Radioactive Waste Operations at Area G

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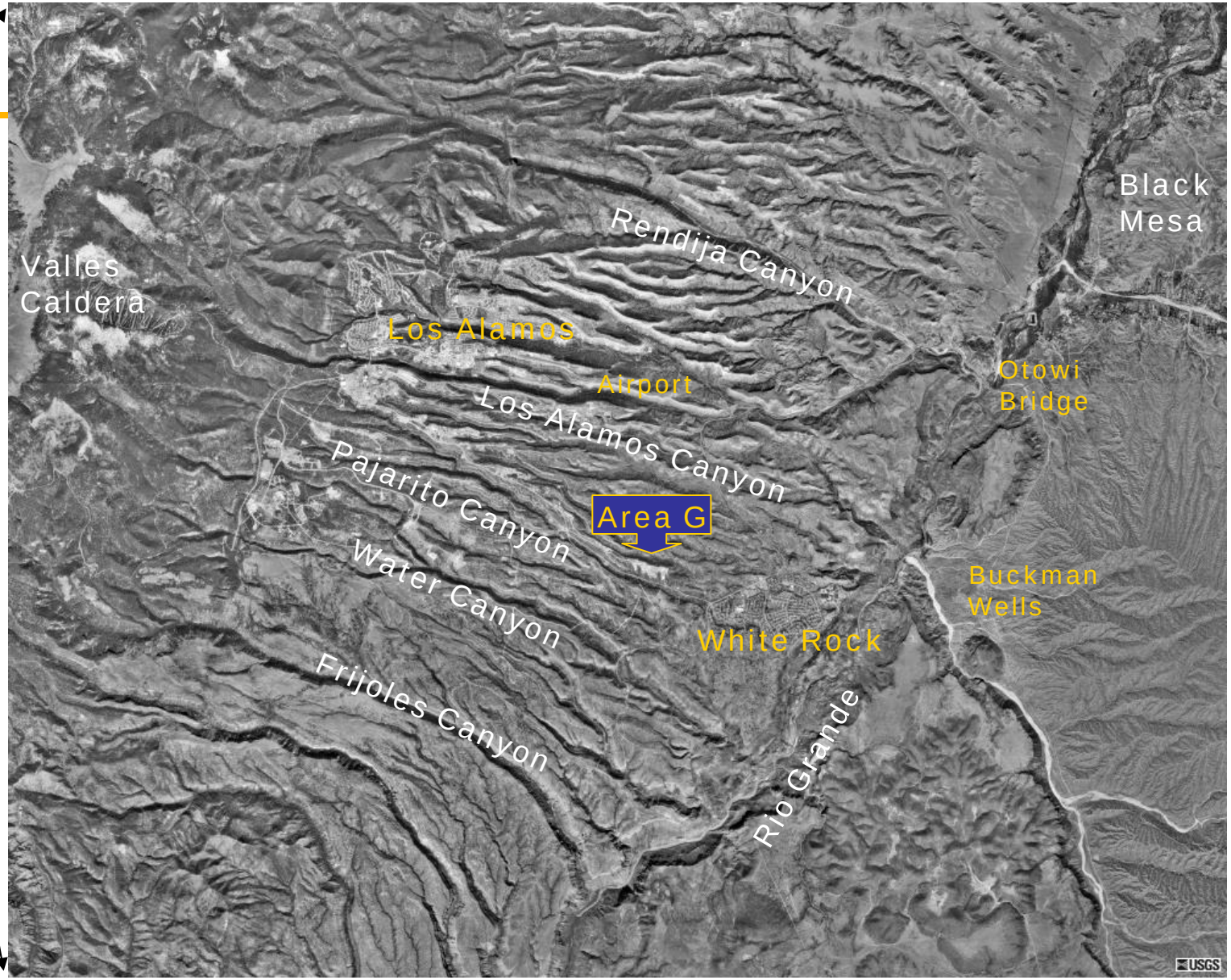
Pajarito Plateau



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LANL


Water Canyon
Cañon de Valle
Three Mile Canyon
Two Mile Canyon
Pajarito Canyon
Mortandad Canyon
Ten Site Canyon
Sandia Canyon
Los Alamos Canyon
DP Canyon
Pueblo Canyon
Rendija Canyon
Bayo Canyon
Cañada del Buey
Area G

About the Site: TA-54, "Area G"

- On top of the Mesita del Buey
- Used for disposal of radioactive waste since 1957
- Only open disposal facility
- Adjacent to Native American lands
- 1.3 miles from nearest residential community of White Rock
- Acreage
  - Currently: 63 acres
  - Zone 4: 30 acres
- Annual volume: 2-3000 cubic meters
- 160 technical and support staff

Looking west over domes at Area G

The most recent performance assessment:

"Area G meets the DOE performance objectives"

"Radiological exposures to the public are well below regulatory guidelines"

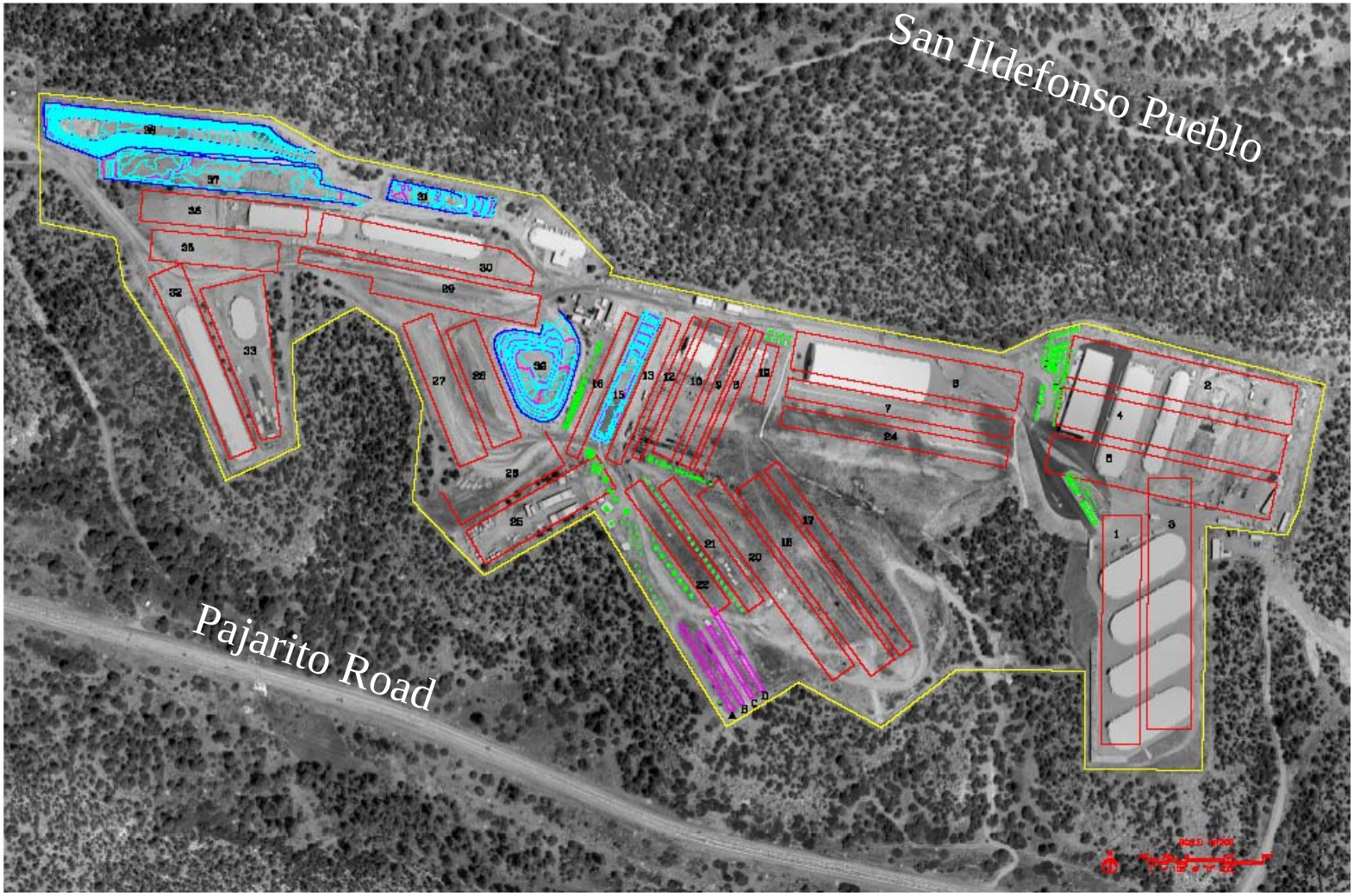
About the Site

TA-54, "Area G" Continued

- In 1956 the U.S. Geological Survey recommended the site to minimize the possibility of contamination
- The site is about 840 feet above the regional aquifer
- Topography and a semiarid climate help contain contaminants
- Nearly all precipitation at the site is removed by evaporation and transpiration
- Very little water comes in contact with the waste

Currently open pit

Area G: Existing Waste Areas with Pits Outlined



About the waste

The waste is material contaminated with tritium, plutonium, uranium, and medical radioisotopes

- "Low-Level" is disposed of
- "Transuranic" is stored

Low-level waste disposal in Pit 38

TRU waste stored for shipment to WIPP

Most of the waste consists of

- paper
- protective clothing
- packaging materials
- building rubble
- soil
- debris from cleanup

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How waste is disposed on-site

- **Low-level** wastes are disposed of in layers in unlined pits
  - solid wastes, non-hazardous, PCBs, Beryllium
  - approximately 20 yards deep, 50 yards wide and 200-300 yards long
- Shafts are used for the higher activity wastes (vertical holes up to a depth of 20 yards)
- Once full, pits and shafts are covered with uncontaminated, native-soil backfill and seeded with native grasses
- Final Area G closure methodology will be determined by NMED

Disposal pits

How waste is stored pending disposal off-site

- **Transuranic** waste (TRU) waste is bound for WIPP
- **Mixed** low-level waste is bound for commercial disposal facilities

TRU waste in Dome #48 stored for easy accessibility during inspections

Drums being prepared for characterization.

Shipping TRU Waste

Characterizing waste in drums for WIPP requirements

Readying TRU waste drums and installing into TRUPACT II containers

A TRU waste shipment ready for WIPP

Who regulates Area G? Federal Law

Department of Energy (DOE)

- Disposal of radioactive waste:

  DOE Order 435.1, Radioactive Waste Management

  – radioactive waste *disposal*, waste acceptance criteria, and a waste certification program

- Area G is a *nuclear facility*:

  10 CFR 830.120 (Code of Federal Regulation)

- EPA (Environmental Protection Agency)

  – PCB *disposal*: Toxic Substances Control Act (TSCA)

  – Air *emissions*: National Emission Standards for Hazardous Air Pollutants (NESHAP)

  – Storm *runoff:* Multi-Sector General Storm Water Permit (MSGP)

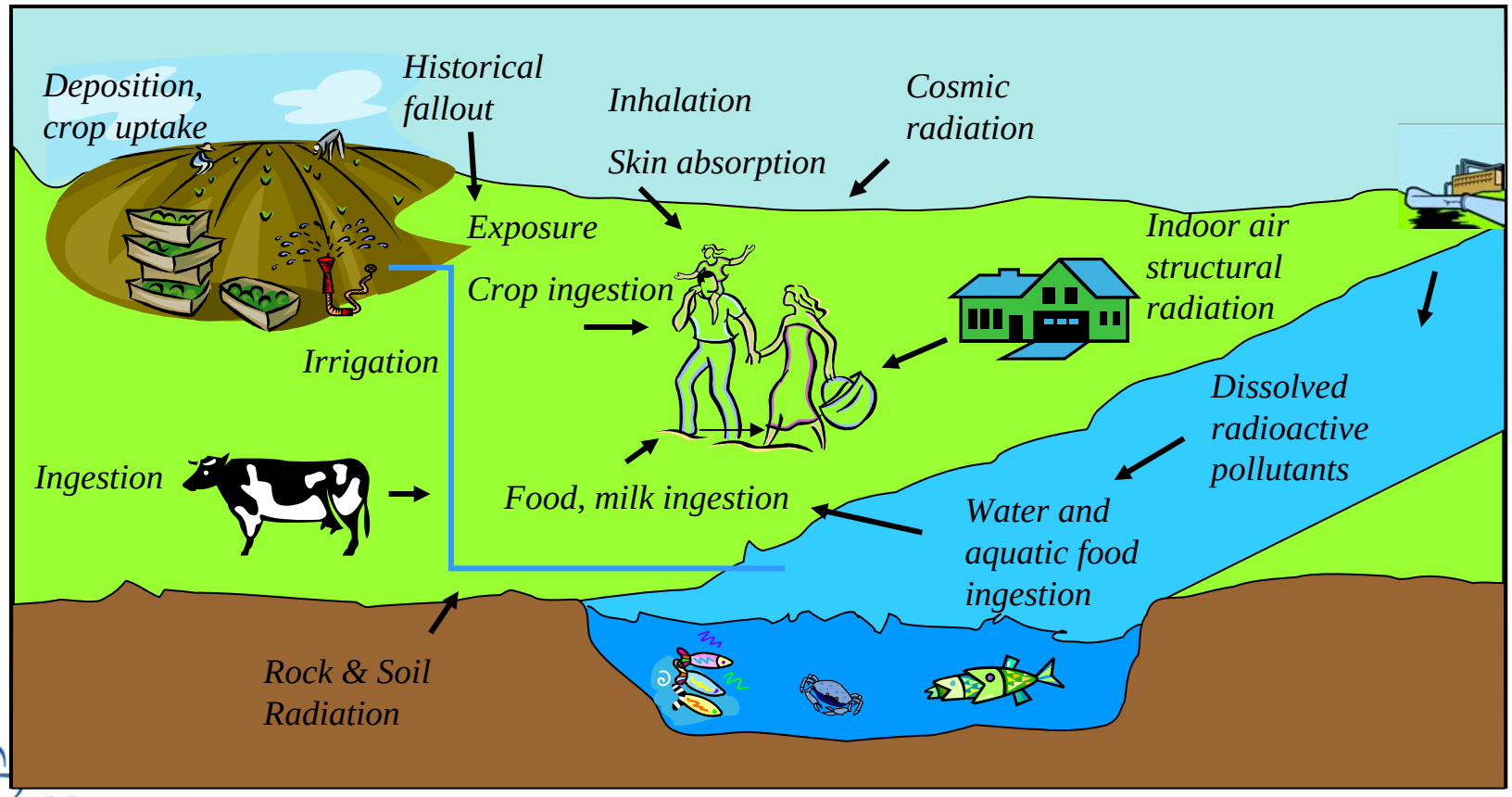
Who regulates Area G? State Law

- NMED (New Mexico Environment Department)
  - Regulates above ground storage domes: RCRA (Resource Conservation & Recovery Act) for hazardous waste that is *stored* there for shipment off-site
    - Hazardous waste *is not disposed* of on-site
    - NMED periodically verifies that hazardous waste is *not disposed* at Area G
  - Regulates non-radioactive air emissions
  - NMED will determine closure methodology through the 2005 Order on Consent

Sources of Radiation Exposure

"Background" radiation in most of NNM is around 400 mrem

Additional exposure to the public from all LANL operations is less than 3 mrem

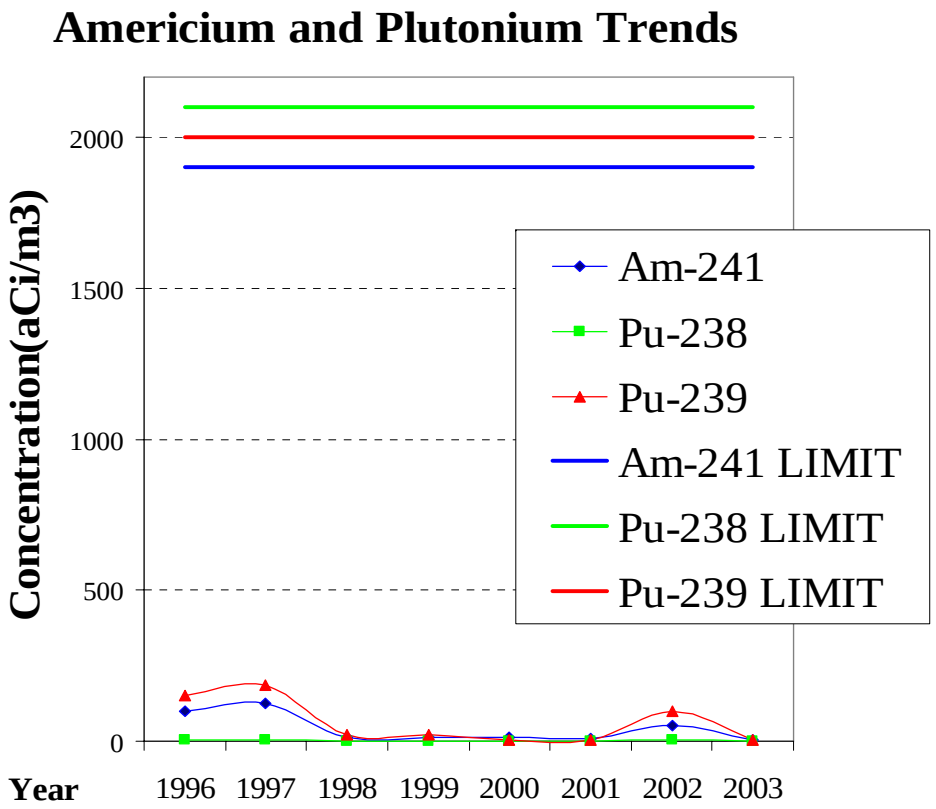


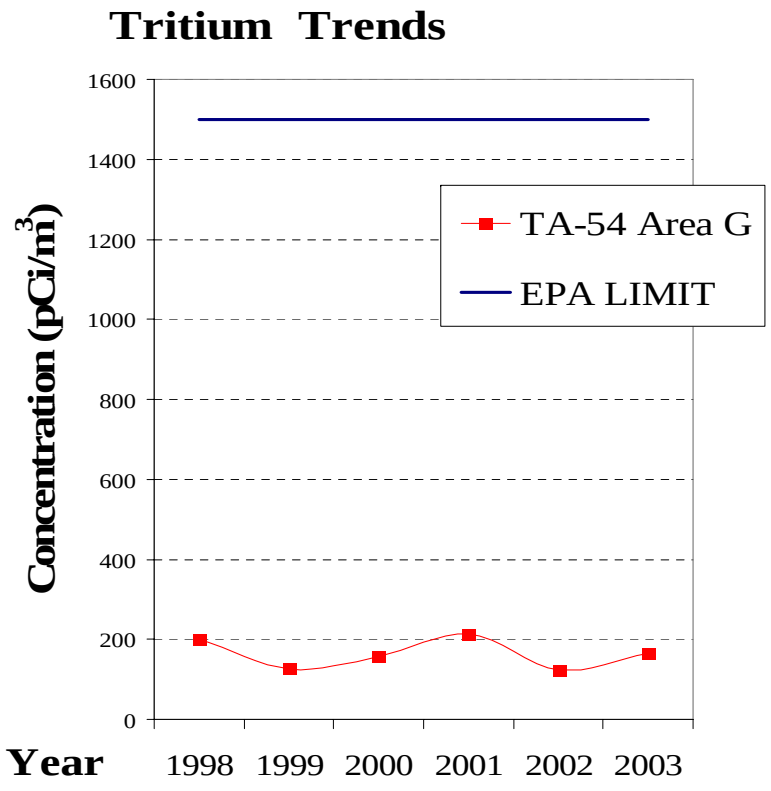
Environmental Monitoring: Air

- Samples are collected through air filtration, and results are recorded and monitored
- "Thermoluminescent dosimeters" (a type of personal radiation detector)
  - attached along fence lines
  - Continuously sampled and analyzed quarterly
- Sampling of air from bore holes adjacent to pits is used to monitor vapor plumes

Taking readings from an Airnet station

Environmental Monitoring: Ambient Air

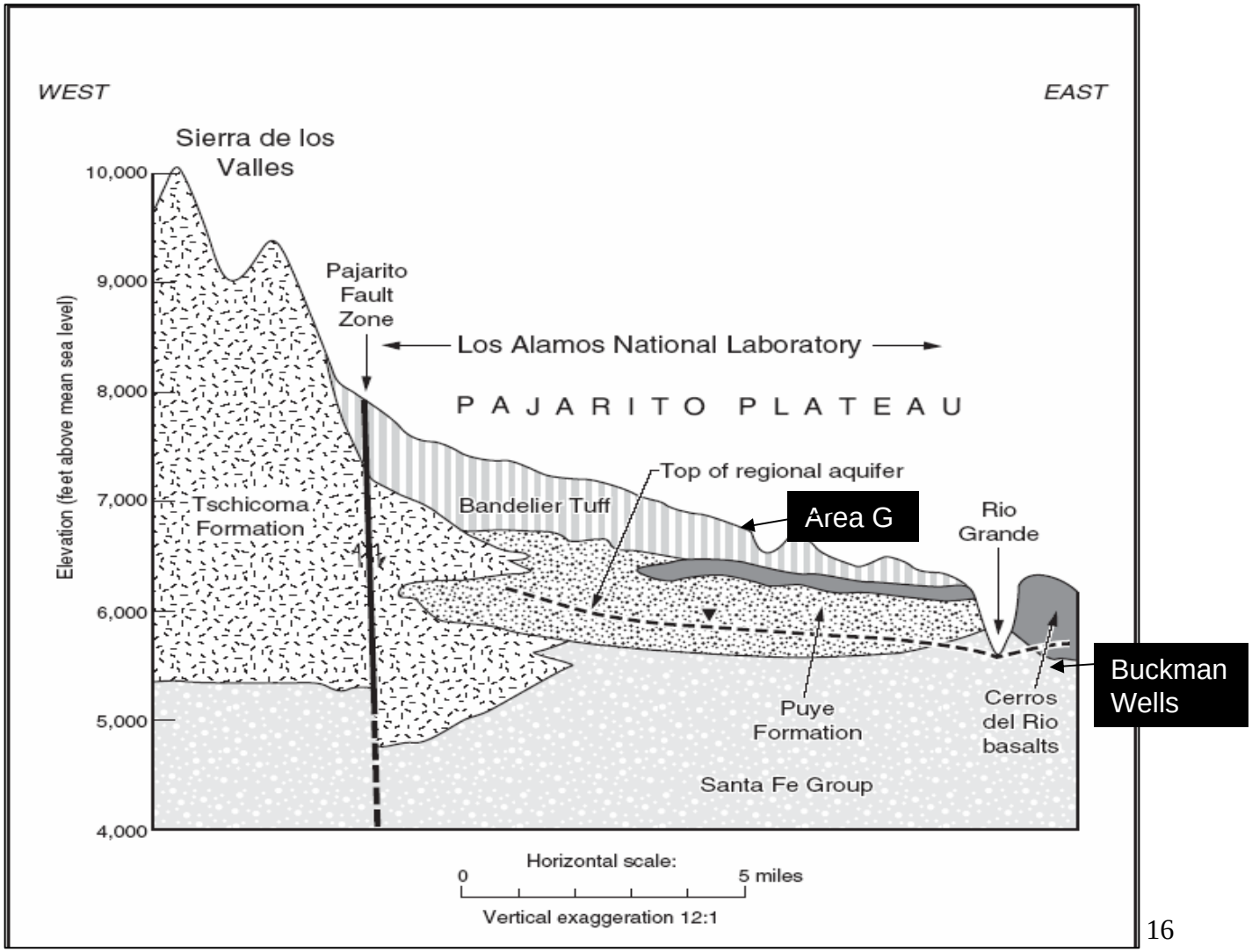




Area G is an access-controlled area. Most Area G sample data are not representative of a potential public dose. Members of the public would not be exposed to these concentrations.

Environmental Monitoring: Water

- Contaminants: radiological and chemical
- Storm water and stream channel sediments
- Groundwater
  - 5 shallow alluvial wells
  - 6 regional aquifer groundwater wells
  - 2 municipal water supply wells



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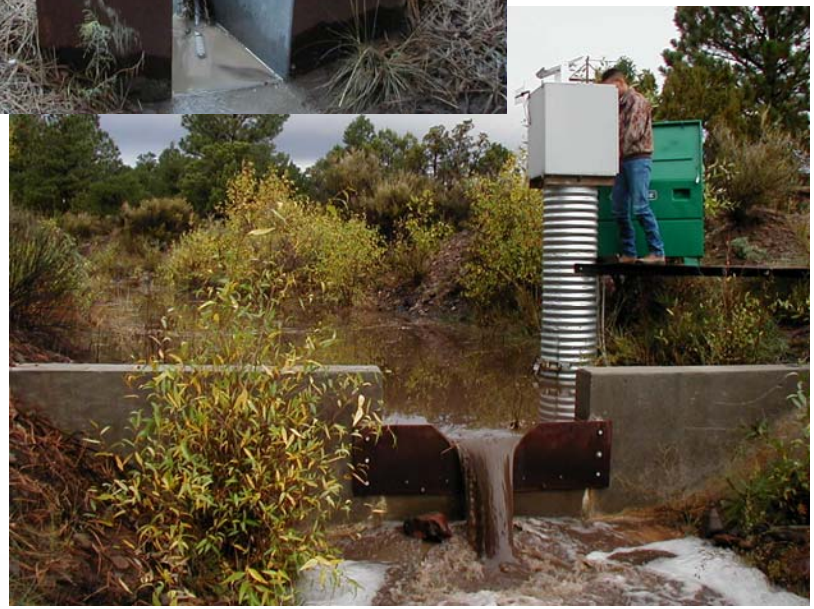
Environmental Monitoring: Water, *results*

Storm Water

Storm water sampling stations



- Storm runoff is monitored in 7 locations around Area G under the Federal Facility Compliance Agreement (FFCA) signed between DOE and EPA
- Testing includes radionuclides, metals, organics and PCBs.
- Radioactivity is below DOE limits in storm runoff
- No PCB's are detected in runoff
- Plutonium and PCB's in channel sediments are below residential limits

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Environmental Monitoring: Water, *results*

Groundwater

- Six deep-monitoring wells have been drilled near Area G since 2000.
- Long-term monitoring of shallow wells and deep municipal supply wells has identified no impacts from Area G
- NMED Consent Order requires regular testing of water in all monitoring wells around Area G
- Initial sampling
  - Very low concentrations of tritium have been found in one well
  - No other LANL impacts have been found

Well drilling

Other Environmental Monitoring

Soils, Flora and Fauna

- Tritium, americium and plutonium in soils and biota are slightly above background levels but well below levels requiring action
- Other radioactivity in soils and biota are within regional background levels
- Radioactivity is at background levels in fish downstream of LANL, similar to fish from upstream sources

Concentrations of radioactivity in soils and biota are well below the DOE standards

Plant Sampling

Fish sampling

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Public and Worker Safety

DOE Assessments

- DOE requires comprehensive evaluation and modeling
  - potential radiological exposures from past, present and future disposal air, water, soil and biological systems
- Exposures are projected for 1,000 years beyond when the facility is closed
- Limits are determined by national and international regulations
- Models are reviewed annually with a full revision every 5 years

Surveying sample locations

Potential Exposure to Individuals

Radioactivity projections over the next 1,000 years

"Exposure": Being subjected to an influence or material that originates from outside of the body, for example, rain or diesel fumes.

An exposure to radioactivity is measured as a *dose*.

Pathway	Area G Dose Projection	DOE Dose Limit
Exposure via the air	.0066 millirem per year *	10 millirem per year
Exposure via groundwater	.0072 millirem per year **	4 millirem per year
Exposure via all pathways	5.5 millirem per year **	100 millirem per year
Radon flux	3.1 picocuries per square meter per second *	20 picocuries per square meter per second

** performance data from 1988 to closure ** composite data from site inception to closure*

These projected exposures are well below DOE limits

Future for Area G, Zone 4

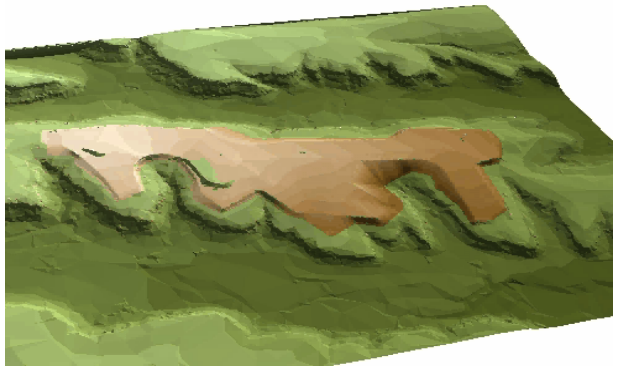
- Options
  - Shipping offsite
  - Additional development in Area G, Zone 4
  - Combination of shipping and disposal
- *NNSA concluded that development of Zone 4, combined with shipping some waste off site, is the best choice*

Future for Area G

- Development of Area G disposal in Zone 4
  - 40-60 year disposal capacity
- Extend capacity for disposal at Area G through more efficient use of existing space
- Focus on waste minimization
  - Less waste generation
  - Compaction
  - Shipping offsite
- Stage TRU shipments to WIPP
  - Reduce operations and inventory through removal of legacy waste

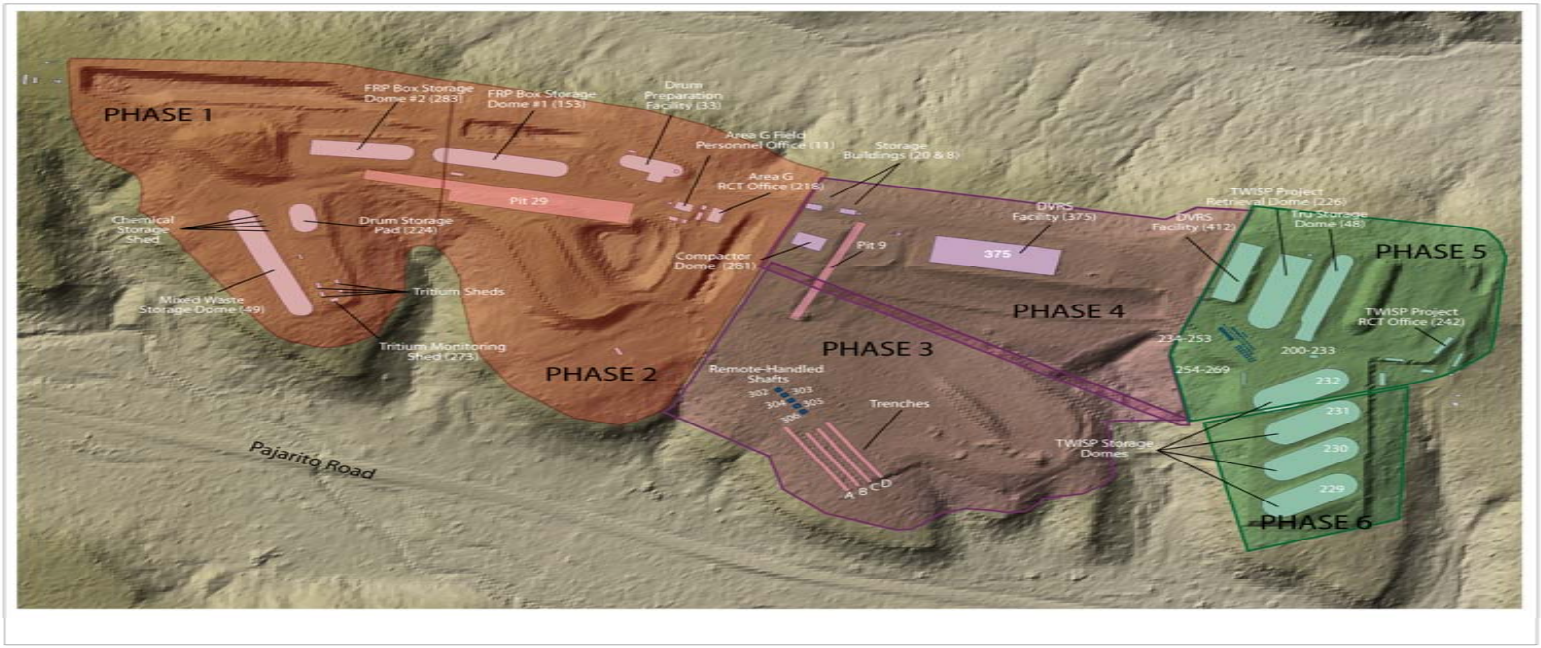
Area G Closure

- The existing NMED Consent Order requires closure of Area G by 2015
- Studies are being done for a phased closure
- NMED will select a method for closure in 2007
- Likely closure will be the capping of 65 acres



Model of Area G "capped"

Closure Phases



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