

Technical Area-V Groundwater Area of Concern presented to the Water Protection Advisory Board

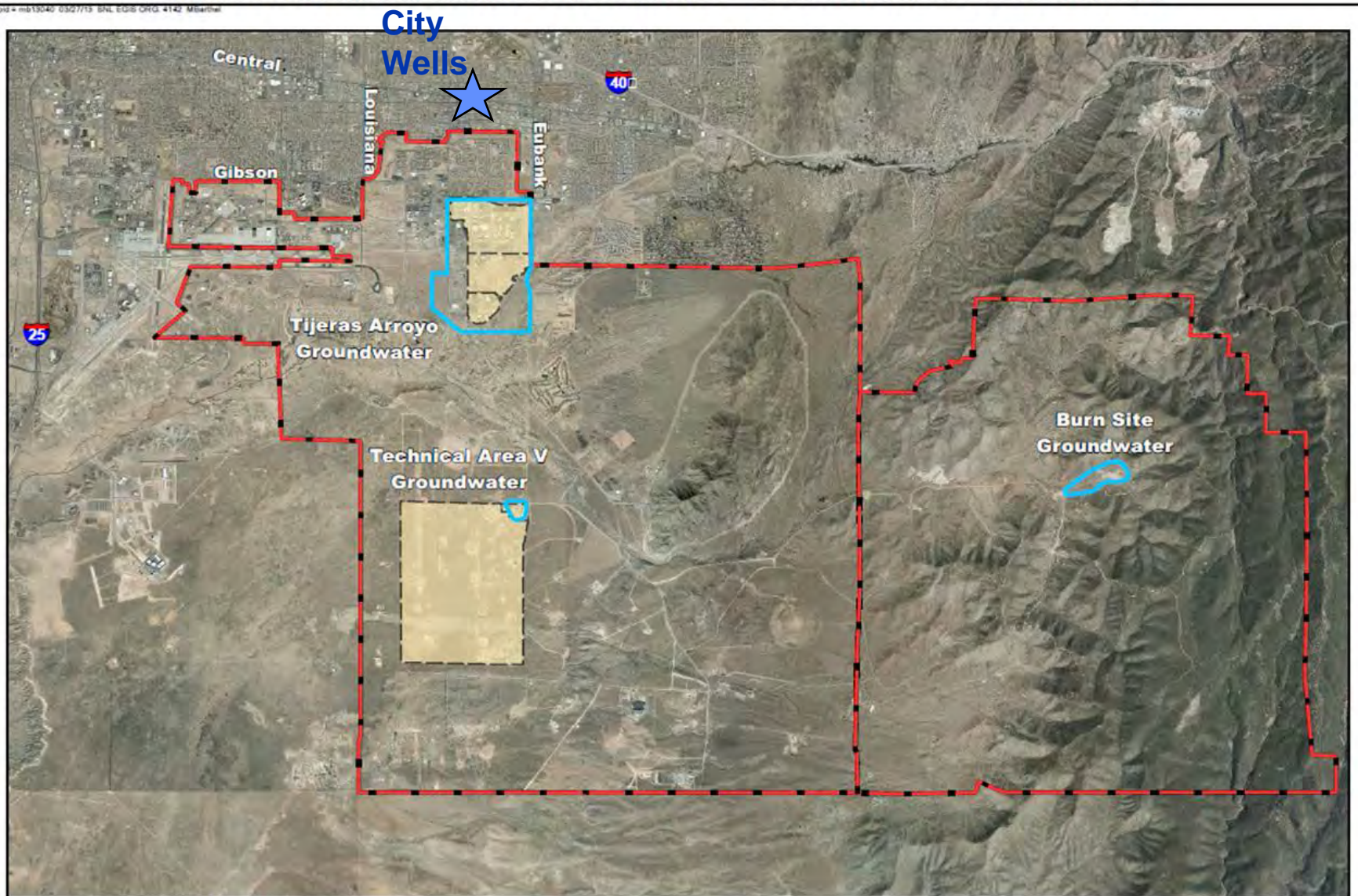
August 12, 2016

Jun Li, Technical Lead
Sandia National Laboratories



Sandia National Laboratories, New Mexico - Groundwater Areas of Concern

Mapid = mb13040 03/27/13 SNL EGIS ORIG 4142 MBarthel



Legend

- Groundwater Area of Investigation
- SNL Technical Area
- KAFB boundary







Sources of Contamination at TA-V Groundwater AOC

- **Technical Area-V is about 35 acres.**
- **Sources of contamination are wastewater discharges prior to 1992.**

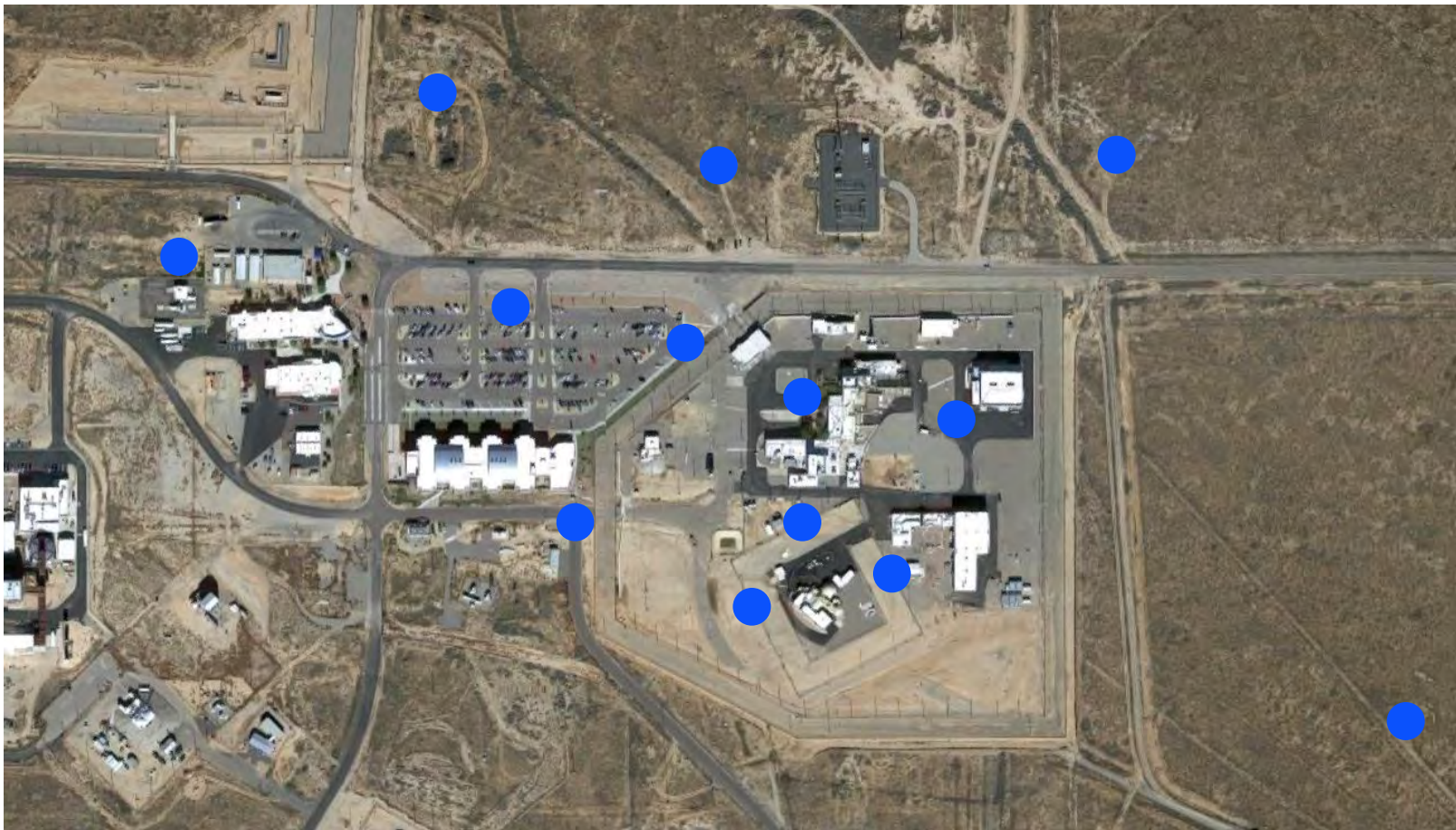
Discharge Site that Impacted Groundwater	Date of Discharge	Estimated Volume	Wastewater
Liquid Waste Disposal System (LWDS) Drain Field	1962 – 1967 (5 years)	6.5 Million Gallons	Industrial waste water
TA-V Seepage Pits	1960s – 1992 (30 years)	30-50 Million Gallons	Septic waste and industrial waste water



Groundwater Monitoring at TA-V

- Groundwater is at 500 ft below ground surface in low permeability sediments.
- Extensively monitored since 1992.
- Current monitoring network has 16 wells including three deep wells.
- Quarterly monitoring for most wells.

Groundwater Monitoring at TA-V





Regulating Groundwater Contamination at TA-V

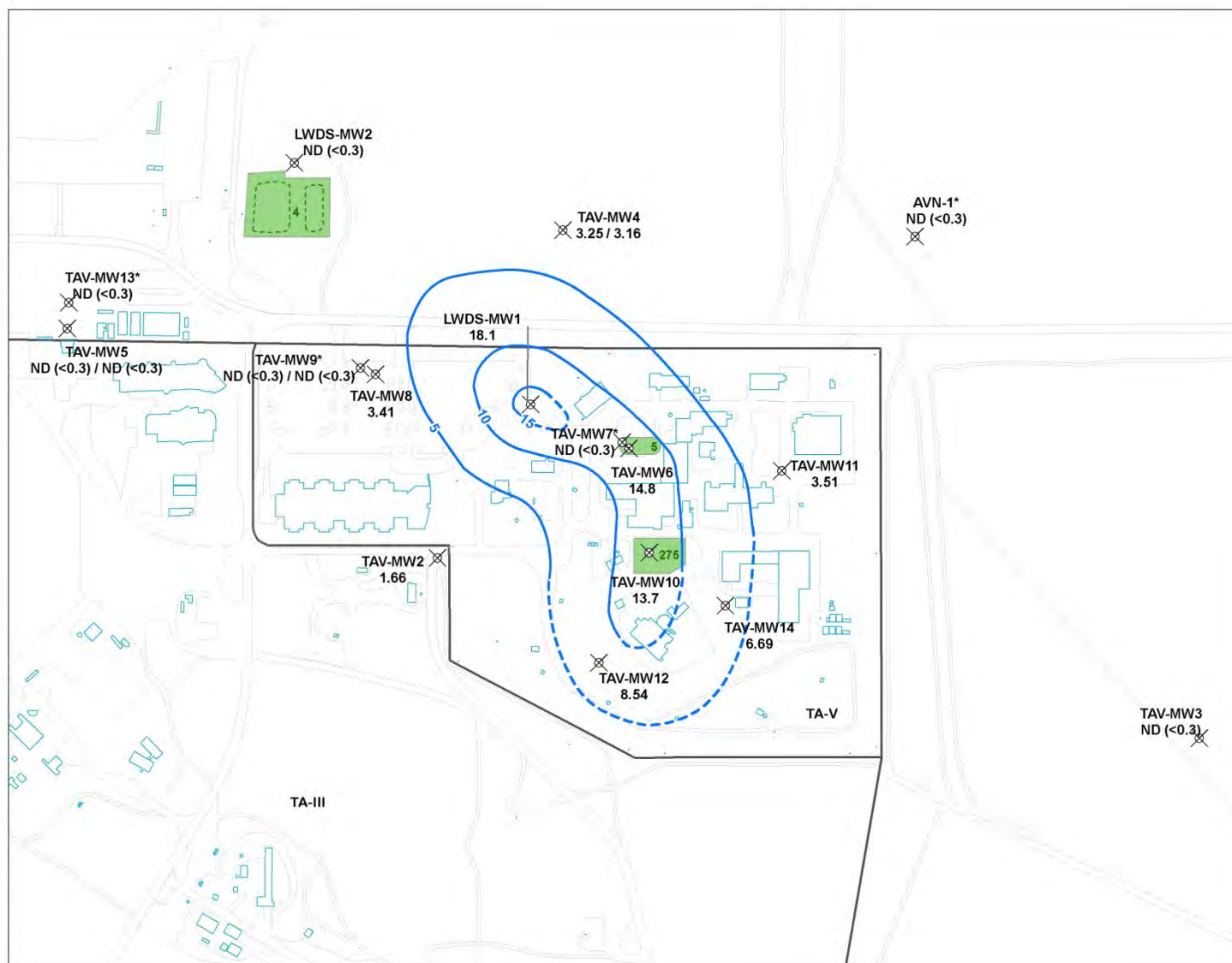
- **NMED Hazardous Waste Bureau regulates the site.**
- **Regulatory standards for groundwater contamination at Sandia are EPA Drinking Water Standards.**

Contaminant in Groundwater at TA-V	Maximum Concentration	EPA Drinking Water Standard
Nitrate	~ 15 mg/L	10 mg/L
Trichloroethene (TCE)	~ 20 µg/L	5 µg/L

- **There is no pure phase TCE in the groundwater at TA-V.**

TCE Distribution in Groundwater at TA-V

November/December 2015



Legend

- Monitoring well, with 3.51 November/December 2015 Trichloroethene concentrations (µg/L)
- Isoconcentration contour (µg/L), dashed where inferred
- Road, paved and unpaved
- Building / structure
- Inactive impoundment boundary
- Solid Waste Management Unit (SWMU)
- Technical Area (TA) boundary

Notes:

- * Wells AVN-1, TAV-MW7, TAV-MW9, and TAV-MW13 are completed below the water table, and were not contoured.
- ND = not detected, method detection limit indicated in parentheses.

Scale:

0 300 600
Feet

0 100 200
Meters

North Arrow

EGIS

Map of Kirtland Air Force Base

SNL EGIS ORG.4142

Sanl National Laboratories

New Mexico State Plane Central Zone, 1983

1988 North American Vertical Datum

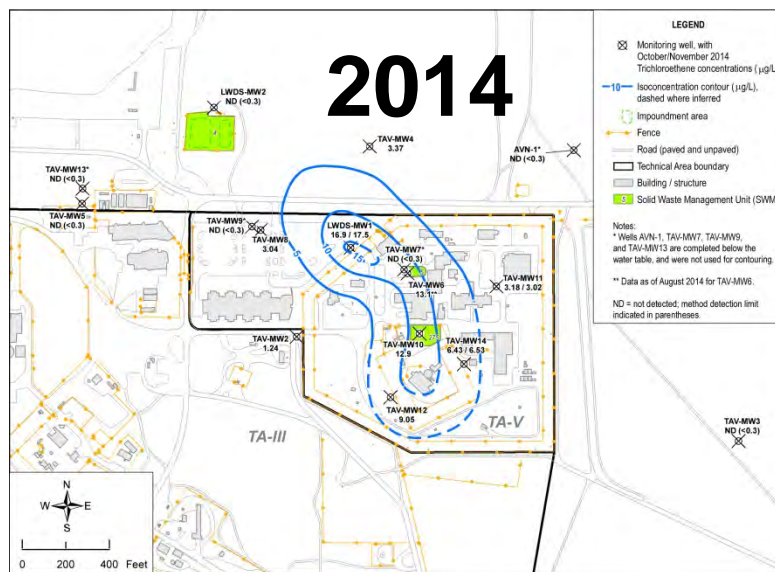
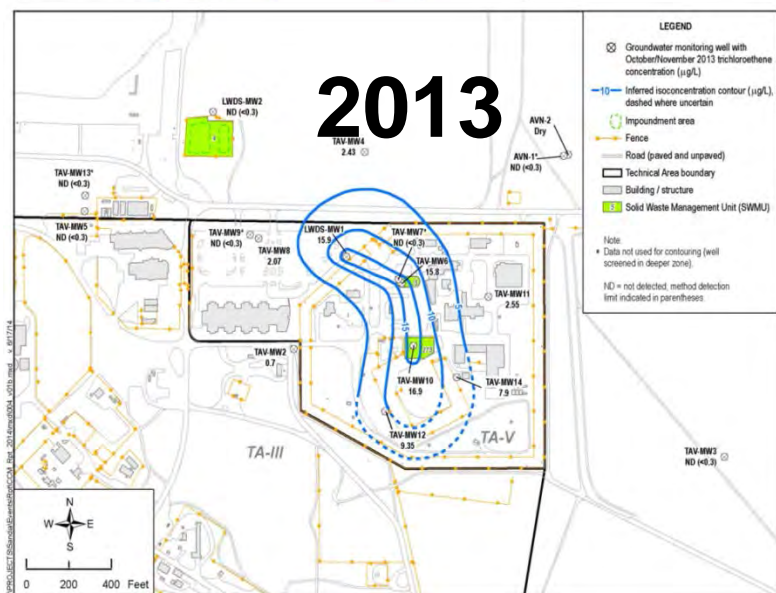
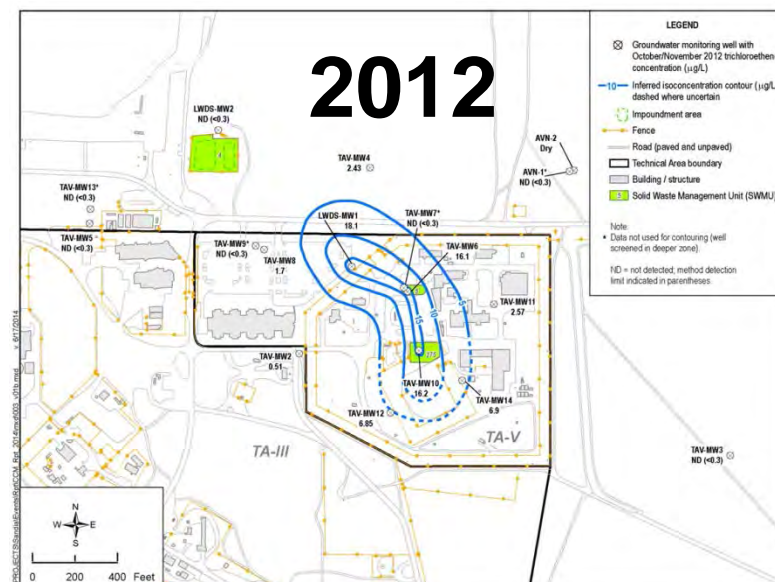
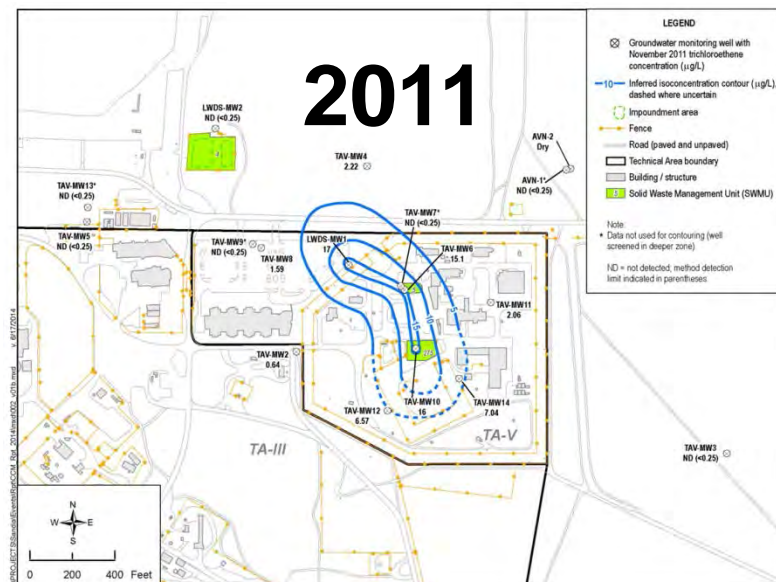
SNL, EGIS Dept 4142 ce16515 3-16-16 / mb13135

Nitrate Distribution in Groundwater at TA-V

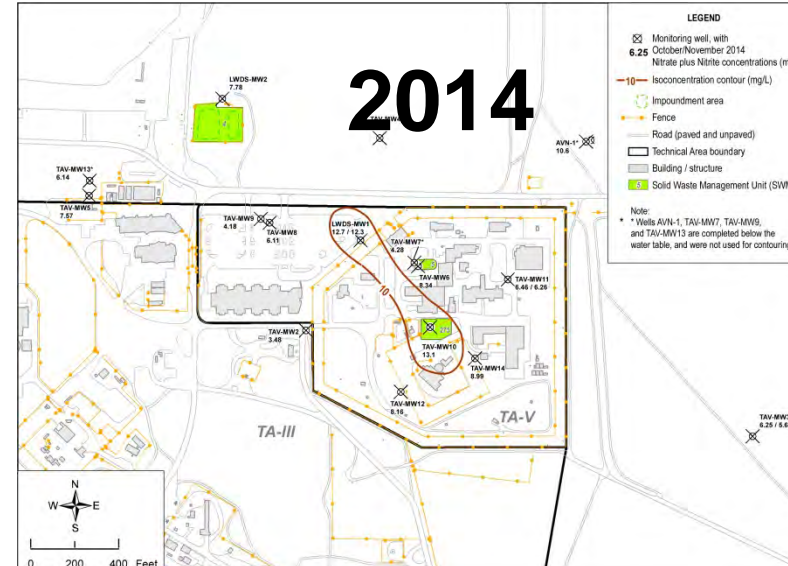
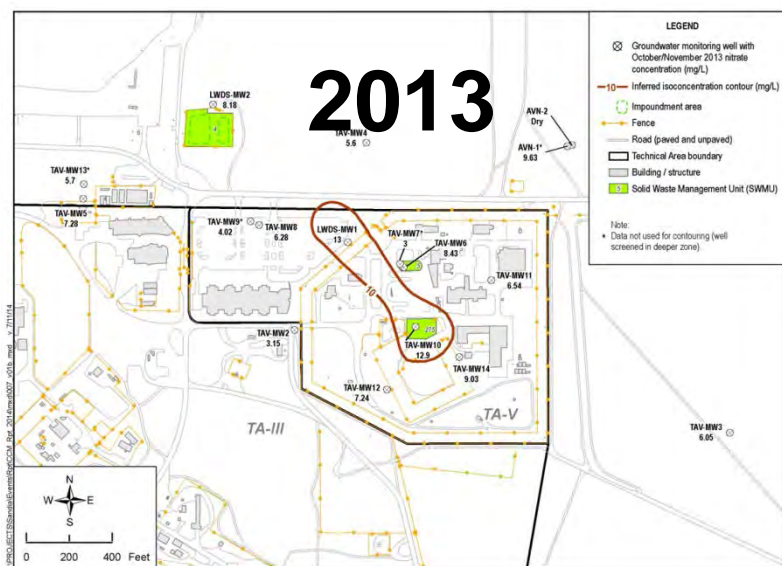
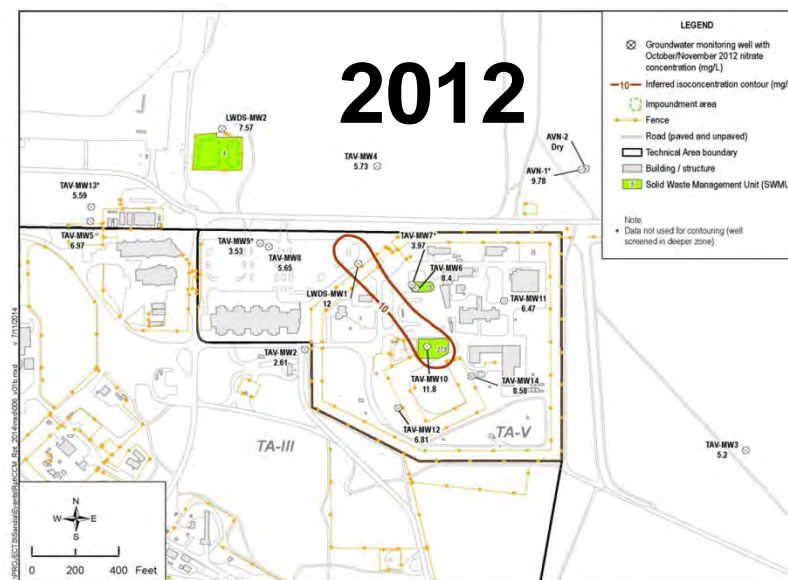
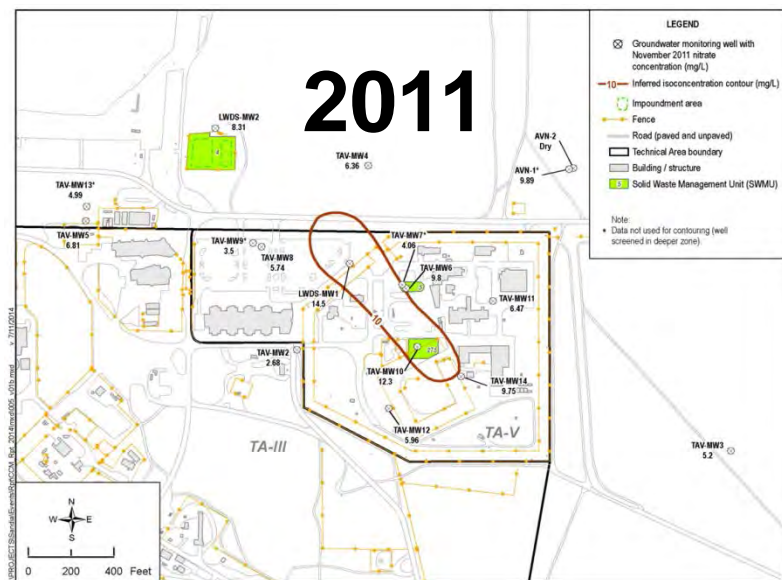
November/December 2015



TCE Distribution in Groundwater 2011 - 2014

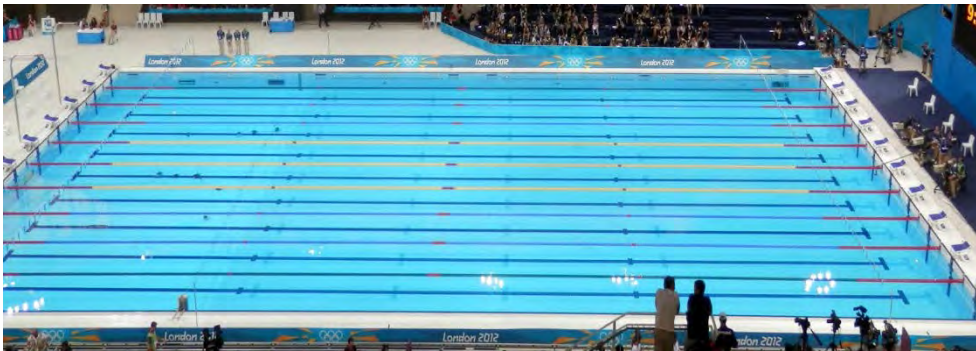


Nitrate Distribution in Groundwater 2011 - 2014



Characteristics of TCE and Nitrate Plumes at TA-V Groundwater AOC

- Plumes are not moving.
- Plumes are approximately five miles south of City drinking water wells.
- Plumes are low concentrations.
 - No TCE detected in perimeter wells and deep wells.



45 Olympic-Size Swimming Pools





Path forward: a Phased Treatability Study of In-Situ Bioremediation

- **“In-Situ” means to treat the contamination in place.**
- **“Bioremediation” means we will make biodegradation happen by supplying the following:**
 - **Dechlorinating bacteria to break down TCE.**
 - **Food and nutrients (i.e., substrate solution) to stimulate the growth of natural bacteria and injected dechlorinators.**

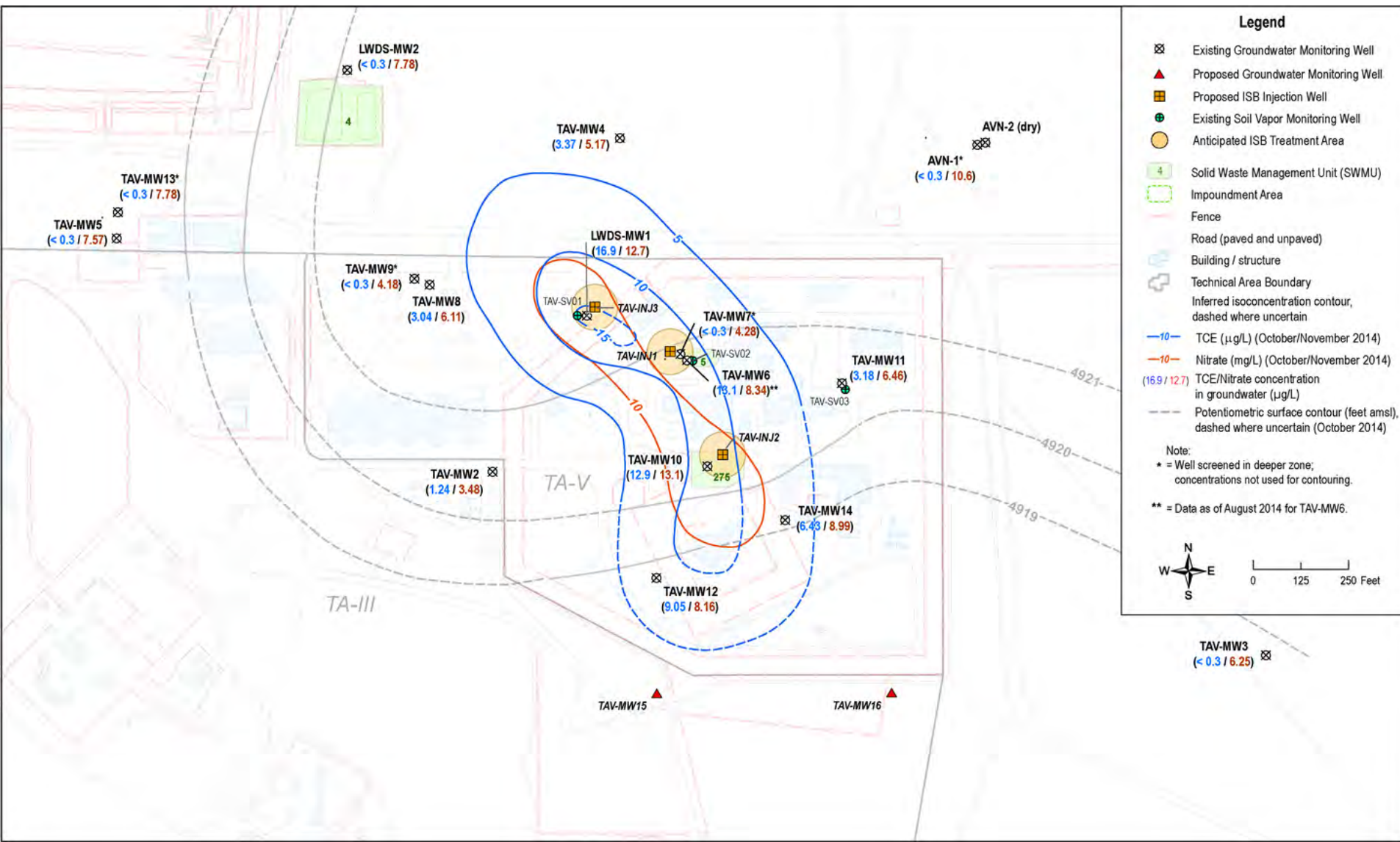
★ Animation video
if there is time.



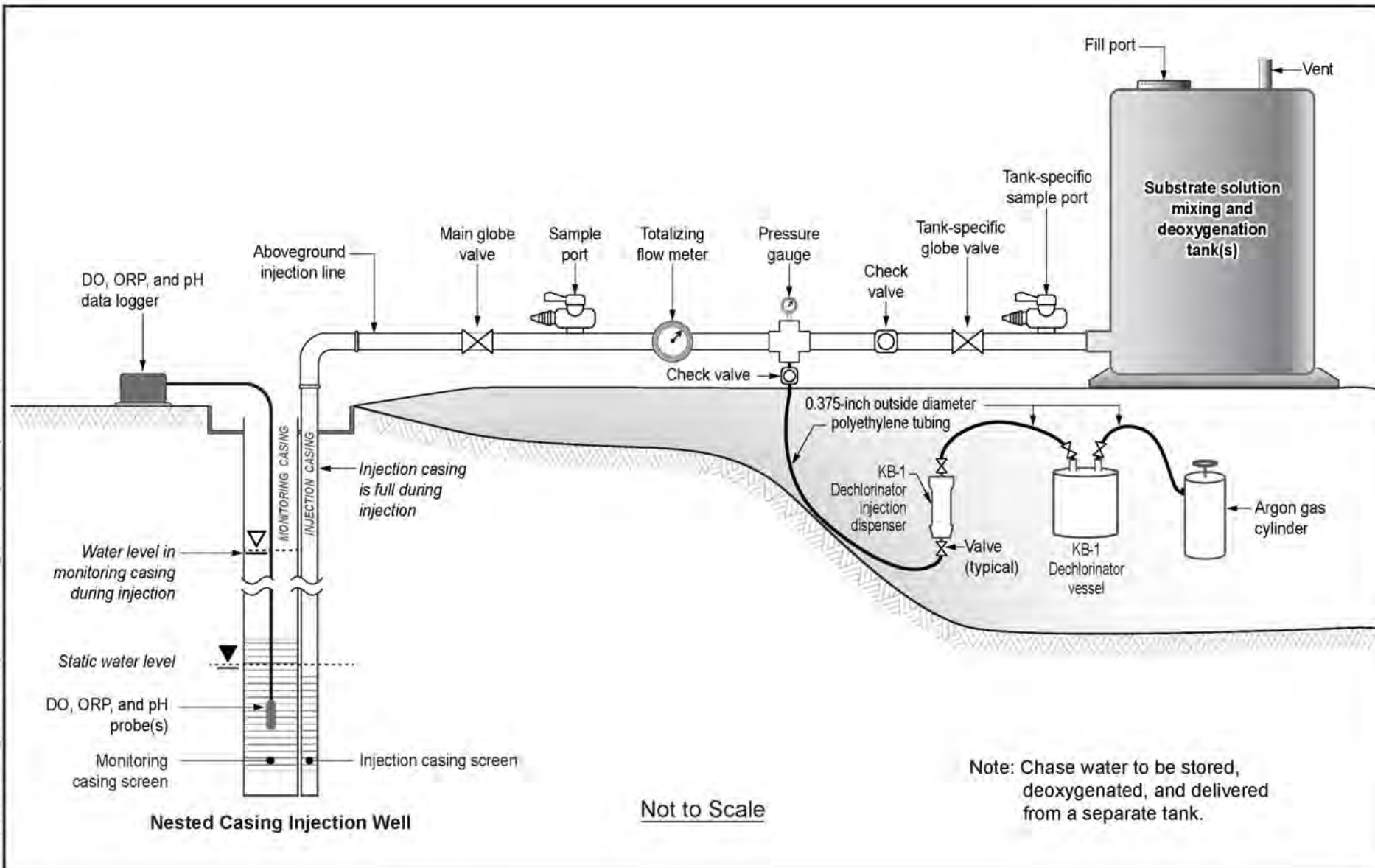
Treatability Study: Target the Heart of the Plume

- **Install up to three injection wells where the highest TCE and nitrate concentrations are detected.**
- **Assemble an aboveground injection system to deliver the dechlorinating bacteria and substrate solution.**
- **“Treatability Study” to test the effectiveness of in-situ bioremediation technology at TA-V.**

Treatability Study: Install up to Three Injection Wells at Heart of the Plume



Treatability Study: Assemble an Aboveground Injection System





Implementation of Treatability Study

- **Phase I Pilot Test.**
 - Injection volume is 3,700 gallons
 - Injection completes in one day
 - Performance monitoring for four months
- **Phase I Full-Scale Injection at the first injection well.**
 - Injection volume is 530,000 gallons
 - Injection occurs for six months
 - Performance monitoring for two years
- **Phase II Full-Scale Injection at the second and third injection wells.**



Progress: Treatability Study Work Plan

- Treatability Study Work Plan approved May 2016.



Sandia National Laboratories, New Mexico
Environmental Restoration Operations

Revised Treatability Study Work Plan for
In-Situ Bioremediation at the Technical Area-V
Groundwater Area of Concern

March 2016





Progress: Discharge Permit Application

- Discharge Permit Application submitted July 2016.



Sandia National Laboratories, New Mexico
Ground Water Discharge Permit Application for
Technical Area-V Treatability Study Injection Wells

July 2016





Discharge Permit

DP-1845 for Sandia National Laboratories, NM

TA-V Treatability Study Injection Wells

- **NMED Ground Water Quality Bureau is the regulator for Discharge Permits.**

COMING UP

- **NMED and Sandia will put out public notice for 30 days for this DP application.**
- **NMED GWQB will make available a proposed approval or disapproval of the DP application.**
- **The Public and Sandia will have opportunities to comment on the proposed approval or disapproval during a 30-day public comment period.**



Summary

- **TA-V groundwater AOC is adequately characterized with TCE and nitrate contamination.**
 - **Plumes are stagnant and far from drinking water wells.**
 - **Plumes are of low concentrations.**
 - **No TCE detected in perimeter wells and deep wells.**
- **NMED HWB regulates the site to drinking water standards.**
- **Sandia plans to implement a Treatability Study of in-situ bioremediation contingent on funding from Congress.**
- **NMED GWQB regulates the Discharge Permit for injection wells used for Treatability Study.**



Information Available to Public

- **NMED HWB Website, <https://www.env.nm.gov/HWB/> ↗ “Waste Facilities”, then ↗ “Sandia National Laboratories (SNL)”:**
 - **Consolidated Quarterly Report (most recent is April 2016)**
 - **CY 2015 Annual Groundwater Monitoring Report**
 - **NMED DOE Oversight Bureau data on groundwater sites at SNL**
- **Physical copies of the Quarterly Reports and the Treatability Study Work Plan are available at UNM Zimmerman library.**



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Our Mission

The Hazardous Waste Bureau's (HWB's) mission is to provide regulatory oversight and technical guidance to New Mexico hazardous waste generators and treatment, storage, and disposal facilities as required by the New Mexico Hazardous Waste Act [HWA; Chapter 74, Article 4 NMSA 1978] and regulations promulgated under the Act. New Mexicans will then be assured that hazardous waste is managed, and contaminated sites are cleaned up, in a manner that is safe and protective of human health and the environment. HWB also ensures abandoned hazardous substances are handled on an emergency basis, and lessens the resulting hazards that may present endangerment to humans.

Kirtland Air Force Base - Bulk Fuels Facility Spill

Correspondence and documents regarding the Bulk Fuels Facility Spill can be found by [clicking on this link](#).

Notifiers

The Annual Hazardous Waste Fee Report is now available for download. Please visit the [Hazardous Waste Bureau Notifiers Page](#).



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Sandia National Laboratories

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[April 27, 2016 NMED Public Meeting Presentation on Groundwater Investigation Sites \(Burn Site, Technical Area V, and Tijeras Arroyo\) at Sandia National Laboratory](#)

- [• NMED DOE Oversight Bureau data on the Groundwater Investigation Sites at SNL](#)

[Consolidated Quarterly Reports](#)

[March 27, 2007 - SNL Consolidated Quarterly Report, March 2007](#)

[January 9, 2007 - SNL Consolidated Quarterly Report, December 2006](#)

Annual Groundwater Monitoring Reports

[June 28, 2016 - Calendar Year 2015 Annual Groundwater Monitoring Report](#)

[June 23, 2015 - Calendar Year 2014 Annual Groundwater Monitoring Report](#)

[September 26, 2014 - Calendar Year 2013 Annual Groundwater Monitoring Report](#)

[November 6, 2013 - Calendar Year 2012 Annual Groundwater Monitoring Report](#)

[August 16, 2012 - Calendar Year 2011 Annual Groundwater Monitoring Report](#)