Los Alamos National Laboratory Permit Modification Request for Open Detonation Units

LANL Hazardous Waste Facility Permit

Fuller Lodge, Los Alamos

Tuesday, August 16, 2011

Agenda

Time	Subject	Speaker
5:30 – 5:40	Meet and greet	
5:40 – 5:50	Meeting purpose	Bruce MacAllister
5:50 – 6:20	Explosives wastes sources and treatment	Dave Funk Division Leader, Weapons Experiments
6:20-6:50	Open Detonation Permit Modification Request	Luciana Vigil-Holterman Environmental Professional
6:50 – 7:30	Question and Answer	Bruce MacAllister

General Ground Rules

- **Please wait until the scheduled time to provide comments or to ask questions, clarification questions are okay.**
- **Please identify yourself before speaking.**
- **Please keep your questions short and remember that others may be waiting to ask questions.**
- **Please honor the process by keeping questions and comments civil and by using appropriate language.**
- **Please yield the floor if requested by the facilitator**
- **Please help the participants and facilitator keep to the agenda and timeframes**

Meeting Purpose

- Discuss permit modification request to add two open detonation units to Permit
- Discuss contents of the permit modification request
- Discuss the data collected for the request
- Discuss requested permit conditions and operational controls in place at the units
- Does not include any other operations that are co-located with the units
- Does not include any open burning units
- Does not include information about wildfire concerns

Sources and Treatment of Explosives Wastes

Presented by

David J. Funk

Weapons Experiments

August 16, 2011

Why does LANL create high explosive waste?

- **LANL conducts national security mission research in support of our nuclear deterrent and the war fighter.**
- **Research often involves testing of explosive materials to support:**
  - Basic research
  - Certifying safety and operability of the nuclear stockpile
  - Counter-terrorism
  - Detection technology development
  - Improvised Explosive Device (IED) detection and defeat

Protecting troops against improvised explosive devices

Basic explosives research supports innovation and maintains intellectual competence

- **Greening of explosives**
  - Less solvents => less synthesis waste
  - Green starting materials
  - Multiple Pollution Prevention Awards
- **Explosives formulations**
  - New explosives
  - Improvised explosives from household materials
- **Explosives for weapons configurations**
- **Aging of explosives**

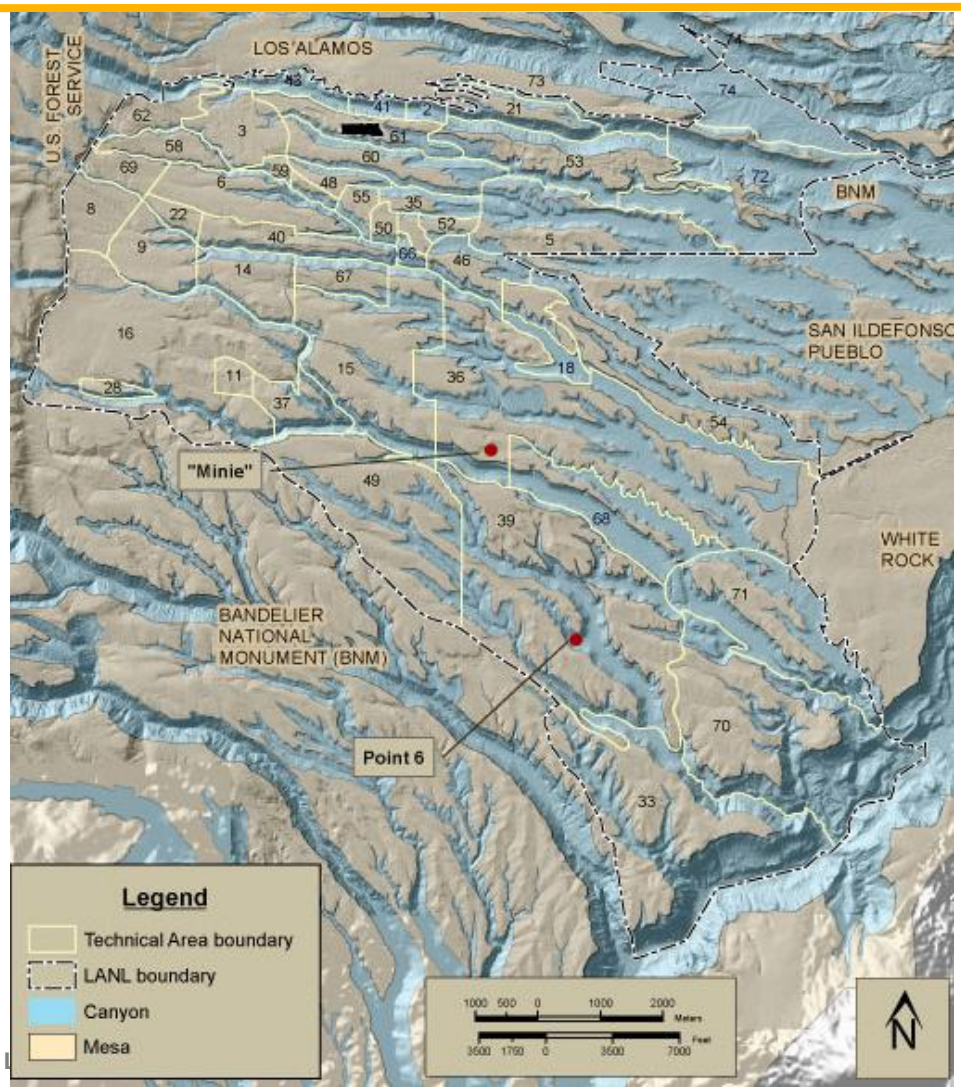
Open detonation treatment of high explosives waste is conducted in remote and secure locations

Point 6

- Located at TA-39 in Ancho Canyon
- Steep canyon walls
- Shots only done during favorable wind speed and direction
- Quantities are typically limited to 100 pounds

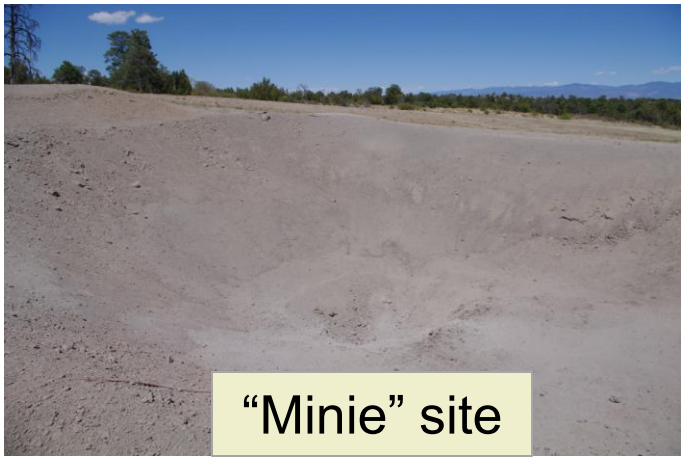
Minie Site

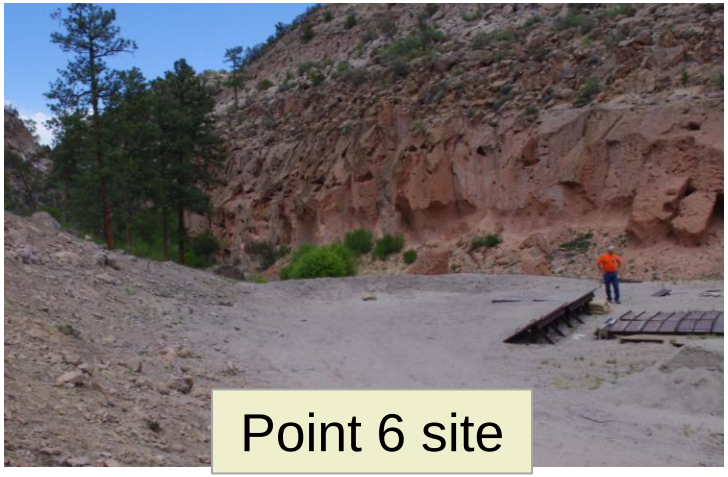
- At TA-36 on the mesa top between Pajarito and Water canyons
- Shots only done during favorable wind speed and direction
- Quantities are typically limited to 100 pounds



LANL's goals in managing our waste creation and treatment are oriented in safety

- **Continue safe treatment of high explosive waste through detonation at secure and remote areas (Point 6 and Minie)**
  - Less than 30 shots per year total expected, ~60 lbs average
  - Prevent transportation of waste on public roads
- **Minimize waste**
  - Create/treat smaller amounts of high explosives waste
- **Ensure safety to human health and the environment**





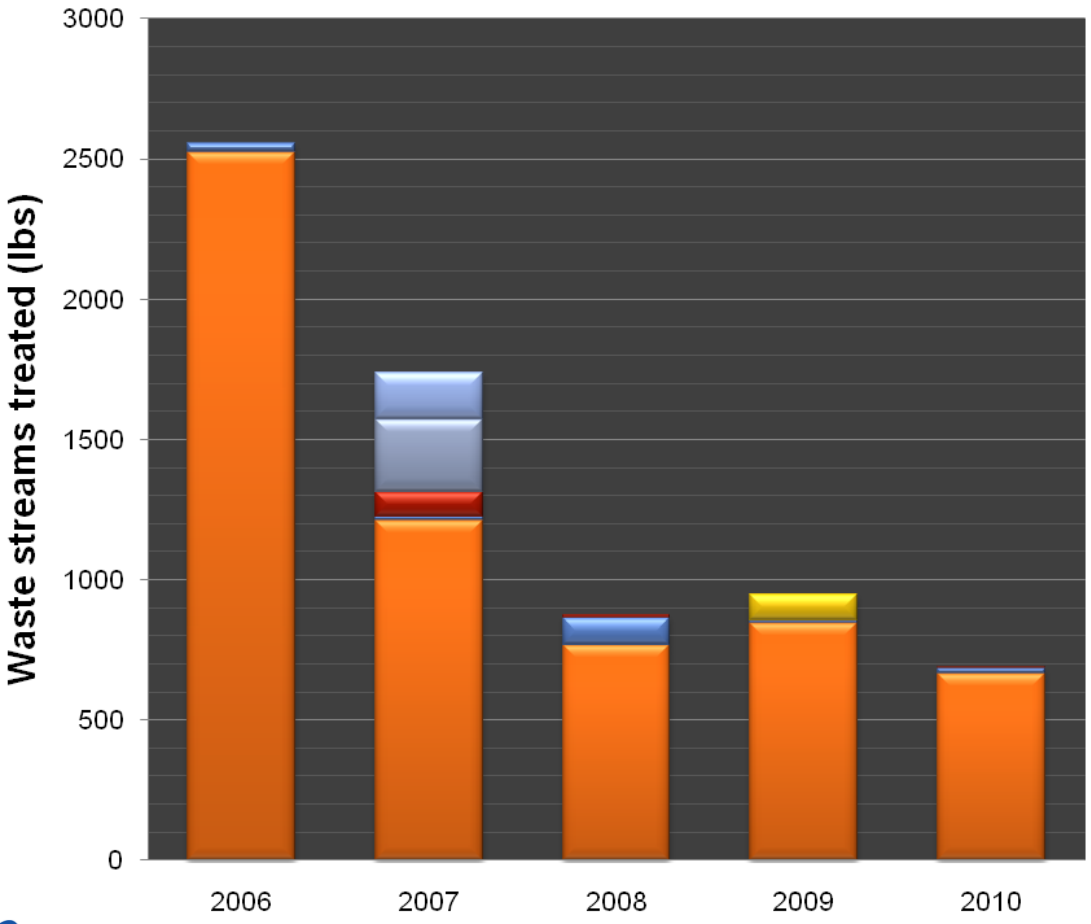
Why does LANL have to treat waste on-site?

- **Transporting certain HE wastes is dangerous**
  - Forbidden for some substances
  - May be more reactive after heat, impact, etc. tests have occurred
  - Aged materials may also have greater reactivity
- **Open detonation on site is safer than transporting the material on public roads for waste disposition elsewhere**
- **Analysis of alternatives finds that open detonation is the most cost-efficient and safe**

Are there technological alternatives to open detonation?

- **12 types of treatment technologies capable of treating LANL explosives waste streams**
- **Most feasible technologies include:**
  - Contained detonation,
  - Contained burn in a confined burn facility, and
  - Open burning
- **No single treatment technology is capable of treating 100% of LANL's explosives waste streams**

LANL has made strides to reduce on-site waste treatment needs



- Black powder or gunpowder
- Small caliber ammunition
- Pressing molds
- Projectiles and munitions larger than 50 caliber
- Shaped charges and test assemblies
- Detonators, initiators, and mild detonating fuses
- Explosives contaminated debris
- Excess explosives

LANL completes all of our missions responsibly, protecting human health and the environment in the process

- **Worker and public safety is paramount**
- **Protection of human health and the environment is not only a requirement: it is a core value**
  - Knowledge of the waste streams and the results of waste treatment is important to understand how to operate safely and protective

What is in wildfire smoke, fireworks, and open detonations?

What is in…

	Commercial Fireworks	Wood Smoke	Open detonation of explosives*
Contents	Ozone, sulfur dioxide, nitric oxide and chlorates	Carbon monoxide, carbon dioxide, water vapor, particulate matter, hydrocarbons, nitrogen oxides, formaldehyde, and other organic chemicals	Dust/soil, metal fragments, carbon dioxide, nitrogen, water and oxygen
Metals	Metals cause color (e.g., aluminum, barium, lead, copper)	Not likely part of what is burnt during forest fires	Metal components are fragmented and are not melted or vaporized.
Dioxins/Furans	None	From biomass combustion	None

*Information obtained from studies conducted for the Naval Air Warfare Center Weapons Division, China Lake, CA

LANL is required to apply for RCRA permit to treat waste

- **Regulated by the Resource Conservation and Recovery Act (RCRA) and the NM Hazardous Waste Act**
- **Currently open detonation treatment is done safely under an interim status requirements**
- **In New Mexico, the Environment Department has been authorized by the EPA to administer and enforce the Act**

Permit will help define the rules under which we operate

- **LANL has submitted a permit modification request to add two open detonation units to the Permit**
- **Included in the permit modification are LANL proposed conditions for treatment by open detonation**

LANL proposed permit conditions for treatment

- **Maximum quantity of waste to be treated**
  - 15,000 lbs/year at both sites combined
- **Maintain controls that minimize run-off**
- **Hours of operation**
  - Between 1 hour after sunrise and 1 hour before sunset
- **Weather considerations**
- **Safety related controls and maintenance**
- **Permit conditions are applicable only to treatment operations**

Questions?

Contents of Open Detonation Permit Modification Request

Presented by

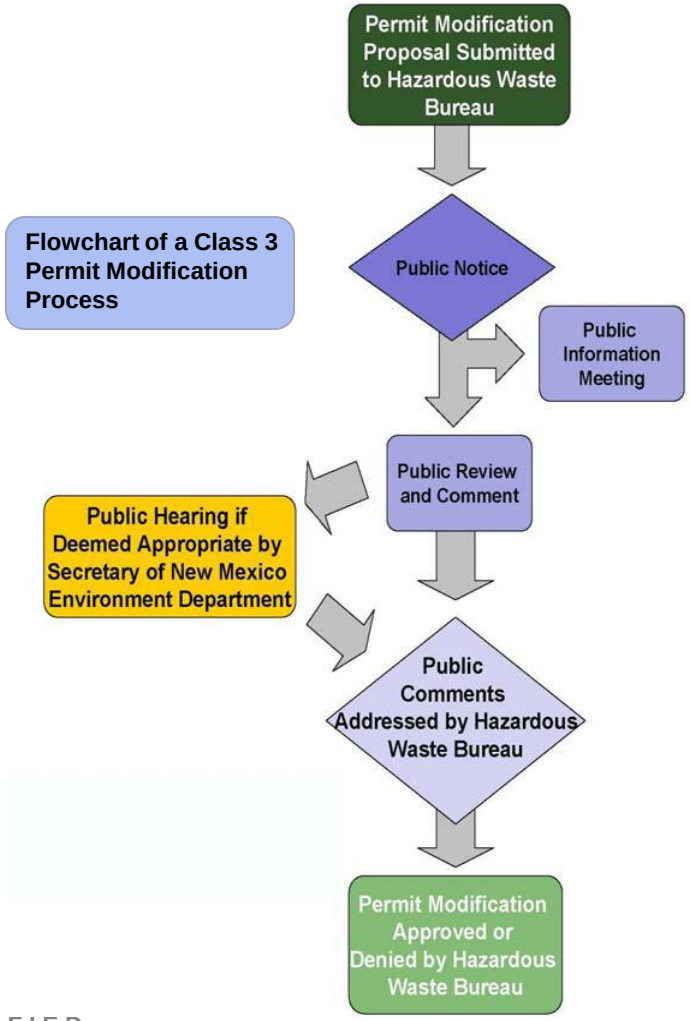
Luciana Vigil-Holterman

ENV-RCRA

August 16, 2011

What is the process for public comments?

- **"The public shall be provided at least 60 days to comment on the modification request" 40 CFR 270.42(c)(5).**
- **Submit comments to NMED before the end of the public review and comment period (July 21 to September 19, 2011)**
- **NMED reviews and responds to public comments regarding the permit modification request.**
- **NMED issues a final decision**



What is included in the permit modification request?

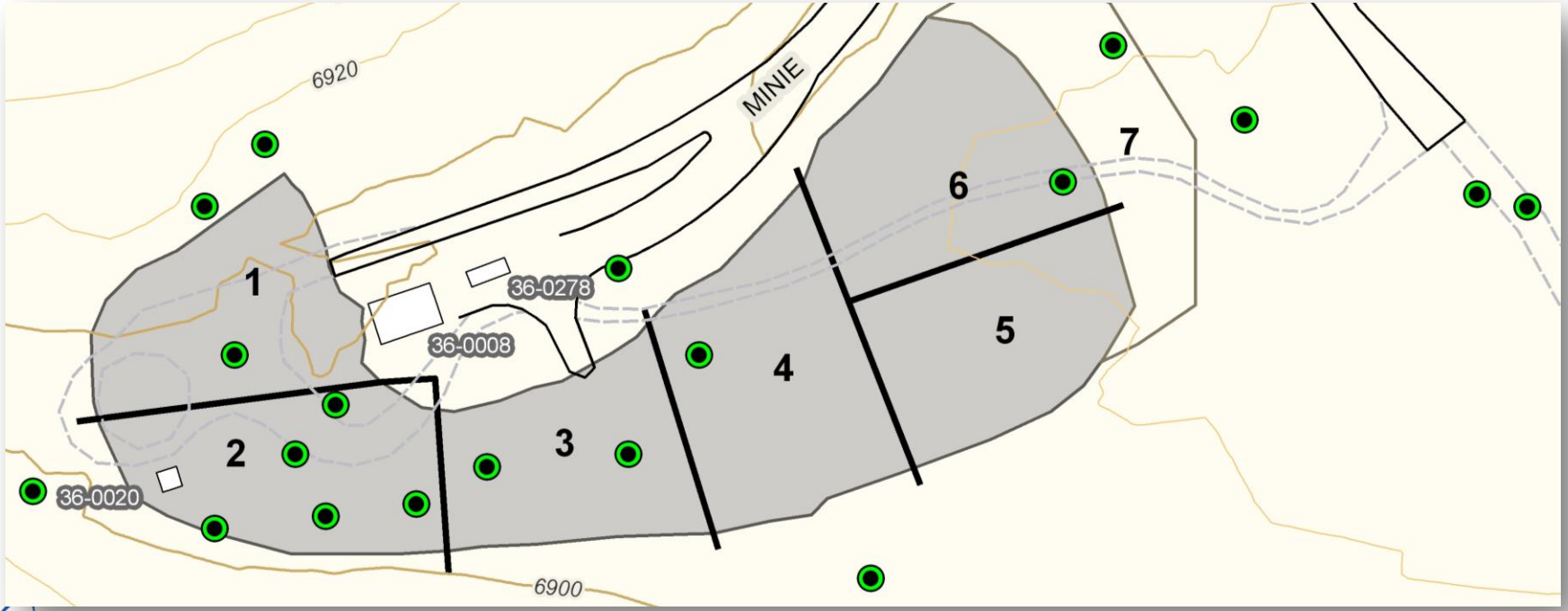
- **Description of units**
- **Treatment operations**
- **Environmental performance standards**
  - Surface water
  - Groundwater
  - Air
  - Soil
- **Waste acceptance**
- **Hazards preparedness and prevention**
- **Contingency planning**
- **Inspection and record keeping**
- **Closure plan**

What is included in the permit modification request?

- **Attachments**
  - Summary of pre-meeting comments
  - Part A form
  - Groundwater detection data
  - Soil data
  - Air modeling
  - Noise measurements
  - Air sampling
  - Human Health Risk Assessment
  - Small mammal population study
  - Small mammal uptake analysis
  - Alternatives Assessment
  - Permit suggested changes in redline-strikeout

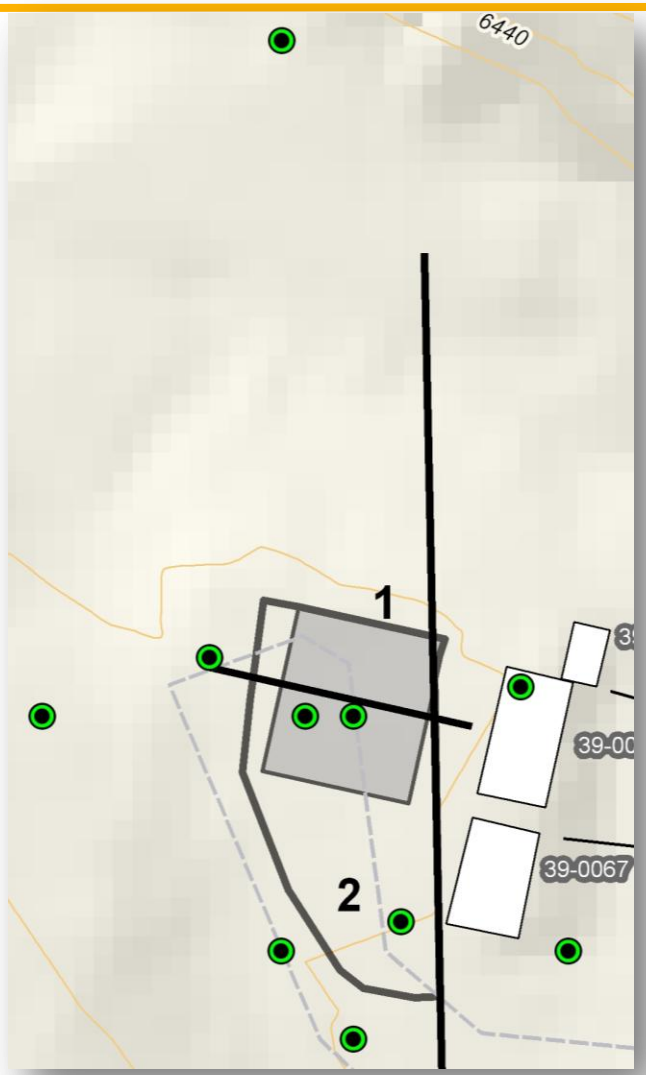
Soil Sampling

- **TA-36-8**
  - 7 composite and
  - 19 grab samples



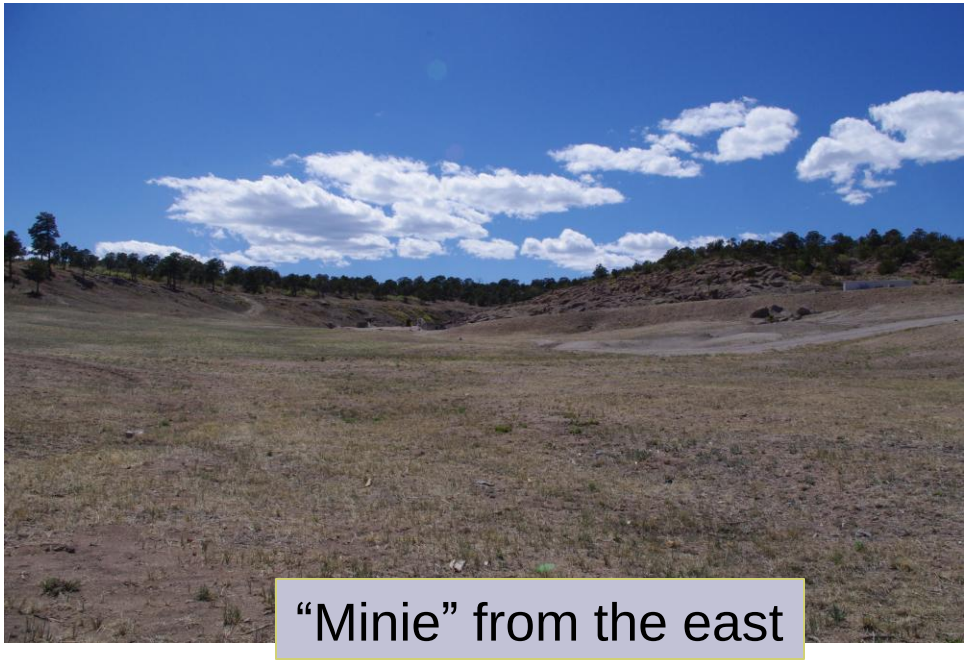
Soil Sampling

- **TA-39-6**
  - 2 composite and
  - 10 grab samples



Soil Sampling (continued)

- **Samples were analyzed for**
  - High explosives
  - Metals (including depleted uranium)
  - Dioxins/furans
  - Semi-volatile organic compounds (SVOCs)
  - Volatile organic compounds (VOCs) – not composited
  - Polychlorinated biphenyls (PCBs)
  - Perchlorates

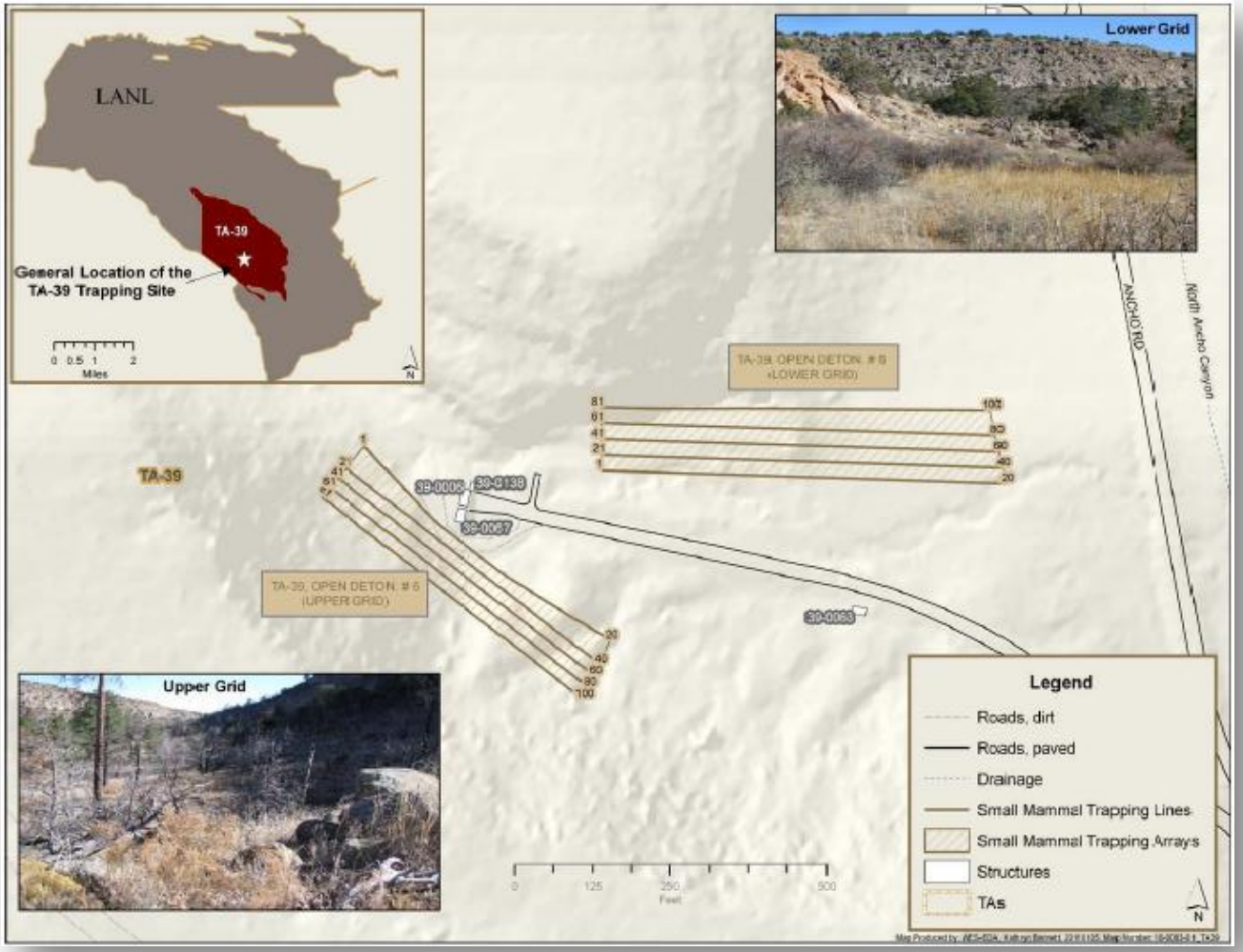


- **Human health risk analysis conducted indicated that risk is below Permit and consent order targets for total excess cancer risk of 10^{-5} and a hazard index of 1.0**
  - Residential and industrial scenarios were assessed

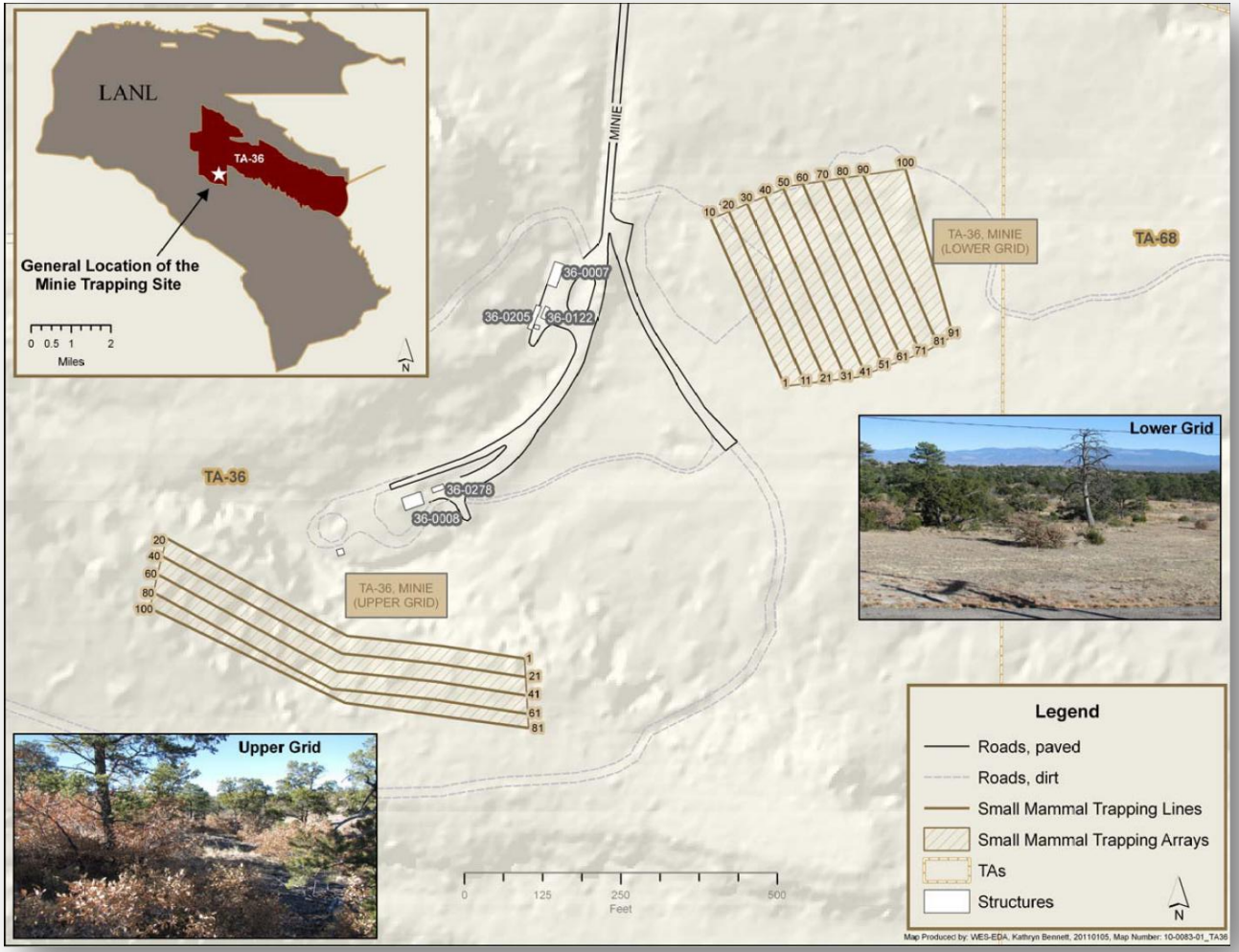
Small Mammal Assessments

- **Small Mammal Population Study**
  - Concluded that OD sites were similar to an undisturbed background location
- **Small Mammal Chemical Concentration Study**
  - TA-36-8 uptake analysis showed no concentrations above identified regional screening levels
  - TA-39-6 with the exception of lead showed no concentrations above identified regional screening levels

TA-39 Trapping Sites



TA-36 Trapping Sites



Air Sampling Results

- **30 samples analyzed for dioxins/furans and metals**
  - 25 congeners per dioxin/furan analysis and 22 metals per analysis

- **Concentrations are all below the short-term screening levels identified**
  - Results were compared to air inhalation exposure concentrations developed for the EPA or the California EPA

Waste Treatment Detonation

Air Modeling

- **Simulated 15,000 lbs/year at each unit of explosives waste and explosives contaminated waste**
  - TA-36-8 modeling simulations
    - 2,000 pounds per shot
    - one shot per hour
  - TA-39-6 modeling simulations
    - 250 pounds per shot
    - four shots per hour
- **Actual waste treatment volumes have been less than 3,000 lbs/year at both units combined**
- **Individual waste treatment shots are generally kept below 100 lbs/shot**

Air Modeling- Estimated Air Concentration Results

- **Single day and annual air estimations are at levels less than EPA screening levels**
  - EPA ambient air quality standards for 1-hr, 3-hr, 8-hr, 24-hr, and annual air estimations
  - Other constituents for estimated 1-hr and annual air concentrations were compared to screening levels developed for the EPA and the California EPA as identified

1-hour Screening Level Results (mg/kg/m³)

Contaminant	TA-36-8 Result	TA-39-6 Result	Screening Level
Benzene	1.19E-02	3.88E-02	1.30E+03
Toluene	4.00E-03	1.30E-02	3.70E+04
Naphthalene	1.61E-04	5.24E-04	7.50E+04
Methylene Chloride	3.70E-02	1.20E-01	2.00E+05
Acrylonitrile	5.96E-07	1.94E-06	2.20E+04

Annual Air Screening Level Results (mg/kg/m³)

Contaminant	TA-36-8 Result	TA-39-6 Result	Screening Level
Benzene	2.66E-09	7.72E-08	3.10E-01
Propylene	1.73E-09	5.02E-08	3.10E+03
Toluene	8.90E-10	2.59E-08	5.20E+03
Methylene Chloride	8.23E-09	2.39E-07	5.20E+00
Nitromethane	5.98E-12	1.74E-10	2.70E-01
BDNPA	1.33E-13	3.86E-12	3.60E-02

Air Modeling- Estimated Deposition Results

- **Predicted 10 yr. soil deposition concentrations are less than NMED residential screening levels and LANL derived ecological screening levels**

10 year Soil Deposition Concentration				
	mg/kg			
Contaminant	TA-36-8 Result	TA-39-6 Result	HH Screening Level	Minimum ESL
Benzene	**1.57E-06**	**4.57E-05**	1.55E+01	2.40E+01
Toluene	**5.26E-07**	**1.53E-05**	5.57E+03	2.30E+01
Naphthalene	**2.12E-08**	**6.17E-07**	4.50E+01	1.00E+00
Methylene Chloride	**4.87E-06**	**1.42E-04**	1.99E+02	2.60E+00
Barium	**2.04E-03**	**5.94E-02**	1.56E+04	1.10E+02
Copper	**2.04E-03**	**5.94E-02**	3.13E+03	1.50E+01
Lead	**2.04E-03**	**5.94E-02**	4.00E+02	1.40E+01
Trioctyl phosphate	**2.04E-03**	**5.94E-02**	5.40E+02	none
Aluminum	**7.70E-04**	**2.24E-02**	7.81E+04	none
Ammonium perchlorate	**3.53E-09**	**1.03E-07**	7.20E+02	none
HMX	**3.53E-09**	**1.03E-07**	3.06E+03	2.70E+01
Nitrocellulose	**3.53E-09**	**1.03E-07**	1.80E+09	none
Nitroguanidine	**3.53E-09**	**1.03E-07**	6.20E+04	none
Nitromethane	**3.53E-09**	**1.03E-07**	2.50E+01	none
RDX	**3.53E-09**	**1.03E-07**	4.42E+01	7.50E+00
Tetryl	**3.53E-09**	**1.03E-07**	2.44E+02	9.90E-01
TNT	**3.53E-09**	**1.03E-07**	3.59E+01	6.10E+00
Acrylonitrile	**7.85E-11**	**2.28E-09**	3.70E+03	none
Bis(2-ethylhexyl) adipate	**7.85E-11**	**2.28E-09**	1.40E+03	none
Dibutylphthalate	**7.85E-11**	**2.28E-09**	8.60E+01	1.10E-02
Dinitrotoluene	**7.85E-11**	**2.28E-09**	6.20E+04	5.20E-01
Dioctyladiapate	**7.85E-11**	**2.28E-09**	5.50E+00	None
Dioctylphthalate	**7.85E-11**	**2.28E-09**	1.40E+03	1.10E+00
Diphenylamine	**7.85E-11**	**2.28E-09**	1.20E+02	1.00E+01

Ongoing Monitoring

- **LANL Facility-wide monitoring programs**
  - Groundwater- Interim Facility Wide Groundwater Monitoring Program
  - Surface Water- EPA Individual Storm Water Permit for LANL
  - Air monitoring- AIRNET
- **Proposed monitoring specific to OD Units**
  - Soil monitoring- Years 1, 4, and 7 after the inclusion of the units in the Permit
  - Small mammal population study- Year 7 after the inclusion of the units in the Permit

Public comment period runs from July 21 to September 19

- **Public comments can be submitted in writing to:**

  NMED-Hazardous Waste Bureau
  2905 Rodeo Park Dr. East Building 1
  Santa Fe, NM 87505
  Email: john.kieling@state.nm.us

- **Request is available for public review:**

  J. Robert Oppenheimer Study Center and Research Library
  4200 West Jemez Road at Casa Grande
  Los Alamos, NM 87545
  http://eprr.lanl.gov

- **LANL external OD website contains a link to comment:**
  http://www.lanl.gov/environment/waste/obod.shtml

- **NMED's LANL Permit website:**
  http://www.nmenv.state.nm.us/hwb/Permit.htm