Environmental Commitment

Tracking Los Alamos National Laboratory's Continuing Environmental Commitment – 1989-2000

This document shares key environmental initiatives at Los Alamos National Laboratory from 1989 through 2000 that have contributed to the following positive baseline trends:

- *Airborne radiation "dose"* (effective equivalent dose): These go from highs of 11 mrem (millirem) in 1989 and 11.5 mrem (with fluctuations in intervening years) to 0.64 mrem in 2000. In years after 1989, the Environmental Protection Agency's standard was 10 mrem.
- *Air emissions*: Gaseous mixed activation products have been reduced from 157,000 curies in 1989 to 700 curies in 2000; tritium has been reduced from 14,000 curies in 1989 to 2,400 curies in 2000. These two components represent 99+ percent of total emissions.
- *Reduction of wastewater outfalls from areas below wastewater pipes:* These have gone from a baseline of 141 outfalls in 1993 to 20 in 2000.
- *Outfall samples exceeding government Clean Water Act standards*: From a baseline of 31 in 1994 and a spike to 33 in 1996, these have gone to zero in 2000.
- *Low-Level Waste Disposal*: From a baseline of 25 percent in 1993, the pit efficiency (volume of raw low-level waste per volume of pit) at Area G has increased to 50 percent in 2000, putting off movement into the expansion area by at least five years. Goal: increase pit efficiency to 65 percent by 2005.
- *Routine Low-Level Waste Generation from ongoing operations*: From a baseline of approximately 2000 cubic meters in 1993, the quantity is approximately 400 cubic meters in 2000. Goal: 80 percent reduction from baseline to 400 cubic meters by 2005.
- *Generation of routine sanitary waste*: From a 1993 baseline of 2,780 metric tons, this dropped to approximately 2000 metric tons in 2000 with much of the achievement coming from recyclable materials. Goal: 50 percent reduction from baseline by 2005.

Ensuring clean water is one of the Laboratory's many environmental commitments to the land in which we live and work.

2000

Overview

- The Department of Energy awarded the Laboratory a rating of "excellent" in its annual performance appraisal for FY 2001 for environmental restoration and waste management achievements.
- An independent audit found the Laboratory in compliance with the Clean Air Act standard. The audit was part of the conditions set in the 1997 consent decree with Concerned Citizens for Nuclear Safety.
- Potential release sites (where hazardous materials are located) were reduced through consolidation and cleanup to 880 vs. the 2,124 sites originally administered.
- Work began on cleanup of Bldg. 260 outfall area at TA-16, a technical area involved with high explosives and tritium.
- Investigation completed of material disposal area (MDA) H at TA-54, a waste disposal area.
- Following the Cerro Grande fire, Laboratory staff evaluated more than 600 sites to reduce the possibility of contaminants moving during floods.
- The Laboratory instituted NEPA (National Environmental Policy Act) cultural and biological training to increase awareness; this resulted in better planning and resource protection and carried out 68 NEPA emergency reviews following the Cerro Grande fire.

The Laboratory:

- Competed Cerro Grande fire analysis and mitigation action plans.
- Developed procedures for assessing and monitoring potential impacts to its floodplains and wetlands.
- Completed environmental assessment for and development of a Wildfire Hazard Reduction Program.
- Developed institutional procedures for assessing and monitoring potential impacts to Laboratory floodplains and wetlands.
- In addition to ongoing programs, special studies included assessing

organic biocontaminants in food chains within two canyons at the Laboratory, studying effects of depleted uranium on amphibians, assessing potential risks from exposure to natural uranium in well water, and surveying erosion and other effects of the Cerro Grande fire.

Measurements
- Approximately 300 air quality reviews have been performed.
- The dose from radioactive air emissions was 0.64 mrem (vs. EPA standard of 10 mrem). This is greater than the prior year due largely to tritium cleanup activities at several technical areas and increased activities at LANSCE (Los Alamos Neutron Science Center).
- The dose from all pathways* (air, ingestion, direct penetrating radiation) was 13 mrem vs. the DOE standard of 100 mrem. This dose resulted primarily from direct penetrating radiation produced by the Calibration facility, which subsequently was moved, eliminating public exposure.
- Overall, ambient air quality in and around the Laboratory met EPA and DOE guidelines.
- The Laboratory was the first DOE site to receive a Disposal Authorization Statement from DOE, establishing the regulatory basis for ongoing low-level waste disposal at Area G. The technical basis for the authorization resulted from a performance assessment conducted in 1997
- Radionuclide concentrations in off-site soil samples were low and mostly indistinguishable from background levels.
- Soil samples collected from on- and off-site locations after the Cerro Grande fire showed radionuclide and trace element concentrations similar to the small amounts in samples taken a year earlier, indicating no increase in contaminants because of the fire.
- Ambient air measurements following the fire showed a maximum inhalation dose of radionuclides from the Laboratory of 0.00003 mrem and 0.2 mrem from natural environmental sources.

**Note: The methods for calculating the DOE all-pathways dose and the EPA air-pathways dose are not comparable. Consideration of shielding, occupancy and correction factors are allowed only in the DOE calculation. As a result, the air-pathway dose in certain cases may be greater than the all-pathways dose.*

Environmental Expenditures
Environmental Activities — $82.6 million

1999

Overview
- All newly proposed activities that could impact the environment were evaluated under NEPA guidelines with 159 NEPA forms sent to DOE for review.
- Completed Site-Wide Environmental Impact Statement (SWEIS) and the first annual SWEIS yearbook.
- The Laboratory and DOE began planning and developing an Integrated Resources Management Plan to integrate existing management plans with site-planning and mission activities.
- Developed preliminary draft Biological Resources Management Plan to integrate the Laboratory's activities with monitoring of forest and range, wildlife and sensitive species and habitats, and biocontaminants.
- Completed construction-related mitigations for DARHT (Dual-Axis Radiographic Hydrodynamics Test) facility-mitigation-action plan.
- Completed development of a Materials Recovery Facility to segregate recyclable materials and hazardous waste before sanitary waste is shipped to the county landfill.
- Initiated requests for proposal to have industry present technologies to increase the efficiency of cooling towers, the largest source of water consumption at the Laboratory.
- Purchased a mobile unit to treat photo chemicals, chiller cleaner, rinse water and other hazardous liquid wastes to meet the waste-acceptance criteria for the sanitary waste plant.
- Replaced mercury thermometers with digital or alcohol-based thermometers to minimize the amount of mercury in radiological controlled areas.
- Installed 22 stream-monitoring stations, raising the total number of stations to 54.
- Removed more than 120 pounds of high explosives from the TA-16 area.
- In addition to ongoing environmental activities, special studies included these ecological risk assessments: organics in fish collected from the Rio Grande, depleted uranium effects on aquatic organisms, disease analysis of elk and PCB concentrations in small animals around the Laboratory.
- Established method for conducting wildlife dose assessments based on soil and vegetation data from Area G, a waste disposal area.
- Received U.S. Fish and Wildlife Department notification that implementation of the newly completed Threatened and Endangered Species Habitat Management Plan constitutes institutional compliance with the Endangered Species Act of 1970.

External Awards
- The Laboratory received three New Mexico Green Zia Environmental Excellence awards: an achievement level award for the Transuranic Waste Inspectable Storage Project, begun in 1994, and two commitment level awards presented to the Environmental Science and Waste Technology Division and to the Hydrodynamic Operations Group.

Measurements
- The effective dose equivalent from airborne radiation was 0.32 mrem, based on an EPA standard of 10 mrem.
- The all-pathways dose was 16 mrem vs. the DOE standard of 100 mrem, due primarily to operation of the Calibration facility.

Environmental Expenditures
Environmental Activities — $75.6 million

1998

Overview
- First DOE site to receive a Disposal Authorization Statement from DOE, establishing the regulatory basis for ongoing low-level waste disposal at Area G. The technical basis for the authorization resulted from a performance assessment conducted in 1997.
- Completed the Legacy Materials Cleanup Project with the collection and management of more than 22,500 items.
- Staff reviewed 430 proposed projects for compliance with NEPA requirements, 846 proposed actions for

possible effects on cultural resources and 400 proposed projects for their impact on biological resources.
- Identification, decontamination and recycling of lead material at LANSCE eliminated low-level waste that would have cost $50 million for disposal.

In addition to ongoing environmental activities, conducted special contaminant studies:
- Developed databases demonstrating that concentrations of radionuclides in soils and vegetation have decreased significantly over time.
- Preoperational survey for tritium at the TA-54 waste disposal site.
- Survey of contaminants in fish within lakes in Santa Clara Canyon and along the Rio Grande from Colorado to Texas.
- Developed methodologies for estimating ecological risk to federally-listed threatened and endangered species.
- Investigation of bees as indicators of radionuclide contamination
- Testing for contaminants among squirrels around a radioactive liquid waste site.

Measurements
- The dose from airborne radiation was 1.72 mrem, below EPA guidelines.
- The all-pathways dose was 19 mrem, based on EPA's standard of 100 mrem, due primarily to the Calibration facility.
- 99.4 percent of samples from sanitary effluent outfalls, 99.3 percent from industrial effluent outfalls and 100 percent of water-quality-parameter samples met discharge requirements.

Environmental Expenditures
Environmental Activities — $85.3 million

1997

Overview
The Laboratory and DOE settled a lawsuit brought by the Concerned Citizens for Nuclear Safety. As part of the settlement, the Laboratory agreed to a series of independent, technical audits for radiation compliance. Additional elements from the settlement included the following:
- Added two additional air monitoring and penetrating radiation stations to the existing network and more than 50 thermoluminescent network stations.
- Established seven neutron monitoring stations.
- Provided an environmental radioactivity course and a radiation-survey-equipment loan program for interested citizens.
- Agreed to operate the Northern New Mexico portion of the NEWNET monitoring network for five years.
- Began a series of public meetings on environmental, safety and health issues.
- Made a grant of $450,000 to the UNM School of Medicine to develop an environmental health curriculum for the Masters of Public Health degree program.

Other efforts in 1997:
- Began three-year effort to develop a habitat management plan for the Bald Eagle and other threatened/endangered species that might reside at the Laboratory.
- Began implementing strategic forest-thinning activities to protect Laboratory facilities and cultural and regional resources from wildfire threat.
- Staff reviewed more than 1,500 proposed actions for environmental, cultural-resource and endangered/threatened species impacts.
- Completed performance assessment for Area G, providing the technical basis for ongoing low-level waste disposal there and demonstrating the site's ability to isolate and contain contaminants for thousands of years.

Measurements
- The dose from radioactive airborne emissions was 3.51 mrem, below the EPA standard of 10 mrem.
- The all-pathways dose was 23 mrem vs. DOE's standard of 100 mrem, primarily caused by operation of the Calibration facility.
- The Laboratory was in compliance with on-site liquid discharge requirements in 99.4 percent of samples from sanitary effluent outfalls, 99.5 percent of industrial effluent outfalls and 99.9 percent of water quality parameter samples.

Environmental Expenditures
Environmental Activities — $74.6 million
Capital Improvements — $5 million for new high-explosives wastewater treatment plant that eliminated 20 high-explosives outfalls.

1996

Overview
- Staff reviewed 272 proposed projects for NEPA compliance, 947 for possible cultural-resources effects and conducted 31 intensive field surveys; they reviewed more than 500 proposed actions for potential impacts to threatened/endangered species.
- Initiated the DARHT facility mitigation action plan to monitor and mitigate release of contaminants and to conduct long-term monitoring of impacts on significant cultural resource sites.
- Initiated Low-Energy Demonstration Accelerator mitigation action plan to monitor and mitigate potential environmental impacts from facility construction and operations.
- Enhanced surveillance activities with a small-mammal contaminant study at the Area G waste disposal site.
- Initiated an ongoing effort to evaluate wildfire potential following the Dome Fire. Completed the first step of inventorying fuel levels on the Pajarito Plateau completed at 39 surveillance plots.

Measurements
- The dose from airborne radioactivity was 1.93 mrem, 19 percent of the EPA standard.
- The all-pathways dose was 14 mrem or 14 percent of the DOE standard of 100 mrem.
- In compliance with on-site liquid discharge requirements in 98.8 percent of samples from sanitary effluent outfall and 97.9 percent of industrial effluent outfall.

Environmental Expenditures
Environmental Activities — $85.7 million
Capital Improvements — $3-4 million. Beginning in 1996, upgrades to TA-50 radioactive liquid wastewater treatment facility. Reduced effluent discharges from 12 million gallons per year to less than 200,000 gallons per year.

1995

Overview

- Completed 50 percent of the high-explosive wastewater treatment schedule established in 1994.
- Completed a comprehensive identification of point release source.
- Upgraded stack monitoring equipment at LANSCE.
- Completed and implemented a quality assurance plan for monitoring air emissions at LANSCE.
- Implemented the emissions control delay line at LANSCE and expanded it to include an air scrubber to remove radioactive vapors and tritium.
- Continued the Water Supply and Cross Connections Control Survey that identified 1,092 potential cross connections or deficiencies and completed 581 corrective actions.
- Eliminated 27 outfalls.
- Installed stream monitoring stations on all canyons entering or leaving the Laboratory and recorded for the first time the volume of water entering and leaving the Laboratory.

Measurements

- Air sampling conducted at more than 50 locations with a net two new stations added in 1995.
- The dose from airborne radiation measured at 5.50 mrem vs. the EPA standard of 10 mrem.
- The all-pathways dose was 2.3 mrem vs. the DOE standard of 100 mrem.
- In on- and off-site soil samples, most radionuclides and radioactivity have shown decreasing levels over time.

Environmental Expenditures

Environmental Activities — $130.4 million

1994

Overview

- Complied with established standards in 100 percent of sanitary wastewater discharges and 98.6 percent of industrial wastewater discharges.
- Recycled 1,000 tons of recyclable solid materials together with 13,000 gallons of waste oil.
- Initiated Transuranic Waste Inspectable Storage Project, at an estimated cost of $35.7 million, to remove waste stored under an earthern cover.
- Staff reviewed 131 proposed actions for NEPA requirements, 904 for impacts on cultural resources and 395 for impact on threatened/endangered species.
- Began work to eliminate the last of 75 outfalls identified since the program's origins.
- Planned and coordinated 82 public meetings on Laboratory activities and public involvement in 47 projects, including the public advisory board to the Department of Energy and Laboratory.
- Emissions-control delay line installed for a partial year at Los Alamos Meson Physics Facility, reducing total emissions by 26 percent and air emissions from the primary target area by 80 percent.

Measurements

- Overall, 450 sampling stations conducted routine environmental monitoring.
- The dose from airborne radiation was 7.62 mrem based on the EPA standard of 10 mrem. The measurement resulted primarily from external short-lived airborne emissions from the Los Alamos Meson Physics Facility.
- The all-pathways dose was 3.5 mrem based on the DOE standard of 100 mrem.

Environmental Expenditures

Environmental Activities — $110.3 million

1993

Overview

- Staff reviewed 953 proposed actions for NEPA applicability, 780 proposed actions for cultural effects and 410 proposed actions for potential impacts to threatened or endangered species.
- Conducted multi-agency Tiger Team assessment, finding no immediately harmful environmental deficiencies. Forty-nine action plans were developed to address the Team's other findings.
- Completed design of and scheduling for two High Explosive Wastewater Treatment Facilities.
- Continued the Water Supply and Cross-Contamination Control Survey, completing the review of 25 percent of all buildings with potable-water connections.
- Completed Sanitary Lagoons Elimination Project at TA-53, which houses cryogenically cooled vacuum chambers.
- Completed survey of all Laboratory buildings to identify and eliminate noncompliant wastewater discharges.

Measurements

- Air sampling was conducted at 90 air-stack discharge points.
- The dose from airborne radiation was 5.7 mrem based on EPA's standard of 10 mrem.
- The all-pathways dose was 3.1 mrem based on DOE's standard of 100 mrem.
- Total radioactive air emissions decreased 50 percent from the prior year's level, largely caused by longer holding periods before emissions were released from the Los Alamos Meson Physics Facility.
- Complied with established standards in 100 percent of samples from sanitary effluent outfalls and 99.1 percent of industrial effluent outfalls.

Environmental Expenditures

Environmental Activities: $82.1 million

1992

Overview

- Routine surveillance gathered 8,200 environmental samples and conducted 127,000 analyses for radioactive and nonradioactive constituents.
- Completed design for High Explosive Wastewater Treatment System.
- Completed Sanitary Wastewater System Consolidation project, eliminating eight of nine deteriorating treatment facilities.
- Complied with established standards in 99.6 percent of sanitary waste samples and 99.0 percent of industrial discharges.
- Reviewed 1,067 proposed actions for possible environmental, safety and health issues.
- Completed approximately 60 percent of the TA-53 Sanitary Lagoons Elimination Project.
- Completed survey of 75 percent of all Laboratory buildings for noncompliant wastewater discharges.
- PCB remediation efforts removed, dechlorinated or disposed of about 300 PCB transformers, capacitors or other components.

Measurements
- The dose from airborne radiation was 7.9 mrem compared with an EPA standard of 10 mrem.
- The all-pathways dose was 6.1 mrem based on DOE's standard of 100 mrem.

Environmental Expenditures
Capital Improvements — $17 million for new TA-46 sanitary wastewater treatment facility. Eliminated eight noncomplying sanitary wastewater treatment plants and 30 septic tank systems.
Environmental Activities: $82.1 million

1991

Overview
- Staff reviewed 614 proposed actions for NEPA applicability; 1,110 for possible effects on cultural resources, which required 51 intensive field studies; and 614 for potential impacts on threatened/endangered species.
- Conceptual design completed for High-Explosives Wastewater Treatment Facility.
- Construction begun on Sanitary Wastewater System Consolidation Project, which will replace seven existing wastewater treatment plants and 30 septic tanks.
- Stack modifications under way at Los Alamos Meson Physics Facility, allowing longer holding time for radioactive decay before emissions are released.
- Completed work plan to characterize activities at the TA-21 tritium facility, one of the Laboratory's oldest areas with more than 100 solid waste management units.
- Began work on closure plans for the TA-40 scrap detonation site.
- Completed work on the plan to close six above-ground oil-storage tanks at TA-54.
- In addition to routine monitoring of external penetrating radiation, conducted a special study comparing Laboratory data with data obtained from a commercial contractor.
- Began preparation of a draft performance assessment document, reporting results of low-level waste management at Area G.

Measurements
- Overall, 400 sampling locations used for routine environmental monitoring.
- The dose from airborne radiation was 4.4 mrem vs. the EPA standard of 10 mrem.
- The all-pathways dose was 4.4 mrem based on DOE's standard of 100 mrem.
- The highest measured annual concentrations of airborne tritium, uranium and plutonium combined equaled less than 0.30 percent of the DOE public dose limit.

1990

Overview
- Staff reviewed 702 proposed actions for NEPA applicability and 355 for compliance with cultural resource requirements.
- Completed clean closure of Ground Burning Surface Impoundment unit at TA-16.
- Closed six above-ground waste-oil storage tanks at TA-54.
- Removed from various technical areas six underground storage tanks in need of upgrade.
- Initiated a waste stream identification and characterization program to verify that each stream is properly monitored.
- Converted two septic holding-tank systems into sanitary waste treatment systems.
- Installed a new monitoring well in Mortandad Canyon.
- Established a Community Relations Program and conducted community interviews necessary for development of an action plan for the program.
- Began a special study of external penetrating radiation designed to compare Laboratory air-monitoring data with data gathered by a commercial contractor.

Measurements
- Radioactive air emissions were monitored at 88 discharge locations.
- The dose from airborne radiation of 11.5 mrem exceeded EPA's 10 mrem standard.
- The all-pathways dose was 3.1 mrem based on DOE's 100 mrem standard.
- All concentrations of radionuclides and chemicals in water sampled outside the Laboratory were less than 7 percent of DOE guidelines.

1989

Overview
- The second year of a two-year special environmental study at the Pueblo de San Ildefonso indicated no significant change in water sample measurements from the prior year.
- Waste oil in six above-ground storage tanks at TA-54 was removed and disposed of as hazardous waste.
- Two waste oil storage pits were closed at the TA-35 site, which is involved with high explosives and other materials.
- A survey of all septic tank systems identified 77 in operation or under design for disposal of sanitary waste. New leach fields were installed at one site to prevent effluent from surfacing.
- Tested each of the backflow prevention devices that separate potable water supply systems from potential sources of contamination.

Measurement
- The dose from airborne radiation was 11 mrem based on the 1989 EPA standard of 25 mrem.
- The all-pathways dose was 3.9 mrem based on DOE's 100-mrem standard.
- Air monitoring conducted from 87 release points.
- Total emissions increased over 1988, caused principally by the 30 percent increase in releases of airborne activation products at LAMPF.
- Only the surface and shallow ground waters in on-site liquid effluent areas contained radioactivity above natural background levels. Water samples from the community showed no significant effects.

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