

SANDIA NATIONAL LABORATORIES

2022

PHOTOGRAPHY: Rhett Zyla

ANNUAL SITE
ENVIRONMENTAL SUMMARY REPORT

ALBUQUERQUE, NEW MEXICO

DOE and Sandia are committed to ***safeguarding the environment, assessing sustainability practices, and ensuring the validity and accuracy of the monitoring data*** presented in this summary of the 2022 SNL/NM annual site environmental report.

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This report summarizes the environmental protection and monitoring programs in place at Sandia National Laboratories, New Mexico (SNL/NM) during calendar year 2022.

Detailed information on these programs can be found in the full annual site and environmental reports (ASERs), accessed via the QR code.





A robust environmental management system ensures a structured approach to identifying environmental aspects, setting environmental objectives, and monitoring environmental performance. Sandia's Environmental Management System is ISO 14001:2015 certified. Sandia personnel follow the system's requirements, as verified by an external, third-party audit in 2022. This environmental management system is Sandia's primary platform for implementing the environmental management programs that help achieve annual site sustainability goals.

For fiscal year 2022, the significant aspects for Sandia operations were: greenhouse gas air emissions and hazardous air pollutants (asbestos); hazardous materials; hazardous, mixed, and radiologic waste; release of explosives and combustion byproducts to soil, surface, and groundwater; wastewater and process water discharge; and water use.

Sandia management takes environmental stewardship seriously.

ENVIRONMENTAL MANAGEMENT SYSTEM





Red yucca (*Hesperaloe parviflora*) summer seed pods

SITE SUSTAINABILITY

A site sustainability plan is prepared annually and identifies contributions toward meeting DOE sustainability goals.

Highlights for SNL/NM in 2022 include decreasing the year-over-year Scope 1 and Scope 2 greenhouse gas emissions relative to fiscal year 2021, completing a vulnerability assessment and resilience plan, decreasing potable water intensity by 32.8 percent relative to a fiscal year 2007 baseline, and designing and constructing three new LEED Gold buildings. Additionally, personnel diverted 62.9 percent of nonhazardous solid waste from treatment and disposal facilities and diverted 20.1 percent of construction and demolition waste from treatment and disposal facilities.

Though Scope 3 greenhouse gas emissions were reduced by 25.4 percent from the fiscal year 2008 baseline, these greenhouse gas emissions increased year-over-year by 9.5 percent relative to fiscal year 2021. In fiscal year 2022, energy intensity increased by 3.3 percent relative to fiscal year 2021. Also, Sandia personnel managed electronics stewardship, with 95.5 percent of acquisitions meeting environmentally sustainable electronics standards, 100 percent of operations using power management features during computer and monitor use, and 100 percent of end-of-life equipment being disposed of through government programs or certified recyclers.





Cooper's hawk (*Accipiter cooperii*)

ENVIRONMENTAL PERFORMANCE

During the most recent DOE evaluation, Sandia earned an overall rating of very good.

DOE assesses environmental performance through the collection of data, measures, and indicators and then reports on this as part of an overall performance evaluation.

During **2022**, two occurrences met the criteria for reporting in this annual site environmental report:

- Post Inspection Notification issued for Failing to Obtain Fugitive Dust Control Permit (NA--SS-SNL-4000-2021-0006)
- Notice of Violation Issued for Noncompliance with New Mexico Hazardous Waste Management Regulations (NA--SS-SNL-NMSITE-2022-0002)

More information on these occurrences can be found in the full annual site environmental report.

All environmental monitoring in 2022 was conducted in accordance with program-specific plans that contain applicable quality assurance elements and meet appropriate federal, state, and local requirements for conducting sampling and analysis activities.





AIR QUALITY COMPLIANCE PROGRAM

Program personnel support compliance with air quality regulations, permits, and other requirements. In Bernalillo County, New Mexico, the City of Albuquerque Air Quality Program implements air quality regulations and standards established by the U.S. Environmental Protection Agency (EPA) and the Albuquerque Bernalillo County Air Quality Control Board.

2022 Program activities and results:

During 2022, potential emissions from permitted and registered stationary sources were 10.68 tons of hazardous air pollutants, 3.28 tons of volatile organic compounds, 10.64 tons of carbon monoxide, 8.02 tons of nitrogen oxide, 1.67 tons of particulate matter with a diameter $\leq 10 \mu\text{m}$, and 0.09 tons of sulfur dioxide. These emissions were within permitted limits.

During fiscal year 2022, SNL/NM operations directly emitted a total of 137,674 tons of carbon dioxide-equivalent emissions. Activities resulting in greenhouse gas emissions were below federal regulatory reporting thresholds. Twenty-two open burn permits and 10 fugitive dust permits were in effect in 2022.



Two-tailed swallowtail (*Papilio multicaudata*) on purple coneflower (*Echinacea purpurea*)

AMBIENT AIR SURVEILLANCE PROGRAM

Ambient air is surveilled through a network of air monitoring stations located on or near Sandia property. Ambient air quality is monitored for particulate matter and analyzed for metals and radiological constituents. Particulate matter that has a diameter equal to or less than $2.5\ \mu\text{m}$, or $\text{PM}_{2.5}$, was measured at two monitoring locations (CPMSTEOM and A3BAM).

2022 Program activities and results:

The 2022 annual average for one-hour $\text{PM}_{2.5}$ measurements was $3.42\ \mu\text{g}/\text{m}^3$ at A3BAM and $6.38\ \mu\text{g}/\text{m}^3$ at CPMSTEOM. The highest monthly average PM_{10} (particulate matter that has a diameter equal to or less than $10\ \mu\text{m}$) concentration in fiscal year 2022 was $83.75\ \mu\text{g}/\text{m}^3$, which occurred in the second quarter of fiscal year 2022. The PM_{10} samples are also analyzed for metals and radiological constituents, and the fiscal year 2022 averages were generally well below threshold limit values. The average result for gross alpha was measured at $1.54\text{E-}03\ \text{pCi}/\text{m}^3$, and the average result for gross beta was measured at $2.23\text{E-}02\ \text{pCi}/\text{m}^3$; both of these radiological constituents have a threshold limit value of zero.





Apache plume (*Fallugia paradoxa*)

CHEMICAL INFORMATION SYSTEM AND CHEMICAL EXCHANGE PROGRAM

The Chemical Information System is a comprehensive chemical information tool used to track workplace chemical and biological containers by location. The primary drivers for the Chemical Information System are state and federal regulations, including the Emergency Planning and Community Right-to-Know Act.

The Chemical Exchange Program at SNL/NM was developed in 1989 as a hazardous waste management waste minimization program. The goal is to reduce the amount of usable chemicals disposed of as waste and instead make them available for reuse, thereby lowering the cost for both new acquisitions and disposal.

2022 Program activities and results:

In 2022, chemical containers at SNL/NM were tracked along with information about any related chemical hazards. Seventy-four chemicals were submitted to the Chemical Exchange Program in 2022, 145 chemicals were available to claim, and 16 chemicals were reapplied.





Historic Building 6590, the Sandia Pulsed Reactor
(photograph by Norman Johnson, March 28, 2012)

CULTURAL RESOURCE MANAGEMENT PROGRAM

The Cultural Resource Management Program is focused primarily on long-term preservation and protection of cultural resources and cultural resource compliance to ensure that the heritage of Sandia operating areas and their landscapes are maintained. Long-term preservation and protection also ensure that data are available to make proper land use decisions and to assist with environmental planning. The Cultural Resource Management Program is focused on two main cultural resource categories: archaeological resources and historic buildings.

2022 Program activities and results:

In 2022, 18 archaeological surveys were conducted; no cultural resources were affected by ongoing or proposed activities. DOE completed two consultations with the New Mexico State Historic Preservation Officer and one consultation with the Pueblo of Isleta.

The historian completed historic building assessments in response to 22 proposed actions at 29 properties in 2022. Consultation between DOE and the State Historic Preservation Officer is complete on 21 of the actions. Additionally, a memorandum of agreement was completed for demolition of two historic buildings, and four consultations are underway for projects at 10 buildings.





ECOLOGY PROGRAM

Ecology Program personnel perform several monitoring, compliance, and staff support activities throughout each year, including vegetation monitoring and surveillance; ecological restoration and revegetation; herpetofauna, bat, avian, and wildlife surveillance; and wildlife responses.



Greater short-horned lizard (*Phrynosoma hernandesi*)

ECOLOGY PROGRAM (CONTINUED)

Herpetofauna

During 2022 herpetofaunal field monitoring, 135 individuals representing 10 species were recorded: 3 snake species, 6 lizard species, and 1 amphibian species. Species diversity and species evenness were above average at the Robotic Vehicle Range, and were below average at the West of Technical Area III area.

Bats

In 2022, 21 species of bats were documented at SNL/NM using passive bioacoustic recordings of bat calls at two sites. The big brown bat (*Eptesicus fuscus*) and the silver-haired bat (*Lasionycteris noctivagans*) were among the most frequently detected bats at both sites.

Birds

In 2022, a breeding bird survey was conducted in June and July. Forty-eight species and 461 individuals were detected across the transect. The 2022 winter bird survey was completed in January 2022. Twenty-six species and 275 individuals were detected. Monitoring Avian Productivity and Survivorship protocol banding sessions were run from May to August. Twenty-two species were captured, and 63 individuals were newly banded. Five fall migration banding events were run from October to November 2022 at a new location, Coyote Wetlands. Nine species were captured, and 13 individuals were banded.

Revegetation

The Ecology Program revegetation subject matter expert supported five ecological restoration projects, participated in 37 Facilities Conceptual Location Analysis planning processes, reviewed 33 National Environmental Policy Act checklists, and monitored ongoing restoration projects.





A female mountain lion (*Puma concolor*) and her three cubs

ECOLOGY PROGRAM (CONTINUED)



A dark-colored American black bear (*Ursus americanus*) after bathing in the Madera Canyon Guzzler

Wildlife

Ecology Program personnel maintain two wildlife water guzzlers: the Madera Canyon Guzzler and the Range Guzzler. Since June 2005, 70 species have been recorded and identified at the Madera Canyon Guzzler. Six of these species have been documented in each year since monitoring began, including the American black bear, common raven, coyote, gray fox, mourning dove, and mule deer. In 2022, 25 different species were observed at the Madera Canyon Guzzler, including 6 mammal species and 19 bird species. Since monitoring began, 73 species have been recorded and identified at the Range Guzzler. Two species have been observed in images at the Range Guzzler in every year of monitoring: gray fox and mule deer. In 2022, 36 different species were observed at the Range Guzzler, including 7 mammal species, 20 bird species, and 2 reptile species.

Wildlife Response

Sandia personnel use a web-based ticketing system, Eco Ticket, for reporting wildlife concerns and requesting biological surveys. In 2022, 204 wildlife issues or requests were received. There were 36 snake removal tickets in 2022, a slight increase from 2021. Of the 36 tickets, 16 were for venomous snakes. Ecology Program personnel received 435 Eco Ticket requests for biological surveys in 2022. The majority of these tickets were for routine, small-scope requests such as campus maintenance activities. The remaining 97 requests were for nonroutine projects such as outdoor testing and large-scale construction activities.





Greater roadrunner (*Geococcyx californianus*)

ENVIRONMENTAL EDUCATION OUTREACH

Environmental Education Outreach personnel connect with the local community and Sandia personnel through organized events. In addition to complying with requirements, it is recognized that communicating with the local community and Sandia personnel about reducing environmental impacts at work and at home is important. An integrated approach is employed to communicate environmental awareness to personnel via newsletters, annual campaigns, and outreach events.

2022 Program activities and results:

Events conducted in 2022 included a virtual Earth Day and a virtual presentation of the annual Environmental Excellence Awards. The annual Environmental Excellence Awards are presented in recognition of Sandia personnel who demonstrate environmental excellence in areas such as energy and water conservation, environmental protection, waste minimization, and recycling. Since the inception of the awards in 2006, there have been 291 nominations for contributions to the vision of environmental excellence across all of Sandia's sites.

Environmental education models are used in presentations and include topics such as air quality, landfills, groundwater, and watersheds. In 2022, environmental professionals visited 40 public school classrooms in the Albuquerque area to complete a watershed model activity with students in support of the RiverXchange education program.





Perkysue (*Tetrameuris argentea*)

Environmental Release, Response, and Reporting Program personnel are contacted in the event of any spilling, leaking, pouring, emitting, emptying, discharging, injecting, pumping, escaping, leaching, dumping, or disposing of material into the environment, which may include, but is not limited to, soil, water, air, and drain systems.

2022 Program activities and results:

In 2022, no releases to the environment met the criteria for reporting to the New Mexico Environment Department or the EPA. No releases met the criteria of a DOE-reportable occurrence. The chemical inventory report and the toxic release inventory report for 2022 were submitted to support compliance with the Emergency Planning and Community Right-to-Know Act.

ENVIRONMENTAL RELEASE RESPONSE AND REPORTING PROGRAM



A photograph of a House Finch (Haemorhous mexicanus) perched on a branch. The bird has a vibrant red head and throat, with streaked brown and grey plumage on its back and wings. It is facing right. The branch it sits on is thin and brown, with several small, round, brownish fruits hanging from it. The background is a soft, out-of-focus blue sky.

House finch (*Haemorhous mexicanus*)

ENVIRONMENTAL RESTORATION OPERATIONS

The Environmental Restoration Project (now Environmental Restoration Operations) was created under the DOE Office of Environmental Management to identify, assess, and remediate sites potentially contaminated by past spill, release, or disposal activities in accordance with Resource Conservation and Recovery Act, as amended by the Hazardous and Solid Waste Amendments of 1984.

2022 Program activities and results:

In 2022, six sites continued to require corrective action, including three groundwater areas of concern and three active test facilities. In addition, routine samples were collected for the three groundwater areas of concern. For the Technical Area V Groundwater area of concern, 18 monitoring wells were sampled in 2022. Several results exceeded the maximum contaminant levels for trichloroethene (six wells) and nitrate plus nitrite (three wells). For the Tijeras Arroyo Groundwater area of concern, 21 monitoring wells were sampled. In the perched groundwater system, the nitrate plus nitrite concentration exceeded the nitrate maximum contaminant level at five wells, tetrachloroethene exceeded the maximum contaminant level at one well, and trichloroethene exceeded the maximum contaminant level at one well. For the Burn Site Groundwater area of concern, 14 wells were sampled in 2022. Nitrate plus nitrite exceeded the maximum contaminant levels in six wells.



Great-horned owl (*Bubo virginianus*)

LONG-TERM STEWARDSHIP PROGRAM

The Long-Term Stewardship Program is designed to protect human health and the environment from hazards associated with residual contamination at legacy sites and to minimize environmental liability by ensuring compliance with the environmental requirements in multiple permits.

2022 Program activities and results:

In 2022, post-closure care activities were conducted at two permitted units, and long-term monitoring and maintenance activities were conducted at numerous solid waste management units. At the Chemical Waste Landfill, semiannual groundwater monitoring was performed in January and August in accordance with post-closure care permit requirements. Groundwater sample results were consistent with previous years; trichloroethene was the only volatile organic compound detected.

The 2022 Corrective Action Management Unit soil vapor monitoring results continue to show the edge of the residual soil vapor plume emanating from the nearby former Chemical Waste Landfill. The volatile organic compound concentrations are not attributed to the material in the Corrective Action Management Unit. The 2022 soil moisture monitoring results remained consistent with the baseline data for the primary subliner and vertical sensor array monitoring subsystems with no trigger levels exceeded. In 2022, 218 gallons of leachate were removed from the collection system compared to 219 gallons in 2021. The evapotranspirative cover continues to meet revegetation criteria and is in excellent condition with even coverage of mature, native perennial grasses.





Sandia staff member measuring groundwater levels

Groundwater is the water found beneath the earth's surface in pore spaces and in fractures of rock formations.

LONG-TERM STEWARDSHIP PROGRAM (CONTINUED)

Semiannual groundwater monitoring was performed at the Mixed Waste Landfill in May and October. All groundwater sample results were consistent with previous years, and no analytes were detected at concentrations exceeding EPA maximum contaminant levels or Long-Term Monitoring and Maintenance Plan-defined trigger levels. Additional groundwater samples were collected in October to analyze for perfluorohexane sulfonic acid, perfluorooctane sulfonic acid, and perfluorooctanoic acid in accordance with a New Mexico Environment Department request. There were no detections above laboratory method detection limits.

All Resource Conservation and Recovery Act Facility Operating Permit-required physical inspections were completed in 2022. The need for replacement of weathered signs was observed at one solid waste management unit in 2022. The replacement will be completed in the first quarter of 2023.

In addition, Groundwater Monitoring Program personnel sampled 16 wells and one spring in 2022. Fluoride was detected above the maximum allowable concentration in three groundwater wells. Beryllium concentrations at Coyote Springs exceeded EPA maximum contaminant levels. The exceedance for each of these elements is attributable to the elevated natural concentrations associated with bedrock groundwater systems at the sampling locations. In one groundwater well, mercury was detected above the EPA maximum contaminant level in the environmental sample but below the method detection limit in the associated duplicate environmental sample.





Sandia Mountains crest

MATERIALS SUSTAINABILITY AND POLLUTION PREVENTION PROGRAMS

Materials sustainability and pollution prevention programs help reduce the amount and toxicity of waste streams generated in office and lab settings throughout the campus.

Materials Sustainability Program personnel educate, influence, and track compliance with federal regulations, including procuring products that meet various environmental specifications, such as biobased and recycled content and energy and water efficiency standards.

Pollution Prevention Program personnel ensure participation in recycling efforts, which are necessary to meet Sandia's Zero Waste by 2025 goal. Since establishing the goal of Zero Waste by 2025, the diversion rate has gone from 47 percent in the baseline year of 2008 to 64 percent in 2022.

2022 Program activities and results:

To increase acquisition of sustainable products, a 2022 interdepartmental working group updated the "green language" in subcontractor contracts and created an automated process to identify applicable contract categories that need to incorporate the 350APR clause. Sustainable acquisition requirements were also added to the Request for Information and Request for Quote process to further communicate requirements to interested subcontractors.





Black and yellow garden spider (*Argiope aurantia*) on Russian sage (*Perovskia atriplicifolia*)

METEOROLOGY PROGRAM

Meteorology Program personnel provide forecasts (e.g., wind speeds, precipitation percentages, and lightning possibilities) to inform go/no go decisions for future tests and analyses of past weather conditions (including wind gusts, average wind speed, and total precipitation values) to all Sandia programs and operations that require atmospheric information. Such parties include health and safety operations, emergency management and response, regulatory permitting and reporting programs, and general research and development groups.

Meteorological monitoring is conducted through a network of meteorological observation towers located across Kirtland Air Force Base.

2022 Program activities and results:

Program personnel provided services, data, and analyses to support project planning decisions in 2022. Routine instrument calibrations and a preventive maintenance field program ensured data quality. In 2022, local conditions across SNL/NM were generally in line with the statewide pattern, with drought conditions improving as the year progressed but ending 2022 in a moderate drought condition.





NATIONAL ENVIRONMENTAL POLICY ACT PROGRAM

NEPA Program personnel provide technical assistance to ensure that Sandia operations and activities are reviewed for NEPA compliance at all Sandia sites. For all proposed projects and activities, project owners must complete a NEPA checklist using the online NEPA Module application. A NEPA checklist is an internal form that NEPA Program personnel use to review proposed projects and activities for compliance with NEPA. After reviewing a NEPA checklist, NEPA Program personnel determine whether proposed projects and activities have been evaluated in existing NEPA documentation. In addition, other relevant environmental program subject matter experts review NEPA checklists to identify any applicable environmental permitting and/or other requirements for the proposed work and then communicate this to project managers.

2022 Program activities and results:

In 2022, program personnel reviewed 318 proposed checklists through the NEPA online tool, and an additional 354 maintenance activities were reviewed through the Routine Maintenance Criteria SharePoint site. NEPA Program personnel submitted 13 Air Force 813 forms on behalf of the Sandia Field Office. In addition, NEPA Program personnel assisted DOE in initiating a new site-wide environmental impact statement for SNL/NM and participated in process improvement activities with the DOE Sandia Field Office.

Rattlesnake (*Crotalus atrox*)



Prickly pear cactus (*Opuntia species*) with fruit

Oil Storage Program activities support regulatory compliance associated with the management, operation, and maintenance of oil storage containers and equipment. As required by 40 CFR 112, *Oil Pollution Prevention*, Oil Storage Program personnel maintain and implement the site-wide Sandia National Laboratories Spill Prevention, Control, and Countermeasure Plan, which describes the oil storage facilities at SNL/NM and the mitigation controls in place to prevent inadvertent discharges of oil.

2022 Program activities and results:

The oil storage capacity at SNL/NM is approximately 2.2 million gallons. In 2022, the inventory of oil storage containers operating under the Sandia National Laboratories Spill Prevention, Control, and Countermeasure Plan included 45 stationary aboveground storage tanks. Additional oil storage capacity in 55-gallon drums, mobile and portable containers, mobile refuelers, and oil-filled operational equipment exists throughout the site. Two underground oil storage tanks were permanently closed and removed in 2022. There were no reportable oil spills in 2022.

OIL STORAGE PROGRAM





Sandia's National Solar Thermal Test Facility; Venus illuminated to the right.

RADIONUCLIDE NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Radionuclide air emissions from Sandia facilities are reported each year.

EPA regulates radionuclide air emissions in accordance with 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities," and has established an effective dose equivalent limit of 10 mrem/year to any member of the public resulting from all radionuclide air emissions from a DOE facility. An annual Radionuclide National Emission Standards for Hazardous Air Pollutants (NESHAP) report summarizes radionuclide air emission releases from Sandia facilities and presents the results of the annual dose assessment. DOE submits the annual report to EPA and the City of Albuquerque Environmental Health Department. The radionuclide air emission data provided in the ASER is pulled from the 2022 NESHAP report.

2022 Program activities and results:

In 2022, the primary radionuclides released from Sandia facilities were argon-41 and tritium. Calculated doses were well below the 10 mrem/year dose limit set by the EPA and DOE. A summary of radionuclide releases and public doses resulting from SNL/NM operations in 2022 can be found in the full annual site environmental report and the *radionuclide NESHAP annual report CY 2022, SNL/NM*.





Gray fox (*Urocyon cinereoargenteus*)

SAFE DRINKING WATER PROTECTION PROGRAM

Safe Drinking Water Protection Program activities ensure the availability of safe drinking water for all people at Sandia-operated facilities. Program personnel work in conjunction with Infrastructure Operations personnel to maintain compliance with applicable federal, state, and local requirements. Program personnel coordinate operations that maintain, test, and inspect appropriate backflow-prevention activities, and submit the Annual Sandia Field Office Backflow/Cross Connection Certification to KAFB.

Drinking water at SNL/NM is supplied by the Kirtland Air Force Base-owned system. Sandia personnel adhere to New Mexico Environment Department regulations when operating and maintaining the drinking water system.

2022 Program activities and results:

In 2022, Safe Drinking Water Protection Program personnel coordinated with Kirtland Air Force Base to support compliance activities such as sampling, inspections, or access to SNL/NM sites.

Kirtland Air Force Base publishes an annual summary of drinking water quality at Kirtland Air Force Base Environmental Assessments .

<https://www.kirtland.af.mil/Home/Environment/>





Summer rain runoff

STORMWATER PROGRAM

Stormwater Program personnel maintain regulatory compliance with federal, state, tribal, and local stormwater requirements via National Pollutant Discharge Elimination System permit coverage consisting of the Construction General Permit, the Middle Rio Grande Municipal Separate Storm Sewer System Permit, and the Multi-Sector General Permit.

2022 Program activities and results:

Three EPA National Pollutant Discharge Elimination System permits were maintained, and compliance activities were conducted in 2022. Monthly compliance inspections were conducted at 16 construction sites under the Construction General Permit and at 18 sites under the Multi-Sector General Permit. Water quality sampling was conducted at 16 locations under the Multi-Sector General Permit and at 5 locations under the Municipal Separate Storm Sewer System Permit.





Painted lady butterflies (*Vanessa cardui*) on a chamisa
(*Ericameria Nauseosa*)

SURFACE DISCHARGE PROGRAM

Surface Discharge Program personnel evaluate all water and water-based compounds that discharge to the ground surface at SNL/NM for compliance with New Mexico Water Quality Control Commission regulations as implemented by the Ground Water Quality Bureau.

2022 Program activities and results:

In 2022, 25 individual discharge requests for SNL/NM met applicable standards and were approved.

Sandia personnel continue to operate the two evaporative lagoons through Discharge Permit 530 issued by the New Mexico Environment Department Ground Water Quality Bureau. Samples were collected from Lagoon 1 and Lagoon 2 on August 22, 2022. Sample fractions were collected for major ions, total dissolved solids, and purgeable and extractable organics as specified in DP-530. Laboratory analysis results indicated that all detected constituents met the state standards, with the exception of fluoride at Lagoon 1. This is suspected to be due to a slightly higher concentration of anions in the sediment from evaporation.



A photograph of a coyote standing on a gravel path next to a young tree. The coyote is looking towards the camera. The background shows a desert landscape with dry grass and some buildings in the distance.

TERRESTRIAL SURVEILLANCE PROGRAM

Coyote (Canis latrans)

Terrestrial Surveillance Program personnel collect environmental media (soil, sediment, and vegetation) samples on a calendar-year basis, which are analyzed for radiological constituents, as required. As a best management practice, samples are also collected to analyze metals and other site-specific constituents.

2022 Program activities and results:

The statistical analysis for metals identified eight instances of statistical significance for the following metals: arsenic, beryllium, chromium, copper, nickel (soil and sediment), selenium, and thallium. The results from this group of metals was compared to reference values and to results from previous years; no 2022 sampling event results were outside the reference ranges. Radiological analyses were performed on soil and sediment samples. Statistical analyses of the 2022 results for the selected radionuclides revealed no statistically significant population differences nor any increasing trends in the on-site locations.

Three on-site locations were analyzed for high explosive compounds. There was one detection for rapid-detonating explosive. One on-site location was analyzed for perchlorate. The estimated perchlorate result was below the New Mexico Environment Department soil screening level for residential use.

Environmental dosimeters used to measure the dose from ambient gamma radiation indicated levels within natural background values in 2022.



Yellow aphids (*Aphis spp.*) on milkweed (*Asclepias spp.*)

WASTE MANAGEMENT PROGRAM

Wastes (including solid wastes, hazardous wastes, and radioactive wastes) are generated during ongoing operations. The wastes are collected and managed at SNL/NM before shipment to off-site permitted facilities.

2022 Program activities and results:

In 2022, the following amounts of waste were handled and shipped: low-level radioactive waste, 90,797 lb; mixed low-level radioactive waste, 26,782 lb; hazardous waste, 127,608 lb; polychlorinated biphenyl waste, 860 lb; other regulated waste (asbestos, chemical, and infectious waste), 424,105 lb; and solid waste, 5,291,474 lb. Recycled commercial, construction, and demolition solid waste totaled 8,743,988 lb and recycled regulated or chemical waste totaled 512,610 lb.

During 2022, DOE and Sandia personnel met all regulatory deadlines, shipped no mixed transuranic waste to the Waste Isolation Pilot Plant for disposal, and provided an annual update of mixed waste activities during the previous year. In addition, during 2022, Sandia personnel managed 1.76 m³ of mixed transuranic waste that was subject to the Federal Facility Compliance Order.

The fiscal year 2022 New Mexico Environment Department Hazardous Waste Bureau inspection was held December 7–9, 2021, and a notice of violation was issued in early 2022. The notice of violation included three findings related to container labels and one finding related to container closure. All findings were corrected during the inspection, and no further action was required.





Coyote Springs

WASTEWATER DISCHARGE PROGRAM

All wastewater discharges are monitored to meet regulatory compliance. Toxic discharges are further reduced by implementing toxic organic management plans, general good housekeeping, and engineering practices.

2022 Program activities and results:

In 2022, wastewater was monitored, and three permit-mandated split samplings were conducted with the Albuquerque Bernalillo County Water Utility Authority. All routine monitoring and split sampling events met the standards set by the Albuquerque Bernalillo County Water Utility Authority Sewer Use and Wastewater Control Ordinance requirements.

In April 2022, the Albuquerque Bernalillo County Water Utility Authority performed annual inspections of facilities that discharge within permitted flow basins. No issues or findings were identified during any of these inspections. The Albuquerque Bernalillo County Water Utility Authority presented DOE and Sandia with six Pretreatment Gold Awards in 2022. Gold awards are given for 100 percent compliance with wastewater discharge permit reporting requirements, zero notices of violation, and an exceptional level of permit compliance.





Sandia National Laboratories



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