KAFB Bulk Fuels Facility Spill

Revised Interim Measures and Characterization Plans
And
Site Status

New Mexico Environment Department
http://www.nmenv.state.nm.us/hwb/

May 3, 2011

KAFB Bulk Fuels Facility

Fuel Storage and Distribution System

- Constructed ~ 1952
- Tank farm (2.1 and 4.2 MGal tanks)
- Ancillary piping (underground and above ground)
- Fuel Offloading Rack (removed)
- Fuels: aviation gas (in the past) and jet fuel (JP-4 prior to 1993, JP-8 since 1993)

The Problem

- Millions of gallons of fuel have leaked into the ground, possibly for decades.
- Jet fuel floating on groundwater (500 ft depth) – known as “LNAPL” – extends north at least ½ mile
- Dissolved fuel constituents form groundwater contaminant plume extending north at least a mile.
- Contamination has migrated, and may still be migrating, off-site toward water-supply wells
- Contaminants in groundwater include fuel constituents such as EDB, benzene, toluene, xylene, naphthalene, 1-methyl naphthalene, 2-methylnaphthalene

Primary Features of Bulk Fuels Facility

Former Fuel Offloading Rack

Underground Pipeline

Above Ground Pipeline

Fuel Tanks

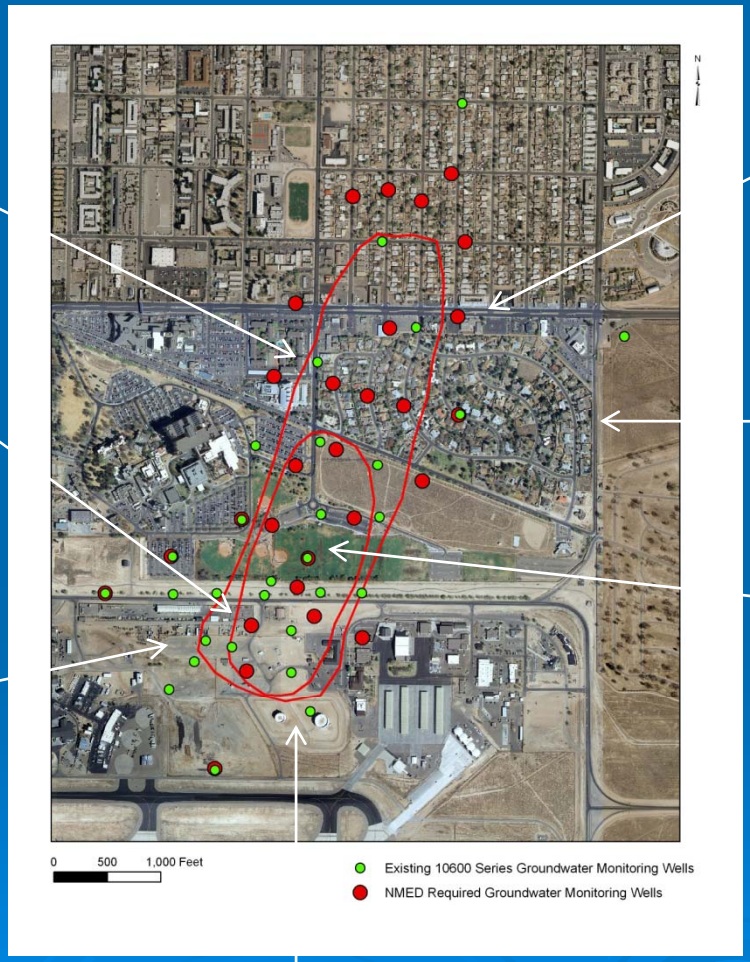
Historical Depiction of Contaminant Plumes

Isoconcentration line of 50 ppt EDB

Boundary of LNAPL Plume

Bulk Fuels Facility Former Fuel Offloading Rack

Bulk Fuels Facility Fuel Tanks

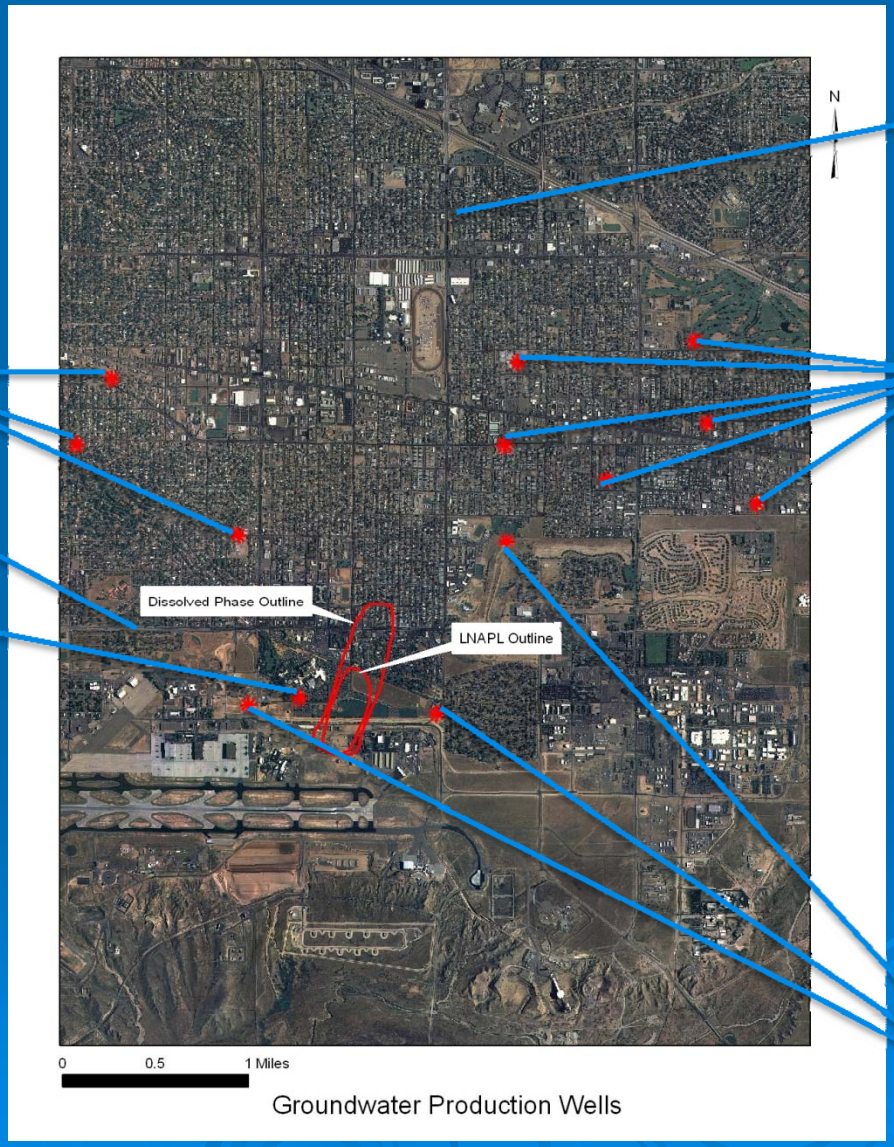


Gibson Blvd.

Louisiana Blvd

Bullhead Park

Historical Depiction of Contaminant Plumes Relative to Water-Supply Wells



Louisiana Blvd

Burton Wells

Ridgecrest Wells

Gibson Blvd

VA Well

KAFB Wells

Current Objectives

- Accelerate and complete characterization of vadose zone (VZ) and groundwater (GW)
  - Nature and extent of all contamination
  - Meet clean up levels in those areas above standards
- Conduct Interim Measures (IM) to begin cleanup
- Conduct Corrective Measures Evaluation for selection of long-term remedy
- Four major plans have been submitted by KAFB to accomplish the first two objectives

The Four Major Plans

- **IM Plan –** excavate former Fuel Offloading Rack area, complete shallow boreholes along ancillary piping, and conduct various tests.
- **VZ Investigation Plan –** complete soil borings and soil-vapor monitoring wells.
- **GW Investigation Plan –** install groundwater monitoring wells.
- **LNAPL Containment Plan –** proposal to stop migration of LNAPL and dissolved-phase plumes by extracting groundwater, treating the water, and re-injecting the water back into the aquifer.

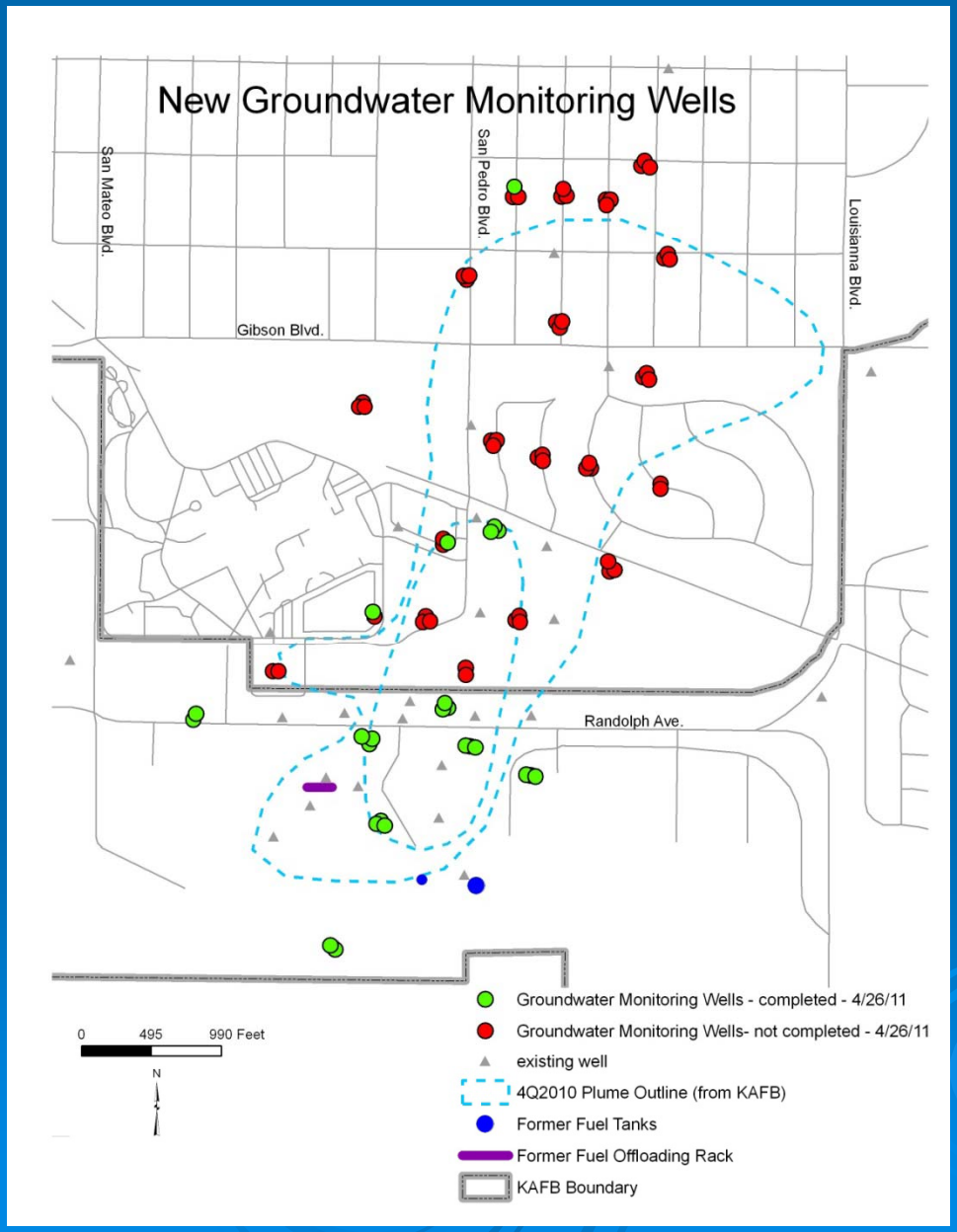
Status of the Four Work Plans

- March 31, 2011 – KAFB submitted revised IM, GW, and VZ Investigation Plans
  - Plans partially approved by NMED on December 10, 2010
  - Revisions under review by NMED
- March 31, 2011 – NMED disapproved LNAPL Containment Plan
  - Required characterization work plan to collect information crucial to system design – due June 15, 2011
  - Report on characterization due February 1, 2012
  - Design for pump and treat system due April 2, 2012

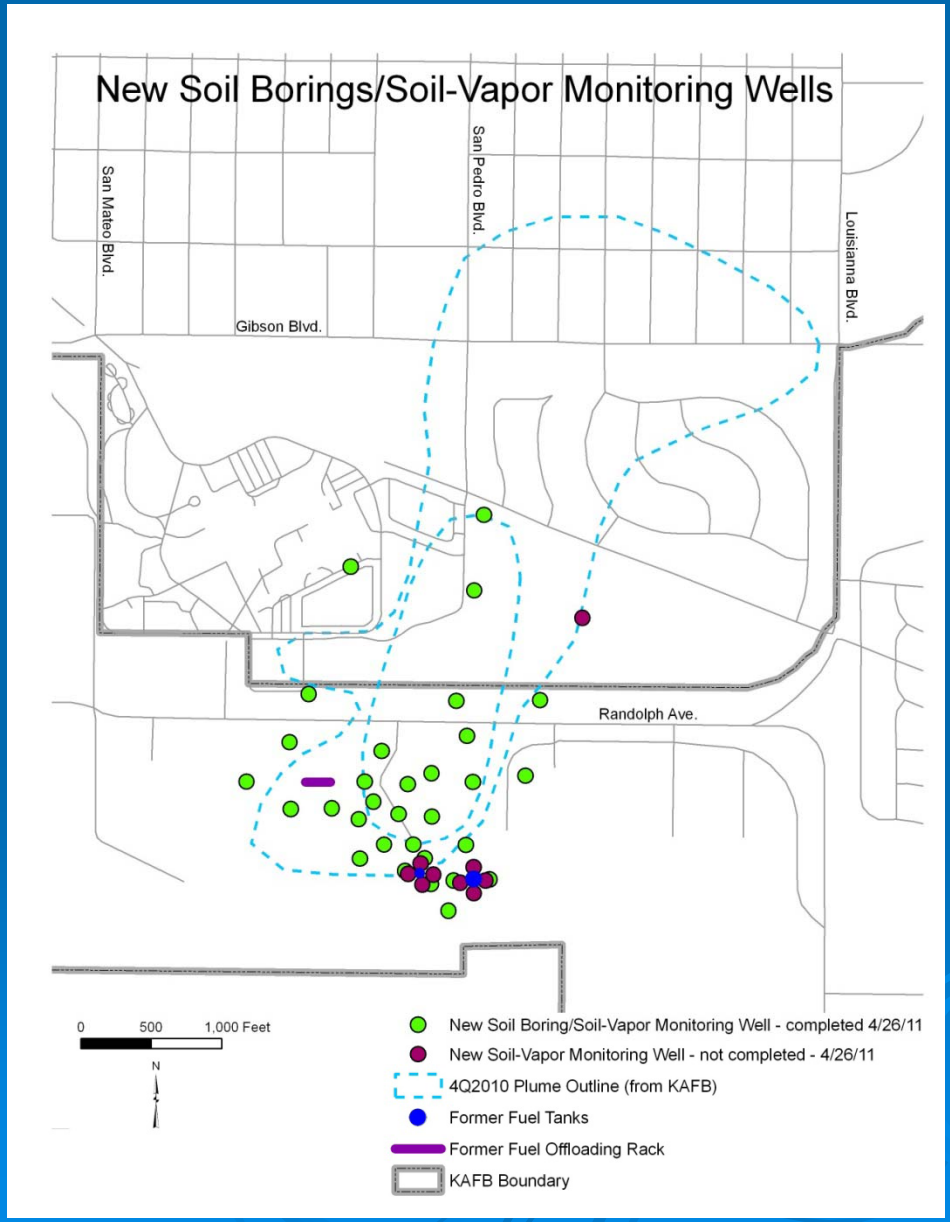
Characterization Work Completed

- Shallow Soil Borings: 5 of 5 completed
- Soil-Vapor Monitoring Wells: 26 of 35
- Groundwater Monitoring Wells: 25 of 78
  - Drilling has moved to neighborhoods north of KAFB
  - 6 drilling rigs in operation
  - Noise, vibration, disruption, air quality are among the neighborhood concerns

Status of Groundwater Monitoring Wells



Status of Soil Boring/Soil Vapor Wells



Relocation of Wells

- Locations for 4 groundwater wells along Gibson changed or to be changed
  - 3 alternative locations approved
  - 1 proposed alternative location requires access agreement
- Locations were moved to:
  - Lessen disruption of traffic flow
  - Improve safety for workers and the public

Indoor Air Quality

- January 28, 2011 – NMED disapproved *Screening Level Risk valuation for Petroleum Hydrocarbon Fuel Compounds in Subslab Soil Vapor*
- Report documents analysis of subslab soil-vapor samples collected at the Fuels Facility Office (Building 1032) and the 90-Day Hazardous Waste Storage Area (Building 1048)
- Additional investigation of soil vapor, and further risk evaluation required
- No air quality impacts from LNAPL plume or groundwater to residents, workers, or KAFB personnel

Hydraulic Properties

- February 21, 2011 – KAFB directed to collect samples at well locations during current drilling campaign
  - Analyze samples for key hydraulic properties
  - Samples were to be undisturbed and representative of aquifer
- No formal response received from KAFB to date, but NMED agreed to allow KAFB to:
  - Collect samples from cyclone of drilling rig, instead of undisturbed samples
  - Forego analysis of porosity and compressibility

A Fifth Work Plan

- January 27, 2011 – KAFB submitted a 5th Work Plan: *Pre-Remedy Monitoring and Soil-Vapor Extraction System Operation and Maintenance Work Plan*
  - Sampling and analysis plan for water, soil, and soil-vapor
  - Also a plan for operating and maintaining the existing soil-vapor extraction (SVE) units
- Under NMED review

Additional Information

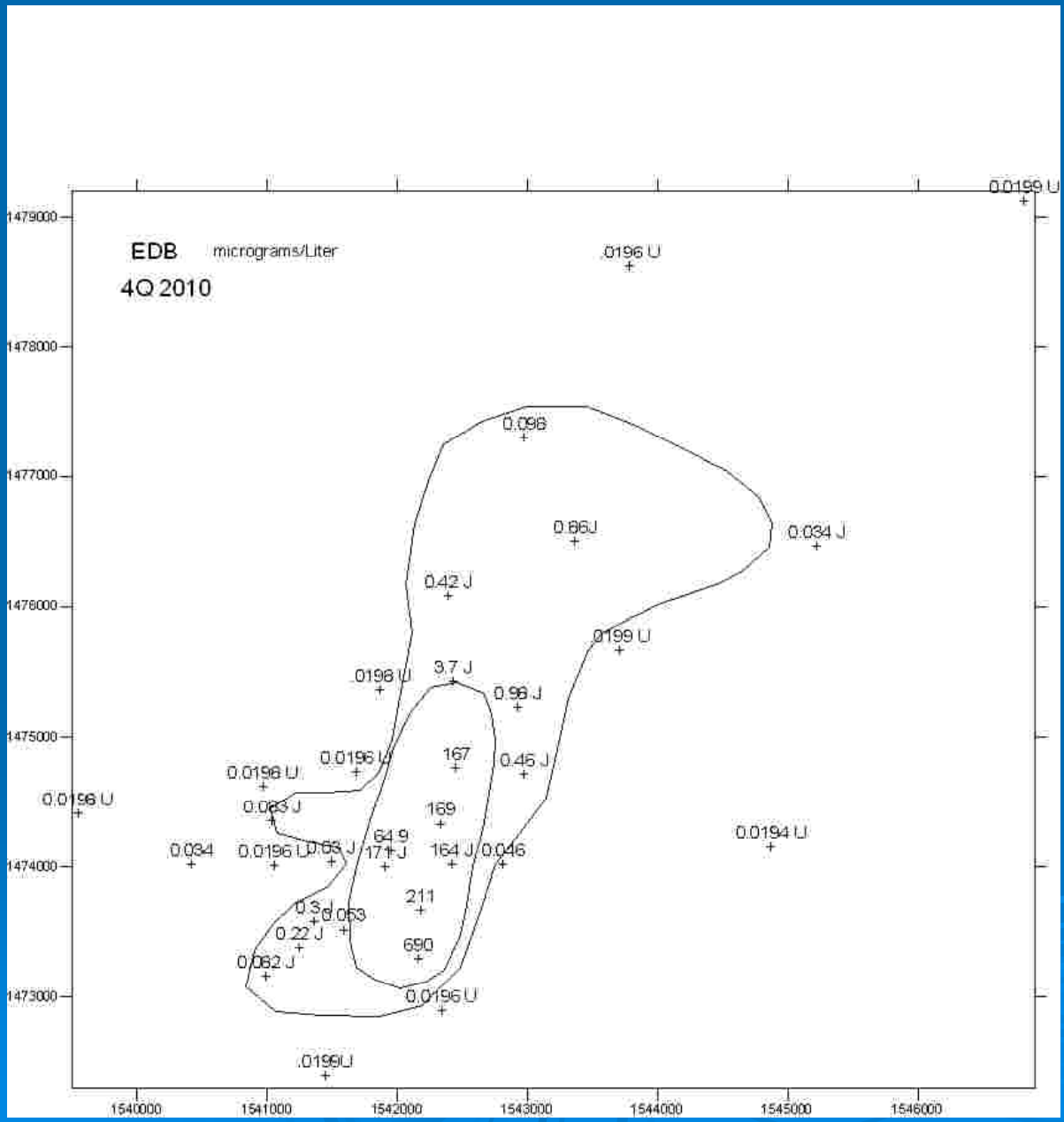
- Quarterly Reports (last February 25, 2011)
- Weekly activity reports
- Memoranda prepared by INTERA Corp. for Water Utility Authority (WUA) concerning various plans
- KAFB response to WUA memorandum on LNAPL Containment Plan
- Laboratory reports on KAFB 10625 and 10626

Available on NMED's web site

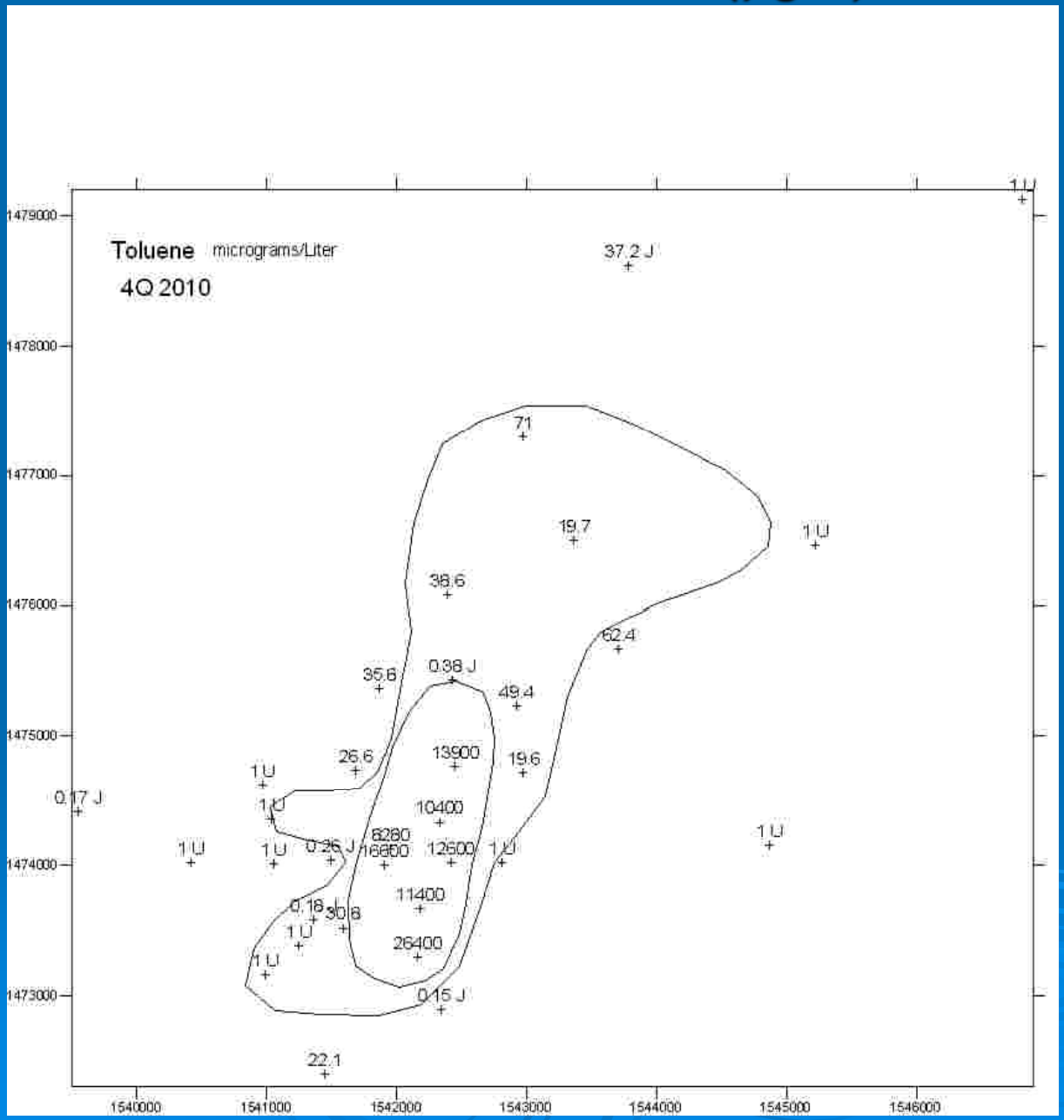
Groundwater Quality
(As Represented by Q4/2010 Data)

- Next 6 slides show the distribution of various contaminants
- Data are from Table 5-2 of the last quarterly report (February 2011)
- For comparison purposes, the “plume boundary” is that depicted in the quarterly report
- The quarterly report is available on NMED’s web site

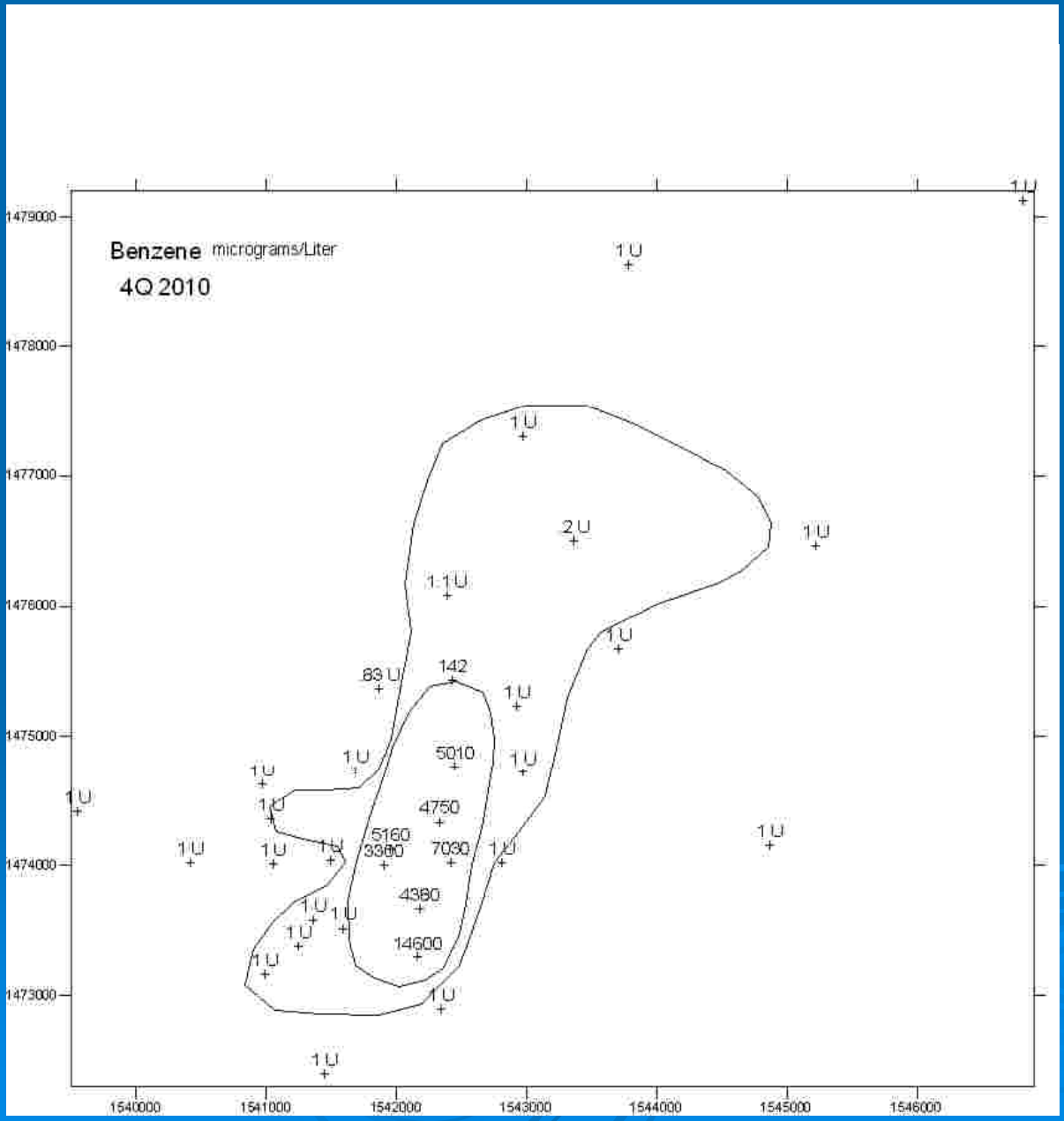
EDB Concentrations (µg/L)



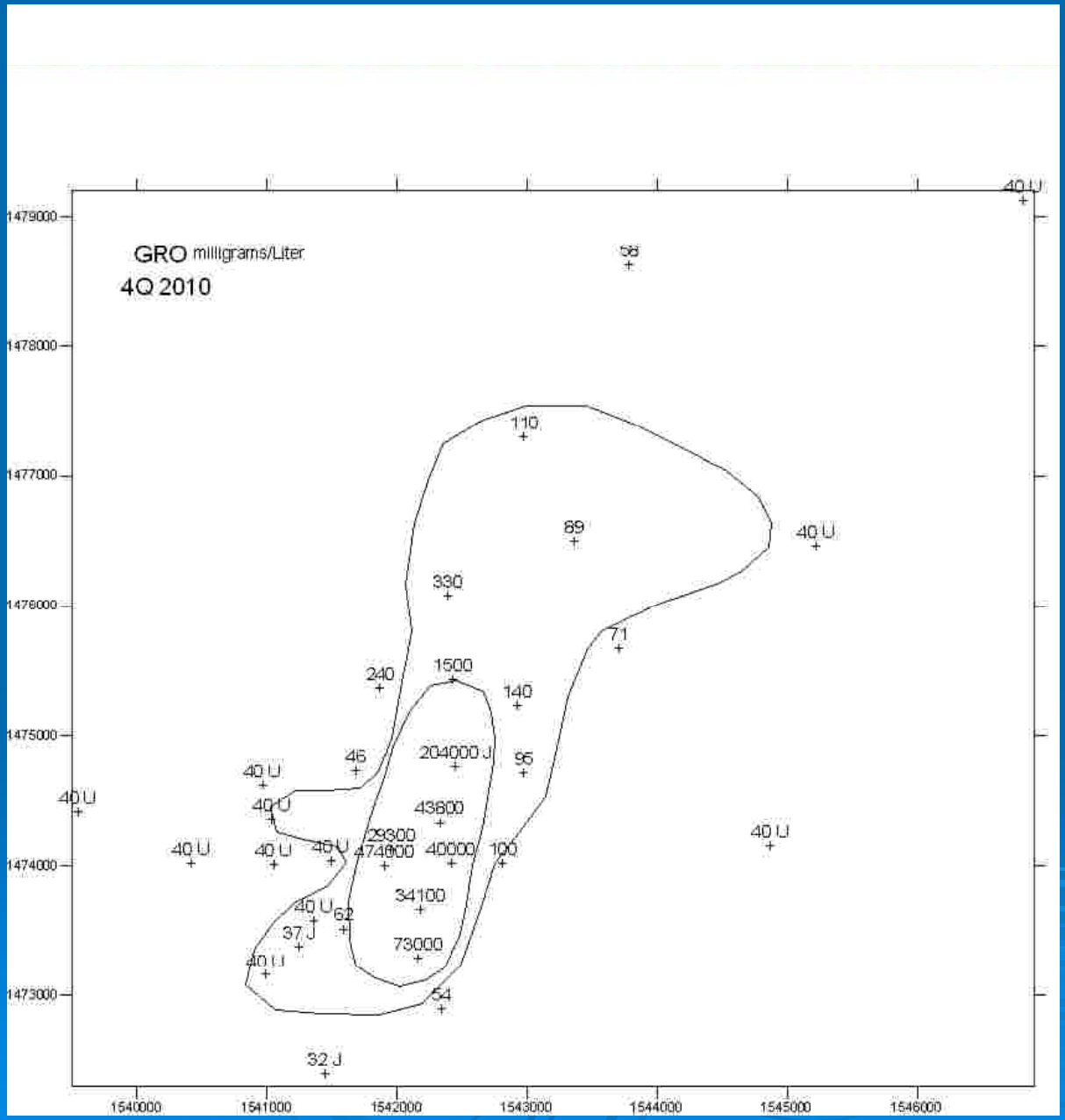
Toluene Concentrations (µg/L)



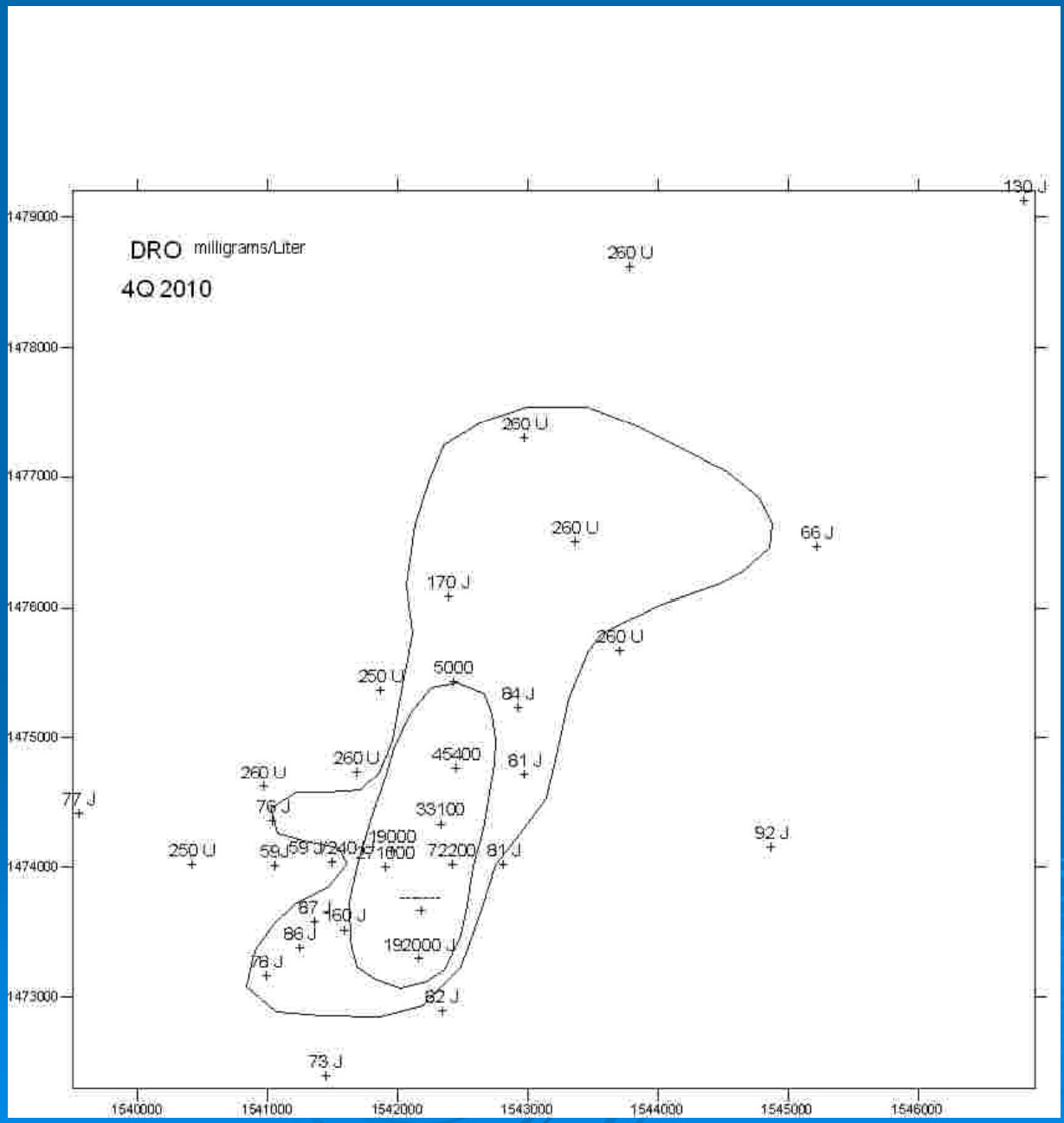
Benzene Concentrations (µg/L)



Gasoline Range Organics (GRO) Concentrations (mg/L)



Diesel Range Organics (DRO) Concentrations (mg/L)



Data Quality Issues

- NMED evaluating the data validation plan for the project. Significant concerns include:
  - Transcription errors
  - High laboratory reporting limits
  - Data qualifier use
- NMED is evaluating data quality and whether data quality objectives are being met

Sentry Well Issue

- Contaminants reported in groundwater samples from well KAFB-10626:
  - Toluene
  - GRO (Gasoline Range Organics)
- GRO points to a fuel source
- Additional investigation needed
- Data must be closely examined for errors and quality
- The drilling campaign underway and subsequent quarterly monitoring events should provide some answers
- While the investigation continues, WUA monitors drinking-water quality to protect public

Independent Sampling of Groundwater

- NMED splitting water samples at 12 wells
  - Analyzing for EDB, VOCs, PAHs, DRO, GRO, and Pb
  - Also general chemistry and redox parameters: major anions, major cations, alkalinity, dissolved Fe and Mn, nitrate, ammonia, and sulfide
- To date, sample splits collected at 7 wells
- NMED split water samples with KAFB at sentry well on April 28, 2011

Looking Ahead: Next 6 Months

- Approval of revised IM, VZ, and GW Investigation Plans
- Complete drilling campaign and geophysical logging
- Collect water and soil-vapor samples from all wells
- Prepare 3D models of geology, hydrology, soil and soil-vapor contamination, and groundwater contamination
- Identify and work to close data gaps
- Implement workplan to collect data for LNAPL containment system design
- Proceed with indoor air quality investigation
- Plan excavation of any contaminated soils in source area(s) that exceed a screening level
- Continue SVE

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