Air Force Civil Engineer Center

Ryan Wortman, Air Force Civil Engineer Center

J. Mark Stapleton, Ph.D., PE, BCEE, Noblis



Discussion Topics



- **Status update: Ethylene Dibromide (EDB) interim corrective measure pump and treat**
 - Status of EDB plume north of Ridgecrest Drive, SE
 - Volume of groundwater treated
 - Granular activated carbon (GAC) change out
 - New injection well KAFB-106IN2 installation, development, and testing
- **Recent Investigation Field Work**
 - Data gap monitoring well installation
 - Bioventilation Pilot Test shutdown
- **Status update: Shallow Soil Vapor Investigation and Current Monitoring**
 - Alternate Investigative Approach
 - Results Q4 2020
- **Upcoming field work**
 - Complete sampling of data gap monitoring wells
- **Upcoming activities**



Status Update: EDB Interim Measure



- Completed development and operational testing of the new injection well KAFB-106IN2
- Granular Activated Carbon change out for the GWTS Train 2
 - Change out was part of routine maintenance of the GWTS
 - GWTS Train 1 was still in operation during change out, system never shut down
- Performed routine maintenance on the sprinkler systems and main pond at the Tijeras Arroyo Golf



Status update: *EDB Interim Measure*



More than 1,108,748,000 gallons of groundwater have been treated to date using granular activated carbon to remove EDB to at or below federal drinking water standards



Groundwater Treatment System (GWTS) Building on Kirtland AFB



Groundwater is treated in much the same way that a filter removes dissolved contaminants in a pitcher of drinking water



EDB Plume – 2015 vs 2020



Legend

- 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 $\mu\text{g/L}$ (EPA MCL)



0 700 1,400 2,800
Feet

General Notes:

-Aerial imagery provided by ESRI Online service

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
 $\mu\text{g/L}$ = microgram(s) per liter

***Plume maps are based on actual measurements and not simulations**

UNCLASSIFIED



EDB Interim Measure: Injection Well Development Activities Completed



- Well installation began in early July 2020
 - Well has been pump tested to almost 1100 gallons per minute
 - Injection tested to more than 800 gpm
 - Development consisted of using the “push and pull” method, injection immediately followed by pumping
 - Well installation, development, and testing was completed on March 24, 2021



Recent Investigation Field Work



- Installed six new water table data gap monitoring wells and one soil vapor well
 - Sampling has been completed and results will be provided in corresponding quarterly reports as well as in the Data Gap Monitoring Well Investigation Report, due 6/15/2021
 - Two wells installed on-Base (one water table well and one soil vapor well) in the source area, three wells were installed on-Base along the south-eastern portion of the EDB plume, and two wells were installed off-Base
- Bioventilation Pilot Test Update and Shutdown
 - The Bioventilation Pilot Test system was shut down in November 2020

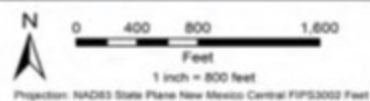


Data Gap Monitoring Wells



Legend

- + Newly Installed Water Table Well
- Former Aboveground Storage Tank
- Former Buried Fuel Transfer Line
- Former Aboveground Fuel Transfer Line
- Installation Fence Boundary
- Ridgecrest Dr
- Bulk Fuels Facility (SWMU ST-106/SS-111)



BULK FUELS FACILITY
SOLID WASTE MANAGEMENT UNITS ST-106/SS-111
KIRTLAND AIR FORCE BASE, NEW MEXICO

NEWLY INSTALLED WELLS

UNCLASSIFIED



Data Gap Monitoring Wells: Additional Water Table Wells



- Six water table wells have been installed as proposed in the work plan approved with conditions
 - Wells installed were designed to address the additional data gap as a result of the rising water table
 - Five of the six wells were installed with a contingency screen above the water table to ensure sampling can continue and the rising water table will not create another data gap
 - Sampling of the wells will provide additional information of the chemical composition of groundwater at the water table
- Drilling was completed March 22, 2021 and sampling activities have been completed



Data Gap Monitoring Wells: Source Area Characterization



- Two wells installed in the source area provide additional data for the characterization of contaminant migration pathways beneath the source area
 - One boring in the source area (KAFB-106V3) included soil coring to assess the presence or absence of a clay layer. A clay layer was identified and this boring was converted to a soil vapor monitoring well with a soil vapor monitoring point above the clay layer and two shallow points
 - Drilling and coring of a second boring (step out) in the source area was completed as a groundwater monitoring well (KAFB-106S10). The location was determined as a collaborative effort between NMED and Kirtland AFB
 - Information collected in the source area will further support the conclusions of the *Revised Source Area Characterization Report*, to be submitted April 30, 2021
- The information collected from the data gap wells will be evaluated by NMED and Air Force to determine if the investigation phase of the project is completed
- Air Force experts believes there is sufficient data collected at this time to proceed to the Corrective Measures Evaluation phase of the project



Data Gap Monitoring Wells: Source Area Core Photos



- Coring allows the geologist to easily see and interpret the subsurface geology
- Assess the presence or absence of a clay layer and any fuel constituents





Bioventilation Pilot Test Shutdown



- Bioventilation Pilot Test Intent
 - Pilot Test was conducted to evaluate Bioventilation as a potential remedial strategy to reduce hydrocarbons concentrations from soil vapor
- Bioventilation Pilot Test was shutdown in November 2020, prior to the planned shutdown date of September 2021
 - Sufficient data has been collected to evaluate this remedy in the Corrective Measures Evaluation
 - Oxygen utilization rates were lower than anticipated
 - Elevated soil vapor concentrations were observed in the immediate vicinity of the pilot test area
 - The elevated soil vapor concentrations are attributable to the Bioventilation air injection
 - No elevated shallow or off-Base soil vapor concentration were measured demonstrating there is no vapor risk
 - Normal semi-annual soil vapor monitoring will continue to measure soil vapor concentrations in the area
 - NMED approved the permanent shutdown of pilot test on 02/11/2021

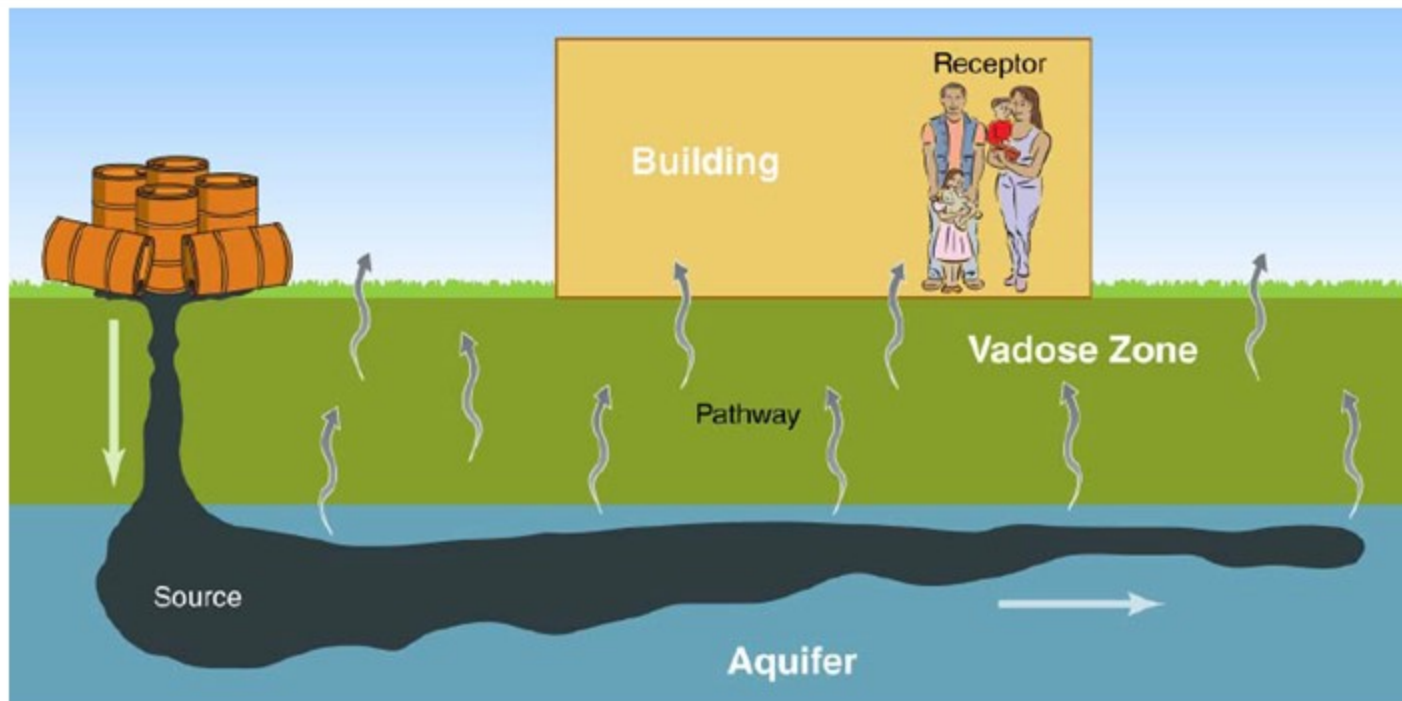


Soil Vapors?





What Are Soil Vapors



- Air is found in the pore spaces between soil particles. The air can become contaminated when chemicals evaporate from subsurface sources and enter the air phase. We refer to this as soil vapors.
- When soil vapors are present directly next to or under the foundation of the building, soil vapor intrusion is possible.



Shallow Soil Vapor



OSWER Publication 9200.2-154

OSWER TECHNICAL GUIDE FOR ASSESSING
AND MITIGATING THE VAPOR INTRUSION
PATHWAY FROM SUBSURFACE VAPOR
SOURCES TO INDOOR AIR

U.S. Environmental Protection Agency
Office of Solid Waste and Emergency Response
June 2015



United States
Environmental Protection
Agency

EPA 510-R-15-001

Technical Guide For Addressing Petroleum Vapor Intrusion At Leaking Underground Storage Tank Sites

U.S. Environmental Protection Agency
Office of Underground Storage Tanks
Washington, D.C.

June 2015

Like groundwater plumes, soil vapors investigation require 3-dimensional thinking!

In general, US EPA guidance establishes an area within 100 feet vertically or laterally (inclusion zones) of the foundation as a potential impact area.

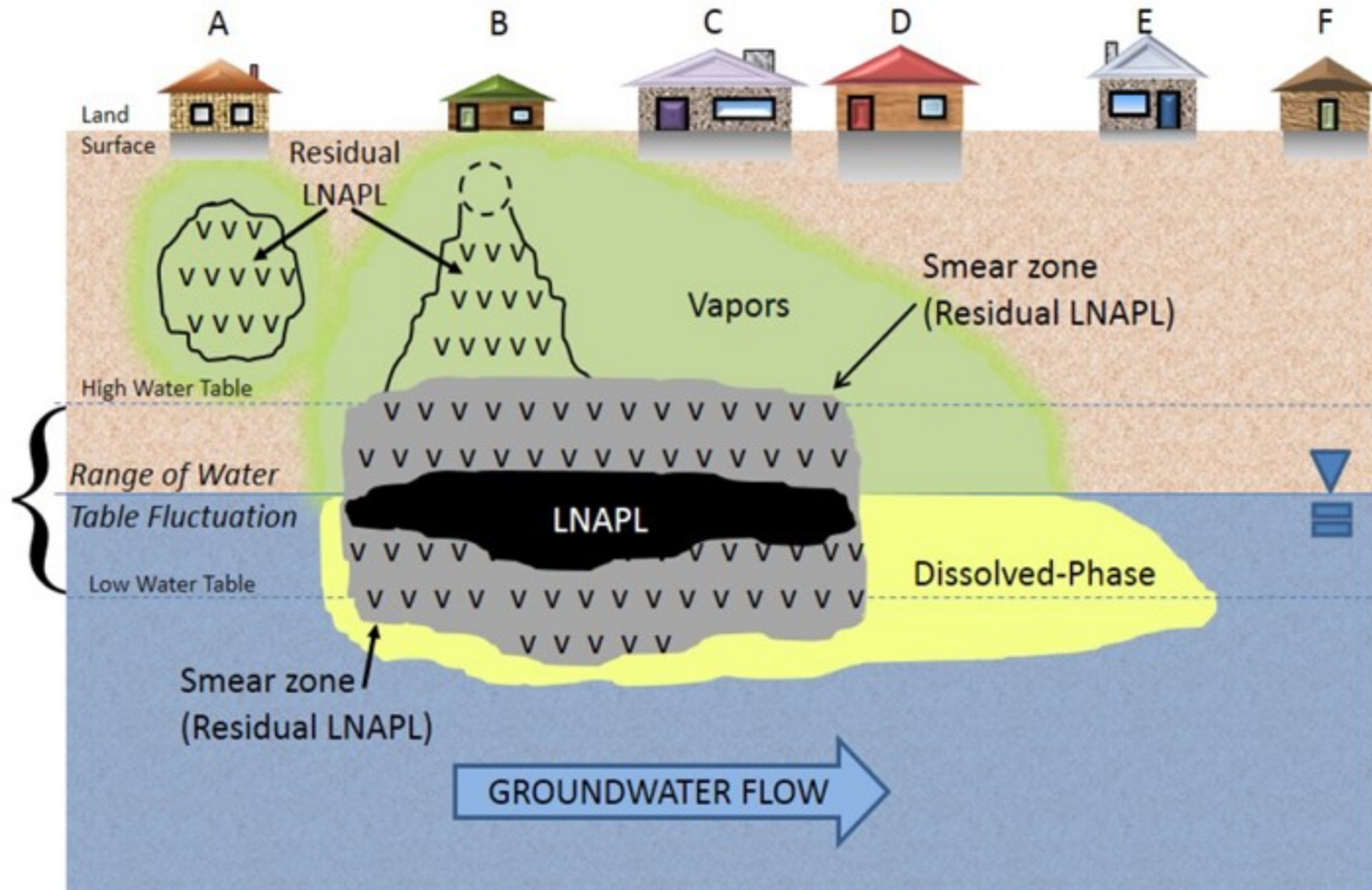
- Groundwater is 475 ft bgs
- Closest occupied bldg. is 1750 ft north of the base boundary

Guidance generally applicable at:

- 1. Service station
 - 2. Dry cleaners
 - 3. A large industrial facility with a groundwater plume
 - 4. A vacant lot with proposed brownfield development over a groundwater plume
 - 5. A vacant large commercial building with warehouse space and office space
 - 6. An apartment building with a parking garage over contamination
- 11 sites along Gibson Blvd SE and Ridgecrest Dr. SE



Shallow Soil Vapor *cont.*



- LNAPL = light non-aqueous phase liquid



Shallow Soil Vapor *cont.*



Scenario	Contamination Beneath Building or is the Building within the Lateral Inclusion Zone?	Potential For Vapor Intrusion	Is Sub-Slab or Near Source Soil Gas Sampling Recommended?	Bullhead Park	VA or Siesta Hills
A	Yes; shallow residual LNAPL in the vadose zone	High	Yes, if vertical separation distance is less than 15 feet from the top of residual LNAPL; otherwise No	Not Applicable (No Buildings, Historical LNAPL detection at 475 feet bgs)	Not Applicable (No LNAPL)
B	Yes; residual including smear zone, LNAPL, dissolved in groundwater	High	Yes, if vertical separation distance is less than 15 feet from the top of the smear zone; otherwise No	Not Applicable (No Buildings, Historical LNAPL detection and Groundwater at 475 feet bgs)	Not Applicable (No LNAPL and Groundwater at 475 feet bgs)
C	Yes; smear zone, LNAPL, dissolved in groundwater	Medium	Yes, if vertical separation distance is less than 15 feet from the top of the smear zone; otherwise No	Not Applicable (No Buildings, Historical LNAPL detection and Groundwater at 475 feet bgs)	Not Applicable (No LNAPL and Groundwater at 475 feet bgs)
D	Yes; dissolved in groundwater	Low	Yes, if vertical separation distance is less than 6 feet from the historical high water table elevation; otherwise No	Not Applicable (No Buildings, Groundwater at 475 feet bgs)	Not Applicable (Groundwater at 475 feet bgs)
E	Maybe; plume may be diving beneath water table	Low – None	Yes, if vertical separation distance is less than 6 feet from the historical high water table elevation; otherwise No	Not Applicable (No Buildings, Groundwater at 475 feet bgs)	Not Applicable (Groundwater at 475 feet bgs)
F	No	None	No	Not Applicable (No Buildings)	Applicable



Shallow Soil Vapor *cont.*



Current Site Screening and Investigation Status

- Step 1 – Develop Preliminary Conceptual Site Model (CSM)
- Step 2 – Evaluate Building for Precluding Factors and Lateral Inclusion
- Step 3 – Conduct Screening with Vertical Separation Distance
- Step 4 – Conduct Concentration-based Evaluation Using Existing Data
- Step 5 – Select and Implement an Applicable Scenario and Investigative Approach
- Step 6 – Evaluate Data
- Step 7 – Determine whether Additional Investigation is Warranted
- Step 8 – Determine whether the VI Pathway is Complete

Current Milestone



Shallow Soil Vapor cont.



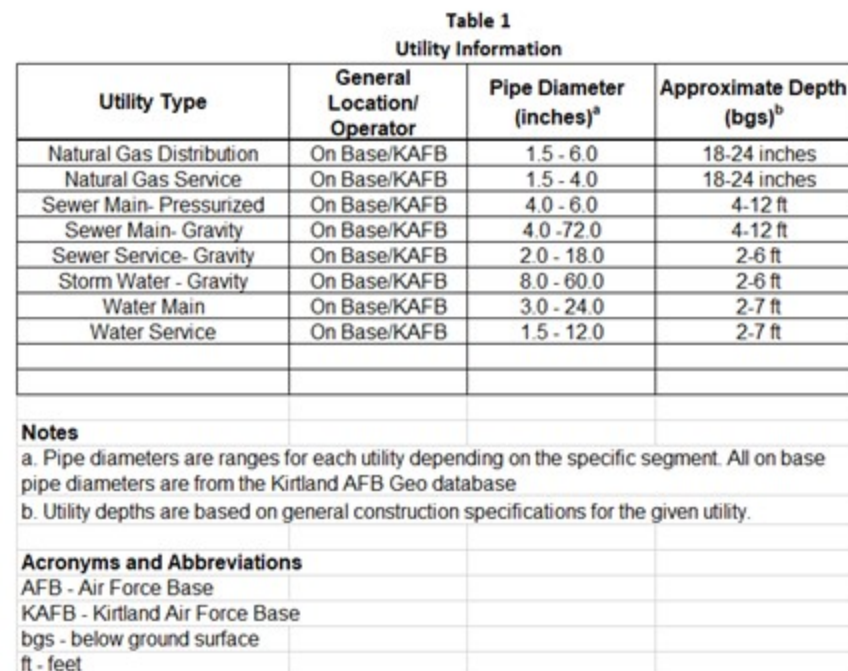
- Historically, contaminated soils have been removed and soil vapor extraction (SVE) systems were installed to remove contaminated soil vapor.
- The SVE systems operated at the Site from 2003 through 2015, ~ 775,000 equivalent gallons of jet fuel have been removed from the subsurface.
- Since that time, soil vapor contaminant concentrations have decreased over time in the area where SVE was performed at the Site.
- KAFB BFF project has 56 soil vapor monitoring (SVM) locations (consisting of 284 soil vapor monitoring points [SVMPs]) and sampling at multiple depths down to the groundwater table, these locations are sampled semi-annually and data has been collected for nearly two decades.
- Air Force does have off-base vapor monitoring points at the Veterans Affairs Hospital as well as into Bullhead Park.
- These vapor monitoring points serve as a Sentinel System for any potential vapor migration towards the Siesta Hills community.



Shallow Soil Vapor cont.



- EPA guidance recommends that subsurface investigations of soil vapors also generally warrant an evaluation of utility corridors and/or vapor migration towards buildings that are serviced by the utility.
- Air Force evaluated the existing data and sampling information suggests the utility corridors are not conveying soil vapors off-base.
- As shown on the next slide, Kirtland collected both on base and off-base utility information to plan the next phase of this investigation.





Shallow Soil Vapor cont.



- With the exception of a plastic natural gas line that is crossing the base perimeter and heading towards the Veterans Affairs Hospital (2 to 3 feet bgs), there is no direct connection of the utilities of any significance (e.g. storm water lines, portable water lines, sanitary sewer lines, electrical, cable) with the populated areas north of Kirtland Air Force Base.
- The most recent sampling data set collected in December 2020 (*most representative of current conditions in accordance with EPA Guidance*) for off-base monitoring points were all below screening levels from 15 ft bgs to the water table (475 feet bgs).
- As of March 24th 2021, the December 2020 Monitoring Report is available on the NMED website.



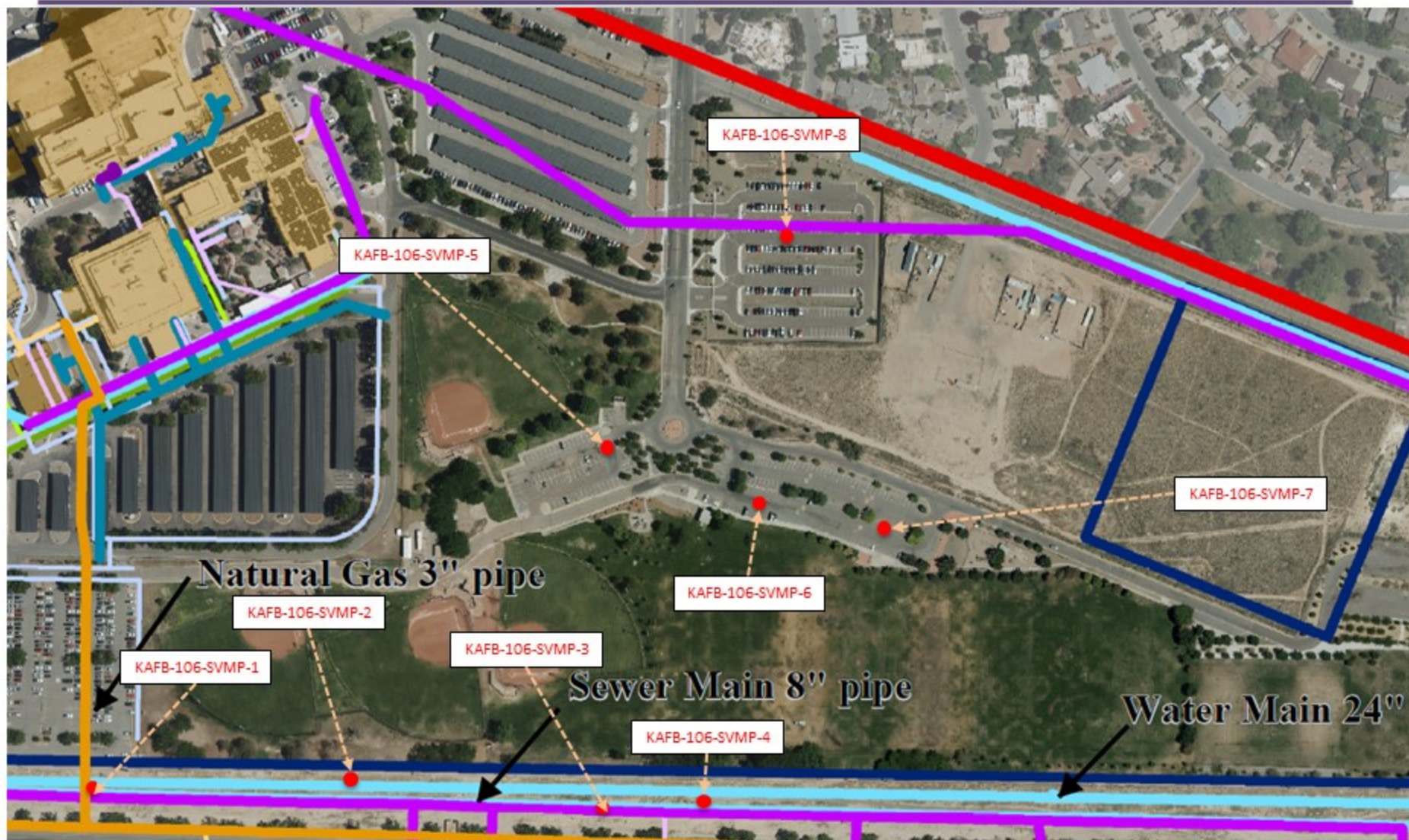
Shallow Soil Vapor cont.



- Air Force proposed in January 2021 a phased step-out investigative approach to confirm that the utility corridors are not acting as preferential pathways.
 - Phase One: 8 permanent soil vapor monitoring locations, four along the northern perimeter and 4 in bullhead park over the existing groundwater plume footprint.
 - Each sampling location would collect three samples at the 5, 10 and 15 foot intervals for a total of an additional 24 off-base samples.
 - Sampling would be conducted semi-annually during the summer and winter months.
- Air Force will coordinate the results of each sampling event with NMED to determine if additional step-out sampling is required, obtain concurrence and collectively determine the path forward.



Shallow Soil Vapor *cont.*





So that's what soil vapors are!



UNCLASSIFIED



Upcoming Field Work



- Complete routine quarter 2 sampling event
- Continue operation and maintenance of the GWTS
- Data Gap Well Installation and Reporting
 - Incorporate validated analytical data into upcoming investigation report, 6/15/2021



Upcoming Activities



Scheduled or Underway for 2021

- Continue to operate the Groundwater Treatment System
- In-Situ Bioremediation pilot test long term monitoring will continue
- Quarterly monitoring
- Bioventilation pilot test area will be decommissioned



Community Outreach



- We welcome your input and look forward to seeing you at the next public meeting tentatively scheduled for 07/22/2021
- The new Information Station located at the New Mexico Veterans Memorial at 1100 Louisiana Blvd SE, Albuquerque, just north of Gibson Blvd remains closed due to COVID-19
- The AFCEC Administrative Record is up to date. We encourage the public to access the record. Simply type <https://ar.afcec-cloud.af.mil/> into your browser, select "Kirtland AFB" from the scroll down menu, and then select "search"





Questions?



Point of Contact:

Kathryn Lynnes, Senior Advisor, (505) 846-8703 - kathryn.lynnes@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