

# **Groundwater and Vadose Zone Contamination from the KAFB Bulk Fuels Facility Spill**

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*<http://www.nmenv.state.nm.us/hwb/>*

# **KAFB Bulk Fuels Facility**

## **Fuel Storage and Distribution System**

- **Tank farm (2.1 and 4.2 MGal tanks jet fuel)**
- **Ancillary piping (mostly underground)**
- **Former Fuel Offloading Rack**
- **Referred to as SWMUs ST-106 and SS-111**

# Aerial Photograph of Bulk Fuels Facility



# The Problem

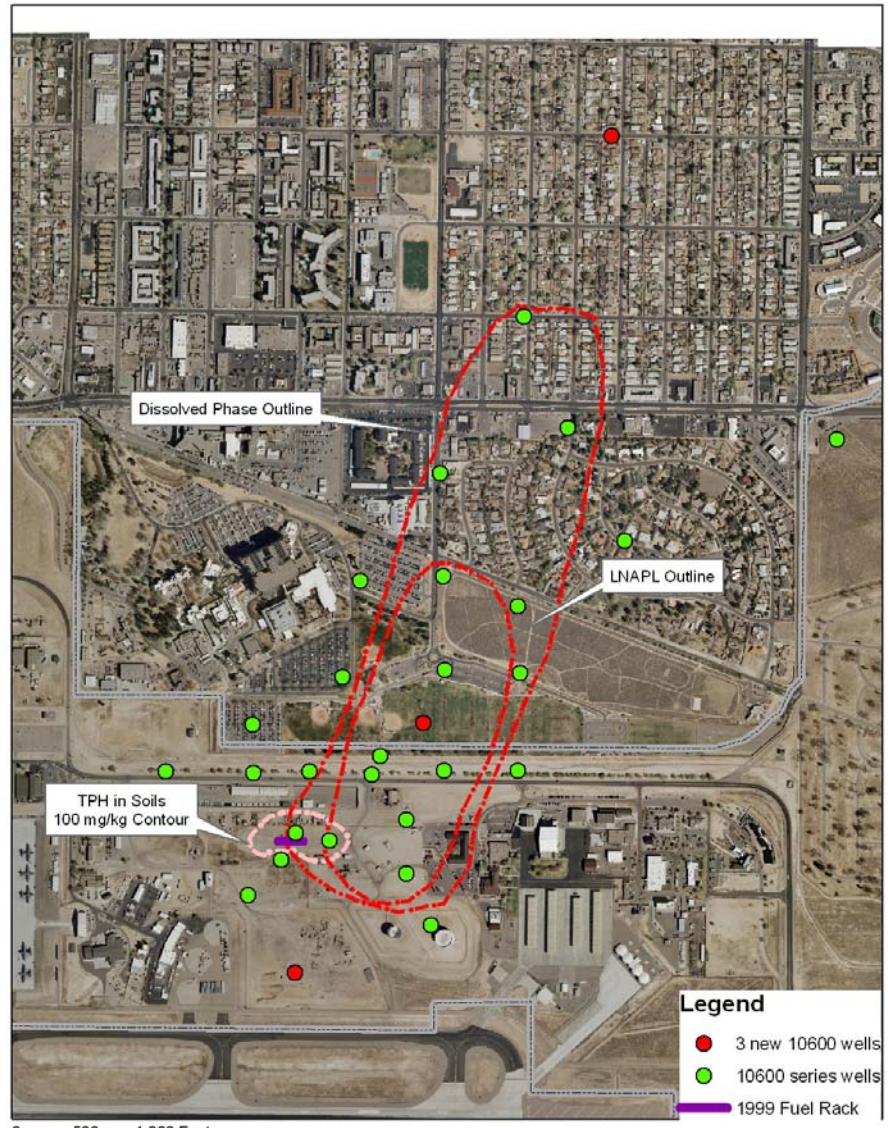
- **Millions of gallons of jet fuel have leaked into the vadose zone for decades**
- **Jet fuel (LNAPL plume) floating on groundwater (depth 500 feet), extending north 0.5 miles.**
- **Dissolved-phase groundwater contamination extending north at least 0.9 miles**
- **Contamination migrating towards water-supply wells, endangering drinking water supplies in Albuquerque area**

# **The Problem**

**Lack of urgency to address the problem**

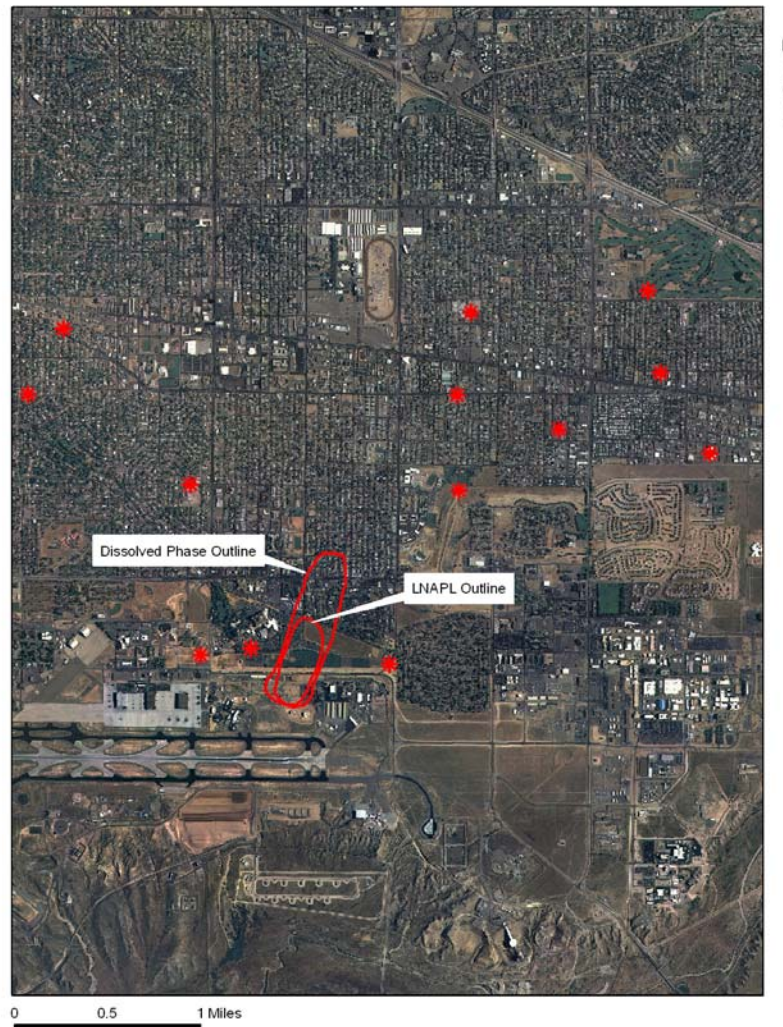
- Leak at Former Fuel Offloading Rack discovered 10 years ago**
- LNAPL plume discovered 3 years ago**
- Water supply wells threatened**

# Existing Groundwater Monitoring Wells



Approximate Location of Groundwater Monitoring Wells

# Plume Locations Relative to Production Wells



Groundwater Production Wells

# **Incomplete Characterization of the Vadose Zone (Soil and Soil Gas)**

- **No sampling along ancillary piping**
- **Characterization of known contamination at tanks not adequate to define extent or design remediation**
- **Characterization of known contamination at Former Fuel Offloading Rack not adequate**
- **Characterization of soil-gas contamination not adequate**
- **Source(s) not connected to groundwater contamination**
- **Amount of fuel released unknown**



# **Inadequate Characterization of the Groundwater**

- **Leading edge and margins of dissolved-phase groundwater contamination unknown**
- **Concentrations of dissolved-phase contaminants under LNAPL plume unknown**
- **Vertical extent of dissolved-phase contamination unknown**
- **Rate of migration at best poorly defined**
- **Geologic and hydrologic conditions poorly defined**

# **Current Remediation Efforts Are Inadequate**

- **On the Base, 4 Soil Vapor Extraction (SVE) Units operating intermittently**
- **From April 2003 to September 2009, about 286,600 gallons fuel extracted**
- **NMED estimates as much as 8 million gallons of fuel released**
- **Without doing something different, could take over 50 years to remove fuel from vadose zone and LNAPL plume**

# **NMED's Regulatory Approach to the Problem**

- **Use authority under Hazardous Waste Act**
- **NMED will direct corrective action under RCRA (HWA, NMSA 1978, §§ 74-4-1 to 74-4-14 and the HWMR, 20.4.1 NMAC)**
- **NMED directed KAFB in letters issued April 2, 2010, to accelerate corrective action, including conducting interim measures**

# **What are Interim Measures (IMs)?**

- **Actions taken to reduce or prevent the migration of contaminants, or reduce or prevent exposure to contaminants while long-term remedies are evaluated (CME stage) and implemented (CMI stage)**
  - **The CME/CMI process often takes a long time to complete**
- **IMs often done when urgent action is needed**

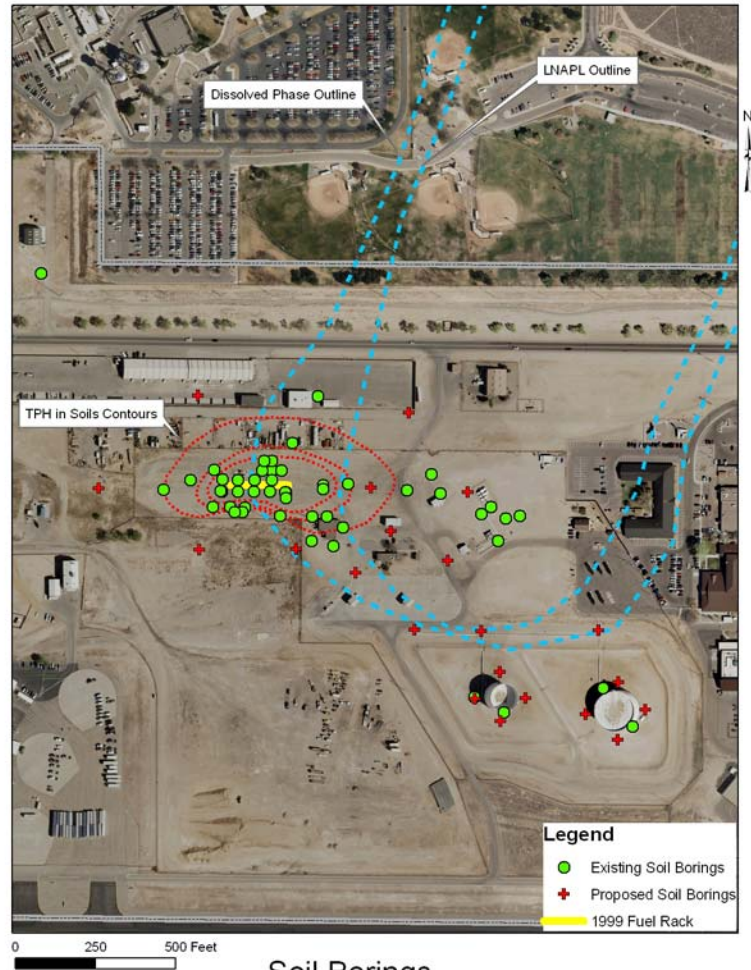
# **NMED's Technical Solution for the Problem**

- **IM to install 3 new groundwater wells now (complete)**
- **IM to continue operation of SVE Units for now**
- **IM plan to arrest and remediate LNAPL plume within 5 years of plan approval, due June 22, 2010 (submitted)**
- **Vadose Zone (includes source) investigation plan, due June 22, 2010 (submitted)**
- **Dissolved-Phase groundwater contamination investigation plan, due July 7, 2010**
- **Corrective Measures Evaluation for final remedy selection, report due 180 days after characterization approved by NMED**

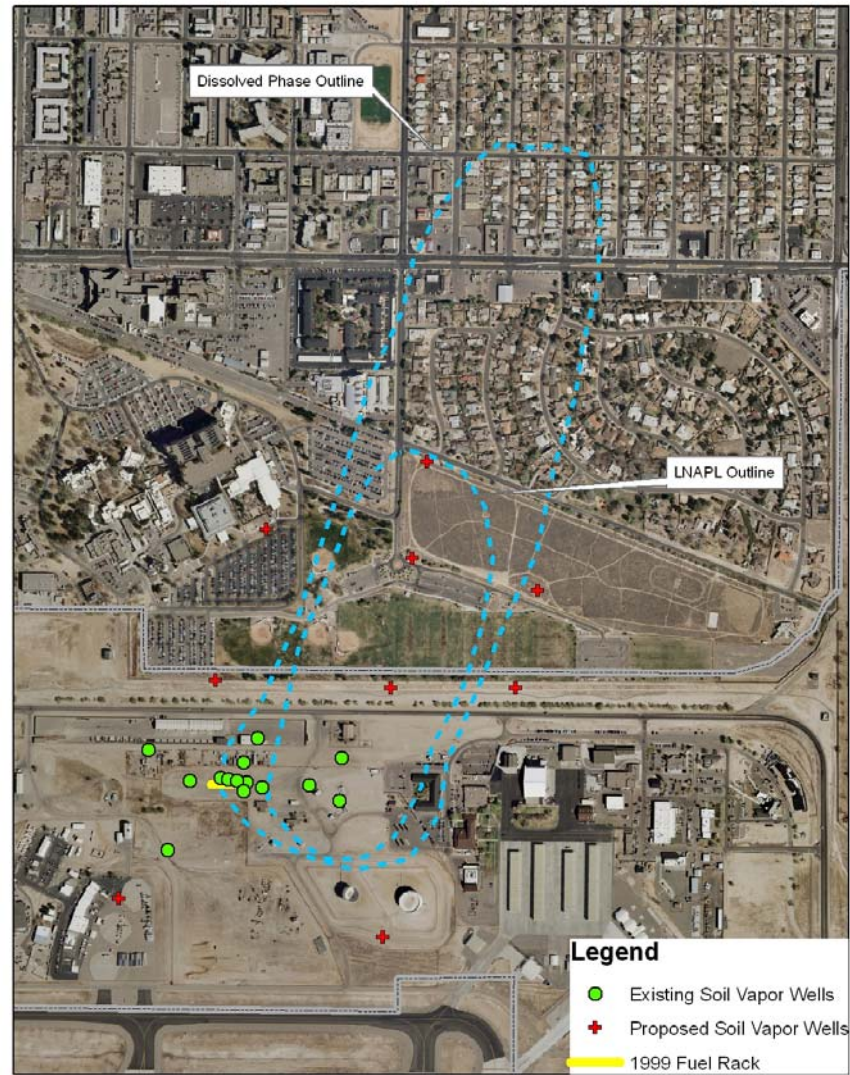
# **Vadose Zone Investigation Plan (Includes Source Investigation)**

- **Complete characterization of tank farm and Former Fuel Offloading Rack**
- **Characterize area along ancillary piping**
- **Connect source(s) to groundwater**
- **Complete characterization of soil-gas plume**
- **21 new boreholes for soil sampling from surface to groundwater**
- **30 new soil-gas monitoring wells (sampling ports 25, 50, 150, 250, 350, 450 feet)**

# Locations of Soil Borings and Soil-Gas Monitoring Wells



# Additional Soil-Gas Monitoring Wells



0 500 1,000 Feet

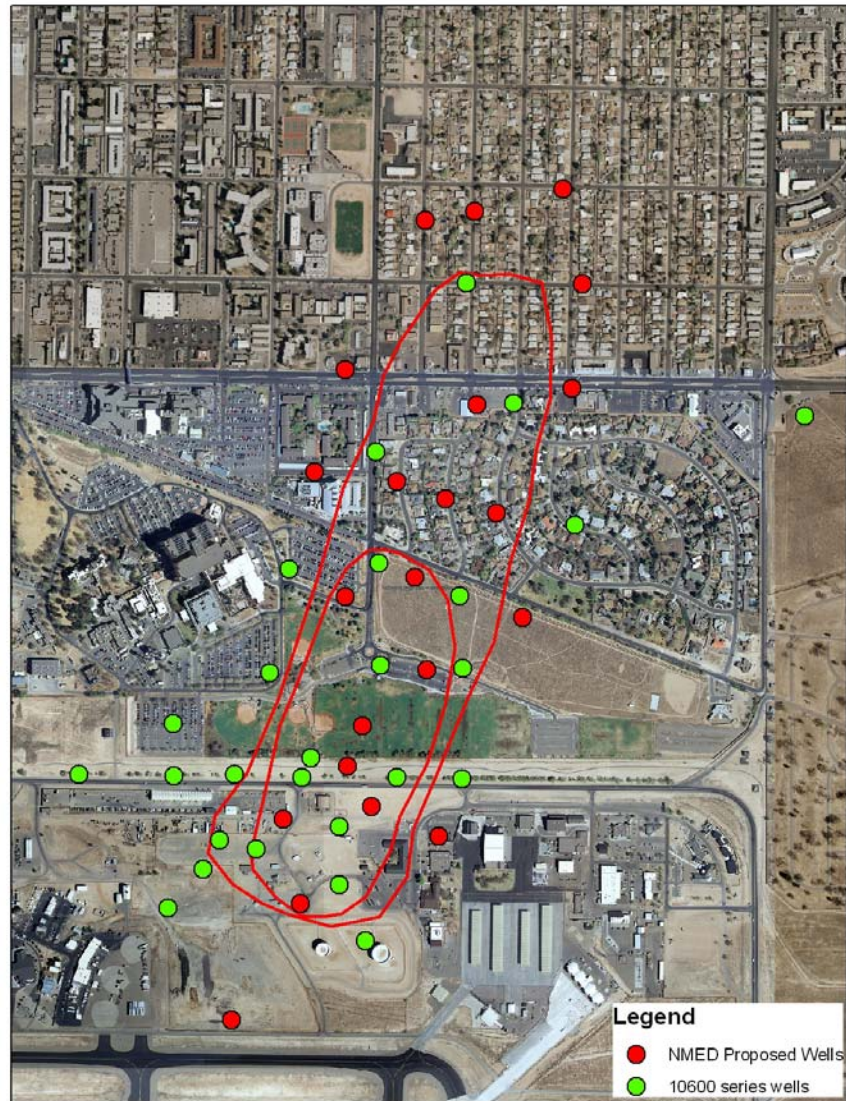
Soil Vapor Wells



# **Groundwater Investigation**

- **Install new monitoring wells at 22 locations**
- **Each location, install 3 cluster wells at different depths at and below water table**
- **Characterize geology and hydrology**
- **Geophysics**

# Groundwater Monitoring Wells



0 500 1,000 Feet

Groundwater Wells

# **Corrective Measures Evaluation**

- **Required in April 2, 2010 letter**
- **Due 180 days after NMED approval of site characterization**
- **Develop and report remedial alternatives to:**
  - **Effectively arrest and remediate contamination in vadose zone, groundwater, and LNAPL plume**
  - **Complete remediation in a reasonable time frame**
- **Public participation in remedy selection process**
- **NMED selects final remedy after considering public input**

# The Near Future

- **NMED Review of Investigation Plan for Vadose Zone and Source Area**
- **NMED Review of IM Plan for LNAPL**
- **Submittal of Investigation Plan for Dissolved Phase (July 7, 2010)**
- **Submittal of Water Quality Data**
  - Quarterly Reports of Groundwater and Soil Gas Data
  - “3-Wells” and LNAPL Data October 5, 2010
- **SVE System Operational Improvements**
- **Consideration of Additional IM for Dissolved-Phase Plume-Front Stabilization**
- **Air Force formulating turnkey approach for Cleanup Phase**

## Contact Information

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