

PATHWAYS TOWARD A CLEANER TOMORROW

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ABSTRACT

The U.S. Department of Energy Albuquerque Operations Office' (DOE/AL) pathways to cleanup involve three interrelated programs-1) Environmental Restoration; 2) Waste Management; and 3) Facility Closure and Transition. The programs are designed to work together to achieve environmental cleanup at the six sites DOE/AL oversees: Los Alamos National Laboratory (LANL), Sandia National Laboratories (SNL), Pantex Plant, Kansas City Plant, the Inhalation Toxicology Laboratory, and Grand Junction, Colorado.

This paper will review the cleanup challenges for the Department of Energy in Albuquerque, which include restoring the environment, managing legacy and on-going waste, and utilizing new cleanup technologies.

The foundation of the research involves interviews with key individuals responsible for the cleanup activities (contractors) as well as stakeholders, regulators, and Department of Energy program administrators.

INTRODUCTION

After World War II and until the end of the Cold War, nuclear weapons production ran constantly at great speed. The United States' Cold War nuclear arms race resulted in a vast research and development, production and testing network known as the "nuclear weapons complex." During that time nuclear waste management was not the Department of Energy's (DOE) first priority. Wastes were produced faster than they could be disposed.

Disposal technology lagged behind production technology. Many of the disposal methods used at that time would not be tolerated today. Nuclear Weapons production resulted in the generation of waste and pollution that contaminated the environment on many levels. Hazards from radiation contaminated groundwater and soil, as well as structures dedicated to nuclear power production research and development. Shortly after the establishment of the Atomic Energy commission, the Safety and Industrial Health Advisory Board reported that "disposal of contaminated waste in present quantities and by present methods...if continued for decades, presents the gravest of problems."¹

A nation's growing concerns about safety to workers and problems with environmental contamination resulted in parts of the U.S. nuclear production complex to shut down in the 1980s. The closures were, at first, expected to be temporary, but after the fall of the Soviet Union in 1991, such shutdowns became permanent. When the Cold War came to an end, the United States nuclear industry embarked on a new direction and a new era.

The DOE's current mission is to deal with the environmental legacy of the Cold War. At the same time, it must lead the development of the weapons program for the next fifty years or more, without nuclear testing and without building new weapons. The DOE's Office of Environmental Management, established in 1989, is involved in stabilizing and maintaining the large number of nuclear materials and facilities that were once in the service of the nation's weapons and production mission. The Waste Management Program was initiated to manage the large amount of a variety of wastes that primarily have been generated from nuclear weapons activities. The program is also involved in designing, building, and operating treatment facilities that will prepare waste for safe storage, or disposal. The primary objectives of DOE's Environmental Management Program are to avoid additional environmental problems, minimize the amount of hazard to workers and the public, and reduce the cost and risks that are passed on to future generations.



The Albuquerque Operations Office (AL) is the largest field organization in the DOE. The primary mission of the office continues to be stewardship and maintenance of the nation's nuclear weapons stockpile. In addition, the office devotes significant resources to restoring and improving the environmental quality of the operation, extending the contributions of the national laboratories to basic and applied research in science and technology and ensuring reasonable access of the U.S. private sector to unclassified technology developed in the laboratories and plants. Although the Albuquerque Operations Office's activity is primarily in the western part of the country and predominately in New Mexico, it has an economic impact in eighteen states.

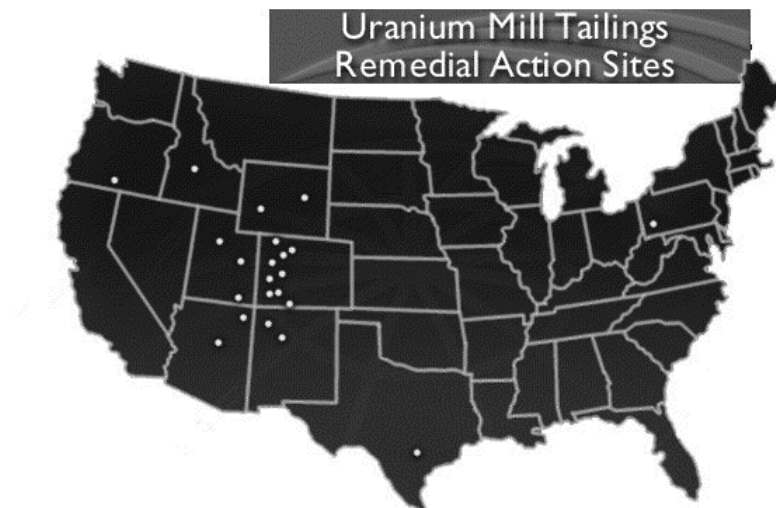
John Arthur, Assistant Manager, Office of Environmental Operations and Services at DOE/AL said: “There are three critical pathways to Albuquerque’s paths to closure. First of all, environmental restoration. . .the second critical area is waste management. . .and the last area, and equally important is facility closure and transition.”² According to Arthur, these three program are designed to work together to achieve the environmental stewardship goal.

DOE/AL is involved in these three programs and is actively addressing the environmental legacy of the Cold War by aggressively implementing permanent and more efficient cleanup programs at sites throughout the West. Rick Glass, Manager, DOE/AL said that the primary mission of his office is to give the President and the public complete confidence in the nuclear stockpile and that “our environmental management program is an essential element of building that public trust.”³

This paper addresses some of the challenges and successes enjoyed by DOE/AL in the three areas.

Environmental Restoration

The Environmental Management Program is divided into two components, waste management and environmental restoration. The environmental restoration program involves the assessment and cleanup of inactive sites contaminated from previous defense and non-defense production activities. Two primary goals of the program are to stabilize urgent contamination problems for the protection of human health and safety, as well as the environment, and to invest in technology research that helps solve contamination problems now and in the future.



To this end the Environmental Restoration Program has accomplished cleanup of historical waste on a grand scale. Twenty-two Uranium Mill Tailings Remedial Action sites, known as

UMTRA sites, have been cleaned up and stabilized in numerous states. DOE safely buried approximately 33.5 million cubic meters of tailings and associated contaminated materials in eighteen disposal cells. The trucks used on this project covered 22.2 million miles without a single fatality.⁴

The health hazards associated with milled uranium ore were not recognized at the time the mills were operational. After the mills shut down, the tailings were used as a convenient source of sand for fill and for concrete aggregate. As part of the UMTRA project, DOE has removed mill tailings from over five thousand separate private and public properties. This project was deemed the largest cleanup effort of its kind in the world.

At the Superfund site in Grand Junction, 27,000 abandoned drums and fifteen tons of lead and radioactively contaminated soil were removed from just one location. The DOE working with the Environmental Protection Agency has completed cleanup at this superfund site.

Reducing legacy waste through the use of innovative technologies has proven effective in AL environmental restoration projects. The Segmented Gate System has been deployed at several DOE sites including Sandia and Los Alamos National Laboratories and at the Pantex Plant in northwest Texas. The Segmented Gate System can reduce the volume of soil that must be special handled by as much as 99%. The system uses computer-controlled iodide sensor arrays to detect gamma emitters. It can also be recalibrated for beta detection. The new technology is in the software and the sensors linked to it. Other than the computerized components, the Segmented Gate System is entirely mechanical using gravel industry components designed for tough conditions. The deployments have significantly reduced waste volume at several sites. The system helps end users comply with mandated cleanup standards and shortens their cleanup schedules.

At Sandia National Laboratories a Corrective Action Management Unit, called CAMU, was approved by the EPA in 1997. The CAMU working group is composed of neighborhood association representatives, the Sandia Citizens' Advisory Board, regulators and DOE. CAMU is now a central component of Sandia's plan for cleaning up the old chemical waste landfill, which was the most serious contamination site at the laboratory. The CAMU expedites cleanup time, saves the cost of transporting waste off-site, and protects the area's groundwater. Jamie Welles, former member of the CAMU citizens' advisory working group said that the group had a number of options but decided not to ship high volumes of waste to other areas around the country and put the burden on other sites, “. . . we decided that this would be best, to keep the high-volume, low contaminant concentration waste here.”⁵

Historical waste presents many different problems to the Environmental Restoration Program. At Los Alamos National Laboratory a decommissioning and decontamination effort tears down surplus facilities contaminated with radiological or hazardous materials. The Los Alamos' Technical Area 16, which is contaminated with sixty-year old, unstable explosives presents a one-of-a-kind problem to solve. The area was constructed in the late 1940's to house

machining and processing systems used for storage of high explosives nuclear weapons components. The structures at the site are where the final assembly of the “Trinity Device” explosive lens took place. As a legacy of the Manhattan Project, it may be eligible for landmark status and preservation as a historical resource once it is clean and safe.

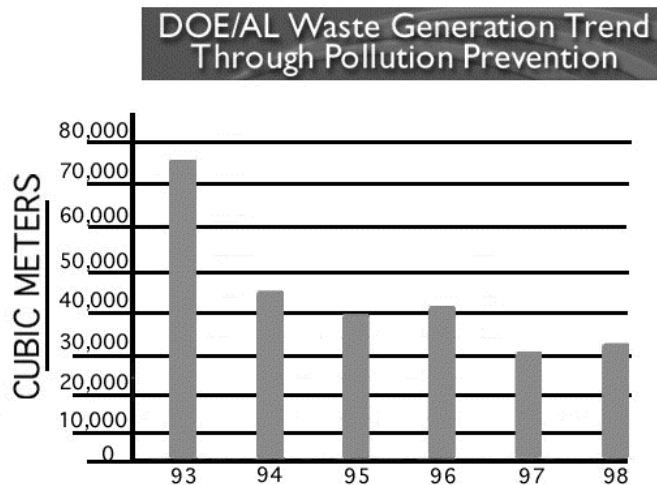
Both the environmental restoration and the waste management programs at DOE are missions on an equal footing with weapons programs.

Waste Management

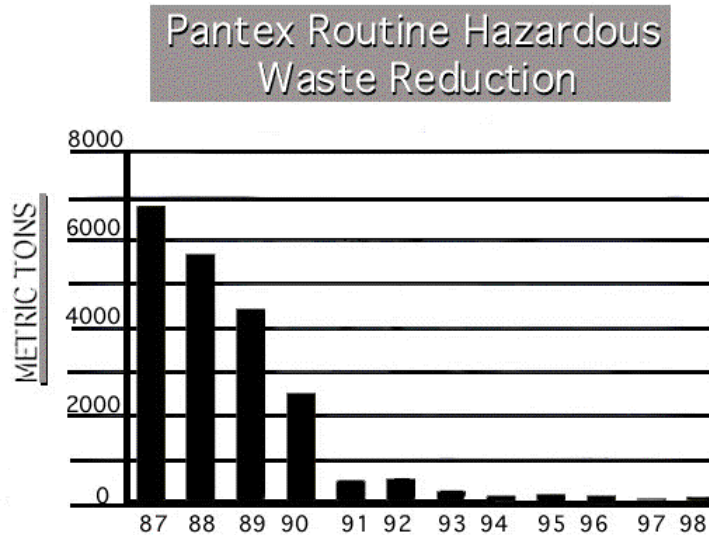
The mission of the Waste Management Program is to treat, store, and dispose of waste in a manner that is safe for humans and the environment. The wastes involved in the program range from highly radioactive and toxic wastes that require extreme caution when handling, to wastes that can be handled fairly confidently.⁶

At Los Alamos National Laboratory, the transuranic waste inspection and storage project, TWISP, is recovering 4,700 cubic meters of drums and crates of radioactive waste stored for over 20 years on three earthen covered asphalt pads. The waste will be inspected and characterized. Los Alamos expects to decontaminate as much as 2,000 cubic meters for on-site disposal, saving millions of dollars. The remaining waste will be repackaged, certified and shipped to the Waste Isolation Pilot Project, WIPP, near Carlsbad, New Mexico for disposal.

In addition Los Alamos National Laboratory’s accelerators, reactors and shops generate low-level radioactive liquid waste and slightly radioactive industrial waste water. Special double-contained, monitored collection systems convey the liquid wastes to the Radioactive Liquid Waste Treatment Plant. At the plant, operators categorize the waste according to the treatment requirements. DOE/AL is working with Los Alamos National Laboratory to achieve zero waste discharges by recycling the clean effluent for other laboratory uses.

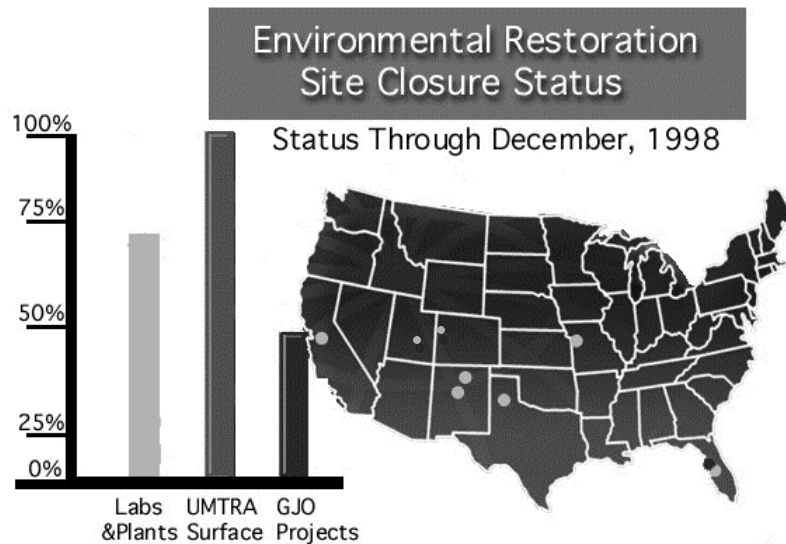


There is also the problem of new waste. Because Los Alamos, Sandia, Pantex, and Kansas City have on-going, long-term missions, they will continue to generate waste. Part of the waste management program at DOE/AL is to minimize new waste and manage what is being generated more efficiently. By using new pollution prevention techniques, the sites will produce much less waste. For example, at the Pantex Plant, both legacy waste and new waste are aggressively managed. While accomplishing its on-going mission, Pantex now generates 99 percent less hazardous waste than the plant did in 1986.



Simple innovations are also effective. The “radioactive wash ‘n wear” program washes and reuses protective clothing instead of discarding it after one wearing. Kansas City Plant now ships hazardous waste to commercial contractors as soon as possible. By storing waste for less than ninety days, the plant has cut waste management costs and closed most of its on-site waste storage lots.

Facility Closure/Transition



The activities of the Environmental Restoration Program are divided into either “remedial” actions or “decommissioning.” Remedial actions are employed when identification and containment or removal of contaminated soil and groundwater are needed in order to prevent contamination from spreading. Four primary tasks are involved in environmental restoration remedial activity: site discovery, site assessment, site cleanup and, finally, closure of the site. This last step in site remediation, closure of the site, also involves a review of the contamination problems at the site to ensure that they have been adequately addressed and that there will not be unanticipated problems, and monitoring of the site for continued compliance with environmental laws and regulations.⁷ While Albuquerque Operation’s long-term missions continue, some individual facilities may close or significantly downsize. The closure and transition pathway to cleanup can significantly reduce costs at Albuquerque sites.

The first and most significant closure has been the Pinellas Plant in Largo, Florida. DOE worked closely with the community to convert the plant to a community-owned high technology center. This action re-employed many Pinellas workers. The plant closed four years ahead of schedule, saving twenty-nine million taxpayers dollars. The neutron generators once produced at Pinellas are now made at Sandia National Laboratories, an additional saving of money through consolidation.

The first DOE laboratory facility in the nation to privatize was the Lovelace Respiratory Research Institute’s Inhalation Toxicology Laboratory located at Kirtland Air Force Base in Albuquerque. It used to be the DOE’s Inhalation Toxicology Research Institute. The Department continues to hold this property as its landlord, and is Lovelace’s principal customer, but the facility is privately managed, servicing many other clients.

In Albuquerque's South Valley, at a privately owned Superfund site, the DOE is sharing the costs of cleaning up hazardous wastes and restoring the environment with the U.S. Air Force and General Electric, the current owner. Hazardous wastes caused contaminated soil and water early in the Cold War. The soils have already been cleaned. Groundwater treatment is ongoing. The water will be cleaned to drinking water standards.

At Los Alamos National Laboratory's Tech Area 21, the plutonium uranium research facility that dates back to the 1940's has been shut down and will be environmentally restored through decontamination and decommissioning. After removing contaminated buildings and soil, this as well as other surplus lands may be transferred to non-DOE ownership.

Another aspect of closure and transition is Long-Term Surveillance and Maintenance. Surveillance and maintenance must be performed at disposal locations such as the UMTRA and Monticello sites.



Additionally, monitoring will be required at all remediation sites. DOE/AL will manage surveillance and maintenance of all its sites, as well as others that may be assigned, far into the future.

CONCLUSIONS

The Albuquerque Operations Office continues to manage the dismantlement of a significant fraction of the Cold War nuclear weapons stockpile. Progress has been made in the cleanup of legacy environmental concerns. Successful shutdown and economic conversion at the Pinellas Plant is a result of a number of innovative actions. Cleanup occurred in over five thousand sites in fifteen states including the Uranium Mill Tailings Remedial Action project and long term surveillance and maintenance programs.

The Department of Energy at Albuquerque continues into the new century to address cleanup challenges to restore the environment, manage legacy and on-going waste and move to closure or transition of many facilities. AL embraces its environmental stewardship responsibilities. It has aggressively approached the cleanup legacy of the Cold War, seeking safe, technically sound, cost-effective and environmentally compliant cleanup methods. In addition, AL wants to make sure that all stakeholder interests are considered as they proceed with this compelling challenge. It strongly encourages citizen involvement regarding its environmental programs to make sure that all stakeholder interests are considered.

Footnotes

1. D. Scott Nacke, National Environmental Technology Network (NETN), “Pathways to a Sound Environmental Future,” First Draft for an Informational video, September 16, 1998
2. Interview with John Arthur, Department of Energy, Albuquerque Operations Office, 7/30/99
3. Interview with Rick Glass, Manager, Department of Energy, Albuquerque Operations Office, 10/08/99
4. Karpinski, Sharon and Zannes, Estelle, The National Environmental Technology Network, “Pathways Toward a Cleaner Tomorrow; Environmental Success Stories from DOE/AL, Video 10/08/99
5. Interview with Jamie Welles, Member of the CAMU working group, 10/08/99
6. U.S. Department of Energy, Albuquerque Operations Office, 1997 Annual Report.
7. U.S. Department of Energy, “Accelerating Cleanup: Paths to Closure, Albuquerque Operations Office,” June 1998

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U.S. Department of Energy, “Accelerating Cleanup: Paths to Closure, Albuquerque Operations Office,” June 1998

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