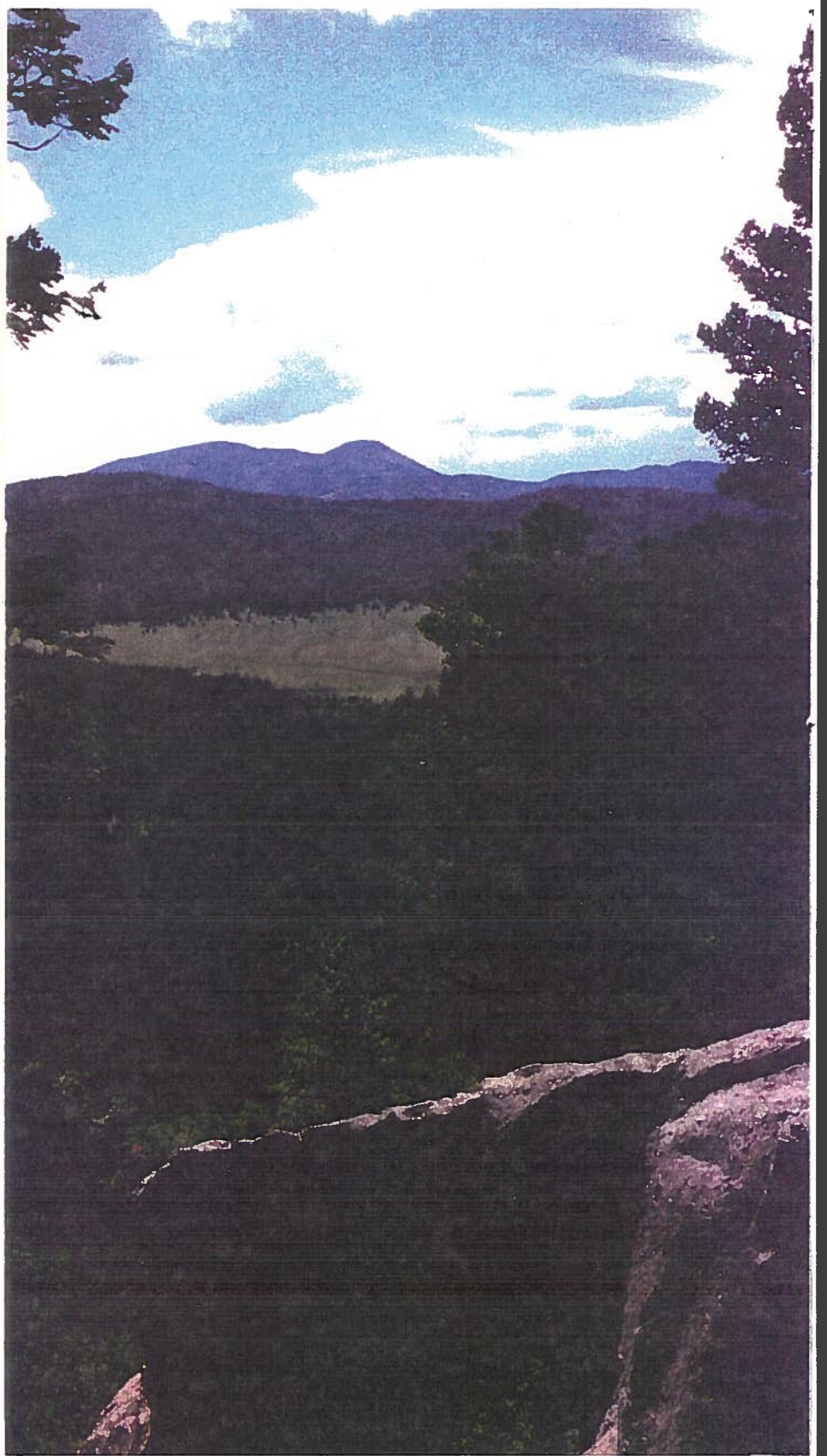
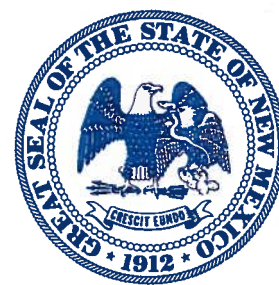




NMED/DOE/AIP-98/4



New Mexico Environment Department



Environmental
Oversight
and Monitoring
at
Department
of Energy
Facilities in
New Mexico

1997
Annual
Performance
Report

New Mexico Environment Department

Environmental Oversight and Monitoring

at

Department of Energy Facilities in New Mexico

1997 Annual Performance Report

July 1998





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**John Parker, Chief
Jeanne-Marie Crockett, Editor**

**2044 A Galisteo Street
P.O. Box 26110
Santa Fe, New Mexico 87501
(505) 827-1536**

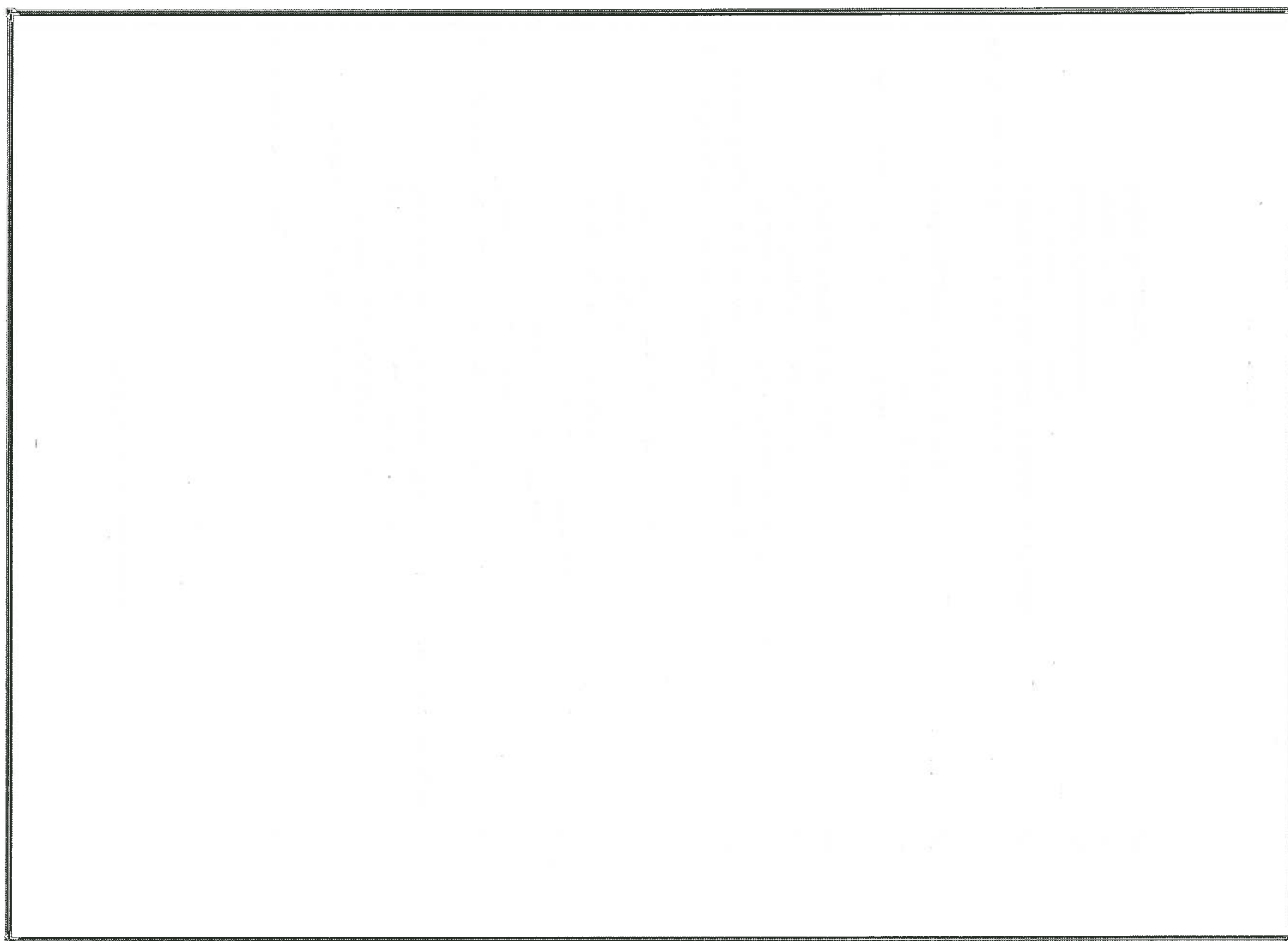
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Executive Summary

Introduction and Program Overview

The mission of the New Mexico Environment Department's DOE Oversight Bureau is to help assure that activities at the U.S. Department of Energy facilities in New Mexico are protective of public health and safety and the environment. Funding for this program is provided through a grant in accordance with the provisions stated in the *Agreement-In-Principle between the State of New Mexico and the U.S. Department of Energy*.

Los Alamos National Laboratory Oversight

Environmental surveillance was a priority for the oversight program at Los Alamos National Laboratory. Air, water, soil, sediment and biota were sampled from the laboratory and surrounding areas to verify sampling data reported by the laboratory, or to independently establish background conditions, or evaluate the impact of past and present operations of the laboratory. Air sample results were similar to data reported by the laboratory for plutonium, americium, uranium and tritium, and were below health-based concentration guidelines. Gamma radiation levels did not exceed regional background. Preliminary data from Rio Grande water samples taken both upstream and downstream from the laboratory indicate similar water quality. Ground water samples were collected from alluvial-aquifer wells on Santa Clara Pueblo and benthic macroinvertebrate and water samples were collected in several of the canyons. Preliminary comparisons of split-samples of soils, sediments, vegetation and foodstuffs indicate that the bureau's data are consistent with LANL's data, and track historical trends. The highest concentrations of radionuclides were found in canyons which are known to have been impacted by laboratory activities.

As sites identified by the laboratory as being potentially contaminated by historical activities are evaluated for cleanup or stabilization, the bureau continues to emphasize the need for constructing and maintaining erosion controls to curb the spread of contamination. The effectiveness of these erosion controls and the completion of remediation were evaluated by visual inspection and stormwater sampling at several sites. Additionally, the bureau continued to work cooperatively with the laboratory to verify cessation of discharges of effluents from permitted outfalls no longer used as part of the laboratory's efforts to consolidate discharges and to construct effluent treatment facilities.



Sandia National Laboratories and Lovelace Respiratory Research Institute Oversight

Bureau personnel assisted N.M. Environment Department regulators and the U.S. Environmental Protection Agency in an effort to review an extensive backlog of SNL environmental restoration documents. The bureau also participated in efforts to rank environmental restoration sites according to environmental risk. A comparison of independent bureau sampling results to Sandia sampling results was used to establish background concentrations of inorganic constituents that will be used to identify contaminated sites and to plan environmental restoration projects.

Recommendations from the bureau helped to establish monitoring of ground water for potential environmental impacts from tests conducted at Lurance Canyon Burn Site and Lurance Canyon Explosive Test Site. The bureau also provided guidance for the installation of erosion controls and a stormwater monitoring station in the area.

The environmental surveillance program verified Sandia's sampling results and provided independent monitoring of environmental impacts. Analysis of samples collected from air, ground and surface water, soil, sediment and vegetation did not show any exceedence of regulatory standards.

Waste Isolation Pilot Plant Oversight

Environmental oversight activities for the Waste Isolation Pilot Plant have been curtailed with the closing of the WIPP Oversight Office in 1996. Staff members are maintaining the gamma radiation monitoring program and are participating in waste characterization and waste certification procedures for the waste generator facilities.

Public Information and Public Outreach

The Community Radiation Monitoring Project gained in momentum and visibility with ensured financial support for the northern New Mexico NEWNET system as part of a legal settlement between Concerned Citizens for Nuclear Safety, Inc., and the U.S. Department of Energy. Several educational workshops were organized by staff to facilitate a deeper level of public participation in program decisions. Additionally, staff members were in increased demand as panelists and presenters at a variety of conferences and meetings. Ongoing programs were continued, such as the bureau's newsletter, web site and technical report distribution.



Introduction and Program Overview

The mission of the New Mexico Environment Department's DOE Oversight Bureau is to help assure that activities at DOE facilities in New Mexico are protective of public health and safety and the environment. The DOE Oversight Bureau's activities are funded by a grant from the U.S. Department of Energy in accordance with the provisions set forth in the *Agreement-In-Principle between the State of New Mexico and the U.S. Department of Energy*. This agreement focuses on state oversight of environmental impacts of the DOE facilities: Sandia National Laboratories and the Lovelace Respiratory Research Institute in Albuquerque, Los Alamos National Laboratory in Los Alamos and the Waste Isolation Pilot Plant in Carlsbad.

The Agreement-In-Principle resulted from an initiative by DOE to improve its accountability concerning public health, safety and environmental protection. States hosting DOE facilities were provided the necessary funding and staff security clearances. The first Agreement-In-Principle was effective from October 22, 1990 through September 30, 1995. The second five-year agreement became effective on October 1, 1995, through which the New Mexico Environment Department continues to fulfill the four primary objectives of the agreement:

- To assess the DOE's compliance with existing laws including regulations, rules, and standards.
- To participate in the prioritization of cleanup and compliance activities at the DOE facilities.
- To develop and implement a vigorous program of independent monitoring and oversight.
- To communicate with the public to increase public knowledge of environmental matters about the facilities, including coordination with local and tribal governments.

Personnel and Administration

To meet the State of New Mexico's obligations under the Agreement-In-Principle, The New Mexico Environment Department had a total of 29 positions in 1997 funded by the Agreement-In-Principle. One technical position was transferred to another bureau as part of a broader agency resource realignment and another position was transferred from the SNL



Oversight Office to Santa Fe to assist with oversight at LANL. At the close of 1997 the bureau had a total of 27 positions.

The New Mexico Environment Department employees who are funded by the DOE grant are located at "site offices" in White Rock and Kirtland Air Force Base and at New Mexico Environment Department offices in Santa Fe. Environmental oversight and monitoring of the Waste Isolation Pilot Plant are performed by AIP-funded staff members out of the Santa Fe office.

Inter-Governmental Coordination

There was a significant increase in the coordination of oversight activities with tribal governments in 1997. Bureau staff members regularly met with and consulted with environmental staff from San Ildefonso, Santa Clara, Cochiti, and San Juan Pueblos. Outreach programs, such as the Community Radiation Monitoring project, and bureau-sponsored technical workshops have served to initiate positive working relationships among the technical professionals from the Pueblos, local and state governments, federal agencies, and the DOE facilities.

Environmental Restoration Technical Guidance Development

The DOE Oversight Bureau staff participated in meetings of the "core team" to address technical, administrative and regulatory issues common to the environmental restoration programs at SNL and LANL. Representatives from DOE, LANL, NMED and SNL constituted the core team.



Los Alamos National Laboratory Oversight

Environmental Surveillance

In 1997, Department of Energy Oversight Bureau staff located at Los Alamos focused most of their resources on environmental surveillance activities. Surveillance programs included investigations of environmental media including air, water, soil, sediment, and biota, and radiation monitoring. Activities were coordinated with Los Alamos National Laboratory's Environmental Safety and Health Division.

Ambient Air and Radiation Monitoring

Air Particulate Monitoring

Los Alamos National Laboratory maintains a radiological air monitoring system known as AIRNET, a network of 55 air particulate samplers. The bureau's monitoring program conducts side-by-side sampling at selected laboratory stations.

The bureau has five air particulate samplers located at the AIRNET stations shown on **Figure 1**. Four of these stations are very similar to the AIRNET samplers, including pump size, filter size and flow rate. The fifth station uses older equipment, with a smaller filter and flow rate. A motorized pump draws air through filters that collect particulate matter. The filters are collected quarterly, and then analyzed for radionuclides—usually uranium, plutonium and americium. The only significant difference between the bureau's and the laboratory's air samplers is the filter medium. The bureau uses glass fiber filters, while the laboratory uses Dynaweb filters which contain less natural uranium than glass fiber filters.

Sampling results show plutonium and americium were generally within the range of uncertainty associated with the results reported by Los Alamos National Laboratory. Uranium was detected at slightly higher levels than those reported by the laboratory. The difference is likely due to natural uranium in the glass fiber filters used by the bureau. The levels of plutonium, americium and uranium were at or below detection limits and two or three orders of magnitude below health-based concentration guidelines.

At four of the air monitoring stations, tritium was measured for the entire year. Air was pumped through a column of silica gel, which absorbed moisture. This moisture was then analyzed for tritium. At both the bureau's and the laboratory's perimeter stations, tritium



was found at slightly higher levels than at the regional stations. Overall, the bureau's data for 1997 were similar to data reported by the laboratory.

Historically, the bureau's data have been available sooner than the laboratory's data, which are published in their annual Environmental Surveillance Reports. However, in late 1997 Los Alamos National Laboratory began placing data on its Web page, at <http://www.air-quality.lanl.gov>. In 1998, the laboratory is planning to include the bureau's 1996 and 1997 data on its web page so that AIRNET data collected by the two agencies can be easily accessed and compared by the interested public.

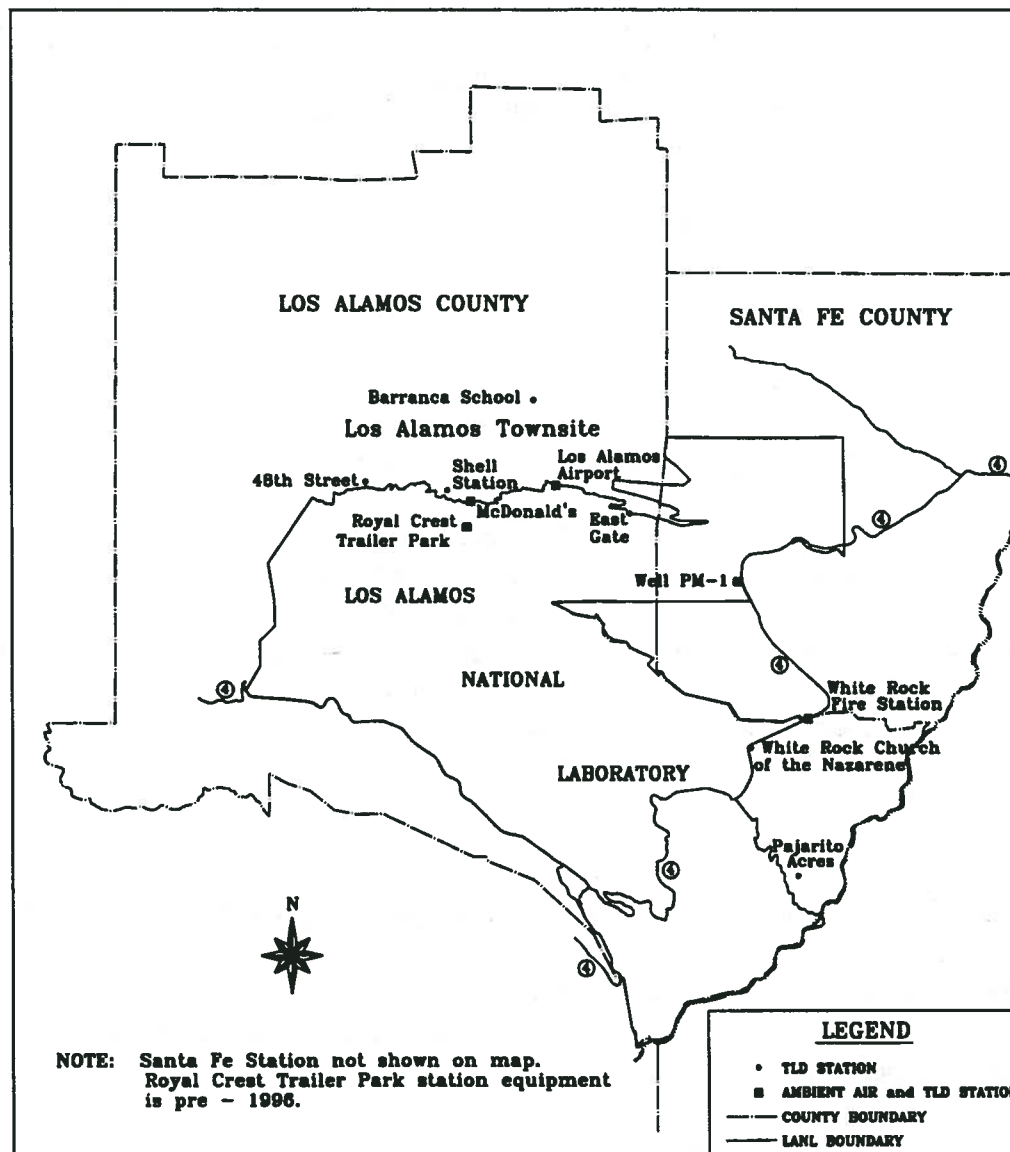


Figure 1.
Perimeter Ambient Air Monitoring and
Thermoluminescent Dosimeter (TLD) Stations



Environmental Radiation Dosimetry

In 1993, the bureau initiated a program for assessing baseline levels of gamma radiation and monitoring laboratory-related gamma radiation anomalies. Using the same strategy as that used for the ambient air monitors, the bureau has located twelve gamma radiation detectors, known as thermoluminescent dosimeters, at stations on the perimeter of the laboratory, as shown in **Figure 1**. Levels of gamma radiation measured by the bureau were consistently lower than the levels measured by the laboratory. The difference is suspected to be due to differences in dosimeter chip media. None of the levels measured were above regional background.

Environmental Radiation Ambient Monitoring System

Besides the air particulate samplers located at Los Alamos, the bureau maintains an air monitoring station on the roof of the Public Employees Retirement Association building in Santa Fe. This sampler is part of the *Environmental Radiation Ambient Monitoring System*, a national network of Environmental Protection Agency stations that collects air and water samples for analysis of radioactivity.

Air filters are collected weekly from the station and, beginning in 1997, a precipitation sample is collected after a rain or snow. The air filters and water samples are sent to the Environmental Protection Agency's National Air and Radiation Environmental Laboratory for analysis. Data from this program are summarized in *Environmental Radiation Data*, published quarterly by the EPA. These reports are also available on the Internet at <http://www.epa.gov/narel/erdonline.html>.

Surface-Water and Ground-Water Monitoring

The bureau monitors surface water and ground water at Los Alamos National Laboratory and outlying areas. Independent and split samples are collected at wells, springs, and permitted effluent release points or "outfalls." The objectives of the water-monitoring program are to verify the laboratory's water-quality data, independently assess water quality at sites both on and off laboratory property, characterize undocumented surface-water and ground-water occurrences, and assess the interaction between surface water and ground water. At sampling locations, field data such as specific conductance, temperature, and flow volume are measured. Water samples are analyzed for water quality parameters as well as contaminants that have been released from the laboratory.

In 1997, a project to acquire background data in the western region of the laboratory was initiated. Specifically, the bureau began evaluating the influence of the Pajarito fault zone on surface-water infiltration in Pajarito Canyon, Cañon de Valle and Water Canyon. In addition to sampling these canyon reaches, field data were collected to better describe the fate of perennial surface water in Sandia Canyon. The study found contaminants in Cañon de Valle

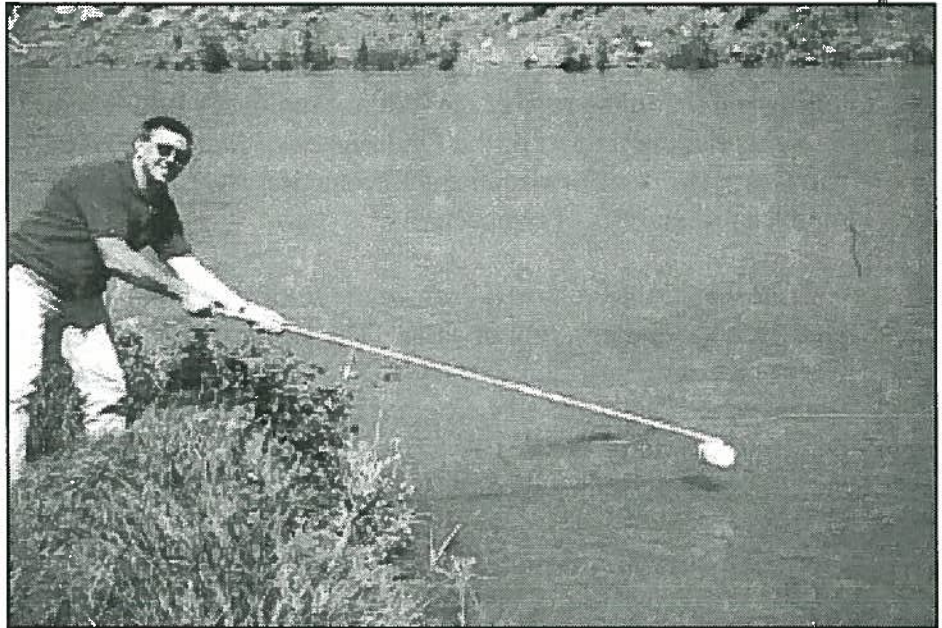


surface water, and found indications of perennial flows in both Pajarito Canyon and Cañon de Valle.

Rio Grande Water and Sediment Quality

Rio Grande water and suspended sediments were sampled at locations above and below where runoff from the laboratory reaches the river. The samples were used to evaluate whether there were differences in water quality between these locations during seasonal high-flow events that are expected to carry greater amounts of contaminants off the Pajarito Plateau.

On consecutive days during the 1997 spring runoff period, samples were collected at two locations along the Rio Grande. One sample location was north of Otowi Bridge (upstream of Los Alamos National Laboratory), and the other was at the Rio Grande/Frijoles Canyon confluence east of the Bandelier National Monument headquarters. Preliminary data indicate that the water quality was similar at the upstream and downstream locations.



A surface-water sample is collected from the Rio Grande.

Santa Clara Pueblo Water Quality Study

During the fall season, bureau staff met with Santa Clara Pueblo's Office of Environmental Affairs, and received permission to collect water samples in Santa Clara Canyon from the Baca Location No. 1 boundary to the Rio Grande confluence. The purpose of the sampling was to conduct an independent assessment of water quality in the canyon, which is geologically similar and nearby, yet not directly impacted by the laboratory. Surface water samples were collected from the Santa Clara Canyon perennial stream and from a spring in the canyon. Ground water samples were collected from three alluvial-aquifer wells, one of which is being used in the summer months for public drinking-water supply. Data resulting from this sampling will be used by bureau staff in their evaluation of water quality data at



the laboratory, and can also be used to support the Pueblo's ground water monitoring program.

Storm Water Runoff from Los Alamos Canyon

Storm water plays a significant role in the migration of contaminants from industrial areas at Los Alamos National Laboratory. Many of the laboratory's current and historical industrial sites are situated on mesa tops that drain into east-west trending canyons, which eventually terminate at the Rio Grande. The bureau evaluated the effectiveness of erosion controls and the completion of remediation by visual inspection and storm water sampling.

The bureau samples runoff in the canyons to determine if contaminants are being transported during storms. Also, samples are collected to verify that the storm water transport pathway is being properly assessed by the laboratory's Environmental Restoration Project. In 1997, the storm water sampling program got off to a slow start because of operational problems with the automated samplers. However, samples were taken by staff of runoff during storms from significantly impacted canyons, such as Los Alamos Canyon. Preliminary data collected in Los Alamos Canyon indicate that erosion controls installed by the Environmental Restoration Project just below the Los Alamos Inn, a former Manhattan Project site, appear to be reducing the migration of contaminated sediments.

During the past five years, the migration of mercury and plutonium down the hillside from the Los Alamos Inn was a concern to both the laboratory's Environmental Restoration Project and the Environment Department. West of the Los Alamos Inn, some privately-owned condominiums rest on another former Manhattan Project site. Bureau data show that uranium-contaminated sediments are migrating down the hillside below these homes. Recently, large volumes of soil and bedrock at both of these hillsides have been removed or cleansed. Some hot spots were inadvertently left in place and may require future removal. Erosion controls were installed during the remediation of both sites to keep contaminated soils from moving.

Macroinvertebrate Sampling

Benthic macroinvertebrate and water samples were collected in Upper Frijoles Canyon, Upper Cañon de Valle, Upper Pajarito Canyon, Upper Guaje Canyon and Upper Santa Clara Canyon. Data from these samples will be used to characterize the water quality and aquatic communities of canyon reaches on the Pajarito Plateau not thought to be impacted by laboratory operations. This information is representative of baseline conditions of aquatic communities in the vicinity of the laboratory and can therefore help to identify canyon reaches which have been impacted by laboratory operations.



Soil, Sediment, and Biota Sampling

Soils, sediments, vegetation, and foodstuffs are sampled annually by the laboratory to measure background levels of chemical and radioactive materials and to determine if contaminants are leaving the laboratory. In a coordinated effort between the laboratory's Environmental Surveillance and Health Division and the bureau, split samples from selected locations were collected and analyzed by an independent laboratory. Preliminary comparisons indicate laboratory data are consistent with the bureau's data and track historical trends. The highest concentrations of radionuclides were found in canyons which are known to have been impacted by laboratory activities.

Environmental Restoration

Approximately two thousand sites at Los Alamos National Laboratory are slated to be investigated or cleaned up under the Environmental Restoration program. The DOE Oversight Bureau provides information to the DOE, the facility, and state environmental regulatory programs regarding these investigations and cleanup activities. Staff members assess compliance with federal and state environmental regulations relating to the clean up of historical contamination, evaluate technical issues, and discuss prioritization of activities. They monitor sites and collect samples to verify data collected by the laboratory, and work with the laboratory in the development and preparation of site investigation plans and reports.

Common Regulatory Approach

In January 1996, the New Mexico Environment Department received authorization from the U. S. Environmental Protection Agency to administer portions of the Hazardous and Solid Waste Amendments to the Resource Conservation Recovery Act. Regulations promulgated under this act are the primary drivers for the environmental restoration projects at DOE facilities in New Mexico. The department's Hazardous and Radioactive Materials Bureau is responsible for implementing these regulations. Additionally, environmental restoration projects must comply with all applicable environmental laws, regulations, standards, and orders.

A working group was formed to integrate the regulatory and technical requirements of these various regulations. The group included representatives of the department's DOE Oversight, Hazardous and Radioactive Materials, Ground Water Quality, and Surface Water Quality Bureaus. The working group met routinely to address crosscutting environmental restoration issues. One such issue was prioritization of cleanup projects based on health or environmental risks versus prioritization of interim measures based on the potential for contaminant migration. Due in part to the diverse nature of the laboratory's more than two thousand potential release sites, the working group has an ongoing array of regulatory issues to address.



No Further Action

Bureau staff reviewed a number of proposals for "No Further Action" determinations. The proposals present information to support the contention that the site is either not contaminated, or is so slightly contaminated that further action is not necessary. The proposals are evaluated to determine their conformance with appropriate guidance and criteria, and the requirements of applicable regulations. Comments resulting from the reviews are provided to the facility and the regulatory authority, in this case the Hazardous and Radioactive Materials Bureau. To date, the laboratory has proposed approximately seven hundred sites for no further action, yet only three of the requests have been approved by the Environment Department.

To promote a higher success rate for such proposals, staff continue to work with the regulatory agencies and the facilities to develop consensus on technical approaches including: determination of site specific background; sampling procedures; field screening technologies; human health risk based screening action levels; use of risk based concentrations in the decision process; and the development of ecological risk based screening and assessment procedures. When agreed upon technical approaches are used, and sufficient information is included, proposals for no further action can be more readily evaluated, and as deemed appropriate, approved by the regulatory authority.

Prevention of Contaminant Migration

The bureau continues to work with the laboratory to identify environmental restoration sites with the potential for erosion, and to determine what measures are needed to prevent the migration of contaminants into watercourses.

During the year, the laboratory identified more than eight hundred priority sites that are located in or near watercourses. To evaluate the potential for migration of contaminated materials from these and other locations, the laboratory, with support from the bureau, developed an assessment tool known as *Administrative Procedure 4.5*. The procedure consists of two parts. The first part involves a site visit where physical attributes of the site (e.g., slope, vegetative cover, proximity to a watercourse, evidence of erosion) are recorded and scored. The second part involves a compilation of maps showing sampling locations and site sampling data.

Sites that have high or medium potential for erosion are evaluated by a surface water assessment team, which includes representatives from the laboratory and the bureau. The team evaluates contaminant migration potential according to the site score and the data review. Based on the evaluation, the team makes recommendations on what corrective or interim actions may be necessary. The team also provides input for the corrective action schedule and helps to identify the responsible party.



The laboratory inspected 925 sites, completed erosion assessments of all priority sites, and compiled data on 476 sites. Fifteen sites were identified as being high in erosion potential but as not having sampling data. The surface water assessment team recommended limited sampling to screen these sites to determine the need for further investigation. As a result of these efforts, erosion controls such as silt fences, run-on controls, and slope stabilizations were put in place on 179 sites. Also, inspection and maintenance schedules were instituted to maintain the integrity of the erosion controls until the sites are remediated.

Slope Stabilization at Los Alamos Townsite Fire Break

In 1997, Los Alamos National Laboratory constructed firebreaks around some of the technical areas in the western part of the laboratory and around homes and businesses near the town site. The firebreak above Los Alamos Canyon was located near some contaminated sites. Bureau staff monitored the construction of this fire break to assure that activities did not mobilize contaminants and to assure that erosion controls and stabilization measures were put in place. The potential for the mobilization of contaminants was also a concern of residents living in the nearby condominiums.

By project's end, the Department of Energy and its subcontractor demonstrated that the firebreaks had been constructed appropriately. All tree debris had been removed from the drainages and the tree-cleared path had been reseeded. The Environment Department recommended that stabilization measures be installed at all bare or steep slopes near potentially contaminated sites. Monitoring will continue at the firebreak throughout 1998 to ensure that the existing stabilization measures are effective.

Stabilization during Decontamination and Decommissioning Activities at TA-21

Decontamination and decommissioning of buildings at Los Alamos National Laboratory occurs when they are no longer needed or when the aging structures become unsafe or too costly to maintain. As these old buildings are torn down, rubble, debris and salvaged building materials are segregated in order to be recycled, reused or disposed. In addition to overseeing the proper disposition of contaminated materials from these sites, over-



Old Plutonium Processing Buildings at Technical Area 21.



sight staff evaluates stabilization practices to ensure that contamination does not leave these sites.

One of the largest and most costly decontamination and decommissioning projects involves the old plutonium processing buildings at Technical Area-21. These buildings were used for thirty years, primarily for plutonium and uranium processing. Therefore, many sections, especially the ductwork, drains, interior walls and floors, were contaminated. During a site visit in late spring following a large rainstorm it was noted that no stabilization measures were in place to prevent materials from leaving the site.

In June, the bureau sampled sediments in two drainages leading from the site. Preliminary data showed elevated levels of mercury and plutonium. These results may indicate that contamination is being spread by storm water runoff and the lack of erosion controls.

Following the transmittal of the results to the Department of Energy and Los Alamos National Laboratory, a meeting was held at the site to discuss stabilization measures. A key recommendation made by the New Mexico Environment Department was that the laboratory develops and implements a storm water pollution prevention plan for Technical Area-21. The Department of Energy and Los Alamos National Laboratory agreed to consider this, despite the fact that the effected area is less than five acres and therefore exempt from this requirement by the regulations.

Stabilization Measures at Material Disposal Area M

Bureau staff members evaluated the effectiveness of stabilization measures at Material Disposal Area M, an abandoned dump site where an "expedited cleanup" was conducted in 1995 and 1996. Upon completion of the cleanup, the site had been stabilized by grading, reseeding, and emplacement of erosion controls.

As part of the evaluation, an automated storm water sampler was installed at the Pajarito Canyon and Starmer Gulch confluence below the site. The sediment sample showed elevated levels of mercury and lead. Also, water was observed flowing through the site during a summer storm, resulting in the erosion of cover materials. As a result of these observations, the laboratory upgraded erosion controls, made plans to regrade and reseed the site, and instituted a routine maintenance program. Recent analyses of water from springs discharging below the site did not show elevated levels of contaminants.

High Explosives Contamination at TA-16, S-Site

At TA-16, the S-site, releases from buildings that fabricate high explosives have contaminated ground water in a tributary canyon of Cañon de Valle. Bureau staff provided technical and field recommendations to laboratory investigators responsible for characterizing and remediating this site. Two intermediate level boreholes and five shallow-alluvial aquifer monitoring wells had been installed.



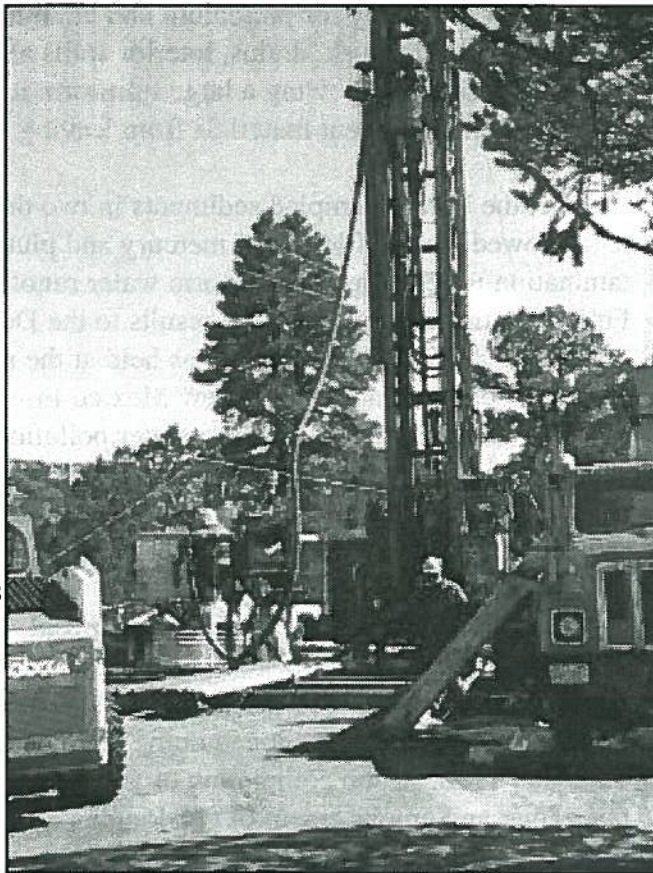
Hydrogeologic Investigations

The DOE Oversight Bureau reviewed a draft version of the "Hydrogeologic Workplan" and submitted written recommendations regarding well location, well design, and scheduling. The plan was issued by the laboratory partly in response to issues raised by the Environment Department, and due to the laboratory's own commitment to the protection of ground water. It describes proposed activities to further characterize the hydrogeologic setting and to enhance the ground-water monitoring program at the laboratory.

The work plan directs the construction of a number of regional test wells. In the fall of 1997, a regional test well, numbered R-9, was drilled in Los Alamos Canyon near the facility's eastern boundary at State Road 4. The well is designed to provide geologic, hydrogeologic, and water-quality data from the regional aquifer as well as shallow and intermediate saturated zones. Prior to drilling R-9, the last regional-aquifer test well was drilled in 1960.

Canyons Investigations

The laboratory is required by permit to describe contamination and its potential for transport to or within canyon watersheds, as well as its health or environmental impact. In response to this requirement, the "Core Document for Canyons Investigations" was submitted in April. Bureau staff reviewed the document and suggested modifications to the descriptions of surface waters on the Pajarito Plateau and suggested consideration of conservative human health exposure scenarios. Also, bureau staff worked throughout the year with the laboratory investigators to prepare canyons investigation plans, beginning with a plan for Los Alamos and Pueblo Canyons, followed by a plan for Mortandad Canyon.



The drilling of regional test well R-9 near State Road 4 in Los Alamos Canyon.



Waste Management

Contaminant Migration from Outfalls

Outfall is a term used to describe point source discharges of liquid effluent to the environment. At the laboratory, they are typically discharge points for floor and roof drains, cooling water drains, process and industrial drains, and other liquid collection and treatment systems. Most of the laboratory outfalls are permitted under the National Pollutant Discharge Elimination System.

To reduce the amount of contaminants that are released to the environment, the laboratory is consolidating outfalls and building treatment facilities to treat effluents. The laboratory constructed two major facilities, the Sanitary Wastewater System Consolidation Plant and the High Explosives Wastewater Treatment Plant. As a result of work done under these projects, the number of outfalls has been reduced through consolidation and elimination, and the amount of contaminants which are released has been reduced by treatment.

Throughout the project, the bureau has worked with the laboratory's Water Quality and Hydrology Group. Staff verifies that there are no longer any liquid discharges, and also matches the location of the outfalls with laboratory data to determine if the site is contaminated, or if contaminated sites are located downstream. A major concern is that if soils or sediments are contaminated, then storm water flows could cause contaminants to migrate. For contaminated sites, bureau staff members recommend that outfalls not be used for storm water discharges. Run-on or runoff controls may also be recommended to divert water away from the outfall drainage.

National Environmental Policy Act

Under the National Environmental Policy Act, a federal action or proposal which has the potential to significantly affect the environment may require an "environmental impact statement." The statement includes a discussion of the need for the action or proposal, the alternatives considered, and the environmental impacts of the proposed action. Actions which are thought to not represent a significant environmental impact may still require an "environmental assessment," which provides evidence and analysis to determine whether to prepare an environmental impact statement. If the agency finds that the project would not significantly affect the environment, the agency may issue a "finding of no significant impact," which explains why an environmental impact statement is not necessary.

The bureau issued comments on the following two draft environmental assessments and one draft environmental impact statement:



- *Predecisional Draft Environmental Assessment for the Parallax Project Fuel Manufacture and Shipment.* The assessment addressed a proposal to manufacture plutonium and uranium mixed oxide fuels at Los Alamos National Laboratory's Technical Area-55 and transport the fuel rods to Canada for use in special reactors. The DOE concluded that the proposed action would cause little or no adverse human health or environmental impacts. Bureau staff recommended that the Department of Energy reconsider the type of containers and method of shipment for mixed oxide fuels because they do not appear to qualify as "relatively low-level radioactive materials."
- *Predecisional Draft Environmental Assessment for Lease of Land for the Development of a Research Park at Los Alamos National Laboratory.* The assessment addressed a proposal to build a research park near Technical Area-3. The DOE concluded that the proposed action would cause little or no adverse human health or environmental impacts. The bureau stated concerns about land development near potentially contaminated sites, about the possibility of generating hazardous waste during construction activities, and about the possible need for stabilization measures during construction.
- *Draft Environmental Impact Statement on Management of Certain Plutonium Residues and Scrub Alloys Stored at the Rocky Flats Environmental Technology Site.* The statement considers alternatives for management of approximately 93,000 pounds of plutonium residues and 1,540 pounds of scrub alloy located at Rocky Flats. Plutonium separation processes could be done at Los Alamos. No new facilities would be required, but existing facilities might need to be modified. The bureau stated concerns about waste transport standards, waste processing capabilities, and disposal facility capacity.



Sandia National Laboratories and Lovelace Respiratory Research Institute Oversight

Inhalation Toxicology Research Institute Changes

The DOE contract with Lovelace to operate the Inhalation Toxicology Research Institute changed from an operation and maintenance format to a cooperative agreement on September 20, 1996, which gave Lovelace more independence as the operator of the facility. Along with the change in contract format, 1997 was the first full year the facility was known as the Lovelace Respiratory Research Institute.

The DOE Oversight Bureau has been evaluating the ground water monitoring program at the Lovelace Respiratory Research Institute since 1993. The bureau installed four monitoring wells in 1994 and 1995 to provide independent monitoring and enhance the conceptual hydro-geologic model for the area. Oversight of ground water contamination at this site is continuing.

Environmental Restoration

“Steam Team”

Bureau personnel reviewed and commented on numerous reports and proposals generated by Sandia National Laboratories as a result of its environmental restoration efforts. Personnel also commented on site drilling plans, sampling and analysis plans, and on the results of sampling efforts. By mid-1997, there was an extensive backlog of environmental restoration documents which had not been reviewed by the regulators. To address this backlog, a “Steam Team” was assembled which included regulatory representatives from the Environment Department and the U. S. Environmental Protection Agency and representatives from the oversight bureau. Oversight staff’s independent site knowledge was vital to the success of the Steam Team which completed review of all the documents and prepared formal responses.

Bureau Participates in Site Ranking

In February 1997, a working group was formed by Sandia National Laboratories to rank its environmental restoration sites according to environmental risk. Generally, the reason for ranking sites is to help assure that those which pose the greatest hazard to human health and



the environment are cleaned up first. Also, the rankings should be reviewed periodically as new information is developed or as work is completed.

The working group included a wide range of stakeholders. Because the bureau had conducted a similar exercise in 1996, bureau members were invited to present their approach and results. The bureau provided an independent look at anticipated risks, based on a working knowledge of conditions in the field. Direct comparison of the results of the Sandia Site Ranking Working Group with the bureau's prioritization results is difficult. Although some of the criteria used in the two efforts were the same, there were different approaches to weighting the criteria. However, both ranking systems resulted in the Chemical Waste Landfill, the Classified Waste Landfill, and the Sandia North ground water contamination falling within the ten highest priority sites and work at these sites is proceeding. The other sites in the top ten of the Sandia prioritization were not considered high priority by the bureau. Variations between the systems in evaluating individual and groups of sites may account for some of the differences.

Site Background Concentrations

The bureau compared its independent sampling results to a Sandia study of background concentrations of inorganic constituents in soil and water for most of the Kirtland Air Force Base area. Based on this comparison, the Environment Department and the DOE reached consensus on background concentrations for inorganic constituents in ground water, base-wide. Consensus was also reached on background concentrations for inorganic constituents in soils over most of the base, excluding the canyons area. Discussion and analysis is ongoing to determine the background concentration of metals for the canyons area. The consensus background concentrations will be used for determining areas of contamination and planning site cleanups.

Hydrogeologic Investigations at the Burn Site

The Lurance Canyon Burn Site, which coincides with the Lurance Canyon Explosive Test Site, is currently used to test fire survivability of transportation containers, weapon components, simulated weapons, and satellite components. Historically, this site was used to test high explosives. It is located on the canyon floor alluvium in the upper portion of the Lurance Canyon drainage. The presence of elevated metals and volatile organic compounds has been detected in soils at the Burn Site. The bureau has made recommendations on three issues relating to potential environmental effects from activities at the site.

Nitrate concentrations in excess of drinking water standards have been detected in water from the supply well located near the Burn Site. Possible sources of the elevated nitrate include explosive tests, sewage discharges, and natural processes. At the suggestion of the bureau, Sandia National Laboratories analyzed a sample for isotopes of nitrogen. Results of those analyses ruled out human or animal waste, but not explosives, as a source. An addi-



Statue Guarding The Lurance Canyon Burn Site.

tional sample was collected for analysis to determine if components of high-explosives are present. Results from this test have not yet been received.

To effectively understand the hydrogeology and monitor for contamination leaving the Burn Site, the bureau suggested that Sandia drill two monitor wells. One well will be constructed specifically to monitor ground-water flow that might occur along the contact between bedrock and the overlying sediments. The other well will be constructed to monitor ground water in the regional saturated zone that is expected in bedrock. Construction of these wells began in December 1997.

During construction of the Burn Site, grading filled in portions of an arroyo crossing the site. The bureau previously recommended the installation of a shallow piezometer within the arroyo to detect the presence of ground water that might flow along the bedrock-alluvium interface. The bureau is con-

cerned that such ground water has the potential to mobilize and transport contaminants further down Lurance Canyon. Although the piezometer is instrumented with a continuous water-level recorder, no underflow has yet been reported by Sandia. The absence of water is not surprising since it has been a fairly dry year and the occurrence of such flow may be infrequent.

Cleanup in Lurance Canyon

Environmental Restoration Site 12-B is located in a watercourse which flows through the Lurance Canyon Burn Site. With input from the bureau, Sandia staff removed buried debris including concrete, cable, wood, and metal from the site. Depleted uranium found in the soil was segregated for disposal as radioactive material.

With guidance from the bureau, erosion controls were installed to prevent contaminant migration and an automatic storm-water collection station was installed to monitor storm-water quality in upper Lurance Canyon.

Proposed Treatment Units at CAMU

Sandia National Laboratories' request to modify its Resource Conservation and Recovery Act Permit to construct and operate a Corrective Action Management Unit (CAMU) was approved by the EPA on September 25, 1997. The CAMU will store and contain hazardous



wastes generated during the cleanup of environmental restoration sites. Construction of the CAMU began on December 1, 1997.

In July, Sandia requested another permit modification to authorize the operation of two "Temporary Units" to treat hazardous wastes derived from remediation activities. The bureau provided comments on the proposed treatment units from which wastes will either be placed in the CAMU or shipped to offsite disposal facilities. The bureau commented on waste treatment standards and sampling of contaminated and treated soils.

The proposed treatment methods are soil washing and low temperature thermal desorption. Soil washing treats soils contaminated with metals, while low-temperature thermal desorption removes volatile organic compounds from contaminated soil. At year's end, the DOE and the EPA were discussing regulatory issues regarding the proposed low-temperature thermal desorption treatment process.

Environmental Surveillance

The environmental surveillance program verifies Sandia National Laboratories' and the Lovelace Respiratory Research Institute's sampling results and provides independent monitoring of environmental impacts. It includes the verification of facility data by collecting and analyzing split samples, the collection of independent samples of environmental media, and the observation of facility operations.

To verify sampling data, bureau staff accompanies Sandia and Lovelace investigators to evaluate sample acquisition and handling procedures. At some locations, samples are split with the facility and are analyzed by an independent laboratory.

To monitor environmental impacts, independent samples are collected at other locations and analyzed for environmental contaminants. Samples of air, ground and surface water, soil, sediment, and vegetation are collected.

Oversight bureau sampling results were compared to results obtained by each of the facility's monitoring program and appropriate regulatory standards. Up through the third quarter of 1997, oversight program sampling results were consistent with results obtained by Sandia and have not exceeded any regulatory standard.

Ambient Air Monitoring

To monitor possible effects on air quality from DOE operations, the bureau operates four continuous air samplers. Three stations are located at sites on the perimeter of Kirtland Air Force Base, and one is located at the University of New Mexico.



The continuous air samplers collect airborne particulate matter, precipitation and water vapor. Airborne particulates are collected on glass fiber filters that are analyzed for both gross radioactivity and specific radioactive isotopes. Precipitation and water vapor are collected by passing a measured volume of air through a column of silica gel, which traps the moisture. At the end of each calendar quarter, the silica gel cartridges are removed from the samplers and sent to an analytical laboratory for tritium analysis.

Because of the low recorded values (at or near detection limits) and because of the station locations, results are expected to represent background values of radionuclides. The results are consistent with historical data. No values exceed federal or state standards for radionuclides in air.

Environmental Dosimetry

To monitor levels of external penetrating radiation in the Albuquerque area, the bureau maintains a network of thermoluminescent dosimeters. The thermoluminescent dosimetry program is intended to measure the total external penetrating radiation from both natural and manmade sources for trend analysis and to verify data from Sandia's and Lovelace's programs.

The bureau has twelve thermoluminescent dosimeters collocated at about 30 percent of Sandia's monitoring sites. The locations are chosen to be representative of on-site, perimeter and community stations. Bureau and Sandia personnel deployed unexposed dosimeters and collected exposed dosimeters on the first day of each quarter.

The bureau has received Sandia's data from the first three quarters of 1997. The annual dose equivalent estimates determined by the bureau are consistent with the Sandia and Lovelace estimates. There are no significant differences between quarterly readings from the on-site, perimeter and off-site locations, indicating that the external gamma radiation contribution by manmade sources including Sandia and Lovelace could not be distinguished from the relatively large contributions of natural sources. Quarterly data for 1997 were consistent with 1996 data.

Terrestrial Surveillance

The bureau collects samples of soil, sediment, vegetation, and surface water to verify Sandia's results and to monitor possible environmental impacts. In July 1997, bureau staff accompanied Sandia personnel to collect samples at eleven locations. Bureau staff sampled approximately 10 percent of the number of locations and media that Sandia sampled. The samples were submitted to an independent laboratory and analyzed for radionuclides.

The data collected by the bureau were compared to Sandia data for validation purposes. Most of the levels measured by the bureau were at or below method detection limits. All of



the radiological data were consistent with data reported in the *SNL 1996 Environmental Report*.

Waste-Water Monitoring

Bureau personnel observed routine sampling at various permitted wastewater monitoring locations. On four occasions bureau staff members collected split samples from a sewer line which collects water from Sandia's nuclear facilities at Technical Areas 3 and 5. This location was chosen for sampling because this wastewater stream has the greatest likelihood of containing radionuclides. The samples were sent to an independent laboratory for radiological analysis. Analytical results were consistent with results obtained by Sandia.

Sampling of Springs in the Central Arroyo del Coyote Area

Besides the perennial Coyote Spring, there are a number of other springs in the Central Arroyo del Coyote area, located in the eastern portion of Kirtland Air Force Base. During the past two years, bureau staff described and mapped several of these previously undescribed springs or seeps.

In addition to the springs, there are several environmental restoration sites in or near Arroyo del Coyote. Because of concerns about possible connections between surface and ground water and contamination at these sites, bureau staff collected water samples. The samples were analyzed for major ions and other parameters including nitrate and volatile organic compounds. The analytical results are being evaluated.

Erosion Control at Environmental Restoration Sites

Water-caused erosion can move soil and sediments large distances. If erosion occurs at a contaminated site, contaminated soil and sediment may be carried away from the site. Bureau staff worked with the department regulators and Sandia to identify sites that are in or near watercourses, where storm water has the potential to transport contaminants. As a result of this work, Sandia personnel are investigating whether erosion controls are needed to prevent or minimize contaminant transport.

Erosion Control at Environmental Restoration Site 228

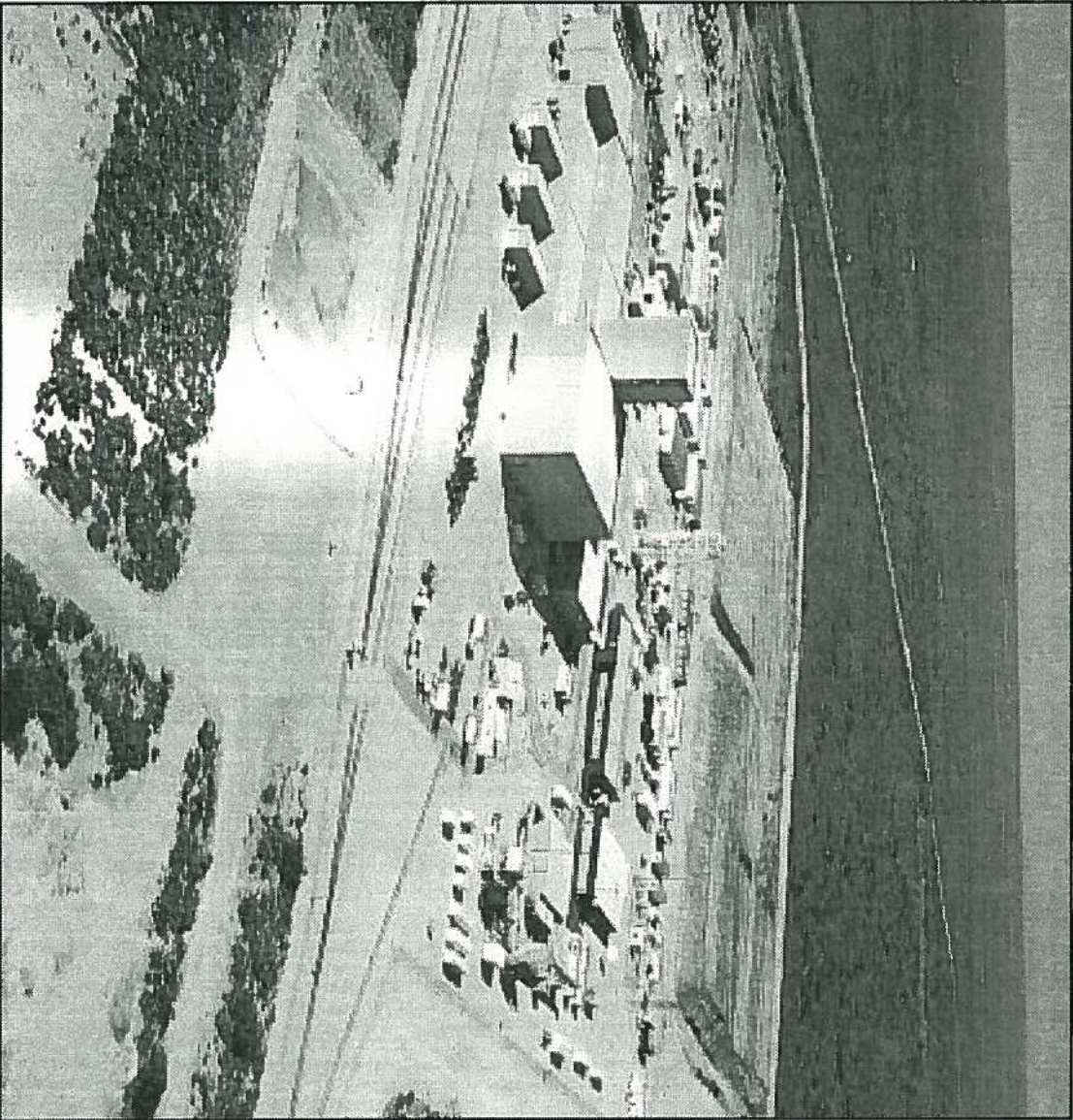
In late July, heavy rains caused a washout of material into Tijeras Arroyo from Sandia National Laboratories' environmental restoration Site 228. Rainwater eroded a channel at the waste dump site, exposing debris and depleted uranium which had been buried below the surface, and transported material to the Tijeras Arroyo floodplain. After discovering the washout, Sandia personnel constructed a berm and diversion channel to control erosion by directing storm water away from the eroded portion of the dump site.



Oversight Bureau staff visited the site to evaluate the erosion controls, and suggested extending the berm to encompass the erosion channel. To determine how far the depleted uranium had flowed into the floodplain of the arroyo, bureau staff coordinated with Sandia staff to select soil sampling locations. Although results indicated elevated levels of thorium-234 outside the posted site boundary, staff concluded that the levels did not pose an immediate environmental threat, and that adequate erosion controls were either in place or planned.

Improved Spill Reporting

The bureau was instrumental in raising Sandia's awareness of the regulatory requirements of spill reporting. Improved spill reporting will help regulators better evaluate the water quality impacts of spills, and determine the need for and track the implementation of corrective measures.



Aerial Photograph of the Waste Isolation Pilot Plant



Waste Isolation Pilot Plant Oversight

No radioactive or hazardous material has been disposed at the Waste Isolation Pilot Plant near Carlsbad, New Mexico. However, technical and regulatory progress is being made: a "Record of Decision" on the latest supplemental environmental impact statement was issued, a ruling on the Compliance Certification Application is expected from the Environmental Protection Agency in March, and the New Mexico Environment Department is preparing the draft RCRA operating permit.

Waste Characterization Audits

As part of the bureau's mission to help assure that activities at DOE facilities are protective of public health and the environment, the bureau has reviewed the procedures for disposal of materials at the Waste Isolation Pilot Plant. Some of the most important procedures are those for the characterization, certification, and transportation of transuranic wastes. Facilities that generate waste must implement these procedures before shipments can be made to the Carlsbad facility. To assure that these procedures are in place and are being followed, the Carlsbad Area Office of the DOE routinely audits the waste-generator facilities.

To understand the audit process, several bureau staff members attended auditor training. Staff members accompanied the DOE audit team as observers to the Idaho National Engineering and Environmental Laboratory and Rocky Flats Environmental Technology Site audits. Additionally, staff observed the waste characterization and waste certification audits at Los Alamos National Laboratory. Bureau staff found that the audits were designed to find and correct any deficiencies in the procedures, and were conducted in a professional and rigorous manner. The audit at Los Alamos focused on waste characterization. By the close of 1997, Los Alamos National Laboratory had been certified to ship transuranic waste to the WIPP.

Environmental Surveillance

Since 1993, thermoluminescent dosimeters have been located at several locations surrounding the facility to obtain baseline information on levels of gamma radiation. All readings to date are consistent with, and attributed to, normal background for the region.



Hoisting the mast of the NEWNET station at Ohkay Owingeh Community School was a team effort by staff members from Los Alamos National Laboratory, Ohkay Owingeh (San Juan Pueblo) Environment Office, and the New Mexico Environment Department.

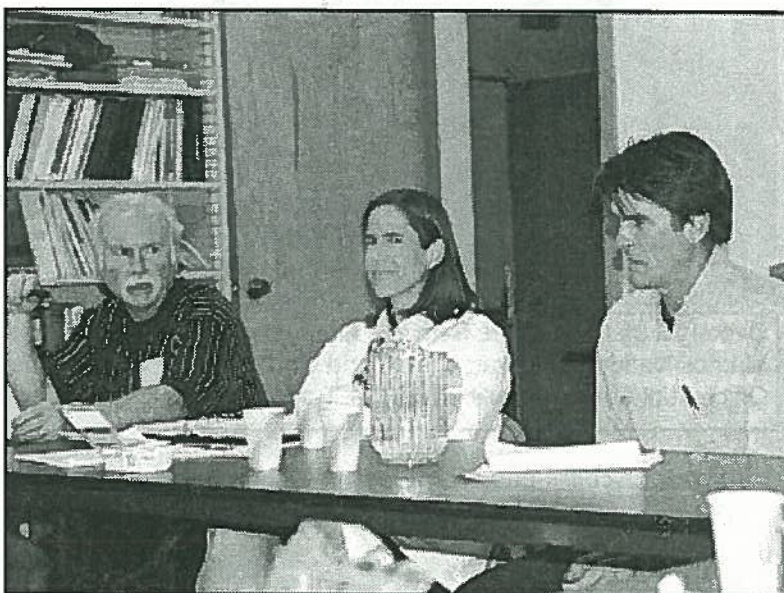




Public Information and Public Outreach

Community Radiation Monitoring Project

Community support for NEWNET, a network of gamma radiation sensors, gained in momentum and visibility this year. The settlement of the Clean Air Act suit between a community group, Concerned Citizens for Nuclear Safety, the U.S. Department of Energy and Los Alamos National Laboratory ensured financial support for the NEWNET program in northern New Mexico for five years. With the announcement of this commitment to the project, the bureau led a flurry of meetings and activities that further acquainted members of the interested or concerned public with radiological data acquisition and interpretation.



Representatives of the DOE Oversight Bureau, Los Alamos National Laboratory and Concerned Citizens for Nuclear Safety discuss the future of the NEWNET system at a meeting of the Community Radiation Monitoring Group.

Bureau staff members facilitated the work and communications of the project's working group which grew to involve, at different times, more than eighty participants from as far south as Carlsbad, NM and as far north as Questa, NM. Such geographic diversity broadened perspectives and enlivened discussions of the important issues brought before the group. Monthly meetings were held in the communities surrounding the five community-based stations, which at the end of the year were located at San Ildefonso Pueblo, at the Northern New Mexico Community College in Española, at the Santa Fe Indian School in Santa Fe, at Cochiti Pueblo and at Ohkay Owingeh Community School on San Juan Pueblo. Each one of these stations sends "near real-time" gamma radiation and weather data up to a satellite which transmits the data to LANL. The data is posted on a web page and can be found at <http://newnet.jdola.lanl.gov>.



Oversight staff members from the Albuquerque site office assist Los Alamos National Laboratory staff and Cochiti Pueblo Environmental Office staff during a routine NEWNET station maintenance visit.

From its inception at a bureau public meeting in 1994, the Community Radiation Monitoring group has become a laboratory for developing successful strategies in LANL, public, and state interaction and cooperation and a hands-on workshop for learning the technical concepts essential to understanding both environmental radiation and the difficulties involved in data interpretation. Project leaders of the U.S.

Environmental Protection Agency's new initiative, Environmental Monitoring

for Public Access and Community Tracking, have described the Community Radiation Monitoring project as the best example of neighborhood-based environmental monitoring in the country.

Educational Outreach

The educational outreach component of the speakers bureau continued to expand. Staff members served as science fair judges and science mentors and welcomed the participation of students in some of the regular outreach programs, such as the Community Radiation Monitoring Group.

Additionally, staff organized and presented formal workshops, and provided one-on-one technical training to facilitate a deeper level of public participation in program decisions.

Performance Assessment Workshop

In December, a workshop was held to introduce the public to the DOE's performance assessments for low-level radioactive waste disposal. Workshop partici-



Oversight staff members discuss the performance assessment process with a representative of the Idaho National Engineering and Environmental Laboratory.



pants included representatives from Indian Pueblos, state, county and federal government, educational, and interest groups. The two-day workshop was attended by as many as thirty-three people. On the first day, representatives from the Idaho National Environmental and Engineering Laboratory introduced the process that the DOE conducts for performance assessment. On the second day, presenters from LANL discussed the performance assessment for LANL's low-level radioactive waste disposal facility at TA-54, Area G. All representatives were invited to participate freely in discussions about the performance assessment and the operation of the disposal facility.

Field Instrument Training Seminar

Bureau staff at the Los Alamos field office conducted a training seminar for water quality and radiation detection field instruments in summer 1997. The goals of the seminar were to communicate with tribal environmental groups and demonstrate the variety and proper use of commonly-used field instruments. The hands-on training demonstrated operating and calibration procedures. The seminar was attended by members from San Ildefonso and Cochiti Pueblos. Because the tribal representatives were from Pueblos adjacent to the laboratory, surface water and ground water issues, in addition to radiation issues, were discussed at the training.

Teaching Students about Geology and Ecology

As part of the bureau's public outreach efforts, a staff member helped lead a field trip to Cochiti Reservoir. More than one hundred eighth-grade students participated. The field trip was designed to help the students better understand the reservoir and dam and the relationship of manmade structures and activities to the natural environment.



A group of Ortiz Middle School students and Cochiti Lake Project representatives waiting to tour the Cochiti Lake dam works 90 feet below the water surface.

Public Presentations

Technical staff members supported organized efforts to increase public awareness of environmental issues related to the DOE facilities in New Mexico. Staff members served as panelists for programs including a nationally televised "Tools for Drinking Water Protection Workshop"; a session addressing DOE's transfer of the drinking water supply system to Los Alamos County, hosted by the League of Women Voters, the Sierra Club and New Mexico Citizens for Clean Air and Water; and a panel discussion conducted by LANL



Environmental Safety and Health at San Ildefonso Pueblo concerning "Ground Water Issues and Off-site Transportation of Contaminants." Presentations were also made to a range of groups including: The Ruidoso Rotary Club, the New Mexico Geological Society, New Mexico Environmental Health Conference, and the site-specific citizens' advisory boards for LANL and Sandia.

Publications

Close to two hundred copies of technical reports produced by the DOE Oversight Bureau were copied and distributed throughout the year. The bureau's web site, [http://www.nmenv.state.nm.us/DOE Oversight/](http://www.nmenv.state.nm.us/DOE_Oversight/) was updated and modified so that the number of visitors can be counted. Also, links to and from related web sites were added. Three issues of the *Environmental Report*, the bureau's newsletter, were produced and distributed to more than twelve hundred recipients. A paper entitled "Lo-Flo Ground-Water Sampling—Is It a Cure-All?" was published in the Spring 1997 issue of *Ground Water Monitoring and Remediation*.

Public Meetings

The bureau hosted a public meeting focused on off-site contamination in surface water and sediments at San Ildefonso Pueblo. An overflow crowd participated in a poster session, presentation and panel discussion.

Bureau staff members routinely attended public meetings and hearings throughout the year hosted by organizations associated with environmental issues at the DOE facilities. At these meetings, staff members serve as independent sources of technical information, and gain valuable insight into public concerns regarding activities at the DOE facilities.

Meetings Attended by Bureau Staff

- Los Alamos National Laboratory Citizens' Advisory Board meetings,
- Sandia National Laboratories' Citizens' Advisory Board meetings,
- RCRA permit modification public meetings concerning Los Alamos National Laboratory,
- LANL's Environmental Restoration Project technical and informational meetings,
- Quarterly public meetings hosted by Sandia National Laboratories' environmental restoration group,
- Kirtland Air Force Base quarterly meetings,
- EPA-sponsored public meetings in Albuquerque, Carlsbad and Santa Fe on the Compliance Certification Application for the Waste Isolation Pilot Plant,
- Dedication and grand opening of the Carlsbad Environmental Monitoring and Research Center,
- Public tours of the Waste Isolation Pilot Plant,
- LANL's Environmental Safety and Health quarterly public outreach meetings,
- A LANL public meeting on brain tumors and thyroid cancers,
- A Concerned Citizens for Nuclear Safety sponsored public meeting on radiation and health issues at Santa Clara Pueblo,
- Public meetings and updates on the Radiological Assessment Corporations's audits mandated under the terms of the Concerned Citizens for Nuclear Safety, DOE and LANL Consent Decree,
- SNL's CAMU Working Group meetings,
- Accelerated Cleanup Focus on 2006 discussion and draft workshop presented by DOE, and
- Waste Isolation Pilot Plant quarterly meetings.