Kirtland Air Force Base Fuel Spill Cleanup Strategic Plan Proposed for 2015

January 28, 2015

Ryan Flynn, Secretary of Environment
Dennis McQuillan, Geologist

A Partnership for Success

The following organizations are working together to solve the complex hydrogeologic and engineering challenges posed by the fuel spill site.

What is The Strategic Plan?

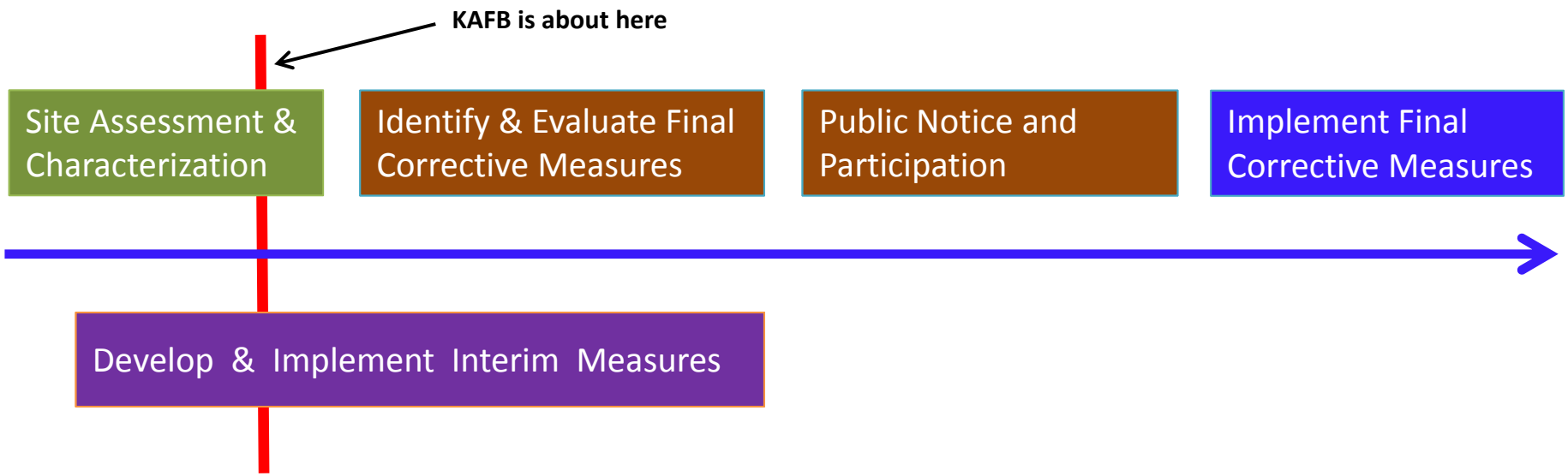
<u>This Strategic Plan presents:</u>

1. **A vision of where we want to be at the end of 2015; and**
2. **A roadmap of how we intend to get there.**

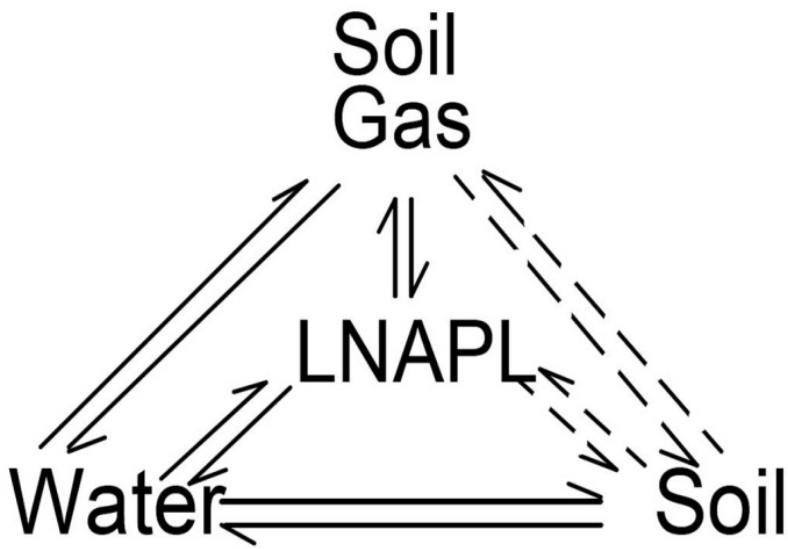
- **Detailed work plans will submitted to NMED as the work proceeds.**
- **The Strategic Plan is not a technical work plan, does not contain engineering specifications and Gantt charts.**
- **Links to detailed project documents are in the Plan.**
- **NMED has received a number of very constructive comments and suggestions that will be incorporated into the final version. This presentation includes some of those suggestions.**
- **Deadline for public comment: January 30, 2015.**

RCRA Corrective Action Process

Kirtland AFB must comply with their RCRA Hazardous Waste Permit, including the Corrective Action Process.



Four Phase System of Fuel Contaminants

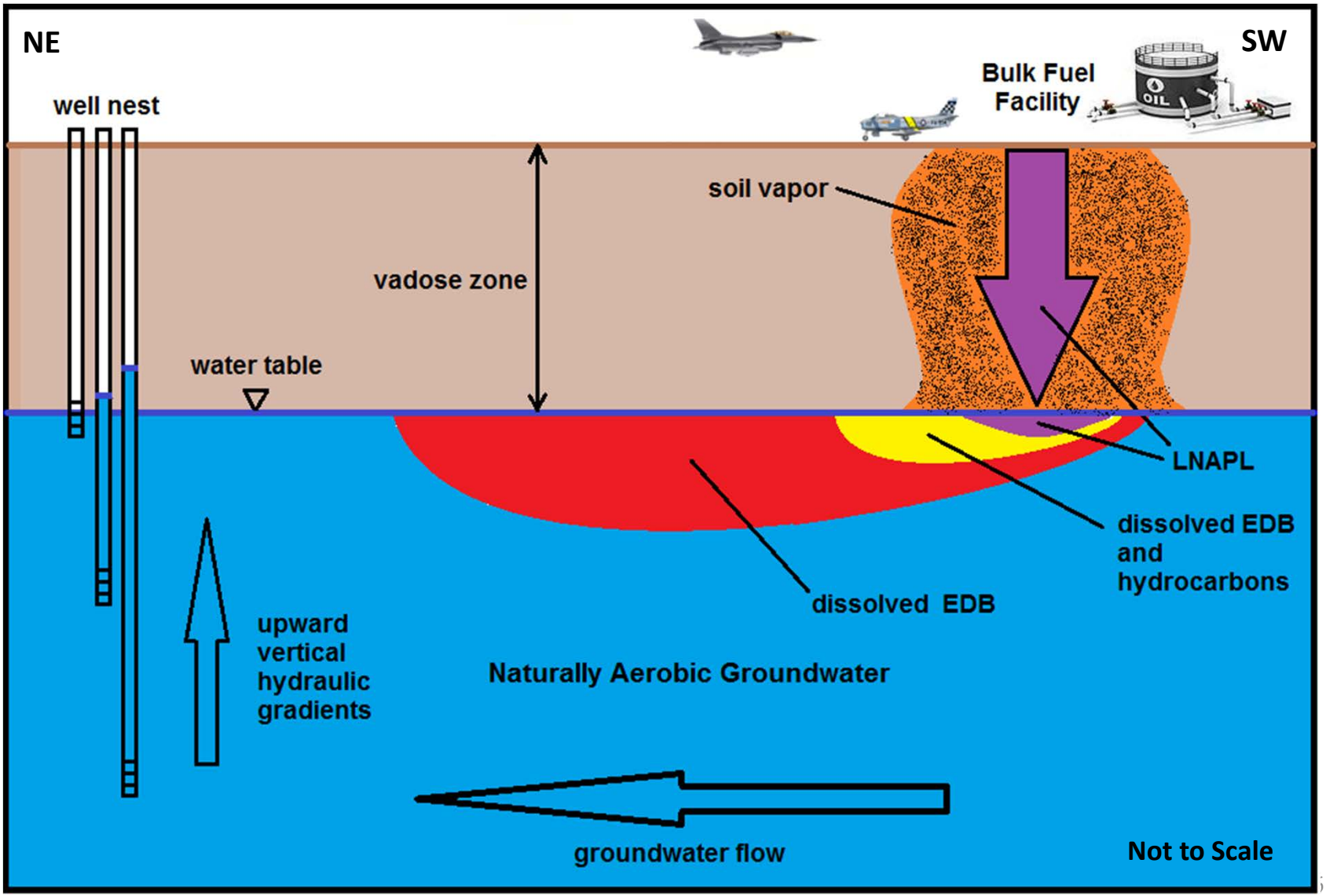


LNAPL is the light non-aqueous phase liquid (jet fuel and aviation gasoline) that was spilled.

<u>Contaminants transfer between phases</u>

- **LNAPL constituents vaporize into soil gas and dissolve into groundwater.**
- **Extracting contaminated soil gas can cause some of the contaminants in other phases to vaporize.**

KAFB Fuel Spill



Strategic Plan Summary

<u>Goal</u>: Protect Albuquerque's aquifer and the drinking water supply wells in the area of the fuel spill

<u>Strategies to Achieve the Goal</u>:

1) **Implement a robust groundwater and wellhead monitoring program**

2) **Collapse the dissolved EDB Plume**

3) **Remediate LNAPL and associated dissolved phases in the LNAPL area**

4) **Clean up soil in the spill area**

5) **Meet or exceed all requirements for providing public information and involvement**

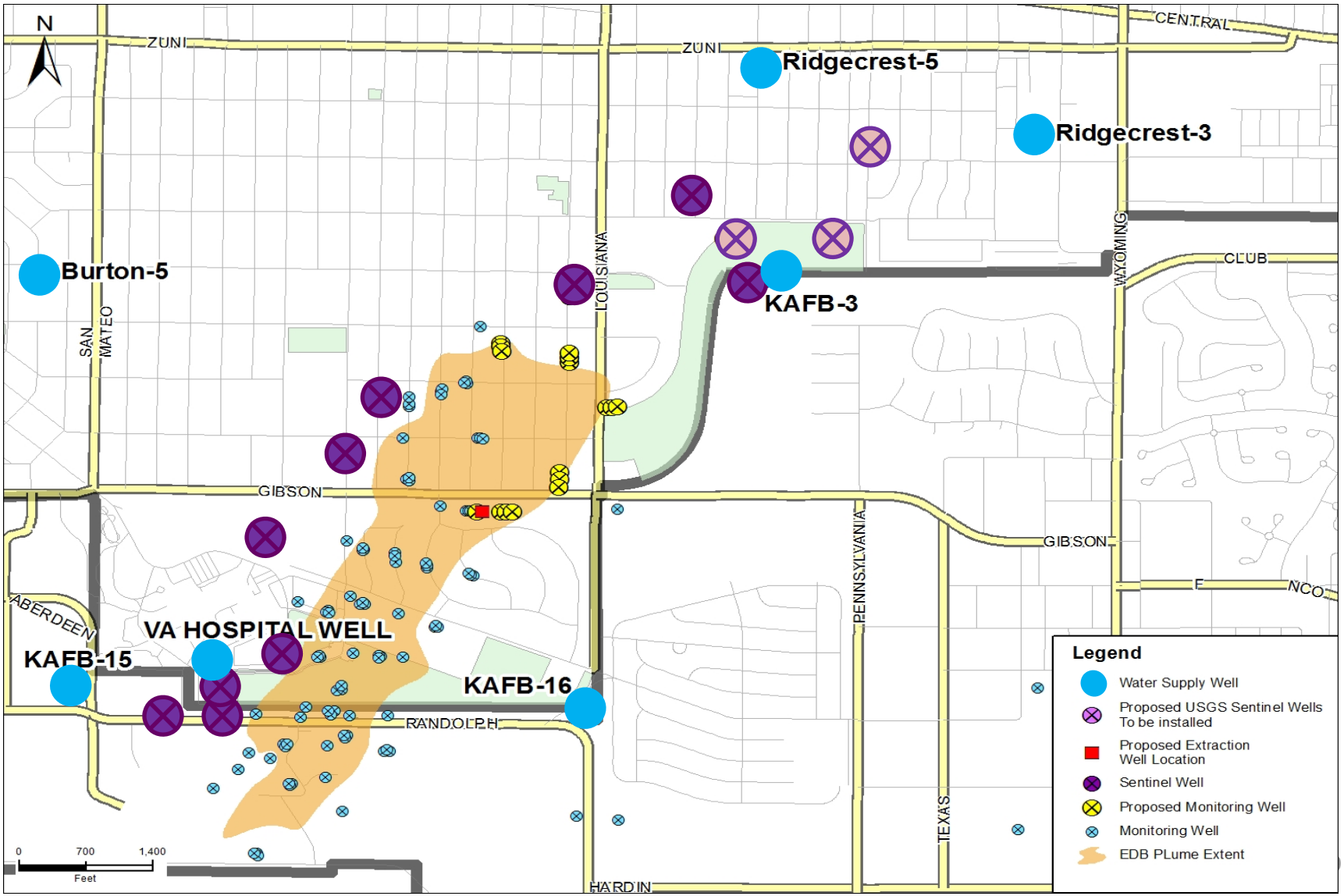
Strategy 1 – Robust Monitoring

EDB Drinking Water Standards	
U.S. EPA	0.05 µg/L
State of New Mexico	0.05 µg/L

- Public water system must comply with drinking water standards
- Drinking water supply wells in the area are being tested monthly
  - ✓ SDWA requires testing once every 3 years
  - ✓ Monthly testing is showing no detections of any fuel contaminants in any production well
  - ✓ EDB regulatory detection limit = 0.01 µg/L for public water systems
- Sentinel wells have been installed to provide early detection of any plume migration in the direction of the water supply wells

Dissolved EDB will not be allowed to impact any drinking water supply system at detectable concentrations

Sentinel Wells

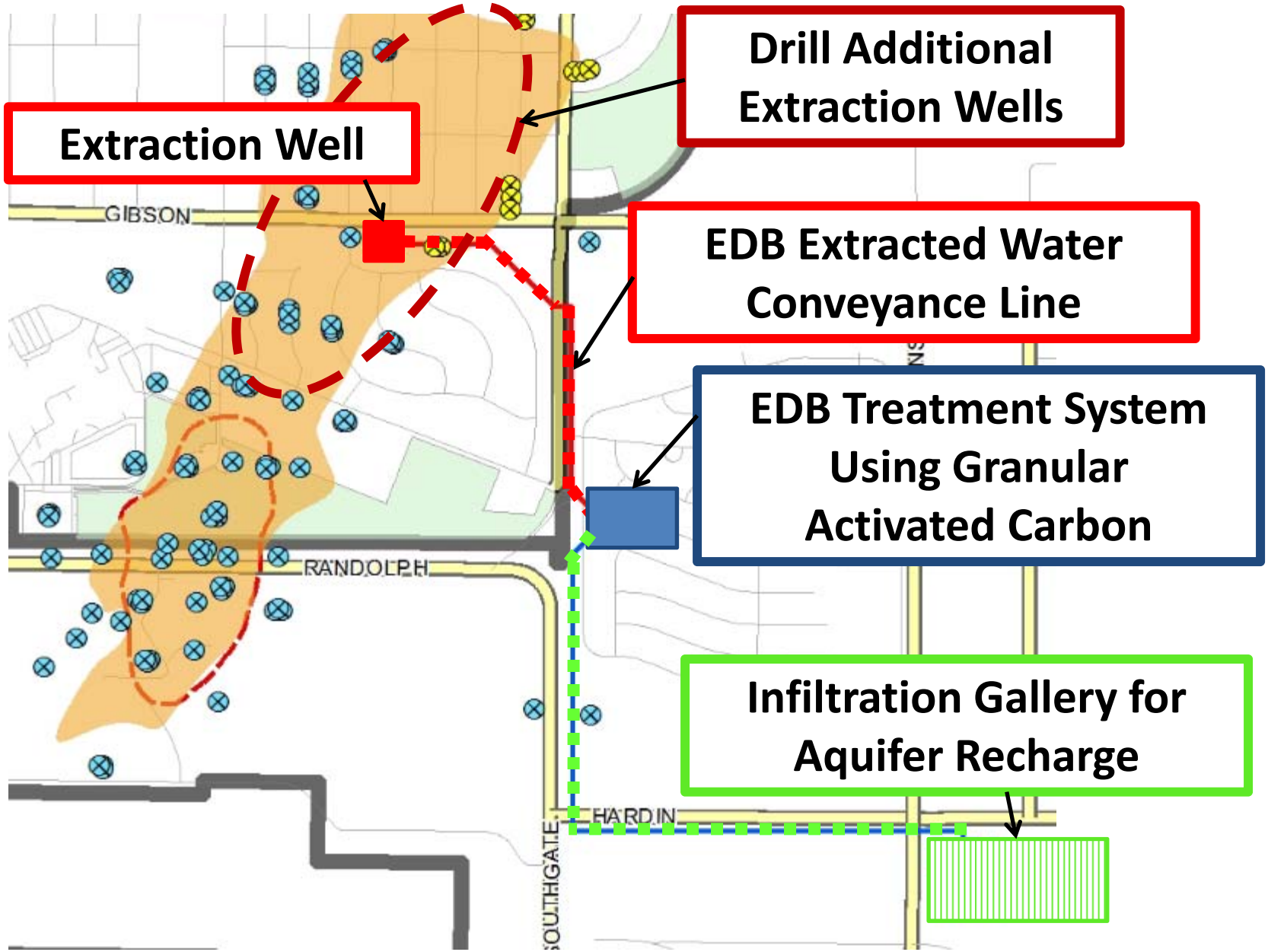


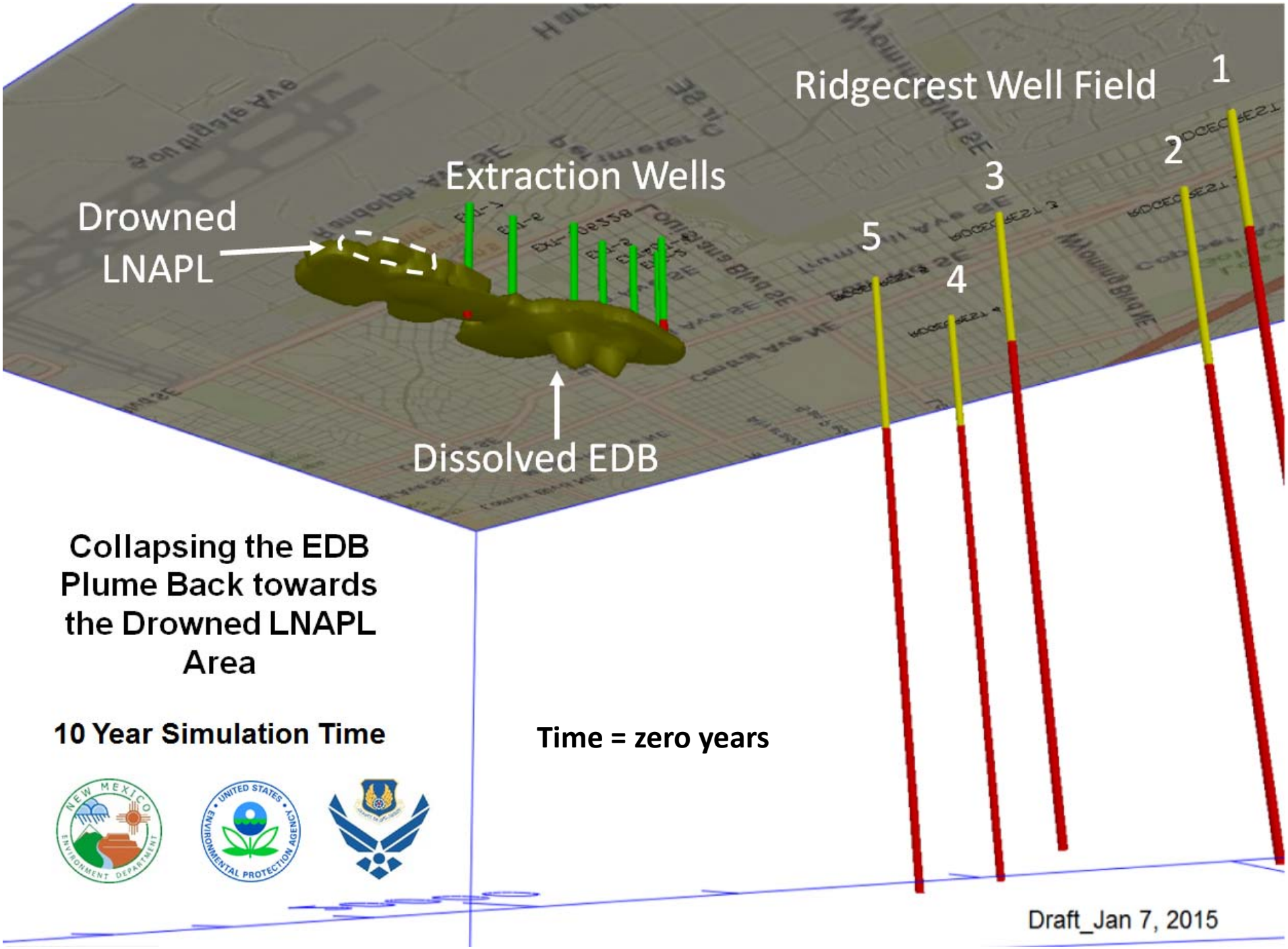
Strategy 2 – EDB Plume Collapse

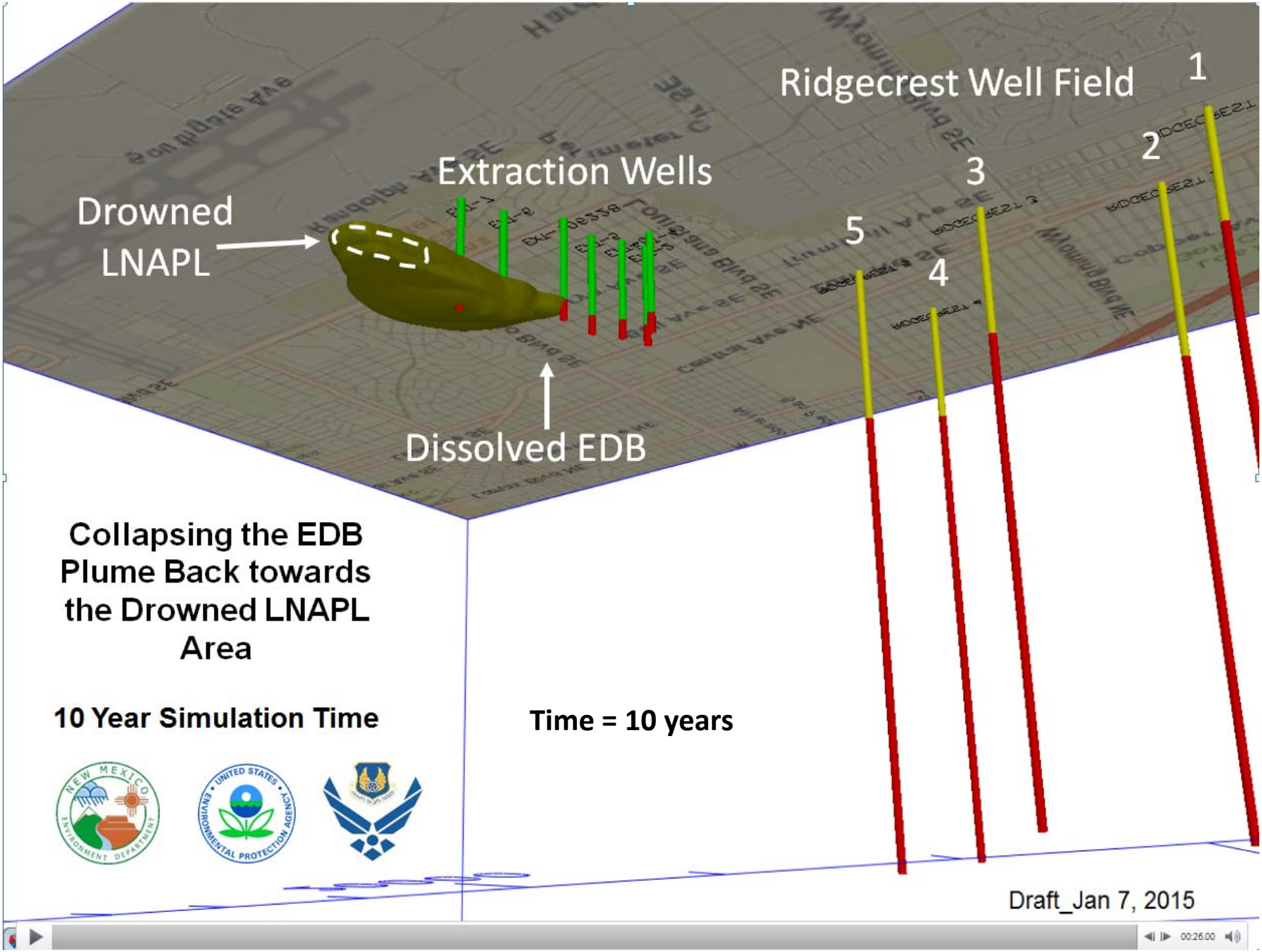
- Fill data gaps in dissolved EDB plume definition
- Drill extraction wells into the dissolved EDB
- Pump contaminated water from the extraction wells
- Remove EDB from the extracted water
- Use the treated water for aquifer recharge, landscape irrigation, or dust control

Two drill rigs are installing wells at this time:
16 new monitoring wells for plume definition
The first of up to 8 extraction wells

Collapsing the Dissolved EDB Plume




Ridgecrest Well Field
1
2
3
4
5
Extraction Wells
Drowned LNAPL
Dissolved EDB
Collapsing the EDB Plume Back towards the Drowned LNAPL Area
10 Year Simulation Time
Time = zero years
Draft_Jan 7, 2015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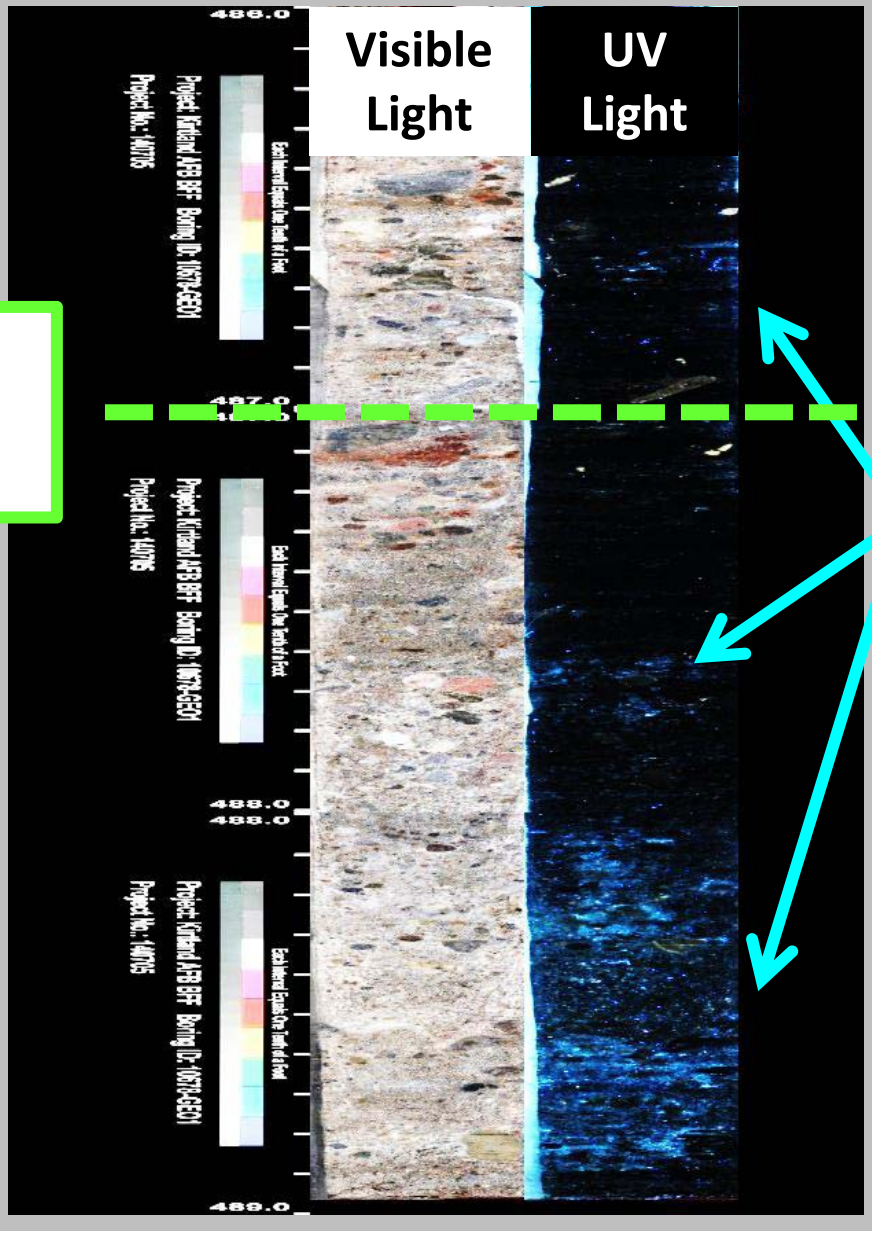
Strategy 3 – LNAPL Clean Up

- **Technically challenging due to depth to groundwater and drowned LNAPL from rising water table**
- **Screen possible technologies for interim measure**
- **Conduct scaled up laboratory and field scale pilot studies for potentially suitable technologies**

Laboratory microcosm testing and an air sparging pilot field test are underway

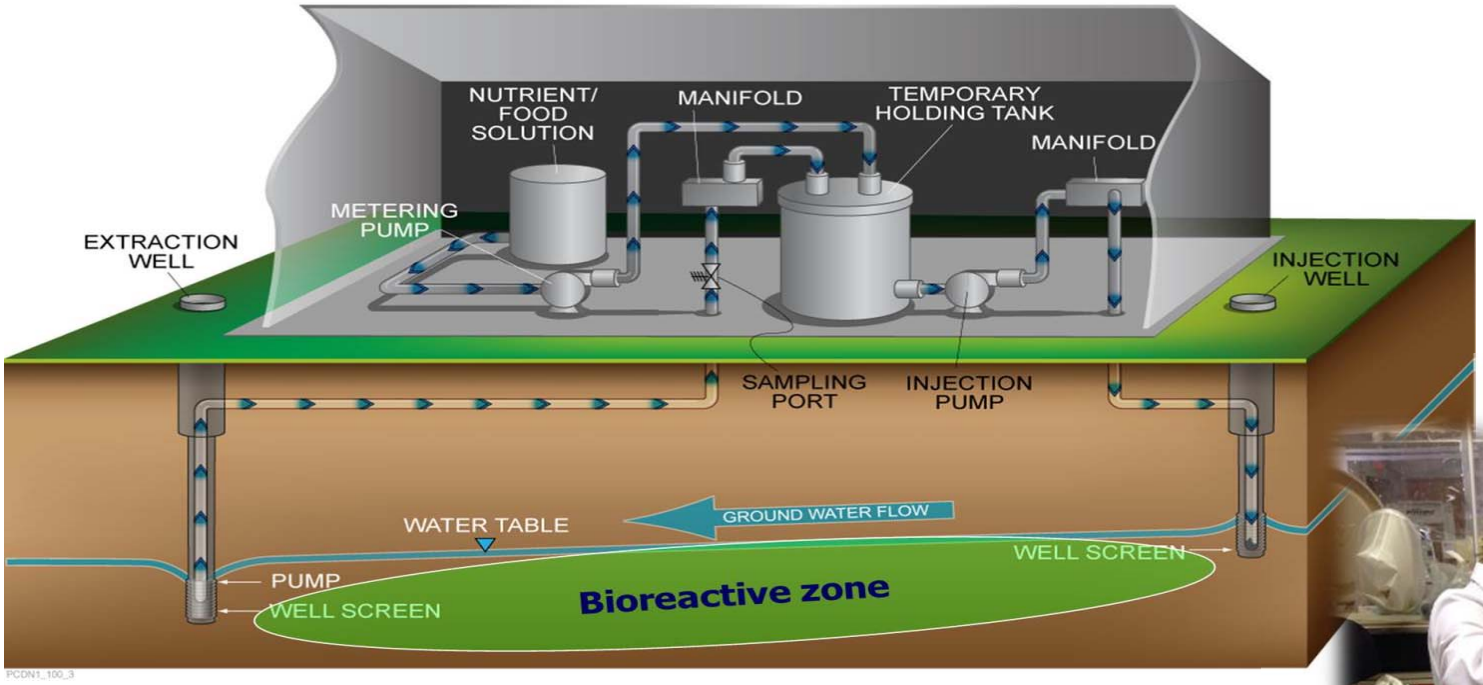
Drowned LNAPL – Soil Cores

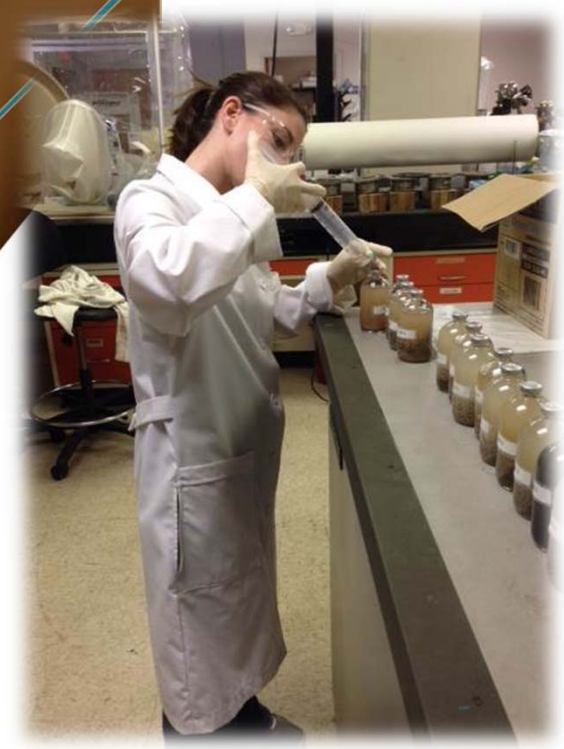


Groundwater Table

LNAPL Under UV Light Fluoresces Blue

In-Situ LNAPL Treatment Option





- **Laboratory studies are evaluating abiotic and biotic degradation under aerobic and anaerobic conditions**

Strategy 4 – Soil Clean Up

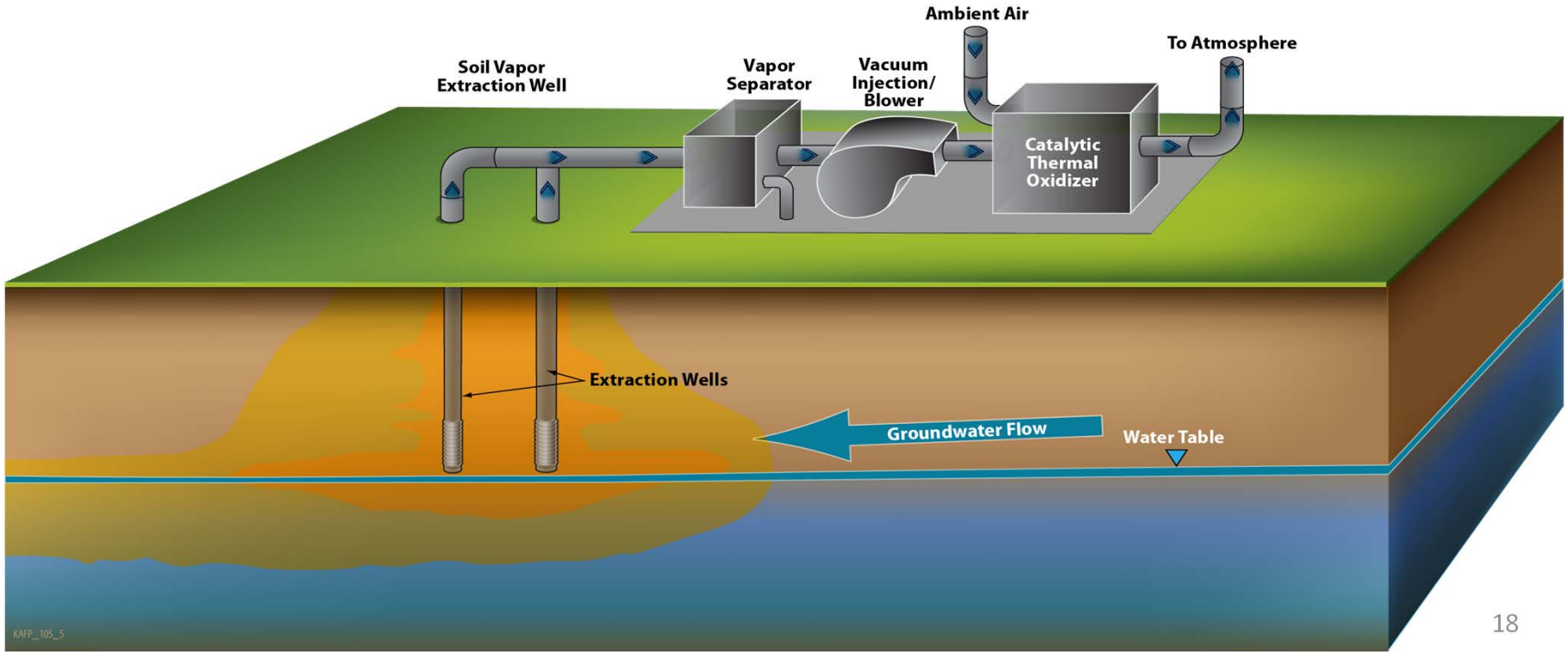
- Soil vapor extraction (SVE) has been ongoing since 2001
- More than 500,000 gallons of fuel have been vacuumed from the soil
- Identify vapor hotspots with a shut-down/rebound test and attack hotspots
- Measure rates of biodegradation with a respiration test; evaluate areas for continued SVE versus bioventing
- Drill more soil vapor monitoring wells
- Install a more robust soil treatment system

Volatile fuel contaminants can be vacuumed out of the soil

Less-volatile contaminants will need to be destroyed by bioventing

Soil Vapor Extraction

- **Vapor contamination is treated in accordance with City of Albuquerque Air Quality Permit requirements**



Strategy 5 – Public Information and Outreach

- Post technical and regulatory documents on website
- Maintain Listserv
- Participate in USAF public meetings and poster sessions
- Make presentations to stakeholder organizations
- Host field trips
- Explore interest in facilitated public working group(s)

Next public meeting on March 12, 2015

Next field trip on April 18, 2015

Questions?