

*Sandia National Laboratories, New Mexico*

# 2008 ASER

annual  
site  
environmental  
report



## Summary Pamphlet



Sandia is a multi-program laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04-94AL85000.  
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## ABSTRACT

Sandia National Laboratories, New Mexico (SNL/NM) is a government-owned, contractor-operated facility. Sandia Corporation, a wholly-owned subsidiary of Lockheed Martin Corporation, manages and operates SNL/NM for the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA). The DOE/NNSA Sandia Site Office (SSO), Albuquerque, New Mexico administers the contract and oversees contractor operations. This pamphlet summarizes data and the compliance status of SNL/NM's environmental protection and monitoring programs through December 31, 2008. Major environmental programs include air quality, water quality, groundwater protection, terrestrial surveillance, waste management, pollution prevention, long-term environmental stewardship, the environmental management system, and implementation of the National Environmental Policy Act.

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The U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) Sandia Site Office (SSO) and Sandia Corporation (Sandia) are committed to protecting the environment and preserving the health and safety of our employees and the public. This Annual Site Environmental Report (ASER) Summary Pamphlet was published in response to the community's desire for a document that summarizes annual environmental activities at Sandia National Laboratories, New Mexico (SNL/NM). For additional technical information and monitoring results at SNL/NM, we encourage you to request a copy or view an online copy of the 2008 ASER at:

<http://www.sandia.gov/news/publications/environmental/index.html>

Sandia collects environmental data to determine the impact of site operations and reports the impact of existing SNL/NM operations on the environment. Sandia's environmental programs include air and water quality, environmental monitoring and surveillance, and activities associated with the National Environmental Policy Act (NEPA). Sandia's objective is to maintain compliance with federal, state, and local requirements, and to affect the corporate culture so that environmental compliance practices continue to be an integral part of operations.

DOE Order 450.1A, *Environmental Protection Program*, requires DOE sites to implement sound stewardship practices that are protective of the air, water, land and other natural and cultural resources impacted by DOE operations. The stewardship practices are the means by which DOE cost-effectively meets or exceeds compliance with applicable environmental, public health, and resource protection requirements. In accordance with DOE Order 450.1A, Sandia implemented an Environmental Management System (EMS), which addresses the environmental consequences of Sandia's activities, products and services.

We hope that you will find the following pages informative and interesting. We appreciate feedback from the community and invite you to ask questions or offer suggestions about what you would like to see in next year's Summary Pamphlet by contacting:

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National Nuclear Security Administration  
Sandia Site Office  
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Attention: Karen Agogino



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# The Environment at Sandia National Laboratories, New Mexico (SNL/NM)

SNL/NM is located on Kirtland Air Force Base (KAFB) in Albuquerque, New Mexico. New Mexico (NM) is the fifth largest state in the U.S. comprising 121,666 square miles. The 2007 population estimate for NM is just under two million (1,969,915 – nearly a nine percent increase since the 2000 census); the US Census projects 2,099,709 by 2030. The largest city in NM is Albuquerque with about half a million metro-area residents; other neighboring metro areas, including the City of Rio Rancho, raise that total to over 700,000 residents.

KAFB is a 51,559-acre military installation, including 20,486 acres withdrawn from the Cibola National Forest through an agreement with the U.S. Forest Service (USFS). The total area of DOE/NNSA/SSO owned property dedicated to SNL/NM facilities and operations is 8,685 acres. Sandia conducts its operations within 2,841 acres, including five technical areas (TAs) and several remote test areas (see Figure 1). An additional 5,817 acres in remote areas are owned by DOE/NNSA/SSO. The regional setting of SNL/NM provides a diverse range of geological, hydrological, climatic, and ecological settings.



Cane Cholla cactus in the Foothills at SNL/NM

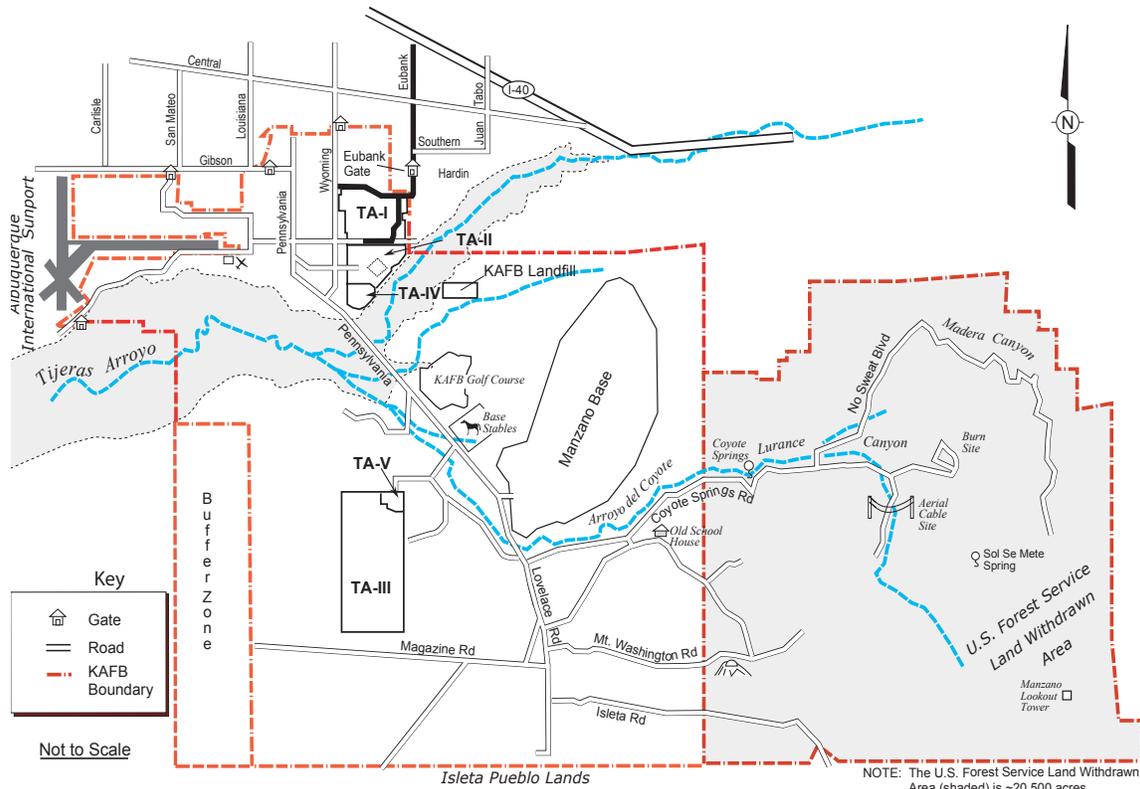
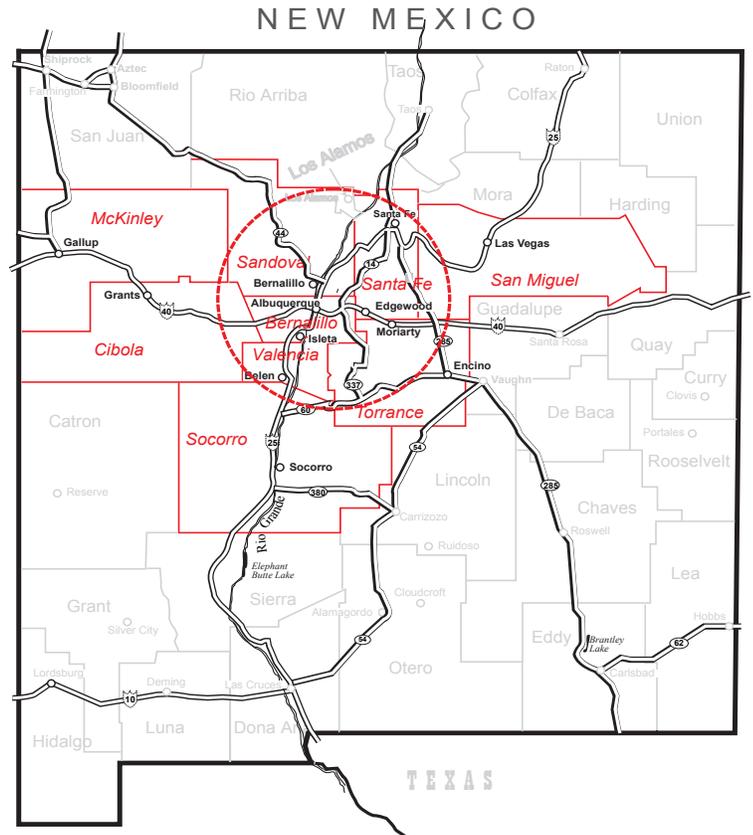


Figure 1: SNL/NM technical areas and the U.S. Forest Service Land Withdrawn Area

KAFB is located at the foot of the Manzanita Mountains, with a mean elevation of 5,384 feet and a maximum of 7,986 feet. KAFB has widely varied topography, ranging from rugged mountains on the east to nearly flat plains on the west. The withdrawn area includes a portion of the Manzanita Mountains within the Cibola National Forest. The remainder of KAFB is situated on gently west-sloping foothill terrain that grades to widespread flat areas where the majority of USAF and SNL/NM facilities are located.

The regional geologic environment in which the Albuquerque metro area, KAFB and SNL/NM are situated has been subjected to relatively recent (in geologic time) episodes of basaltic volcanism and ongoing regional rifting (crustal extension). The Rio Grande rift (which underlies part of KAFB and part of the Albuquerque metro area) has formed a series of connected down-dropped basins, where vast amounts of sediments were deposited.



**Figure 2: State of New Mexico Map -** The overlay shows major roads, cities, county lines, and the 80 kilometers / 50-mile radius from SNL/NM facilities (dashed circle).



Mule Deer at the Range Guzzler Camera Station



Arroyo near the Robotic Vehicle Range at SNL/NM

# Environmental Management System (EMS)

In accordance with DOE Order 450.1A, *Environmental Protection Program*, Sandia implemented an EMS as part of the Integrated Safety Management System (ISMS). Sandia uses the EMS as a framework to manage and improve its environmental compliance and sustainability practices. Through EMS, Sandia identifies the environmental consequences of activities, products, and services at SNL/NM, and develops objectives and measurable targets to mitigate potential impacts to the environment.

Sandia initially implemented its EMS in December 2005. Since that time, Sandia has worked to fully implement and establish the EMS in conjunction with ISMS in all site operations. Some major accomplishments of the EMS for Fiscal Year (FY) 2008 include the items listed below:

- EMS objectives were developed targeting corporate and division levels at Sandia; quarterly tracking is administered to survey successful implementation of the objectives;
- Internal and external outreach events were conducted to increase environmental awareness;
- Corporate and division-level EMS self-assessments were conducted, and identified deficiencies were addressed;
- Environmental program plans that detail requirements, roles and responsibilities, schedules, deliverables, and budgets were updated;
- Benchmarking exercises were conducted to determine how DOE and other facilities designed and implemented their EMS;
- A Chemical Exchange Program was implemented, reapplying over 400 chemicals, reducing 3000 kg of hazardous waste and saving \$100,000;
- A gap analysis was conducted according to DOE Order 450.1A and funding was obtained to gain International Standardization Organization (ISO) 14001 certification in FY09;



*Colias eurytheme*

- A report on the Baseline Ecological Footprint of SNL/NM was produced based on data collected in 2005; and
- A High Performance Sustainable Building Assessment was conducted for 13 buildings to determine compliance with the High Performance Sustainable Buildings Guiding Principles, per DOE Order 430.2b.

The EMS is a continuous improvement system that includes all environmental programs in an integrated approach to effectively minimize the impact of Sandia's operations on the environment. Each year, Sandia's work processes are reviewed, and new environmental objectives and measurable targets are set to ensure continual improvement in environmental performance at SNL/NM.

Visit the EMS website for more information:

<http://environment.sandia.gov/new/index.shtml>



# National Environmental Policy Act (NEPA) & Quality Assurance (QA)



Demolition of Building 805 at SNL/NM

## NEPA

Sandia provides DOE/NNSA/SSO with technical assistance supporting compliance with NEPA and the National Historic Preservation Act. NEPA requires federal agencies, and other organizations that perform federally-sponsored projects, to consider:

- Environmental issues associated with proposed actions;
- Awareness of the potential environmental impacts associated with these issues; and
- Including this information in early project planning and decision-making.

The Sandia NEPA Team reviews SNL/NM projects for conformance to existing DOE NEPA documents and determinations. In 2008, the NEPA team reviewed a total of 1,587 proposed projects, and transmitted 70 NEPA checklists to the DOE/NNSA/SSO for review and determination.

## *SNL/NM Site-Wide Environmental Impact Statement (SWEIS)*

Consistent with NEPA regulations, DOE prepares a SWEIS for its large, multiple-facility sites. In 2008 the SWEIS update process continued to undergo revision to allow better tracking and evaluation of environmental operational limits at both the facility and site level. To accomplish this, Environmental Planning personnel met with representatives from SNL/NM facilities to discuss environmental operations limits (site and facility limits on parameters such as water and electricity use, waste generation, and air emissions)

and their significance within the SWEIS and other NEPA coverage. Causes for exceeding operational parameters were researched and tracked. Exceedances were also put into the context of future activities (for example, whether an exceedance was a one-time event or represented a permanent change in facility configuration or operations).

## QA

QA principles, elements, and tools are an integral part of Sandia activities to assure management, customers, regulators, and the community that Sandia is conducting business in a compliant manner, with respect for our employees, the community, and the environment. One of the QA principles used at SNL/NM is the DOE/NNSA/SSO ISMS to ensure that work is planned, hazards are analyzed and controlled, work is performed according to approved plans, and lessons learned are communicated. The ISMS is a process that continually improves operations and performance.

Environmental programs utilize QA principles to maintain the integrity of program plans, sampling, and analysis. For example, Sandia's Sample Management Office (SMO) provides environmental programs with guidance and sample management support. SMO processes have been developed to ensure that contractor laboratories provide the quality data and laboratory analysis through validation of laboratory data packets and by conducting audits of contractor laboratories. QA plans are implemented to ensure that data validation and records management are a key asset to providing quality environmental data.



Barn Owls

# Community Outreach

Sandia's Environmental Outreach Program reaches out to the community via various events, and provides environmental information to members of Sandia's workforce. The outreach program supports Sandia's EMS and Long-term Environmental Stewardship (LTES) Programs. Sandia recognizes that, in addition to complying with requirements, it is important to communicate with Sandia's workforce and the local community to help reduce environmental impacts at work and at home. Sandia has an integrated approach to communicate environmental awareness to its workforce via quarterly EMS Newsletters, semi-annual LTES newsletters, awareness campaigns, and various outreach events. Sandia collaborates with numerous internal and external organizations such as Sandia's Energy Management Team, Sandia's Long-range Development Plan Team, the City of Albuquerque (COA), and the Environmental Education Association of New Mexico (EEANM).

## Outreach and Awareness Events

Currently, Sandia participates in or holds several internal and external outreach and awareness events. Events conducted in FY08 include the Earth, Wind and Sun Sustainability event, New Mexico Environmental Health Conference; Teachers' Open House, Los Lunas Science Show, Youth Conference on the Environment; School to World, Sandia Earth Day; Take Our Daughters and Sons to Work Day; and Semi-annual EMS Excellence Awards Ceremony. Sandia also coordinates the semi-annual DOE Public Meeting. At these events, the outreach team distributes fact sheets and newsletters.



Children Using the Watershed Education Model

When working with children, the team often demonstrates environmental education models on topics including local air quality, landfills, and watershed education. The Outreach team also encourages the workforce and community to provide feedback and ask questions about Sandia's environmental programs.

In July 2008, Sandia hosted the first annual Earth, Wind and Sun sustainability event. The event was focused around the added requirements of the new Executive Order (13423) and DOE Orders (450.1A and 430.2B), which formally expanded the scope of an EMS to include energy and water conservation, automotive fleet operations and sustainable building activities. The two-day event featured keynote speaker Edward Mazria, an internationally-recognized architect, author, and educator who

presented "Buildings and Climate Change: Energy Conservation, Solar and Daylighting Design." In addition, 30 exhibitors were hosted (including Sandia's programs and external commercial and non-profit organizations), highlighting information on energy, water, and alternative transportation options. Sandia also offered tours to the Leadership in Energy and Environmental Design (LEED®) certified buildings and Sandia's solar research and test facilities. A series of workshops for the community, Sandia's members of the workforce (MOW) and management was conducted. Topics included "Greening Your Life," "Ecology of National Security," "Ecological Footprinting," "Tax Incentives," "Installing Photovoltaics," and a panel discussion on alternative energies. Over 1,200 people attended the Earth, Wind and Sun event.

The Annual Youth Conference on the Environment is a free, one-day conference offered to high school students as a means to educate them on various environmental issues. The 2008, the conference focused on the Rio Grande River and its surrounding ecosystem. Over 150 students attended presentations about the river's water quality and habitat species. The event was cosponsored by Sandia, the EEANM, and the COA.



Students at the 2008 Youth Conference

The semi-annual EMS Excellence Awards Program recognizes MOW who demonstrate environmental excellence in five specific categories (energy reduction/water conservation, risk mitigation/environmental protection, environmentally preferable purchasing, waste minimization, and recycling). Since its inception in 2006, the EMS Team has received over 120 nominations from individuals and teams who are contributing to Sandia's vision of EMS.

For additional information, please visit the following websites:

<http://ltes.sandia.gov>

<http://environment.sandia.gov/new/index.shtml>

# Pollution Prevention (P2)



The focus of the Pollution Prevention (P2) Program is to provide guidance and technical support to reduce waste generation and resource consumption, and to enhance the overall efficiency of processes and organizations within SNL/NM. The program

focuses on reducing hazardous, radioactive, and solid wastes, with the associated goal of optimizing processes. Additionally, the P2 program sets annual targets for recycling, waste reduction, environmentally preferable purchasing (EPP), and reduction of environmental releases.

The P2 Program partners with numerous organizations at SNL/NM, including Environment, Safety and Health (ES&H), Facilities Engineering and Procurement. P2 program staff research waste reduction technologies and strategies applicable to Sandia work processes, research avenues to reuse and recycle waste streams currently landfilled, and assists with cost-effective implementation for new waste reduction or recycling initiatives.

The P2 program is directed and guided by federal laws, DOE Orders, and federal Executive Orders (EO) such as EO 13423 “*Strengthening Federal Environmental, Energy, and Transportation Management.*”

## Awareness and Outreach

The P2 staff conducts awareness programs and outreach activities that promote and teach P2 strategies and technologies to waste generators. For more information, please visit the P2 website at:

<http://p2.sandia.gov>

The P2 Program’s premiere awareness event is the celebration of Earth Day (held on April 17, 2008). Approximately 350 people attended Dr. Robert Hirsch’s presentation on the topic of “*Peak Oil*”. The event included 16 displays, providing information on how people can reduce their environmental impact by waste reduction, recycling and making environmentally preferable (“green”) purchases.

## P2 Awards

In 2008, Sandia received several awards for P2



Sandia’s Earth Day Event

accomplishments at SNL/NM. Sandia won two DOE P2 Star Awards (highest level P2 award in DOE) in 2008: one for its electronics stewardship results in 2007, and the other (an honorable mention) for its Green Chemistry application example. These efforts were both awarded DOE/NNSA Best-in-Class in January 2008.

For work completed in 2008, Sandia was notified in January 2009 that it received five awards in three different categories from the DOE/NNSA P2 Program. One of the Best in Class awards, “P2 measures implemented in Decontamination and Demolition Projects”, was submitted by NNSA to be considered for the prestigious White House Closing the Circle Award. It also won the DOE’s Environmental Sustainability Star (EStar) award, announced in March 2009.

# Environmental Restoration (ER) Project

Sandia's ER Project was created under the DOE Office of Environmental Management to identify, assess, and remediate sites potentially contaminated by past spills, releases, or disposal activities. These sites were investigated in accordance with corrective action requirements of the Resource Conservation and Recovery Act (RCRA), applicable regulations, and hazardous waste operating Permit NM5890110518-1 (the Permit) issued in 1992 and 1993 to DOE and Sandia by the U.S. Environmental Protection Agency (EPA) and the New Mexico Environment Department (NMED). ER sites addressed included solid waste management units (SWMUs) and additional areas of concern (AOC) identified by NMED that were not SWMUs.

Sandia, DOE, and NMED signed a Compliance Order on Consent (COOC) in April 2004. The COOC specifies the current requirements for corrective action for releases of hazardous waste or hazardous constituents.

## ER Project History

The initial identification of ER sites at SNL/NM was completed in 1987; 162 sites were identified in the 1987 RCRA Facility Assessment. Since then, approximately 500 individual sites, potential sites, or individual historical activities have been identified and addressed. Many of these sites were confirmed to contain little or no contamination, and corrective action has been completed. In addition to the SNL/NM site, other sites included in the original scope of Sandia's ER Project were SNL California (SNL/CA), the SNL Kauai Test Facility (KTF) and the SNL Tonopah Test Range (TTR). There were also a number of miscellaneous sites located in other areas, nationwide and internationally. ER sites that are not at the SNL/NM facility have been addressed.

## Cleanup and Site Closures

Waste generated from corrective action at SNL/NM ER sites includes hazardous waste, radioactive low-level waste (LLW), mixed hazardous/radioactive waste (MW), waste subject to the Toxic Substances Control Act (primarily polychlorinated biphenyls [PCBs] with some asbestos), and industrial solid waste.



Snow on the MWL Subgrade

## Corrective Action Complete (CAC) Status

DOE and Sandia propose ER sites to NMED for CAC status when they meet NMED criteria, either before or after remediation. The criteria include acceptable levels of risk to human health and the environment presented by the contaminants at the site. After NMED grants CAC status, DOE and Sandia submit a request for modification of the Permit to add the site to Table A2: "List of Solid Waste Management Units and Areas of Concern not currently requiring Corrective Action." The majority of ER sites have been granted CAC status under a process in which risks to human health and the ecosystem have been calculated for residual contamination according to EPA and NMED guidelines. The level of contamination remaining and the appropriate land-use category (i.e., industrial, residential, or recreational use) are used as inputs to determine the risk to human health and the ecosystem.

## Chemical Waste Landfill (CWL)

The CWL is an interim status landfill undergoing closure in accordance with 40 CFR Part 265 Subpart G and the CWL Final Closure Plan. Closure activities, including two voluntary corrective measures (VCMs), were conducted under Sandia's ER Project. One of the VCMs involved excavation of the entire landfill; the soil was treated as needed and placed in an on-site Corrective Action Management Unit (CAMU) containment cell constructed for long-term management. The Draft CWL Post-Closure Care Permit defines post-closure care activities and was issued by the NMED for Public Comment on May 21, 2007. Negotiations associated with the Draft Permit are ongoing. After the Permit is approved and NMED certifies closure, the Permit will supersede the CWL Closure Plan as the source of operating conditions for the CWL.

## Mixed Waste Landfill (MWL)

The MWL, one of the SWMUs at SNL/NM, is subject to the corrective action requirements of the COOC and also to a Final Order for Corrective Measures (FOCM) issued by the Secretary of NMED. Subgrade preparation for the MWL Evapotranspirative (ET) Cover (i.e., the selected final remedy in the FOCM) was completed during FY 2007. In November 2008 SNL/NM and DOE responded to the second Notice of Deficiency on the MWL Corrective Measures Implementation Plan (CMIP), and in December 2008 NMED conditionally approved the CMIP. Construction of the MWL ET Cover is expected to be completed in FY 2009.

## 2008 Status and Activities

In February 2008, NMED issued a Class III modification to the Permit addressing 28 sites for which corrective action is complete. At the close of 2008, there were 33 ER sites remaining on the list of sites requiring corrective action. DOE and Sandia have submitted requests for Class III permit modification to address 31 of the remaining sites. All CAC proposals and Class III Permit modifications are available for review at the University of New Mexico (UNM) Zimmerman Library.

# Long-term Environmental Stewardship (LTES)

The LTES Program involves stewardship for past, present, and future activities at SNL/NM. The LTES Program's purpose is to promote the long-term stewardship of a site's natural and cultural resources throughout its operational, closure, and post-closure life-cycle. The environmental programs mentioned in this Summary Pamphlet and in the ASER support that stewardship.

An important component of the LTES Program is long-term stewardship (LTS) of legacy sites. This includes post-closure care of waste management units, and long-term monitoring and maintenance of former ER sites. LTS also includes institutional controls to prevent inappropriate future activities, and outreach activities to keep the public informed.

## Compliance Oversight Activities

Some ER sites require long-term controls, such as monitoring or restrictions on future use, after corrective action is completed. These requirements are established by the NMED.

More than 50 groundwater monitoring wells associated with former ER sites are monitored to meet NMED requirements. Water levels and water quality data are determined during monitoring. In 2008, one well in TA-V was replaced as part of the LTS Program. The data are reported in detail in the Annual Groundwater Monitoring Report, which can be found on the following website:

<http://www.sandia.gov/news/publications/environmental/index.html>

The LTS Program also conducts the long-term monitoring of the CAMU. Leachate is pumped weekly, and periodically sampled and disposed. The CAMU Vadose Zone Monitoring System Annual Monitoring Results Report contains more details on activities conducted, and sampling results. Data from Monitoring and sampling activities are maintained in a comprehensive information management system to ensure protection of human health and the environment.

## Institutional Control (IC) Activities

Former ER sites that require restrictions on future use are periodically inspected and maintained when necessary. An IC tracking system has been created to help manage site IC information.

## Community Liaison and Stakeholder Involvement Activities

It is important that the public be made aware of the work being conducted to maintain long-term protection of human health, the environment, and natural and cultural resources. Various efforts include:



Joshua Tree

- A previously developed LTES exhibit at the National Museum of Nuclear Science and History has been updated this year to reflect changes with the LTES Program;
- Biannual newsletters and this ASER summary pamphlet are published and distributed to the public; and
- An LTES website was created for public access. When complete, it will contain key environmental regulatory decision documents for all former ER sites and a map with site locations.

Additionally, in 2008, stakeholders participated in the semi-annual DOE/Department of Defense (DoD) meetings on environmental activities, as well as periodic LTS working groups and meetings. These meetings provided a forum for community input and the opportunity for progress updates regarding the current status of LTS.

The LTS Program has also completed work on the Community Checklist, which was compiled by Sandia's Members of the Workforce and community members who have an interest in LTS at SNL/NM. The Community Checklist contains the community members' questions about LTS. The questions were addressed with Members of the Workforce and posted to the LTES website.

Please visit the LTES website for more information:

<http://ltes.sandia.gov/>

Click on "Legacy" for information about LTS sites.

# Terrestrial Surveillance

Terrestrial surveillance is conducted at SNL/NM through collection and analysis of samples in order to characterize environmental conditions and identify trends. Other objectives of terrestrial surveillance are to establish baseline levels of radiological and non-radiological constituents and assess the effectiveness of P2.

In order to detect potential releases or migration of contaminated material to off-site locations, samples of soil, sediment, and vegetation are collected from on-site, perimeter, and off-site locations (community locations outside KAFB boundaries). In 2008, there were no terrestrial sample results indicating concerns that would prompt actions at locations that are not already being addressed by the ER Project.

In addition, a special sampling campaign and summary report of non-radiological parameters was prepared for several areas in Thunder Range (Thunder Range July-August 2008 Field Report on Baseline Sampling) to serve as a baseline for future reference regarding constituent



Prairie Sunflower

levels in nearby soils. In the future, routine sampling for non-radiological constituents at fixed locations will be reduced, and more emphasis will be placed on sampling specific areas of interest with potential environmental impact. The total number of samples collected annually, is expected to remain approximately the same. For a complete list of results, visit this Website for the SNL/NM 2008 ASER:

<http://www.sandia.gov/news/publications/environmental/index.html>



Dwarf Cholla



Employee Sampling Soil at a Sandia Site

Biota monitoring began in 1996 as an additional element of environmental monitoring within the Terrestrial Surveillance Program. The objectives of the Ecological Surveillance Program are to:

- Collect ecological resource inventory data to support site activities while preserving ecological resources and to ensure regulatory compliance;
- Collect information on plant and animal species present to further the understanding of ecological resources on-site;
- Collect biota contaminant data on an as-needed basis in support of site projects and regulatory compliance;
- Assist Sandia organizations in complying with regulations and laws;
- Educate the Sandia community regarding ecological resource conservation; and
- Support line organizations with biological surveys in support of site activities.

The biota data collected are consistent with the requirements under DOE Order 450.1A. Data are collected on mammal, reptile, amphibian, bird, and plant species that currently inhabit SNL/NM. Data collected include information on presence, abundance, species diversity, and land use patterns. Since no significantly elevated levels of radionuclides or metals were observed in soil or vegetation samples, no contaminant analysis of radionuclides and metals on wildlife were performed in 2008.

These data are primarily utilized to support NEPA documentation and land use decisions on a corporate level. Data also support wildlife communication campaigns to ensure safe work environments and sustainable decision-making strategies. See Table 1 for common birds identified at KAFB.



Gray Fox



Western Diamondback Rattlesnake



Sharp-shinned Hawk

BIRDS			
American robin	<i>Turdus migratorius</i>	Horned lark	<i>Eremophila alpestris</i>
American kestrel	<i>Falco sparverius</i>	Killdeer	<i>Charadrius vociferus</i>
Black-chinned hummingbird	<i>Archilochus alexandris</i>	Loggerhead shrike	<i>Lanius ludovicianus</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>	Mountain bluebird	<i>Sialia currucoides</i>
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>	Red-tailed hawk	<i>Buteo jamaicensis</i>
Dark-eyed junco	<i>Junco hyemalis</i>	Rufous-sided towhee	<i>Pipiloerythro melanocephalus</i>

Table 1: Common Birds Identified at KAFB

# Groundwater Protection

## Groundwater Protection at SNL/NM

The regional aquifer, supplying the COA and KAFB, is located within the Albuquerque basin. SNL/NM gets its drinking water from KAFB, which gets nearly all of the supplied water from wells in the Albuquerque basin. The basin was created by the extension of the Rio Grande Rift that began forming approximately 30 million years ago. The two groups that conduct groundwater monitoring at SNL/NM are:

- The ER Project; and
- The Groundwater Protection Program (GWPP).

In FY08, water level measurements were obtained from 164 wells within and immediately outside the boundaries of KAFB, and the data were used to construct a regional water table elevation map.

## Groundwater Water Quality Monitoring

In FY08, water samples were collected and analyzed from 70 monitoring wells and one spring at SNL/NM by the GWPP and the ER Project. Results from both groups are compared to maximum contaminant levels established by the EPA, maximum allowable concentrations for groundwater promulgated by the State of New Mexico Water Quality Control Commission, and derived concentration guides for radionuclides, established by the DOE/NNSA/SSO.

For detailed well information and sampling results, please see the 2008 Annual Groundwater Monitoring Report at the following website:

<http://www.sandia.gov/news/publications/environmental/index.html>



Groundwater Well Installation at SNL/NM



Measuring a Groundwater Well at SNL/NM



Groundwater Sampling Analysis at SNL/NM

## Wastewater

Wastewater from SNL/NM is discharged from six on-site outfalls to the COA sanitary sewer system under permits issued by the Albuquerque Bernalillo County Water Utility Authority (ABCWUA). Sandia monitors the wastewater to ensure that all discharges meet the standards set by the ABCWUA's publicly owned treatment works. In 2008, there were no reportable events, and all discharge parameters were met; this resulted in SNL/NM receiving six Gold Pre-Treatment Awards from the ABCWUA for 2007-2008. These awards are given based on a facility's 100 percent compliance with reporting requirements and discharge limits sent in its permits.

## Surface Discharge

All water that will be discharged to the ground surface, either directly or to lined containment ponds and areas, must meet State of New Mexico surface discharge standards. In 2008, there were 23 internal requests made for individual discharges to the surface. All requests met the NMED and New Mexico Water Quality Control Commission standards, and were approved by Sandia.

In 2008, thirty two accidental releases and spills at SNL/NM were investigated through the Surface Discharge Program; two of these spills met the reporting requirements established by NMED. Additionally, routine water discharges are made to two evaporation lagoons that service the Pulsed Power Facility under an existing discharge permit. During 2008, all permit requirements for both lagoons were met.



Coyote Springs at KAFB

## Storm Water Runoff

Storm water discharges at SNL/NM are covered under the National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activities (MSGP) issued by the EPA on September 29, 2008. This new permit replaced the previous permit that was issued on October 30, 2000. Under both the old and new MSGP, operators must submit a Notice of Intent (NOI), implement control measures, sample storm water runoff for comparison to national benchmark values, and develop site-specific Storm Water Pollution Prevention Plans (SWP3). MSGP 2000 was issued for a five-year term, and was administratively extended by EPA until the new MSGP was issued September 29, 2008. As a result of the issuance of the new permit, Sandia added several new monitoring locations for compliance with this new permit.

Construction activities that disturb over one acre also require permitting under NPDES to protect of storm water runoff during and after construction. All areas of the construction site that are susceptible to erosion must be stabilized upon completion of the project. A General Construction Permit (GCP) was issued in 2003 for a five-year term, and expired July 1, 2008. The EPA issued an updated GCP effective from June 30, 2008 to June 30, 2010. In 2009 there were 15 active NPDES Construction Permits in 2008.



Young Red Spotted Toads

# Air Quality, Meteorological Monitoring & NESHAP

Sandia conducts air quality monitoring and surveillance under three programs: (1) the Clean Air Network Program (CAN), (2) the Air Quality Compliance Program (AQC), and (3) the National Emission Standards for Hazardous Air Pollutants Program (NESHAP).

## CAN

In 2008, data were collected from eight meteorological towers located throughout SNL/NM and KAFB. The data provided air dispersion and transport modeling information. Figure 3 shows some of the variations and extremes found in meteorological measurements.

### Ambient Air Monitoring

Sandia measures ambient air quality at various locations throughout SNL/NM, and compares results with National Ambient Air Quality Standards (NAAQS) and local ambient air quality regulations. The network monitors criteria pollutants and volatile organic compounds. The ambient air surveillance data, collected from five locations, are utilized to establish background concentration levels for pollutants of concern and evaluate potential effects of Sandia's operations on air quality. In 2008, all results met NAAQS.

## AQC

Air quality standards are implemented through regulations promulgated by local and federal governments in accordance with the Clean Air Act (CAA) and the Clean Air Act Amendments (CAAA) of 1990. The Albuquerque Bernalillo County Air Quality Control Board, the State of New Mexico, and the EPA determine applicable air quality standards for non-radiological pollutants.

DOE/NNSA/SSO and Sandia have met all requirements for air pollution control permits and registrations.

## NESHAP

Radionuclide air emissions from DOE/NNSA/SSO facilities are regulated under NESHAP, with the exception of naturally occurring radon. In 2008, there were 15 SNL/NM facilities reporting NESHAP regulated emissions. Of these 15 sources, 14 were point sources and one a diffuse source. Four of the 15 facilities reported no emissions in 2008.

In 2008, the primary radionuclides released were tritium and argon-41. The on-site theoretical individual with the highest calculated exposure to the radionuclide emissions (the maximally exposed individual [MEI]) received a dose

of 2.25 E-03 millirems per year (mrem/yr) at the Honeywell Systems Support Site on KAFB. The dose resulted primarily from releases of tritium from Sandia's Neutron Generator Facility (NGF). The off-site MEI (at the KAFB Eubank Gate) received a total dose of 2.29 E-03 mrem/yr. Both doses are well below the 10 mrem/yr EPA standard.

## Wind Speed

- Average Annual Wind Speed
- Greatest Difference in Wind Speed over 24 hours
- Greatest Daily Difference in Maximum Wind Gust
- Average Difference in Daily Wind Speed

	Minimum (m/sec)	Maximum (m/sec)	Spread (m/sec)
Average Annual Wind Speed	3.79 (CL1)	4.02 (CW1)	0.23
Greatest Difference in Wind Speed over 24 hours	6.23 (KU1)	11.4 (A13)	5.17 In November
Greatest Daily Difference in Maximum Wind Gust	15.42 (SC1)	32.53 (KU1)	17.11 In July
Average Difference in Daily Wind Speed	0.95		

## Temperature

- Average Annual Temperature
- Network Annual Temperature Extremes
- Greatest Difference in Daily Minimum Temperature
- Greatest Difference in Average Daily Temperature
- Greatest Difference in Daily Maximum Temperature

	Minimum (°C)	Maximum (°C)	Spread (°C)
Average Annual Temperature	13.31 (SC1)	14.06 (A13)	0.75
Network Annual Temperature Extremes	-13.76 (SC1)	35.83 (A21)	49.59
Greatest Difference in Daily Minimum Temperature	-5.12 (MW1)	2.59 (SC1)	7.71 In December
Greatest Difference in Average Daily Temperature	1.58 (CL1)	6.00 (SC1)	4.42 In December
Greatest Difference in Daily Maximum Temperature	2.01 (SC1)	6.06 (KU1)	4.05 In December

## Precipitation

- Annual Precipitation (Extremes)
- Daily Rainfall Variation
- Greatest Monthly Precipitation Difference
- Greatest in Monthly Rainfall occurred in August

	Minimum (cm)	Maximum (cm)	Spread (cm)
Annual Precipitation (Extremes)	15.27 (A21)	21.21 (SC1)	5.94
Daily Rainfall Variation	0.18 (A36)	1.42 (A21)	1.24 In July
Greatest Monthly Precipitation Difference	2.72 (A21)	5.03 (SC1)	2.31 In August
Greatest in Monthly Rainfall occurred in August	5.46 (A21 in July)		

NOTE: Winter precipitation that falls as snow is underestimated (mostly at the SC1 tower). The precipitation at A21 in October is underestimated.

Figure 3: Variations and Extremes in Meteorological Measurements Across the Meteorological Tower Network in 2008

# Waste Management

Waste generated in 2008 at SNL/NM was managed at one or more of the following facilities at SNL/NM: the Hazardous Waste Management Facility (HWMF), the Thermal Treatment Facility (TTF), the Radioactive and Mixed Waste Management Facility (RMWMF), Manzano Storage Bunkers (MSB) and the Solid Waste Transfer Facility (SWTF).

## HWMF

The HWMF manages hazardous wastes and chemical wastes. The waste processing functions include reviewing waste characterization, as well as waste collection, segregation, packaging, storage, and shipment to permitted off-site facilities for recycling, treatment, and/or disposal. In order to track waste through each waste handling step, each waste item received at the HWMF is labeled with a unique bar code and the information is maintained in a database. Waste is usually processed and shipped off-site within 90 days of receipt. In 2008, a total of 8,737 packaged items were handled by the HWMF. The HWMF shipped a total of 55,933 kilograms (kg) (123,311 pounds [lb]) of hazardous waste, including recyclable waste.

## RMWMF

The RMWMF manages SNL/NM's radioactive and mixed waste. The waste processing functions at the RMWMF include waste characterization, collection, segregation, treatment, packaging, storage, and shipment to permitted off-site facilities. In 2008, the RMWMF shipped 23,400 kg (51,574 lb) of LLW, and 7,718 kg (17,010 lb) of MW (650 cubic feet [ft<sup>3</sup>]) to permitted off-site facilities for treatment and/or disposal. In 2008, 10,702 kg (23,595 lb)

of MW was treated at the RMWMF to meet applicable hazardous waste treatment standards. Of the treated waste, 108 kg (238 lb) were rendered non-hazardous. The treated wastes were then stored at the RMWMF or MSB, or they were shipped to permitted off-site facilities. Transuranic (radioactive) waste (TRU) and mixed TRU wastes (MTRU) were stored at SNL/NM during 2008; these wastes will be sent to the Waste Isolation Pilot Plant (WIPP) in the future for final disposal.

## SNL/NM Radioactive & Mixed Waste

*Low level waste (LLW) is primarily contaminated with isotopes of strontium, plutonium, cobalt, americium, thorium, cesium, tritium, and uranium (plutonium and americium in LLW are below the activity level designated for TRU waste). Sandia's LLW inventory generally consists of laboratory waste, decontamination and demolition (D&D) debris, and personnel protective equipment (PPE).*

*Mixed Waste (MW) is hazardous waste that contains a radioactive component.*

*TRU may derive from sealed instrument sources, D&D waste, PPE, and laboratory waste. The radioactive component in TRU is generally americium, plutonium, neptunium, and curium.*



TRU Waste Drum Being Transported at SNL/NM

**TTF and MSBs**

The TTF is operated by SNL/NM as a treatment facility for certain explosive waste streams. The MSBs are used for storage of LLW, MW, TRU, and MTRU wastes.

**SWTF**

The SWTF manages solid waste from SNL/NM operations in compliance with all applicable regulations; waste processing functions include collecting waste, screening it for prohibited items, processing it, and shipping it to offsite facilities for recycling or disposal. The SWTF also processes and ships (but does not collect) solid waste from KAFB and DOE/NNSA/SSO. In 2008, the SWTF received 815,836 kg (1,796,995 lb) of SNL/NM solid waste and 1,089,028 kg (2,398,739 lb) of KAFB and DOE/NNSA/SSO solid waste.

Material	Pounds
Freon	31
Anti-freeze	7,836
Tires	13,400
Light Bulbs	19,328
Plastics	21,071
Toner/Ink Cartridges	33,011
Ceiling Tiles	40,000
Carpet	45,000
Batteries	49,181
Wood	49,985
Oil/Grease/Fuel	111,425
Computers/Electronics	311,916
Paper/Cardboard	1,031,539
Metals	4,202,445
Concrete/Asphalt	14,506,000

**Table 2:** Categories of Waste Recycled at SNL/NM in 2008

**Recyclables**

The secondary function of the SWTF is to collect, process (screen, bale, and track), market, and ship the following recyclable materials from SNL/NM: cardboard, white paper, mixed paper, aluminum cans, scrap metals, printer consumables, and plastics (see Table 2). Proceeds from the sale of recyclable materials are reinvested in the recycling program. The SWTF also provides some recycling support for KAFB and DOE/NNSA/SSO.

In support of small SNL/NM construction and demolition projects, the Construction and Demolition (C&D) Recycle Center accepts small quantities of C&D waste, but it is managed separately from the solid waste. The C&D Recycle Center provides contractors of small C&D projects a location to recycle cardboard, wood, and scrap metal.

*Recycling at SNL/NM*



*Recycled Steel*



*White Paper*



*Aluminum Cans*



*Toner and Ink Cartridges*



*Mixed Paper*



*Plastic Bottles*



