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Title: Los Alamos 50 Year Site Stewardship Plan: An Overview

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~~Native American Fish and Wildlife Service Meeting Abstract~~

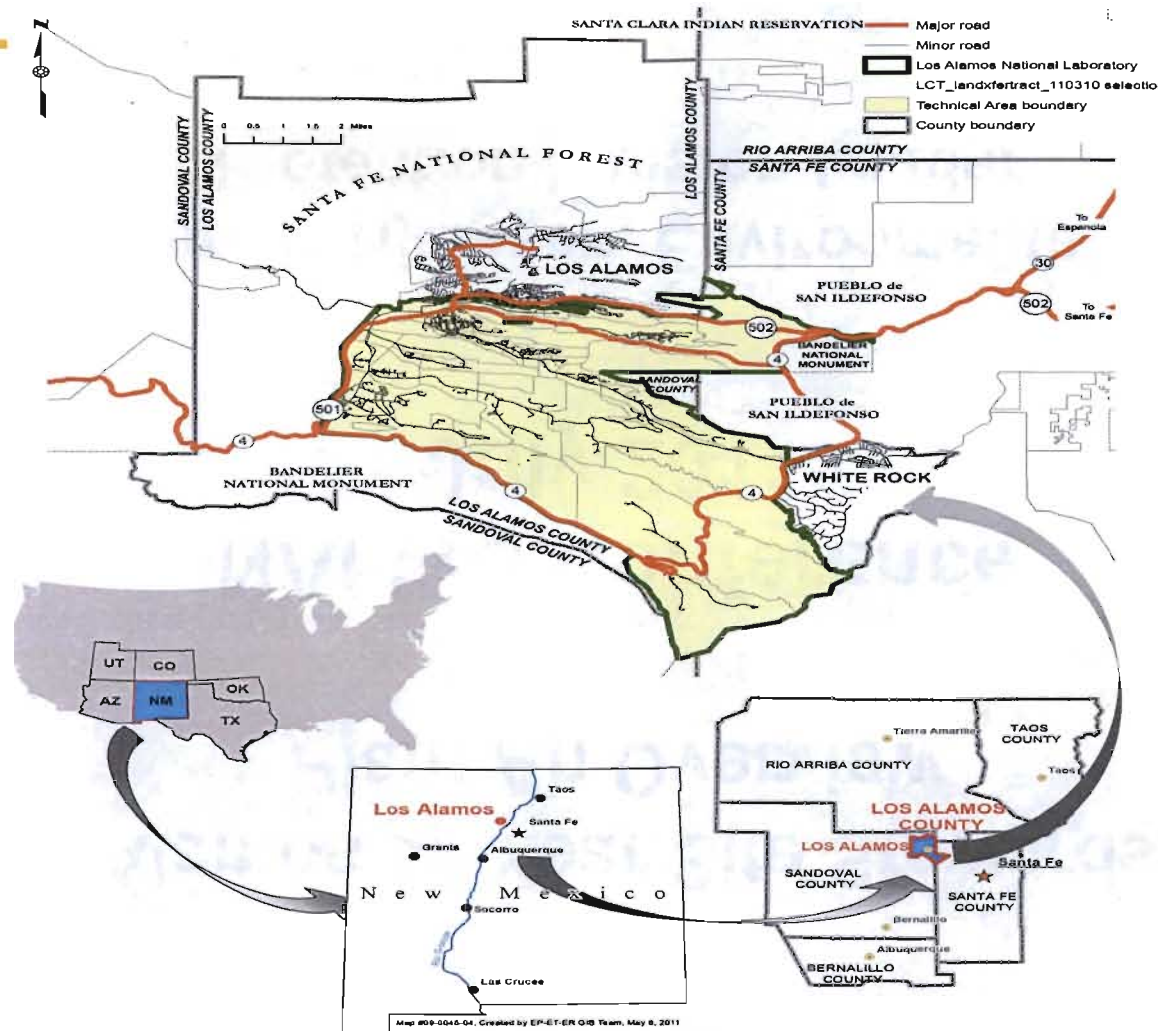
This presentation describes the management and public communication tools developed for the Los Alamos 50 Year Site Stewardship Plan. It is a status update on the development of a set of computer based communication tools that provide access to information on environmental compliance and legacy waste remediation.

Los Alamos 50 Year Site Stewardship Plan: An Overview

NAFWS Conference July 2011

**Dennis Hjeresen, Environmental
Protection Division Leader**

Putting LANL on the Map



LANL has been assigned critical national missions

■ Operations entail working with huge range of potentially toxic materials

- Certifying safety and operability of the nuclear stockpile
- High-explosives research
- Counter Terrorism
- Materials Sciences
- Energy Sciences

Hydrogen 1 H 1.0079	Helium 2 He 4.0026																	Francium 87 Fr 223	Radium 88 Ra 226
Lithium 3 Li 6.941	Beryllium 4 Be 9.0122																	Actinium 89 Ac 227	Thorium 90 Th 232
Sodium 11 Na 22.990	Magnesium 12 Mg 24.305																	Protactinium 91 Pa 231	Uranium 92 U 238
Potassium 19 K 39.098	Calcium 20 Ca 40.078	Scandium 21 Sc 44.956	Titanium 22 Ti 47.867	Vanadium 23 V 50.942	Chromium 24 Cr 51.996	Manganese 25 Mn 54.938	Iron 26 Fe 55.845	Cobalt 27 Co 58.933	Nickel 28 Ni 58.693	Copper 29 Cu 63.546	Zinc 30 Zn 65.39	Gallium 31 Ga 69.723	Germanium 32 Ge 72.64	Arsenic 33 As 74.922	Selenium 34 Se 78.96	Bromine 35 Br 79.904	Krypton 36 Kr 83.80		
Rubidium 37 Rb 85.468	Strontium 38 Sr 87.62	Yttrium 39 Y 88.906	Zirconium 40 Zr 91.224	Niobium 41 Nb 92.906	Molybdenum 42 Mo 95.94	Technetium 43 Tc 98	Ruthenium 44 Ru 101.07	Rhodium 45 Rh 102.91	Palladium 46 Pd 106.32	Silver 47 Ag 107.87	Cadmium 48 Cd 112.41	Indium 49 In 114.82	Tin 50 Sn 118.71	Antimony 51 Sb 121.76	Tellurium 52 Te 127.6	Iodine 53 I 126.905	Xenon 54 Xe 131.29		
Cesium 55 Cs 132.91	Barium 56 Ba 137.33	Lanthanum 57 La 138.905	Hafnium 72 Hf 178.49	Tantalum 73 Ta 180.948	Tungsten 74 W 183.84	Rhenium 75 Re 186.207	Osmium 76 Os 190.23	Iridium 77 Ir 192.22	Platinum 78 Pt 195.08	Gold 79 Au 196.967	Mercury 80 Hg 200.59	Thallium 81 Tl 204.38	Lead 82 Pb 207.2	Bismuth 83 Bi 208.98	Polonium 84 Po 209	Astatine 85 At 210	Radon 86 Rn 222		
Francium 87 Fr 223	Radium 88 Ra 226	Actinide Series																Uranium 92 U 238	Neptunium 93 Np 237
		Lanthanide Series																Plutonium 94 Pu 244	Americium 95 Am 243
		Actinide Series																Curium 96 Cm 247	Berkelium 97 Bk 247
		Actinide Series																Californium 98 Cf 251	Einsteinium 99 Es 252
		Actinide Series																Mendelevium 100 Md 258	Nobelium 101 No 259
		Actinide Series																Livermorium 116 Lv 293	Tennessine 117 Ts 294
		Actinide Series																Oganesson 118 Og 294	

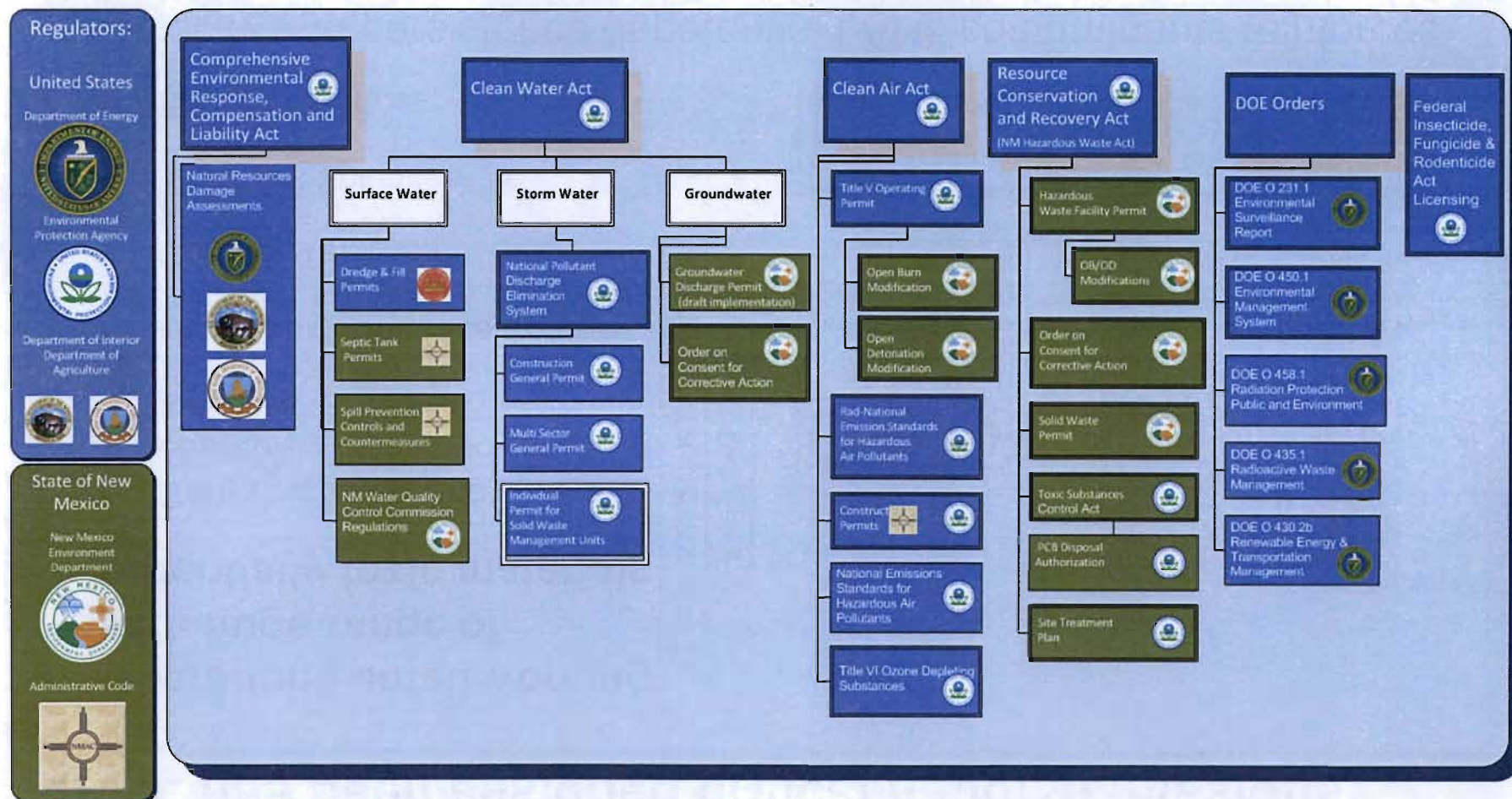
* Lanthanide series

** Actinide series

57 La 138.905	58 Ce 140.12	59 Pr 140.908	60 Nd 144.24	61 Pm 144.913	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.925	66 Dy 162.50	67 Ho 164.930	68 Er 167.259	69 Tm 168.933	70 Yb 173.045
89 Ac 227.033	90 Th 232.038	91 Pa 231.036	92 U 238.029	93 Np 237.048	94 Pu 244.064	95 Am 243.061	96 Cm 247.070	97 Bk 247.070	98 Cf 251.080	99 Es 252.083	100 Fm 257.103	101 Md 258.103	102 No 259.108

- Toxicity and persistence of potential LANL contaminants reinforces need for long-term management and controls

Laboratory operates under regulatory requirements



What Prompts a 50 Year Plan?

- **Complexity of environmental situation at LANL makes a cohesive picture difficult to paint**
 - Legacy contamination and buildings from two previous site incarnations
 - Complex permitting structure for current operations
 - Long-term stewardship requirements
 - Interactions of site eco-system with surrounding neighbors
 - Multiple programs operating on large site:
 - Cleanup, waste management, compliance all managed separately
- **65 year history shows that if you don't plan you get what results**
- **Process must begin with a system**

50 Year Stewardship Plan - Purpose

- **Provide integrated view of LANL site environmental stewardship**
 - Highlight key geographical, public or project interest areas
- **Metrics: Provide an ongoing scorecard of LANL performance against requirement standards and including trends**
- **Community and regulator outreach**
 - Address community interests
 - Provide technical justification for decisions on regulated actions
- **Align long-term site stewardship goals across programs**

Framing a 50 Year Plan

- **Get management buy-in** (DOE made it a contract award term)
- **Create strong cross-disciplinary/organizational team**
 - Planners, data managers, natural resource managers, outreach pro's, hydrologists, air quality, waste mgmt., GIS and graphics
- **Assume change as a constant factor – don't predict**
- **Start with ISO 14001 certified Environmental Management System**
 - Work assessment
 - Environmental risk assessment
 - Corrective and preventive pathways
 - Set objectives and targets
 - Metrics and independent third-party assessment
 - Establish a strategy and communication framework

Strategy

■ Key Messages:

- Clean up the Past – remove or manage legacy contamination
- Control the Present – Compliance and improvement in current operations
- Create a Sustainable Future – Reduce sources, footprint and manage

■ Defense-in-depth strategy

- Monitoring for change in on-site and off-site for contaminants
- Establishing triggers for actions based on regulatory requirements and environmental risks
- Scientifically based actions -Physical controls, cleanup actions
- Establish management responsibility for key elements

■ Share the data as transparently as possible

- Multiple platforms
- Multiple routes of communicating information

Plan Structure – Two Basic Parts

■ Strategy – Plan Document

- How we manage risk associated with past present and future contaminants
- Monitor and sample to permit/compliance requirements
- Set triggers and thresholds
- Implement corrective actions
- Conduct remediations and/or long term surveillance

■ Communications Tools

- The communication tools will address two levels of communication:
 - SME level management tool, and
 - Public non-technical, issues oriented tool
- It will help the public understand the difference between regulatory requirements and actual public health risk
- Data behind tools will be traceable to the Ph.D. level
- Assessment of cumulative environmental performance is based on clearly defined (quantitative) human health risk metrics



Los Alamos National Laboratory 50 year environmental stewardship plan

Management Application



UNCLASSIFIED

Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA



Defenses in Depth Around MDA G

Includes sampling of:

Gage Stations

SMA Samplers

Stromwater

BMPs

Wells

Soils

Air

Small Mammals

MDAs

Environmental Surveillance Soils



Special Studies



Perimeter, stations



Regional

SMA Sampler location

Gage Stations



Stormwater Sample Program location



Corrective Actions Project



Env. Surv. Report



Los Alamos/Pueblo Cyn



MSGP



Rio Grande Background Study



Rain Gage Network

BMP (shown as fine features)



Berm



Channel/Swale



Check Dam

BMP (shown as a polygon layer)



Seed and Mulch



Permanent Vegetation



Sediment Trap/Basin



Gabion



Cap

Small Mammals



Wells



Alluvial



Baseflow

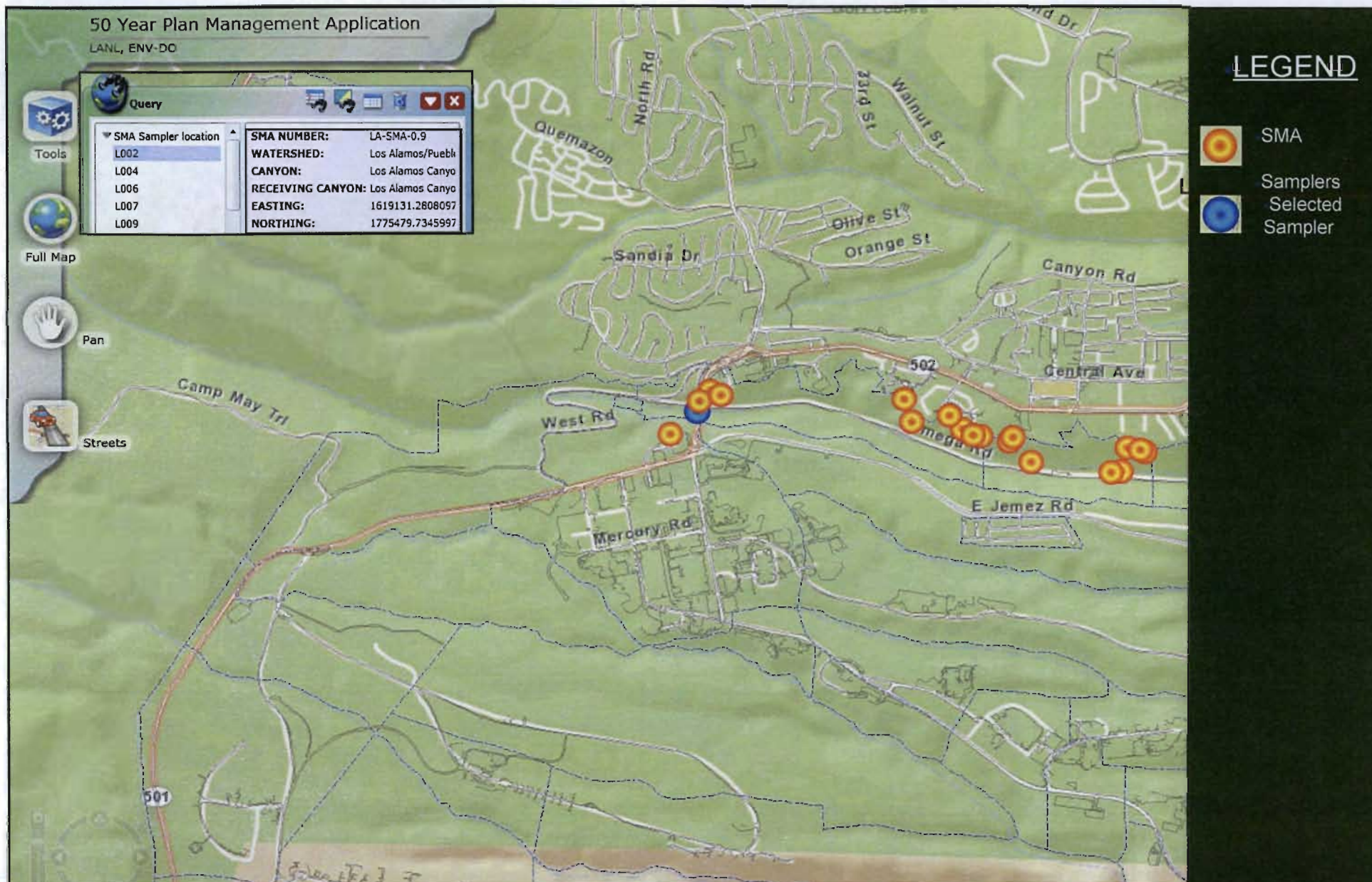
Air Monitoring Stations



Intermediate



Regional



Distribution of SMA Samplers in Los Alamos Canyon

Query of Los Alamos samplers allows managers to view samplers and surface water constituent information allowing for management of the resource. Detailed information is given for the selected

LEGEND



SMA



Samplers
Selected
Sampler/Air
Monitoring Station

Search for Nearby Features

Managers can examine potential spatial relationships between samples of different media and types within specified distances. This allows data from multiple sources and media types to be integrated.

- A SMA sampler was selected and an air monitoring station was identified within a 1500 ft radius

1500
ft
search
radius

L002, LA-SMA-0.9

from a query of SMA samplers
in LA Canyon

Research Park Air Monitoring Station

Is within 1500 ft of the selected
SMA sampler.



Streetview from © Google

Los Alamos Grade Control Structure with Streetview

The application allows managers to view sediment sample information above and below grade control structures to assess effectiveness of the control.

Sediment sample locations

Los Alamos
Grade Control
Structure

Streetview

- ☒ Defenses in Depth
- ☒ Air
- ☒ Water
 - ☐ Basins, 01-001(f)
 - ☒ Stormwater Sample Program location
 - Corrective Actions Project
 - Env. Surv. Report
 - Los Alamos/Pueblo Cyn
 - MSGP
 - Rio Grande Background Study
 - Rain Gage Network
 - ☐ Stormwater Sample (LABELS)
 - ☐ SMA Sampler location
 - ☐ SMA Sampler location (LABELS)
 - ☐ SMA drainage
 - ☐ NPDES Outfalls
 - ☐ Springs
 - ☐ Wells
- ☒ Gage Stations
- ☒ Weirs
- (Grade Control Structures)



Los Alamos National Laboratory 50 year environmental stewardship plan

Public Communications



UNCLASSIFIED

Operated by Los Alamos National Security, LLC for the U.S. Department of Energy's NNSA



50 Year Plan Outreach in 3 parts

1. **Educate the public**
2. **Deliver answers**
3. **Provide additional data**

Educate on program management, contaminants and their remediation

Environmental 50-year Plan - What is in the environment at LANL, how does it affect me and what is LANL doing about it?: All: Environment: LANL Inside - Mozilla Firefox

File View History Bookmarks Tools Help

Environmental 50-year Plan - What is in the ... +

LANL http://int.lanl.gov/environment/all/50yr_what.shtml Google

Air

Biological Resources

Clean-up

Compliance & Monitoring

Cultural Resources

Environmental Risk Reduction

Fire

Waste

Water

Environment

Stimulus »

Hot Topics »

What is in the environment at LANL, how does it affect me and what is LANL doing about it?

How can LANL reduce risk from legacy contamination?

Sources → Pathways → Receptors

Click image to enlarge and view the slideshow

EMS
 recycle
 T training

CONTACTS

Chemistry, Life & Earth Sciences
ADCLES
806-2266

Environmental Programs
ADEP
806-2337

Environment, Safety, Health & Quality
ADESHQ
867-4218

Organizational Contacts

Comments?

IS IT SAFE?

What is in the environment at LANL, how does it affect me, and what is LANL doing about it?

Can I drink the water?

Is it safe to hike on or near Laboratory property?

Can I eat wild game harvested on or near Laboratory property?

Can I garden in or near Laboratory property?

Is it safe to breathe the air and live near Laboratory property?

Is it safe Homepage

DATA & DOCUMENTS

Laboratory Environmental Governing Policy

Air Emissions
Non-Radioactive | Radioactive

Environmental GIS Database (SMART)

Environmental Monitoring Data (RACER)

Image Library

Plans & Procedures
by Subject | by Organization

Potential Release Site Database

Public Reading Room Electronic (EPRI) |

Answer the most pressing questions:

Can I drink the water?

Environment



Stimulus >>



Hot Topics >>

Can I drink the water?

Why? Where? How? Defenses Future Facts

Why is protecting the groundwater important?

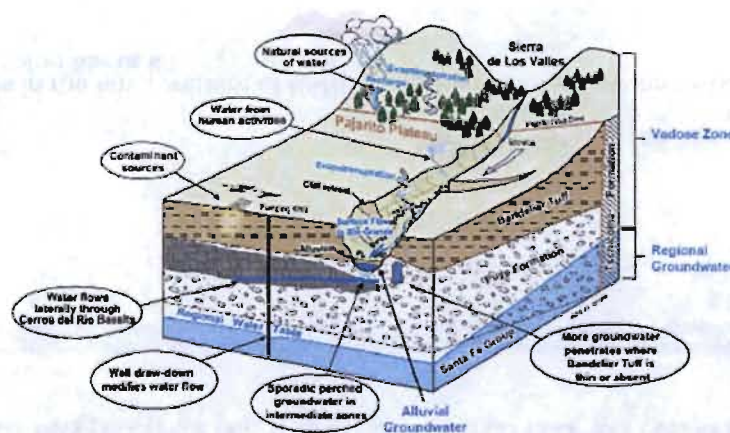
The groundwater in Los Alamos is crucial to the community. It provides most of the drinking water and is an important part of the ecology. Of the three levels of groundwater, alluvial groundwater occupies shallow sediments in canyon bottoms. Below canyons, intermediate depth water sometimes settles in pockets of top of low-permeability rock, which slows the transport to the regional aquifer 600-1200 feet below the surface beneath several layers of unsaturated rock. Only the regional aquifer is a source of drinking water for people.

Drinking Water Quality Reports

Regional municipal drinking water is provided by Los Alamos, Santa Fe and Rio Arriba County. The counties are responsible for monitoring and meeting drinking water standards at the tap.

- ▢ [Santa Fe Water Quality report](#)
- ▢ [Los Alamos Water Quality report](#)

Water Flow Model on the Pajarito Plateau Groundwater Zones



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[Plans & Procedures by Subject | by Organization](#)

[Potential Release Site Database](#)

[Public Reading Room Electronic \(EPRR\) | Hard-copy \(PRR\)](#)

[Publications & Reports](#)

[Records Library EPRM | Domino](#)

[Water Quality Database](#)

PUBLIC NOTICES

[Review of April 2011 Groundwater Data](#)

Can I breathe the air?

Is it safe to breathe the air and live near Laboratory property?

Why? Where? How? Facts

Why is this important?
Many sites on LBNL property have exhaust stacks that release air emissions from LBNL experimental work. No airborne contamination from LBNL threatens human health nor environmental risk safety standards.

IS IT SAFE?

What is in the environment at LBNL, how does it affect us, and what is LBNL doing about it?

- Can I drink the water?
- Is it safe to live on or near Laboratory property?
- Can I eat wild game harvested on or near Laboratory property?
- Can I garden in or near Laboratory property?
- Is it safe to breathe the air and live near Laboratory property?
- Is it safe to breathe?

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Public Reading Room Electronic (PDF) (Hard copy only)
Publications & Reports

Where do you monitor?

Is it safe to breathe the air and live near Laboratory property?

Why? Where? How? Facts

Where is air monitored?
Twenty seven stacks were monitored in Los Alamos in 2007, including stacks at the Los Alamos Neutron Science Center and various chemistry stacks.

IS IT SAFE?

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- Can I garden in or near Laboratory property?
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Is it safe to breathe the air and live near Laboratory property?

Why? Where? How? Facts

How is air monitored?
LBNL samples ambient air with a network called AIRNET. There are 65 AIRNET stations on or around Laboratory property and a few far away at regional locations.

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Is it safe to breathe the air and live near Laboratory property?

Why? Where? How? Facts

What do the monitoring results show?
In 2009, there were 65 operating AIRNET stations. Annual average radioactive concentrations at all LBNL perimeter stations were less than 1% of the EPA class limit for the public. At regional locations away from Los Alamos, all air sample measurements were consistent with background levels. As in past years, the AIRNET system detected slightly elevated radionuclides from known areas of contamination. No new or increase airborne radioactivity was detected and there were no unplanned airborne releases.

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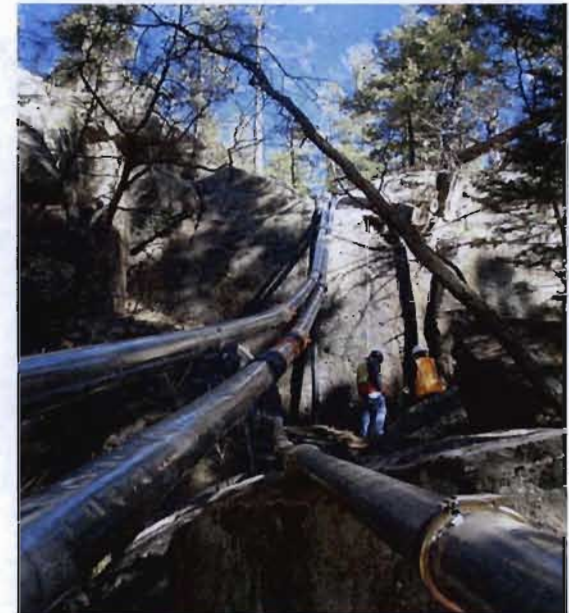
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How does it work?

What is the result?

- Can I hike in the canyon?
- Are there contaminants?
- What are you doing about it?

• PCBs in Upper LA Canyon have been reduced by 99%. Water containment was installed to trap runoff.



Contaminant Source Removal



Defense in depth: After removing contaminants, catchment systems hold rain water for testing

DEMOS ON LINE

■ Questions

50 Year Stewardship Plan - Purpose

- **Provide integrated view of LANL site environmental stewardship using key geographical or project interest areas**
- **Metrics: Ongoing scorecard of LANL performance against requirement standards and including trends**
- **Community and regulator outreach**
 - Address community interests
 - Provide technical justification for decisions on regulated actions
- **Align long-term site stewardship goals across programs**

Strategy

- **Defense-in-depth strategy**
 - Monitoring for change
 - Establishing triggers for actions
 - Scientifically based actions
 - Establish management responsibility for key elements
- **Use existing Environmental Management System (ISO14001) to provide a framework for:**
 - Work assessment
 - Environmental risk assessment
 - Corrective and preventive pathways
 - Set objectives and targets
 - Metrics and independent third-party assessment
- **The Plan will serve as the framework for future environmental stewardship activity and for future post-consent order agreements with regulators**

Plan Structure – Two Basic Parts

■ Strategy – Plan Document

- How we manage risk associated with past present and future contaminants
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- The communication tools will address two levels of communication: SME level management tool, and public non-technical, issues oriented tool
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