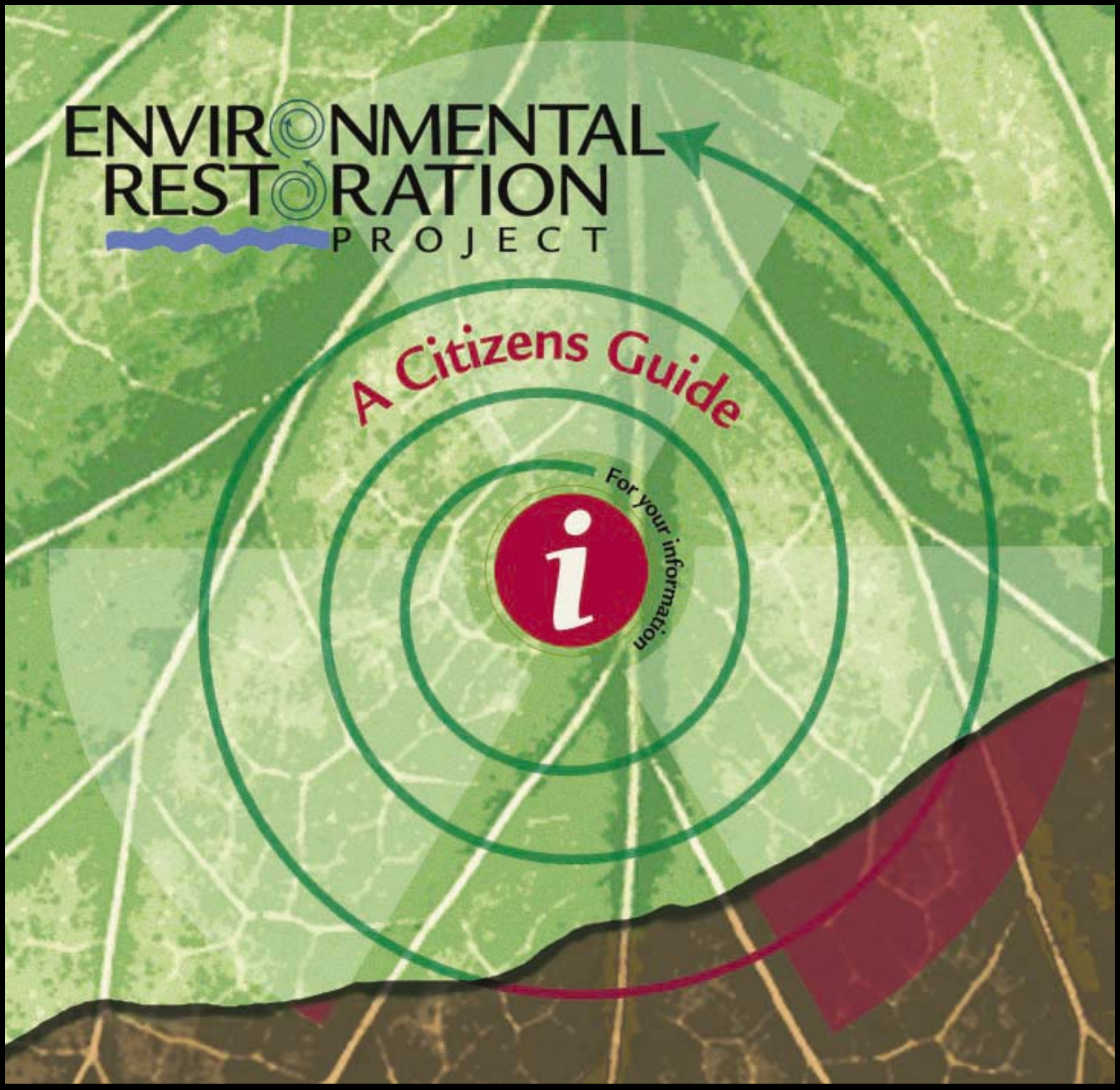

Your personal guide to Los Alamos National Laboratory's environmental restoration efforts.

Los Alamos
NATIONAL LABORATORY

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ENVIRONMENTAL RESTORATION PROJECT

A Citizens Guide

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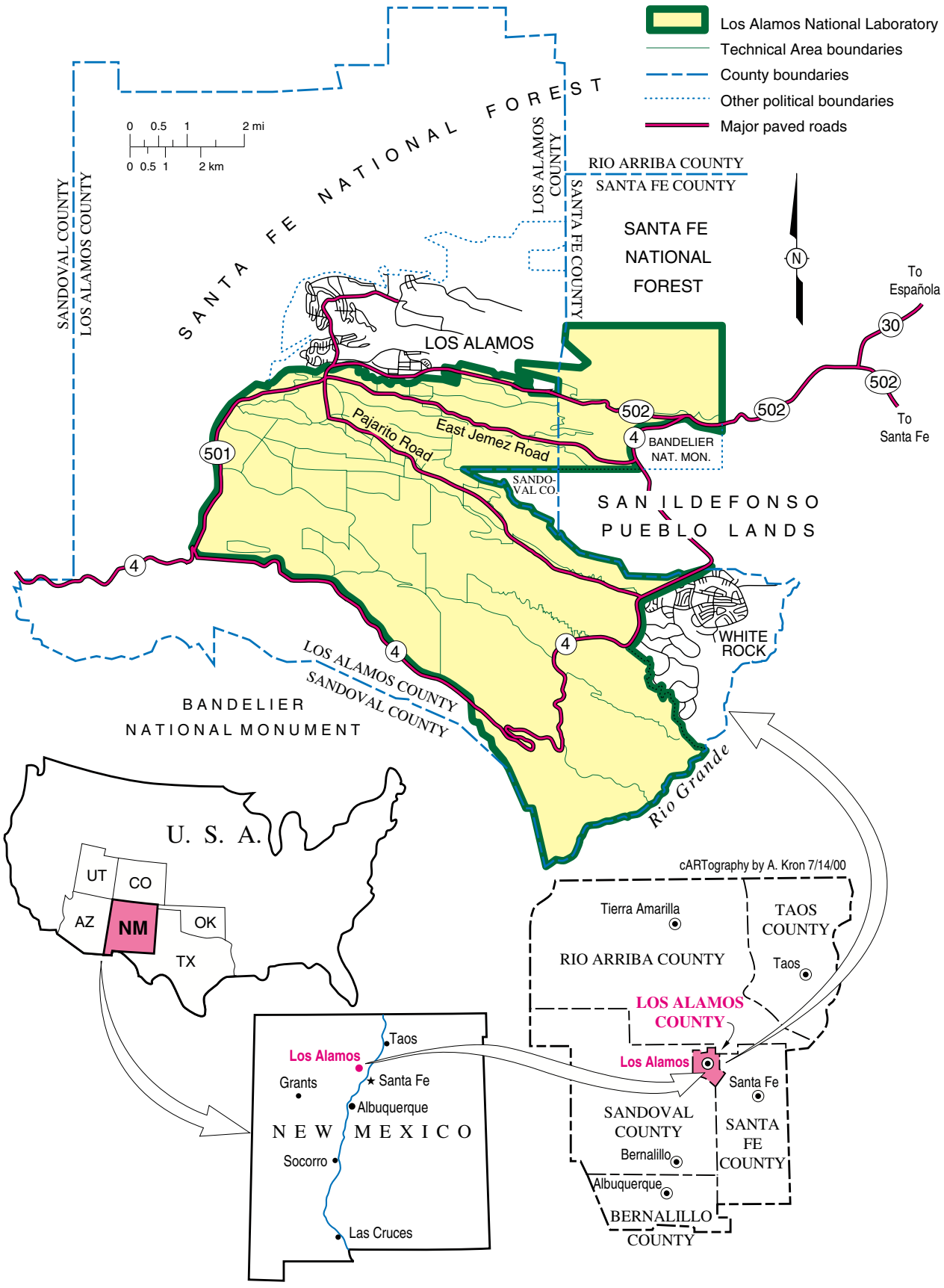

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Introduction

The Los Alamos National Laboratory (the Laboratory) Environmental Restoration (ER) Project was established in 1989 as part of a US Department of Energy nationwide program. The purpose of the ER Project is to investigate hazardous and/or radioactive materials that may be present in the environment as a result of past Laboratory operations, to determine if they pose an unacceptable risk to human health or the environment, and to remediate (clean up, stabilize, or restore) as appropriate those sites where contamination is present. The ER Project's goals are to

- *protect human health and the environment from exposure to hazardous chemical or radioactive materials resulting from past treatment, storage, and disposal practices and*

- *meet or exceed the environmental cleanup requirements of the Laboratory permit to operate hazardous waste facilities.*

This Citizens Guide was written to inform the public of ER Project operations and activities and to answer some commonly asked questions such as these:

next

How to Get Involved and Find Information

The ER Project welcomes your comments and suggestions. Representatives of the ER Project Communications and Outreach Team are available at (505) 665-6770 to answer questions and to guide people to additional information resources. Detailed information is also available from the ER Project web site at http://erproject.lanl.gov.

ER Project documents are available at the Laboratory Community Reading Room, located at 1619 Central Avenue in Los Alamos and on-line from the ER Project Virtual Library at http://erproject.lanl.gov/documents/virtualhome.htm. Information sheets describing various aspects and activities of the ER Project are available from the Communications and Outreach Team.

The ER Project hosts public meetings throughout the year in various northern New Mexico communities. These meetings present information about specific sites or issues that may be of interest to the public. Meeting announcements are placed in local newspapers and are posted on the ER Project web site. Additionally, tours of ER Project activities are conducted several times a year.

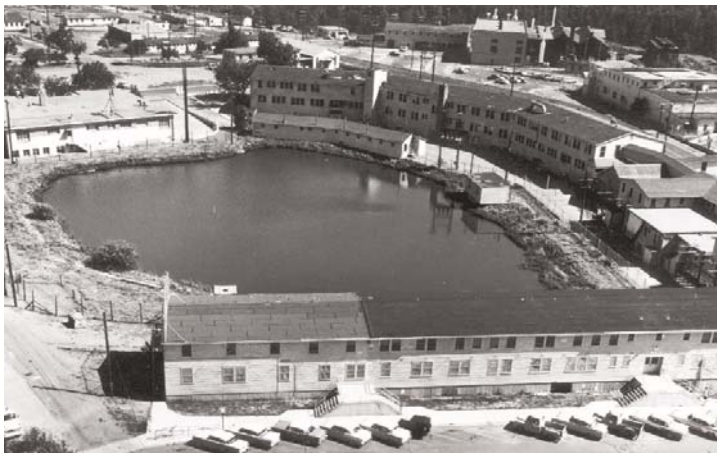
Public meetings provide a forum for information.

Tours of ER Project sites and activities can be arranged.

Why Environmental Restoration Is Necessary at Los Alamos National Laboratory

The Laboratory, located on northern New Mexico's Pajarito Plateau, is a national scientific institution where researchers work in many areas of science related to national defense, energy, health, and ecology.

The Laboratory was founded in 1943 as part of the Manhattan Project, whose members gathered in Los Alamos to develop the first nuclear weapon with the hope of ending World War II. The area around the current County Administrative Building and Ashley Pond in the Los Alamos townsite was used as laboratory and research facilities during World War II and the early days of the Cold War. Hazardous chemicals and/or radioactive materials were stored in and around these buildings, and waste materials were disposed of in nearby areas and in the surrounding canyons. Environmental restoration is necessary at the Laboratory because unacceptable levels of contamination may exist as a result of these past activities.



Historical photograph (circa 1950s) of Laboratory operations at Ashley Pond.

Congress began to create federal laws to protect the environment as more was learned about the health and environmental effects of hazardous chemicals and radioactive materials. The predecessor of the US Department of Energy, known as the Atomic Energy Commission, and the Laboratory began to study and clean up areas where hazardous materials may have been spilled or disposed of during the early years of the Laboratory.

The Laboratory began sampling studies and the first modest cleanups of the area in 1946. Many areas were also sampled and cleaned up during the 1950s and 1960s. The cleanups became more thorough as knowledge increased regarding the potential effects of contamination from hazardous materials.

As the Laboratory developed, its facilities were moved across Los Alamos Canyon to the present location, and the townsite was developed as a residential and business center. In the 1960s, cleanup work was focused on the present-day Los Alamos townsite area.

During the 1970s, environmental standards became more stringent, and the Laboratory began its environmental surveillance program, as documented each year in the "Environmental Surveillance at Los Alamos" reports. In addition, the Laboratory developed new techniques to identify and assess contamination and its impact on human health and the environment.

Today, the Laboratory operates under current applicable environmental laws and regulations to safely treat, store, and/or dispose of the hazardous chemical and radioactive wastes that have been generated as the result of past or on-going experiments and tests.

HOW IS THE ER PROJECT ORGANIZED

The Laboratory is a US Department of Energy facility that is managed by the University of California. The Department of Energy Los Alamos Area Office oversees the Laboratory ER Project, which is a part of the Risk Reduction and Environmental Stewardship Division at the Laboratory. Representatives of both the Department of Energy and the Laboratory ER Project frequently interact with the New Mexico Environment Department and the US Environmental Protection Agency to achieve mutually acceptable objectives.

To perform the large variety of tasks required for success, the ER Project brings personnel together from a variety of disciplines throughout the Laboratory, the Department of Energy, and the New Mexico Environment Department. These people combine their unique skills to address the complex issues of remediating contaminated sites. These personnel include environmental scientists and field technicians, hydrologists, geologists, drilling engineers, risk assessors, ecologists, chemists, and specialists in community and stakeholder involvement, finance and budget, computer systems/information management, health and safety, quality assurance, as well as representatives of many other disciplines, including administrative and support staff.

Radiation monitoring equipment is used to monitor and characterize sites.

Sample management facilities provide ER Project personnel with a place to examine samples taken in the field.

The ER Project is organized into six key areas.

- Corrective action activities involve investigating, stabilizing, and, when necessary, remediating potential release sites found within Laboratory boundaries, in addition to several areas in the Los alamos townsite. Examples of potential release sites being addressed include material disposal areas, chemical storage areas, and septic systems.

- Canyons Investigation activities involve investigating potentially contaminated media (sediments, surface water, and shallow groundwater) downstream from potential release sites in the 19 major canyon systems at the Laboratory and, when necessary, remediating areas of contamination in canyon bottoms.

- Groundwater Investigation involves the implementation of the Laboratory's Hydrogeologic Work Plan, which includes the installation and sampling of up to 32 regional aquifer test wells and analysis of sample results to determine whether Laboratory operations have had an effect on the groundwater in the area.

- Regulatory Compliance efforts include interacting with regulatory agencies, the public, Native American pueblos, and other stakeholders. Other efforts include consistent interpretation of regulatory requirements to ensure that the ER Project remains in compliance with all applicable regulations.

- Analysis and Assessment activities include developing technical strategies and ensuring the use of consistent technical methodologies (strategic decision analysis, data assessment, conceptual modeling, and human health and ecological risk assessments) throughout the ER Project.

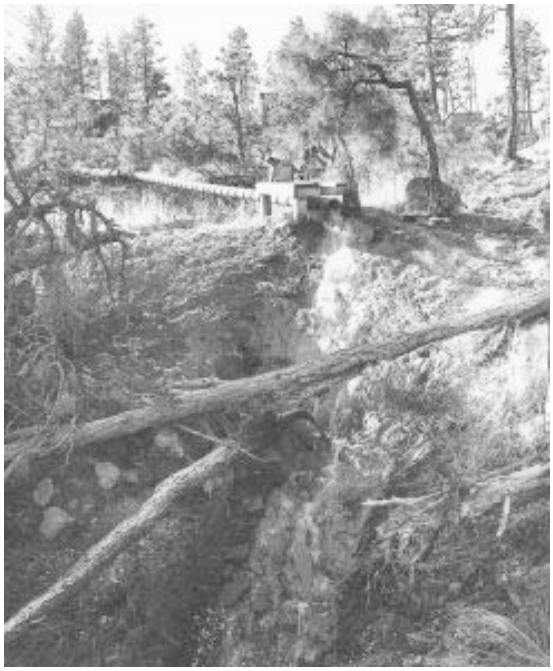
- Information Management efforts focus on coordinating and integrating sample management and geographic information systems, as well as other project databases and computer support systems.

WHAT ARE POTENTIAL RELEASE SITES

The Laboratory originally identified more than 2,100 areas, in and around Laboratory boundaries, that may have been contaminated by Laboratory operations in place prior to today's more stringent environmental standards. These areas are called "potential release sites," or "PRSs." PRS is a generic term that includes solid waste management units (SWMUs) in Module VIII of the Laboratory Hazardous Waste Facility Permit and areas of concern (AOCs).

Examples of potential release sites include septic tanks and associated drain lines, chemical storage areas, wastewater outfalls, material disposal areas, incinerators, sumps, firing ranges, and areas contaminated by leaking storage tanks or spills.

Potential release sites are found along mesa tops, canyon walls, and canyon bottoms. Most are located on US Department of Energy-owned and -controlled property; however, some are found within the Los Alamos townsite, and others are located on private property, Los Alamos County property, or US Forest Service land.



Historical photograph (circa 1946) of an outfall draining into Acid Canyon.

For your information

An "outfall" is the area at the end of a pipe, sewer, ditch, or other conduit that opens to the environment and discharges wastewater, sewage, storm water runoff, or other liquid effluents.

Septic tank removal activities at Technical Area 21 on the edge of Los Alamos Canyon.

Underground storage tank removal at Technical Area 2 located in Los Alamos Canyon.

WHAT IS THE WATERSHED APPROACH

For the first six years of the ER Project, potential release sites were studied as individual units and, if necessary, remediated as individual units. Cleanup decisions were based solely on a site's potential for adversely impacting human health.

In 1998, the ER Project began investigating potential release sites by considering the relationship of nearby and downstream sites and their combined impacts on an entire watershed (natural drainage system). The ER Project also began focusing on air and water quality issues and began assessing potential impacts on ecological receptors (plants and animals) in addition to human health impacts.

By studying a watershed, rather than individual potential release sites, the ER Project can understand how contamination may move from sites into sediments, surface waters, soils, and groundwater throughout the entire drainage system. Natural processes such as rainstorms and snowmelt can cause contaminants to move from the mesa tops, down canyon sides, to canyon bottoms and, eventually, to the Rio Grande.

Eight primary watersheds cross the Laboratory and drain into an 11-mile segment of the Rio Grande between the Otowi Bridge on State Highway 502 and Frijoles Canyon in Bandelier National Monument. The watersheds are identified in Appendix A. Each watershed presents a unique challenge

Aerial view of the Pajarito Plateau looking west. The Valles Caldera can be seen in the distance.

For your information

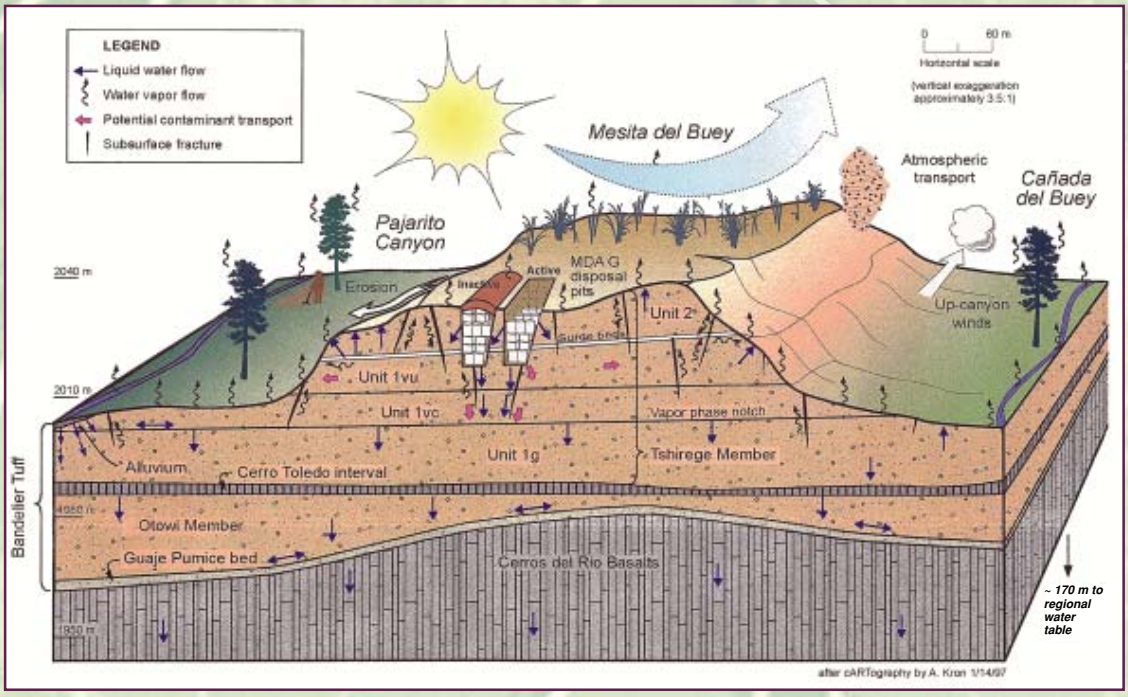
A watershed is an area that drains into, or contributes to, a stream, lake, or other body of water. Ridges, mesas, or summits of high ground separate each watershed. A watershed may be made up of one or more mesas, all the drainages from those mesas, and the major canyons into which the drainages converge.

because of its location, topography, and ecosystem and because the various hazardous materials found in a watershed require innovative and specific remediation solutions.

As the ER Project learns how contaminants move within watersheds, risks to human health and the ecosystem can be assessed for each watershed.

While human health risk is evaluated over a relatively small geographic area, ecological risk assessment requires knowledge of the nature and extent of contamination across much larger areas.

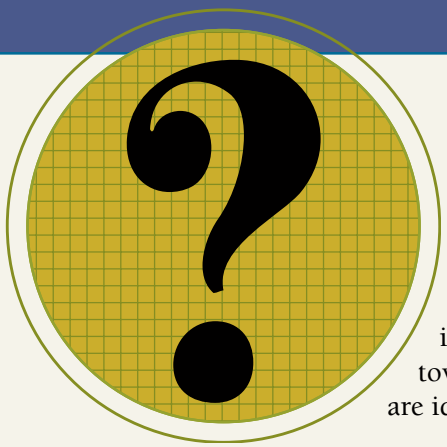
Pathways model for movement of contaminants to receptors in the Los Alamos area.



For your information

The "nature" of contamination is the type and amount of chemicals, either natural or man-made, that are present and have been released to the environment. The "extent" of contamination refers to where a given chemical is spatially distributed in the environment.

HOW ARE SITES RANKED FOR REMEDIATATION



ER Project, US Department of Energy, and New Mexico Environment Department personnel cooperatively ranked potential release sites and watersheds using questions such as the following:

The three watersheds identified as the highest priorities for remediation are discussed in the following section. Each watershed is briefly described, and important accomplishments towards reaching remediation goals are identified.

- Has the public expressed specific concerns about a particular site?
- How easy is it for human or ecological receptors to be exposed to contaminants? Is human access to the site controlled?
- Do animals frequently use the site for feeding or as a water source?
- Does the watershed contain a large number of sites that, if contaminated, may pose unacceptable risks to human or ecological receptors?
- Are contaminants likely to leave the site because of weather events, such as heavy rainfall or high winds?
- Do regulations require sites within the watershed to be remediated before other sites?
- Will remediation activities affect or interrupt day-to-day work at nearby Laboratory operations areas?
- Is the site proposed for transfer to another landowner?

The ER Project is involved with land transfer because Public Law 105-119 directs the Department of Energy to identify any environmental restoration or cleanup that is required before land is conveyed and transferred to Los Alamos County or San Ildefonso Pueblo. Information about the ER Project's land transfer activities is available from the ER Project Communications and Outreach Team or the ER Project web site.

Los Alamos/Pueblo Watershed

Cleaning up potential release sites and potentially contaminated media (sediments, surface water, and shallow groundwater) in the Los Alamos/Pueblo watershed tops the priority list for the ER Project for several important reasons. First, this watershed has a relatively large inventory of contaminants, many of which leave the site during stormwater runoff. Second, many areas of contamination are located on lands no longer controlled by the Department of Energy. And third, many of the canyons in the watershed (Los Alamos, Pueblo, Guaje, Rendija, Barrancas, Bayo, and DP) are used extensively by the public for a variety of recreational activities, thereby increasing the risk of human exposure to the contaminants. Additionally, there are trails that have direct access from residential areas.

The ER Project has made significant progress characterizing and remediating potential release sites and potentially contaminated media in the Los Alamos/Pueblo watershed. Extensive investigations of the sediments in Acid Canyon below the old Catholic church and the Walkup Aquatic Center on Canyon Road have been conducted and the potential risk exposures to those who use the popular hiking area have been assessed.

During 2000, the ER Project cleaned up the site of the old wastewater treatment plant that served Los Alamos County and that is located near the Sombrillo Nursing Facility. This site will soon become the location of the new assisted-living facility at Sombrillo. Planning efforts have begun for the work on the Pueblo Canyon hillside at the Los Alamos airport to remediate the former townsite landfill. Old tires, car bodies, washing machines, and other community trash will be removed from the hillside and nearby drainages.

Many of the Laboratory sources of contamination originating within the Los Alamos/Pueblo watershed are associated with historic activities at Technical Area 2 (TA-2) and TA-41, both located in Los Alamos Canyon below the Omega Bridge. The ER Project determined that many of the potential release sites in Los Alamos Canyon were in the path of potentially devastating floodwaters, as a result of the Cerro Grande fire, that occurred in and around Los Alamos in May 2000. Each potential release site in this area was evaluated and stabilized or removed the summer after the fire.

Local residents enjoy the Los Alamos Skateboard Park located on the upper edge of Acid Canyon.

For your information

The Laboratory is divided into 48 distinct geographic areas referred to as technical areas or TAs. Each technical area is identified by an individual number to allow quick reference to locate buildings, structures, and potential release sites.

Contaminants were also discharged into Los Alamos Canyon from mesa-top technical areas. The ER Project has completed the removal of dried radioactive sludge at a lagoon located at the Los Alamos Neutron Science Center (LANSCE) off East Jemez Road, thus preventing future contaminant migration from the site.

The ER Project has installed three wells that monitor the quality of the groundwater in Los Alamos Canyon. After completing one year of groundwater sampling, the Laboratory will publish the results from the analysis of this sampling.

Removal of dried radioactive sludge and the plastic liner from a lagoon at LANSCE.

Lagoon remediation efforts almost completed.

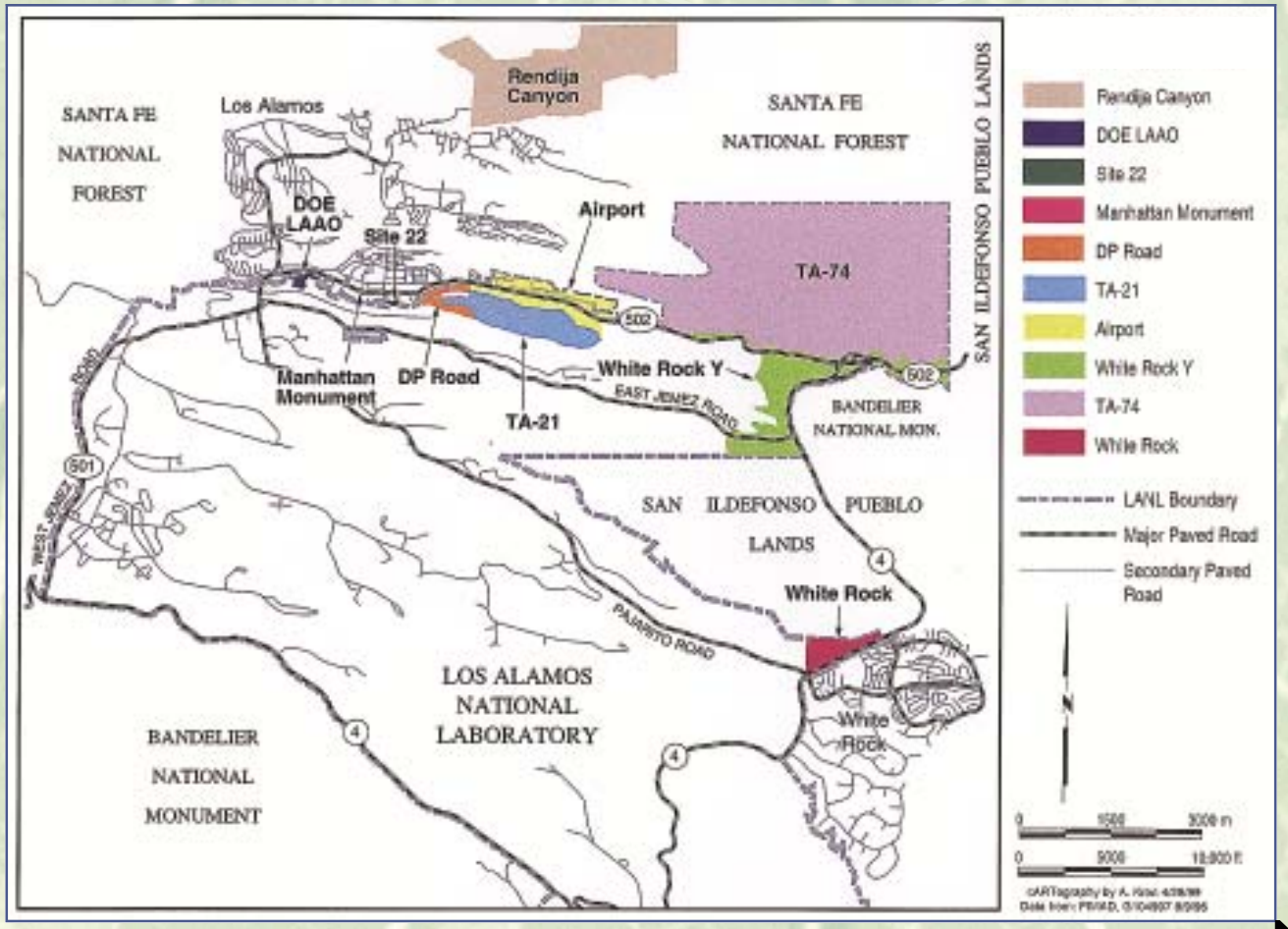
For your information

The ER Project is responsible for implementing the Laboratory's Hydrogeologic Workplan, designed to characterize the geology and groundwater conditions (the hydrogeology) under the Laboratory. Samples taken from wells drilled deep in the aquifer are analyzed for contamination, which allows the Laboratory to develop plans to effectively manage and protect the groundwater resource. See Appendix B for a map showing the proposed wells at the Laboratory.

Several parcels of land in the US Department of Energy Land Transfer Program are located in the Los Alamos/Pueblo watershed. The TA-21 Tract (about 260 acres), located east of the townsite on DP Road, and the DP Road Tract (about 50 acres) are proposed for transfer to Los Alamos County. The ER Project cleaned up several wastewater outfalls on the edge of Los Alamos Canyon by removing contaminated soils and rock in preparation for the possible land transfer. Three sites near the Department of Energy's Los Alamos Area Office (DOE-LAAO) off Trinity Drive were also cleaned up in preparation for transfer of that parcel to Los Alamos County. The TA-74, White Rock Y, and Rendija Canyon land transfer parcels (located within the Los Alamos/Pueblo watershed) will be investigated prior to transfer.

Erosion control measures installed to stabilize soils.

Land parcels being considered in the US Department of Energy's Land Transfer Program.



Mortandad Watershed

Remediating potential release sites in the Mortandad watershed (Ten Site, Cedro, Cañada del Buey canyons) is the second highest priority for the ER Project because of the large inventory of contaminants contained in media found in the canyon bottoms. This large inventory is present from discharges associated with the radioactive liquid waste treatment facilities located at TA-50 and research facilities located at TA-35. Contaminants in this watershed could potentially move off-site and migrate to San Ildefonso Pueblo lands.

Runoff from material disposal areas (MDAs) at TA-54 partially drains into Cañada del Buey. The ER Project completed an extensive investigation of the MDAs at TA-54 during 2000. The study concluded that current levels of contamination in air, surface soil, and sediment do not exceed applicable risk thresholds established by the US Environmental Protection Agency. The ER Project continues to evaluate the most effective and cost-efficient way to control future risks posed by potential long-term releases at these sites and is working on a study of MDA H at TA-54 as a test case for other mesa-top MDAs. The ER Project is studying how contamination might be released and how the impact of any future releases can be controlled to ensure the safety of the site.

The ER Project has installed two groundwater monitoring wells in Mortandad Canyon. Groundwater sampling has begun, and the results from the

Aerial view of Technical Area 54.

For your information

The material disposal areas (MDAs) at the Laboratory have been used to dispose of solid and/or liquid wastes on or beneath the ground in seepage pits, absorption beds, excavated pits, trenches, and shafts. Wastes include radioactive materials, hazardous chemicals, and traditional municipal-type wastes. An information sheet about MDAs is available from the ER Project Communications and Outreach Team or the ER Project web site. See Appendix C for a map that shows the location of MDAs at the Laboratory.

analysis of these samples will be published after one year of sampling is completed.

The ER Project is also conducting a detailed investigation of the sediments along the full length of Mortandad Canyon to determine whether there is a need for cleanup activities within the canyon and, if so, what actions should be taken. Prior work has studied sediments closest to contaminant sources to determine which potential contaminants might affect human and ecological receptors and how concentrations of contaminants vary downstream from contaminant sources. The ER Project is obtaining more detailed information from the previously studied areas and is beginning to examine those areas farther downstream from the sources. Flood concerns caused by conditions resulting from the Cerro Grande fire led to the removal of several areas of sediment from Mortandad Canyon during the summer of 2000.

Examining sediment in a streambed.

Radiation survey in Mortandad Canyon to map contamination levels in the sediment.

Water/Cañon de Valle Watershed

The Water/Cañon de Valle watershed (Water, Cañon de Valle, S-Site, Potrillo, Fence, and Indio canyons) is located on the southwestern edge of the Laboratory off State Highways 4 and 501. Investigation of potential release sites and potentially contaminated media in this watershed is ranked as the third priority for the ER Project because of the relatively high inventory of barium and high explosives in Cañon de Valle and the recent detection of high explosives in the regional aquifer associated with historic activities at TA-16.

Remediation of a very large material disposal area (MDA P) located within TA-16 was completed in March of 2001. The ER Project removed the contents of the landfill as well as the barium and high explosives–contaminated soil from beneath the MDA.

Historical photograph (circa 1965) of MDA P (above). Remote-controlled equipment in use to remove detonable high explosives from MDA P (left). MDA P after ER Project remediation activities (below).

The major portion of an extensively contaminated outfall (260 Outfall) associated with a high-explosives–machining building was cleaned up during 2000, and the ER Project has moved into the next phase of investigation at this site. Because of concerns that conditions caused by the Cerro Grande fire might mobilize contaminants from two other significant areas (MDA R and a photo-processing outfall) within TA-16, the ER Project cleaned up contaminated soil at these sites. Many other sites in this watershed have been cleaned up in previous years, and work continues at these high-priority sites.

Additionally, the Laboratory continues to monitor high explosives in the surface water and groundwater at TA-16.

Stabilization measures at 260 Outfall.

Groundwater well installation equipment at TA-16.

Sampling spring water as part of a study to trace the movement of contamination.

Remaining Watersheds

The five remaining watersheds are discussed below and are ranked fourth through eighth, based on previous sampling efforts and historical information. Selected potential release site evaluations and some remediation efforts are under way in the Pajarito and Sandia watersheds.

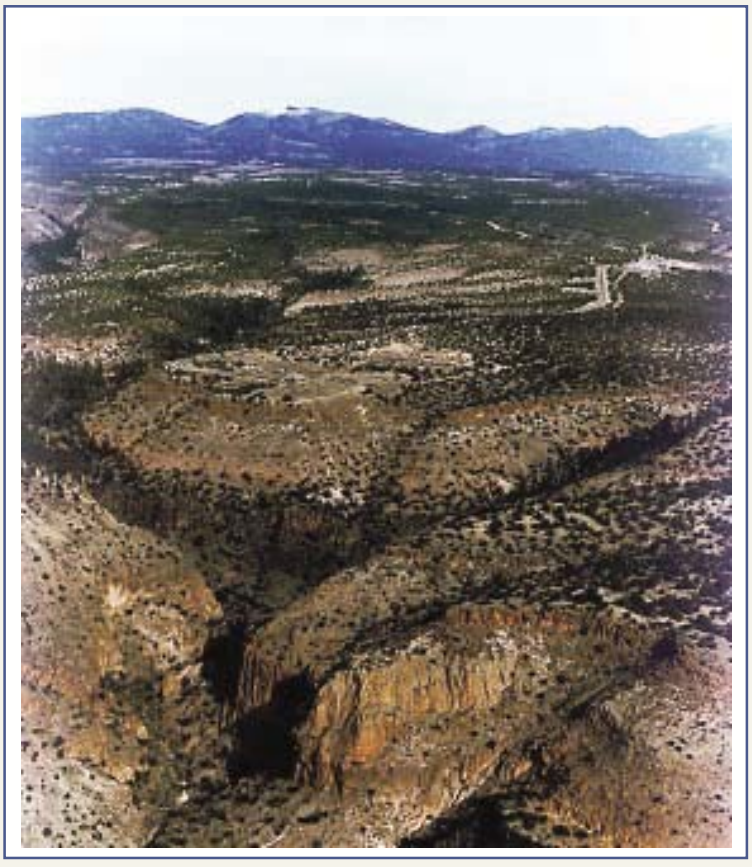
The **Pajarito watershed** ranked fourth on the priority list with respect to the nature and extent of contamination and the potential for exposure to these contaminants. Potential sources of contamination in this watershed are from TA-18 and TA-54.

Potential release sites in the **Sandia watershed** were potentially contaminated from historic activities at TA-3 that could affect wetland within this watershed and from accelerator facilities at the Los Alamos Neutron Science Center off East Jemez Road.

Ancho watershed is located on the southern edge of the Laboratory on State Highway 4, across from Bandelier National Monument. Technical areas in this watershed have been and continue to be used as firing sites. The watershed ranks sixth on the ER Project priority list.

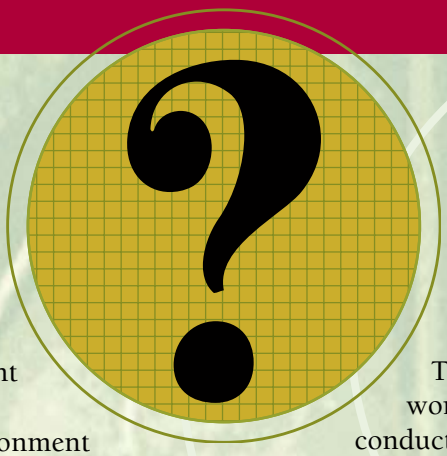
Chaquehui watershed is located in the southern corner of the Laboratory. TA-33, the only technical area in the watershed, was established in 1947 as a substitute test site for weapons experiments then being conducted at Trinity Site in southern New Mexico.

Frijoles watershed has the lowest priority because the sole potential release site in the watershed was already cleaned up in 1995.



Aerial view of Frijoles Canyon shows the typical terrain of the Pajarito Plateau.

WHAT REGULATIONS APPLY TO THE ER PROJECT



All remediation activities conducted by the ER Project are performed in accordance with the Resource Conservation and Recovery Act (RCRA), other applicable federal and state laws and regulations, and US Department of Energy/Laboratory policies and directives. The New Mexico Environment Department administers RCRA for the US Environmental Protection Agency.

Congress enacted the RCRA in 1976. Its hazardous waste management provisions regulate the day-to-day operations of every facility that manufactures, uses, treats, stores, and disposes of hazardous chemical wastes. The principal requirements for the ER Project come from RCRA Sections 3004 (u) and (v). These sections provide for cleanup of all hazardous waste sites at RCRA-regulated facilities and at all contaminated properties located beyond, but bordering, the facility boundaries.

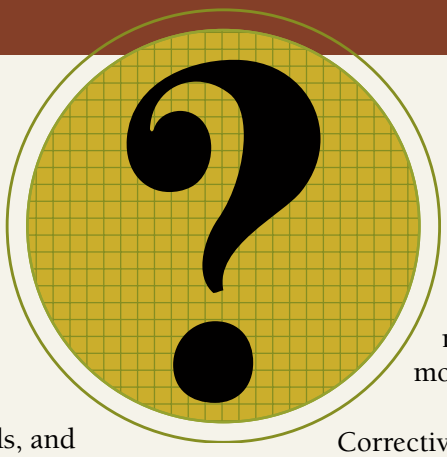
Under RCRA, the US Environmental Protection Agency issued to the Laboratory a Hazardous Waste Facility Permit to operate treatment and storage units. In 1984, Congress amended RCRA by passing the Hazardous and Solid Waste Amendments (HSWA) that caused the US Environmental Protection Agency to add an HSWA section (called Module VIII) to the Laboratory Hazardous Waste Facility Permit. Module VIII requires a specific program (called the corrective action process) for investigating and cleaning up waste disposal sites that are no longer being operated. This process provides the framework for how the ER Project conducts its cleanup activities. The New Mexico Environment Department is the Administrative Authority for potential release sites listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit.

The Laboratory Hazardous Waste Facility Permit does not address all the issues that concern the ER Project or govern every cleanup. For example, some potential release sites have been contaminated by radioactive materials but do not contain specific hazardous chemicals covered by RCRA. The Atomic Energy Act regulates the cleanup of these sites. The US Department of Energy is the Administrative Authority for potential release sites with radiological contamination.

A complete listing and description of the federal and state laws that govern the ER Project is available in an information sheet from the ER Project Communications and Outreach Team or the ER Project web site.

"Administrative Authority" means the federal or state agency that reviews and approves the corrective action process for each potential release site at the Laboratory.

WHAT IS THE CORRECTIVE ACTION PROCESS



The process for evaluating and remediating potential release sites and potentially contaminated media is called the corrective action process. Corrective actions can involve stabilizing contaminated soil, treating groundwater, demolishing and decommissioning buildings, removing sludge and soils, and constructing erosion control devices to prevent contaminants from leaving a site.

There are two possible outcomes when the ER Project performs site remediations. The first involves removing contamination to acceptable levels that protect human and ecological receptors and results in the site being restored to conditions similar to those in existence before the Laboratory began operations. The second results in the reduction of risks by limiting contact with contaminants or the transport of contaminants. In this case, the ER Project protects human and ecological receptors by implementing long-term stewardship activities such as containing the contamination on the site, restricting access to the site, or monitoring.

Corrective actions for a potential release site are complete when the ER Project has demonstrated and documented, and the Administrative Authority has concurred and documented, that a site poses no unacceptable risk to humans or ecological receptors. If, at any point in the corrective action process, ER Project personnel can document that the potential release site is considered "clean" for its intended purpose, the ER Project recommends the site for no further action and proposes that it be removed from the Laboratory's Hazardous Waste Facility Permit.

In environmental remediation, "cleanup" means the process of addressing contaminated land, facilities, and materials in accordance with applicable requirements. It does not imply that all hazards will be removed from the site.

The Corrective Action Process

- Collect and evaluate existing information and/or data about the site.
- Determine if the site needs further investigation.
- If the site needs further investigation, develop a plan to collect additional information and/or data.
- Determine if the site has contamination.
- If the site has contamination, determine the nature and extent of the contamination.
- Conduct human health and/or ecological risk assessments – if necessary.
- Determine and complete appropriate/approved remediation activities.
- Document all decisions and conduct stakeholder involvement activities.
- Implement long-term surveillance and monitoring activities – if necessary.

More information about the ER Project corrective action process is available in an information sheet from the ER Project Communications and Outreach Team or the ER Project web site.

A Continuing Commitment to Future Generations

The Laboratory is committed to the welfare of future generations. The ER Project is developing a Long-Term Environmental Stewardship Program to ensure protection of human health and the environment, following site remediations.

The majority of ER Project potential release sites will be cleaned up to the extent that no future site-use restrictions will be needed. However, at a few sites, it will be necessary to leave wastes in place at levels that will limit future site use. A long-term stewardship plan is being developed to describe how future site uses will be controlled and how future generations will be informed of site restrictions.

Long-term stewardship activities are designed to prevent exposures to residual (left in place) contamination and waste. Examples of these activities are groundwater monitoring, ongoing pump-and-treatment activities, maintenance of barriers and other containment structures, periodic inspections, control of site access, and posted signs.

The Laboratory currently monitors the local drinking water supply system, installs surface-water runoff controls, and has begun characterizing the hydrogeology of the Pajarito Plateau.

The ER Project's Long-Term Environmental Stewardship Program will not only include the remedial activities involved with historical contamination at the Laboratory, but it will also consider the need for long-term stewardship in the design, construction, and operation of new facilities.

Environmental monitoring equipment allows the Laboratory to assess various environmental conditions to ensure site safety.

Path to Completion

RCRA facility investigation work plans have been completed for all potential release sites and for the potentially contaminated media in Los Alamos, Pueblo, Mortandad, Pajarito, and Sandia canyons and Cañada del Buey.

The ER Project has reduced the total number of potential release sites requiring further action (2100) by more than 60%. This has been accomplished by remediating contaminated sites, by evaluating sites and confirming that there is no adverse impact on human and ecological receptors, or by combining related sites. Only a small percentage of this large number of potential release sites (approximately 10% or less) will need to go through the full corrective action process.

According to current projected funding levels, it will take at least 15 years to complete the full investigation and remediation process for the remaining potential release sites. Future work will focus on potential release sites located in the Los Alamos townsite, at the head of Los Alamos/Pueblo watershed, and then continue on to the Mortandad and Water/Cañon de Valle watersheds. Finally, work will progress to the remaining watersheds, until potential release sites in all eight watersheds are investigated and remediated, as necessary.

The ER Project welcomes your questions and comments at (505) 665-6770.

Definitions

Administrative Authority: The regulatory group that has the authority to approve ER activities at a particular site. These groups include the New Mexico Environment Department (NMED), the US Environmental Protection Agency (EPA), and the US Department of Energy (DOE).

Characterize: See Site characterization.

Chemical: Any naturally occurring or man-made substance characterized by a definite molecular composition, including molecules that contain radioactive materials.

Cleanup: Any action that physically removes or treats a hazardous waste or constituent that threatens or potentially threatens human and/or ecological receptors.

Cleanup levels: Media-specific contaminant concentration levels that must be met by a selected corrective action. Cleanup levels are established by using criteria such as protection of human health and the environment; compliance with regulatory requirements; reduction of toxicity, mobility, or volume through treatment; long- and short-term effectiveness; implementability; cost; and public acceptance.

Contaminant: Any chemical (including radioactive materials) present in environmental media or on structural debris.

Contamination: Chemicals introduced into the environment as a result of people's activities, regardless of whether the concentration is a threat to health.

Corrective action: An action taken to rectify conditions adverse to human health or the environment.

Discharge: As defined under RCRA, 40 CFR 260.10, accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into or on any land or water.

Disposal: As defined under RCRA, 40 CFR 260.10, any discharging, depositing, injecting, dumping, spilling, leaking, or placing any hazardous waste into or on any land or water so that such solid or hazardous waste, or any constituent thereof, may enter the environment, be emitted into the air, or discharged into any waters, including groundwaters.

Environmental surveillance: Collection and analysis of samples of air, water, soil, foodstuffs, biota, and other media to determine the environmental quality of an industry or community. Environmental surveillance commonly is performed at sites that contain nuclear facilities.

Groundwater: Water in a subsurface saturated zone; water beneath the regional water table.

Hazardous waste: Any solid or liquid waste is generally a hazardous waste if it

- is not excluded from regulation as a hazardous waste,
- is listed in the regulations as a hazardous waste,
- exhibits any of the defined characteristics of hazardous waste (ignitability, corrosivity, reactivity, or toxicity), or
- is a mixture of solid waste and hazardous waste.

HSWA Module: Module VIII of the Laboratory's Hazardous Waste Facility Permit. The permit allows the Laboratory to operate as a treatment, storage, and disposal facility. Module VIII regulates the cleanup of inactive sites and the activities of the ER Project for those potential release sites listed on the permit.

Institutional controls: Controls prohibiting or limiting access to contaminated media; may consist of deed restrictions, use restrictions, permitting requirements, administrative procedures, etc.

Long-term surveillance and monitoring: Collecting periodic measurements over time to assess status and trends.

Material Disposal Area (MDA): A landfill area used for disposing of chemically and/or radioactively contaminated materials.

Nature and extent of contamination: The "nature" of contamination is the type and amount of chemicals (naturally occurring or man-made) that are present in, or have been released to, the environment and is determined by detection of a chemical in one or more environmental samples. In the case of naturally occurring or widespread man-made chemicals, detection is determined by comparison to background levels. The "extent" of contamination means how a given chemical is distributed in the environment and is determined by comparison to site baseline values, if applicable, and/or analysis of trends in the data.

No further action (NFA): A recommendation that no further investigation or remediation is warranted for a potential release site, based on specific criteria.

Outfall: The vent or end of a drain, pipe, sewer, ditch, or other conduit that releases wastewater, sewage, storm-water runoff, or other liquid effluent into the environment.

Potential release site (PRS): A potentially contaminated site at the Laboratory. PRS is a generic term that includes solid waste management units listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit and areas of concern (AOC).

Receptor: A person, plant, or animal that is exposed to a chemical or physical agent released to the environment.

Release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste or hazardous constituents into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles) that contain any hazardous wastes or hazardous constituents.

Remediation: The process of reducing the concentration of a contaminant (or contaminants) in air, water, or soil media to a level that poses an acceptable risk to human health; the act of restoring a contaminated area to a usable condition based on specified standards; the act of stabilizing a site to reduce or control movement of contamination.

Remedy or remedial action: Those actions consistent with permanent remedy instead of or in addition to removal actions in the event of a release or threatened release of a hazardous waste or constituent into the environment. Those actions used to prevent or minimize the release of hazardous wastes or constituents so that they do not migrate to cause unacceptable risk to present or future public health or the environment.

Resource Conservation and Recovery Act (RCRA): The Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (40 CFR 60.2).

Risk: A measure of a negative or undesirable impact associated with an event.

Risk assessment: A site-specific analysis of the potential adverse effects of hazardous constituents that are released from a site in the absence and/or presence of any control or mitigation actions. Also called a baseline risk assessment.

Runoff: The portion of the precipitation on a drainage area that is discharged from the area through surface flow, either by sheet flow or through a channel.

Sediment: (1) A mass of fragmented inorganic solid that comes from the weathering of rock and is carried or dropped by air, water, gravity, or ice; or a mass that is accumulated by any other natural agent and that forms in layers on the earth's surface, for example sand, gravel, silt, mud, or loess. (2) A solid material that is not in solution and either is distributed through the liquid or has settled out of the liquid.

Site characterization: The process of defining the nature and extent of potential contaminants, as well as pathways and methods of migration of the hazardous waste or constituents, including the media affected; the extent, direction and speed of the contaminants; complicating factors influencing movement; and concentration profiles.

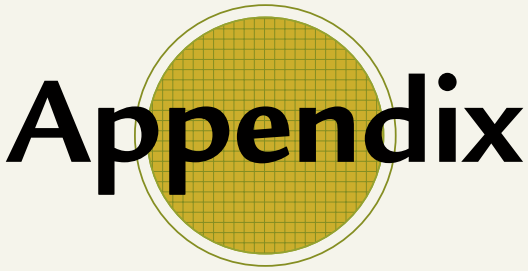
Solid waste: As defined by RCRA, any garbage; refuse; sludge from a waste treatment plant, water-supply treatment plants, or air-pollution-control facility; and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities.

Solid waste management unit (SWMU): Any identifiable site at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at or around a facility at which solid wastes have been routinely and systematically stored, such as waste tanks, septic tanks, firing sites, burn pits, sumps, landfills (material disposal areas), wastewater outfall areas, canyons around the Laboratory, and contaminated areas resulting from leaking product storage tanks (including petroleum).

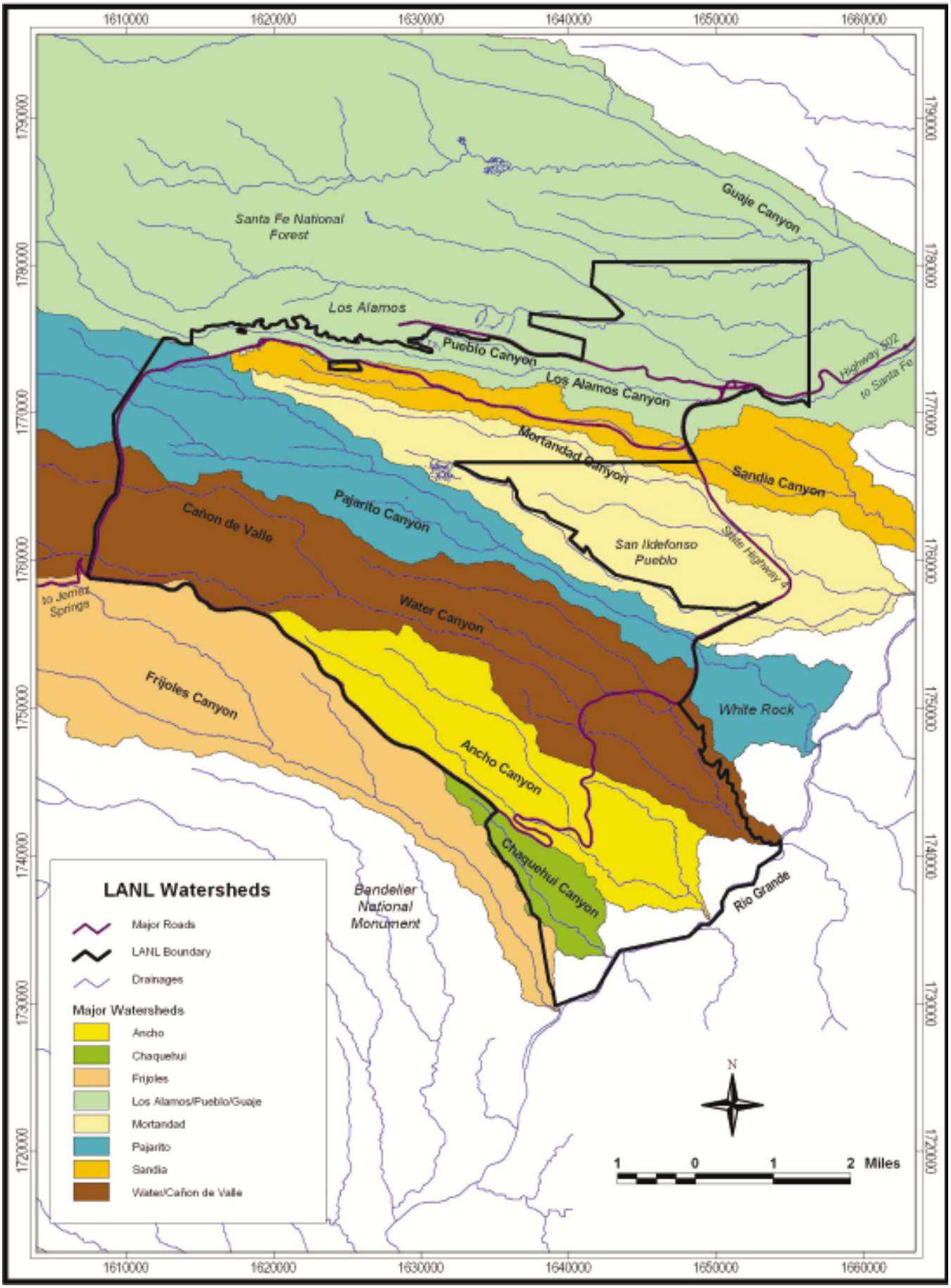
Stakeholder: Any party or agency, whether inside or outside the Laboratory, interested in or affected by ER Project issues and activities.

Technical area (TA): Laboratory-established administrative units for its operations. There are currently 48 active TAs spread over 43 square miles.

Watershed: The region drained by, or contributing waters to, a stream, lake, or other body of water and separated from adjacent drainage areas by divides such as a ridge or summit of high ground.


Appendix

Appendix A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Los Alamos Canyon
Highway 502 to Santa Fe
Mortandad Canyon
Sandia Canyon
Pajarito Canyon
Cañon de Valle
San Ildefonso Pueblo
State Highway 4
to Jemez Springs
Water Canyon
Frijoles Canyon
White Rock
Ancho Canyon
Chaquehui Canyon
Rio Grande
Bandelier National Monument
LANL Watersheds
Major Roads
LANL Boundary
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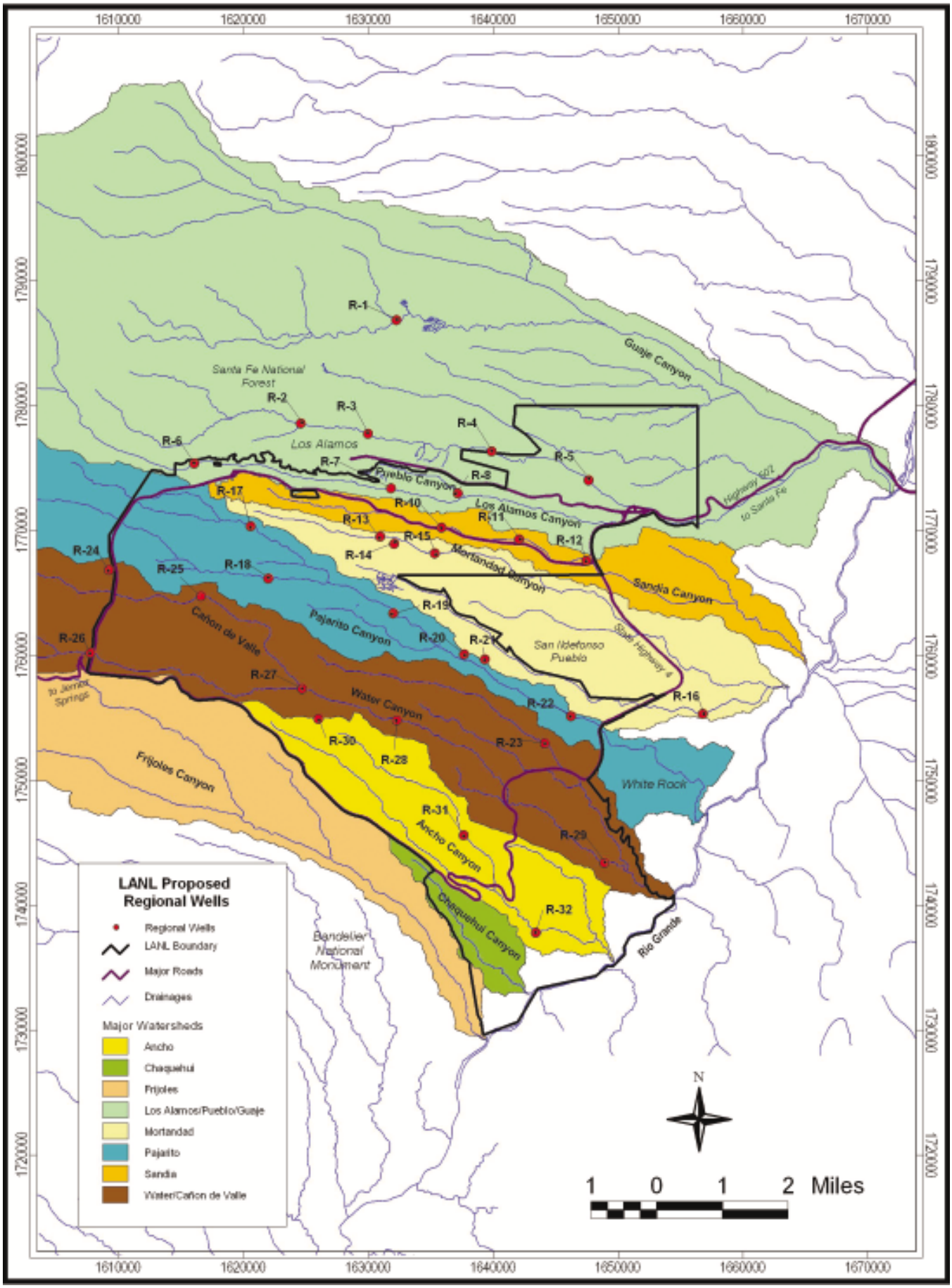
Appendix B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Major Watersheds
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Frijoles
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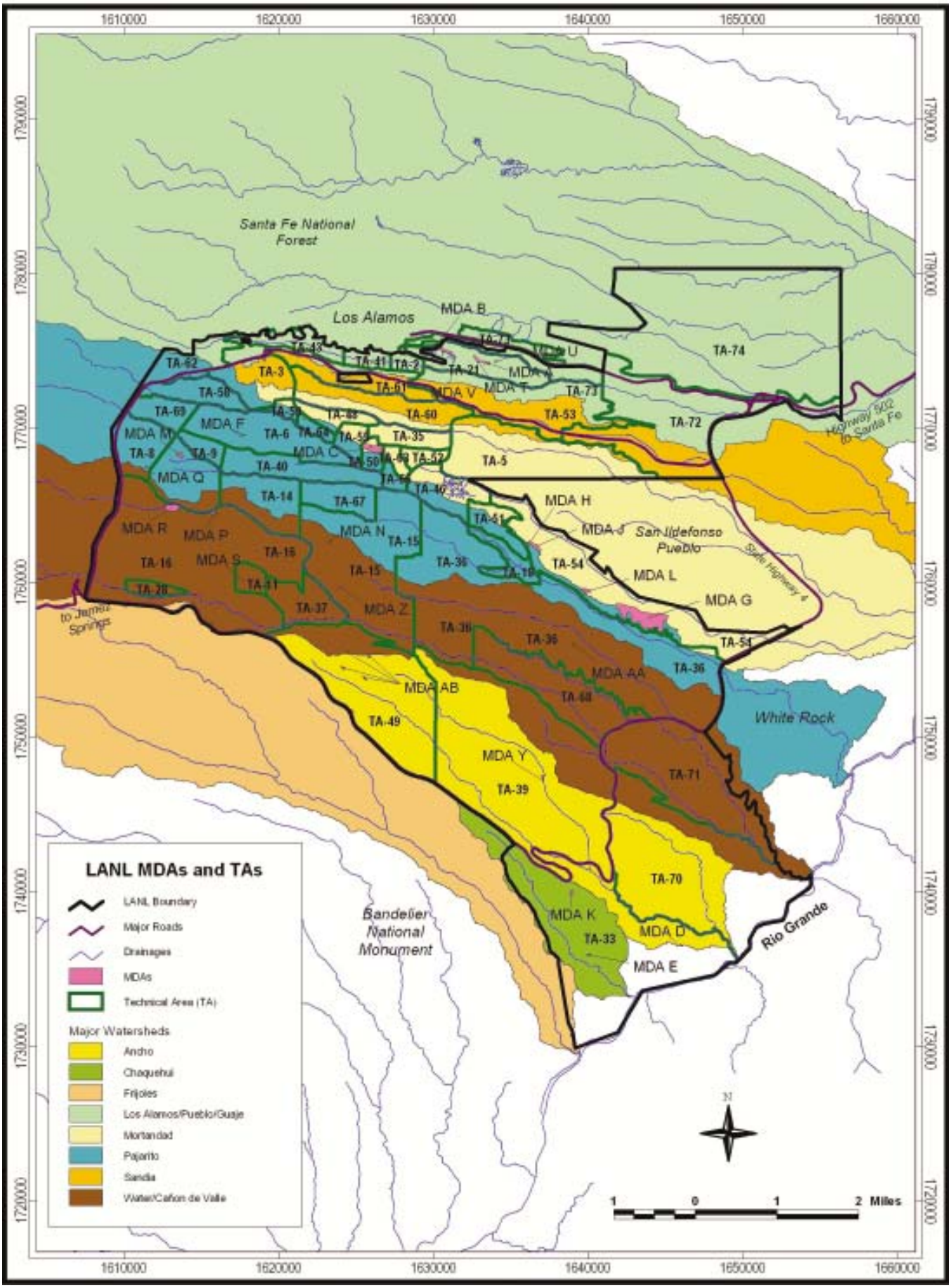
Appendix C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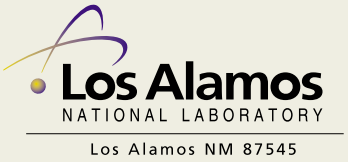

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