

Sandia
National
Laboratories

ANNUAL SITE
ENVIRONMENTAL
SUMMARY REPORT

2023

Gray Fox (*Urocyon
cinereoargenteus*)
by Jeff Clark



CALIFORNIA

LIVERMORE

DOE/NNSA 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 2023 SNL/CA annual site environmental report.

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This report summarizes the environmental protection and monitoring programs in place at Sandia National Laboratories, California (SNL/CA) during calendar year 2023. While most 2023 program activities were performed continuously, they are reported on a calendar-year basis unless otherwise noted. Programs based on the fiscal year operate from October 1 through September 30, annually.

Detailed information on these programs can be found in the full annual site environmental report, accessed via the QR code.





Aerial View of Sandia's Livermore, California Campus
by Randy Wong

ENVIRONMENTAL MANAGEMENT SYSTEM

The environmental management system is Sandia's primary platform for implementing the environmental management programs that help achieve annual site sustainability goals. 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. SNL/CA personnel follow the system's requirements, as verified by an annual external, third-party audit.

For fiscal year 2023, the significant aspects for Sandia operations were: air emissions-greenhouse gases; air emissions-hazardous air pollutants-asbestos; hazardous materials; hazardous, mixed, and radioactive waste; reduced water use; and release of petroleum to soil, surface, and groundwater.

Sandia has established environmental programs at SNL/CA, presented in the following pages that are instrumental in the implementation, maintenance, and continual improvement of the Environmental Management System at this site.





Chinese Maple

SITE SUSTAINABILITY

Sandia defines sustainability practices and goals in a site sustainability plan. An annual plan provides a roll-up of sustainability data from all primary Sandia sites including SNL/CA.

Highlights for SNL/CA in 2023 include reduced Scope 1 and Scope 2 greenhouse gas emissions by 98.6 percent from the fiscal year 2008 baseline, and decreased year-over-year emissions by 48 percent relative to fiscal year 2022 and began implementation of several solutions to increase resilience at SNL/CA.

Additionally, 73.5 percent of nonhazardous solid waste and 87.8 percent of construction and demolition waste were diverted from treatment and disposal facilities. The Sustainable Facilities Tool (SFTool+) was launched in 2023. Sandia delegated representatives and construction subcontractors were provided with a user's guide, training, and a video tutorial on the new reporting mechanism.

In fiscal year 2023, potable water intensity was reduced by 59.2 percent relative to a fiscal year 2007 baseline and by 9.5 percent relative to fiscal year 2022. Energy intensity was also reduced by 9.1 percent relative to fiscal year 2022. Furthermore, electronics stewardship resulted in 93.9 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.





Barn owl (*Tyto alba*)

Occurrences are defined as “events or conditions that adversely affect, or may adversely affect, DOE (including the National Nuclear Security Administration) or contractor personnel, the public, property, the environment, or the DOE mission.”

ENVIRONMENTAL PERFORMANCE

DOE/NNSA assesses environmental performance through data measures and indicators and then reports on this as part of an annual performance evaluation. The performance evaluation is the DOE/NNSA report card that ascribes a rating for five key performance goals and an overall rating. During the most recent evaluation, Sandia earned a rating of very good for the Mission Enablement performance goal, which includes the objective of delivering effective, efficient, and responsive Environment, Safety, and Health quality. By exceeding almost all the objectives and key outcomes under the performance goals, Sandia received an overall rating of excellent for fiscal year 2023.

For this annual site environmental report, the Occurrence Reporting and Processing System database was queried for occurrences related to environmental programs/compliance. During 2023, no occurrences met the criteria for reporting in this annual site environmental report.

Additionally, all environmental monitoring in 2023 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.





Sandia National Laboratories in Livermore California

AIR QUALITY COMPLIANCE PROGRAM

Program personnel support compliance with air quality regulations, permits, and other requirements. In Alameda County, California, the Bay Area Air Quality Management District is the local regulatory authority that implements air quality regulations and standards established by the EPA and the California Air Resources Board.

2023 Program activities and results: In 2023, emissions from permitted and registered stationary sources were 0.38 tons of carbon monoxide, 0.89 tons of hazardous air pollutants, 2 tons of nitrogen oxide, 0.2 tons of particulate matter, 0.01 tons of sulfur dioxide and 2.45 tons of volatile organic compounds. These emissions were within permitted limits.

During fiscal year 2023, operations at SNL/CA directly emitted 125 metric tons carbon dioxide equivalent (MTCO₂e) from fugitive and refrigerant emissions.

In 2023, annual greenhouse gas emissions from natural gas combustion were 2,805 MTCO₂e, which is lower than the annual reporting threshold of 10,000 MTCO₂e. Therefore, operations at SNL/CA are not subject to the California Regulation for the Mandatory Reporting of Greenhouse Gas Emissions or the U.S. Environmental Protection Agency (EPA) Final Rule for Mandatory Reporting of Greenhouse Gases.





Along the Arroyo Seco at Sandia National Laboratories, California

RADIONUCLIDE NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS PROGRAM

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.

There are no radionuclide emission sources at SNL/CA that are subject to 40 Code of Federal Regulations 61, *National Emission Standards for Hazardous Air Pollutants*, monitoring requirements.

2023 Program activities and results: In 2023, no projects emitted any radionuclides into the ambient air; consequently, no annual effluent monitoring and no National Emission Standards for Hazardous Air Pollutants evaluations were completed.





California Poppy

CHEMICAL MANAGEMENT PROGRAM

Chemical Management Program personnel support all projects and activities involving the handling or use of chemicals at SNL/CA. The SNL/CA Chemical Management Program is part of the Sandia corporate chemical management 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. Chemical hazards are reported on safety data sheets, and the Chemical Information System currently contains more than 129,000 safety data sheets in its library for use by any Sandia site.

2023 Program activities and results:

In 2023, chemical containers were tracked along with information about any related chemical hazards listed in the Chemical Information System. Sandia personnel continued to use ChemPro to request permission for new chemical purchases in 2023.

In 2023, Sandia personnel at SNL/CA did not submit any chemicals to the Chemical Exchange Program.





Building 912, Sandia National Laboratories,
California 1958

CULTURAL RESOURCES PROGRAM

Cultural Resources 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 Resources Program is focused on two main cultural resource categories: archaeological resources and historic buildings.

2023 Program activities and results:

In 2023, 17 archaeological reviews were conducted; no cultural resources were affected by ongoing or proposed activities. In 2022, a baseline cultural resource survey was conducted with no findings. DOE/NNSA completed a Section 110 consultation with the California State Historic Preservation Officer on the baseline survey and received concurrence in 2023.

Sandia's historian completed a historic context and historic building survey and assessment of the SNL/CA site. The final reports will be published in 2024. The assessment recommended that 11 properties at the site are eligible for the National Register of Historic Places. One historic district is proposed, consisting of the four properties initially built as the Combustion Research Facility. These properties have a consistent architectural design, and the Combustion Research Facility has housed work of exceptional historical significance. The other 7 properties appear to be individually eligible for the National Register of Historic Places. DOE/NNSA will consult with the California State Historic Preservation Officer on the determination of which properties are and are not eligible at SNL/CA.





California red-legged frog (*Rana aurora draytonii*)

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, avian, and wildlife surveillance; passive bat monitoring using bioacoustic recordings; and Eco Ticket responses.

The Ecology Program personnel also supported monitoring of active ecological restoration projects, participated in 38 Work Hold Control Point permits, supported Facilities personnel in several conceptual design planning processes, and reviewed 37 National Environmental Policy Act (NEPA) checklists.

Vegetation Monitoring

In 2023, spring surveys focused on sampling grass and shrub cover; observing invasive weed infestations, native plant recruitment, seed germination, site maintenance, and irrigation; and recording other plants and animals of note. Fall surveys focused on tree and shrub survival and cover. For 2023, no weeds of concern were noted for all restoration sites but one, which was seen to have good stands of native grass. Of the remaining active restoration sites, a replanting strategy is in place, and the sites will continue to be monitored until success criteria have been met.





Coyote (*Canis latrans*) and cub

ECOLOGY PROGRAM (CONTINUED)

Herpetofauna Surveillance

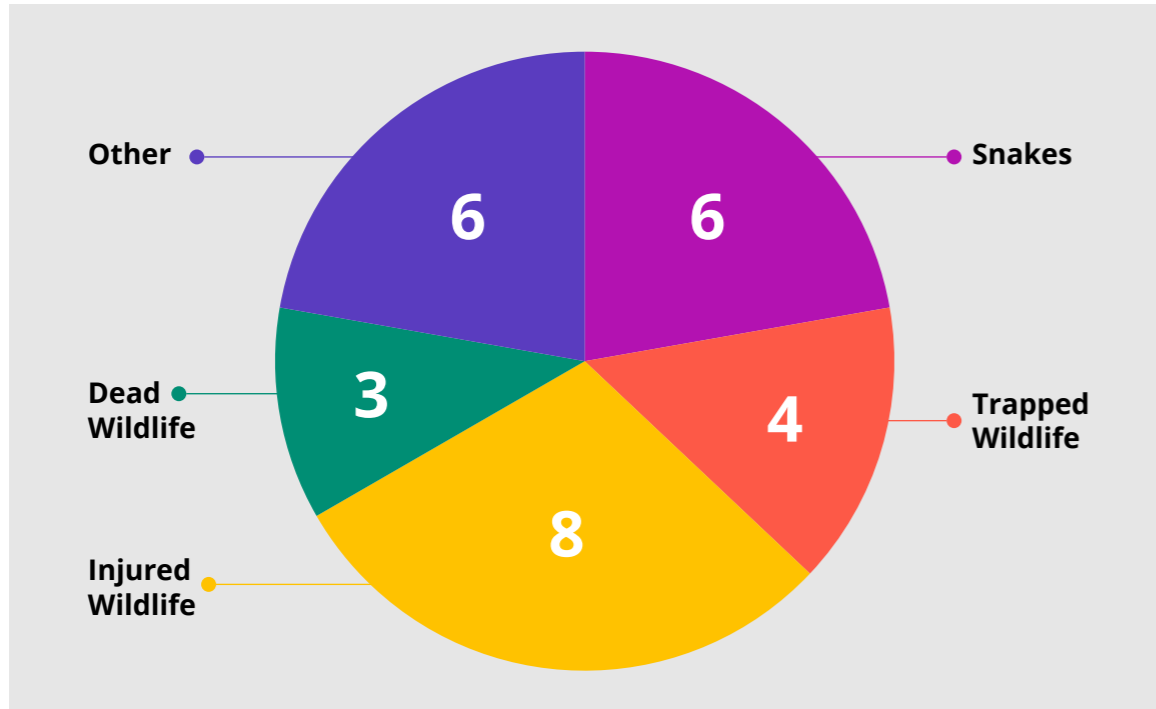
During 2023 herpetofauna field monitoring, six species were recorded as present on-site: two snake species, one lizard species, and three amphibian species. The California tiger salamander (*Ambystoma californiense*), a federal and state threatened species, was seen on-site in January and relocated to the on-site wildlife preserve.

Mammal Surveillance

In 2022, three species of bats were documented at SNL/CA using passive bioacoustic recordings of bat calls at two sites. The California myotis (*Myotis californicus*) and the Mexican free-tailed bat (*Tadarida brasiliensis mexicana*) were the most frequently detected bats at both sites. No passive bioacoustics monitoring was performed in 2023. In 2023, an injured hoary bat (*Lasiurus cinereus*) was discovered on-site and was taken to the nearest wildlife hospital for rehabilitation.

Ecology Program personnel maintain two wildlife game cameras along the Arroyo Seco: one inside a restoration site and one outside the restoration area inside the on-site preserve. The cameras are active from March through July each year to monitor the presence of wildlife and compare wildlife use of the restoration areas to use of the undisturbed portions of the Arroyo Seco.





EcoTickets by type of call, 2023

In 2023, the restoration site camera captured images of 21 different species, with the most common sighting being coyote (*Canis latrans*). At the control location, 12 species were observed, also with the most common sighting being coyote.

Avian Surveillance

In 2023, 40 species were observed in restoration areas, and 49 species were observed in control areas, with a total of 54 different species observed. Bird surveys and nesting surveys were conducted from March to August to compare avifauna (local bird) use between restoration sites and control sites as well as to monitor the active nests on campus. It should be noted that the Swainson's hawk (which is listed as state threatened) pair that nested on the north side of SNL/CA in 2021 and 2022 did not nest on-site in 2023

Eco Ticket

Sandia personnel use Eco Ticket, a web-based ticketing system, for reporting wildlife issues or concerns.

In 2023, 27 wildlife issues or requests were received through Eco Ticket. The "Injured" category was requested most often with 8 tickets; birds and snakes were the most common animals in this category. There were 6 snake removal (non-injured) tickets in 2023. Of the 6 tickets, none were for venomous snakes. The remaining 13 tickets were for dead, trapped, or "other" wildlife incidents.





NATIONAL ENVIRONMENTAL POLICY ACT PROGRAM

NEPA Program personnel provide technical assistance to and coordinate with DOE/NNSA to ensure that operations and activities at SNL/CA are reviewed for compliance with NEPA. 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. As part of a NEPA checklist review, NEPA Program personnel determine whether proposed projects and activities have been evaluated in existing NEPA documentation.

2023 Program activities and results:

In 2023, NEPA program personnel reviewed 81 proposed projects through the NEPA online tool, as well as providing ongoing NEPA support during final construction of the new Limited Area Multi-Program buildings, which consist of a 27,000-square-foot office space and a 17,000-square-foot high-bay facility. Program personnel assisted DOE/NNSA in completing a new screening analysis, and the final determination will be published in a supplemental analysis document with an anticipated final date in 2024.

Sunrise over the Del Valle Regional Park in Livermore, California



Fall colors at Sandia National Laboratories, California

OIL STORAGE PROGRAM

Oil storage containers and equipment are managed, operated, and maintained to prevent inadvertent releases to the environment and to comply with applicable regulations. In 2023, the inventory of oil storage containers operating under the *Sandia National Laboratories, CA Spill Prevention, Control, and Countermeasure Plan* included bulk storage containers and oil-filled operation equipment containers. Bulk storage containers include fixed, portable, and mobile containers. Oil-filled operational equipment containers are associated with electrical, hydraulic, and metal machining equipment. Oil storage container capacities at SNL/CA range from 55 gallons to 1,000 gallons. No underground oil storage tanks are present at SNL/CA.

2023 Program activities and results:

In 2023, Oil Storage Program personnel conducted an annual inspection of all stationary fixed bulk storage containers in accordance with the Steel Tank Institute/Steel Plate Fabricators Association standard SP001, “Standard for the Inspection of Aboveground Storage Tanks” (STI/SPFA 2001). The annual inspections found all stationary fixed bulk storage containers in compliance.

Oil Storage Program personnel also conducted annual training for oil-handling personnel as required by both 40 CFR 112, *Oil Pollution Prevention*, and California Health and Safety Code Division 20, Chapter 6.67 § 25270–25270.13, *Aboveground Storage of Petroleum Act*.

There were no reportable oil spills in 2023.





Miniature lupine (*Lupinus bicolor*) at Sandia National Laboratories, California

POLLUTION PREVENTION AND WASTE MINIMIZATION PROGRAM

The Pollution Prevention and Waste Minimization Program helps reduce the amount and toxicity of waste streams generated in office and lab settings throughout the campus. Pollution Prevention and Waste Minimization Program personnel educate, influence, and track compliance with Federal Acquisition Regulation and DOE Acquisition Regulation clauses in the Prime Contract, which outline the need to procure products that meet various environmental specifications, such as biobased and recycled content and energy and water efficiency standards. Pollution Prevention and Waste Minimization Program personnel provide educational materials and recycling receptacles and conduct outreach and promotion to ensure that personnel can participate in recycling efforts.

2023 Program activities and results:

To increase acquisition of sustainable products, a 2022 interdepartmental working group updated the “green language” clause (350APR clause) in subcontractor contracts to include verbiage to provide services to promote the expanded use of green products, reduce greenhouse gas emissions, and protect the health and well-being of occupants, service providers, and visitors in an NTESS-controlled facility.





California tiger salamander (*Ambystoma californiense*)

POLLUTION PREVENTION
AND WASTE MINIMIZATION
PROGRAM
(CONTINUED)

The working group also created an automated Oracle process to identify applicable contract categories that need to incorporate the 350APR clause; these included construction and demolition contracts over \$250,000. Sustainable acquisition requirements were also added to the Request for Information and Request for Quote process to further communicate requirements to interested subcontractors.

For solid waste recycling in 2023, the following amounts of nonhazardous solid waste and construction and demolition debris were managed and shipped off-site for disposal at a municipal landfill: 204,020 pounds of municipal solid waste (trash) and 57,737 pounds of construction and demolition debris. In 2023, the following amounts of nonhazardous solid material and waste and construction and demolition debris were managed and shipped off-site for recycling: 628,248 pounds of nonhazardous solid waste and 1,405,510 pounds of construction and demolition debris.





Desert cottontail rabbit (*Sylvilagus audubonii*)

TERRESTRIAL SURVEILLANCE PROGRAM

Ambient external gamma radiation levels on-site are measured using environmental dosimeters. On-site sources that could contribute to gamma radiation include small, unsealed radioactive isotopes; sealed sources; and several radiation-generating devices. Dosimeters are used to measure the cumulative ambient external radiation dose and to approximate the dose potentially received from natural and nonnatural sources.

Currently there are no operations on-site that require Sandia personnel at SNL/CA to collect environmental media (soil, sediment, surface water, groundwater, and vegetation) samples.

2023 Program activities and results:

In 2023, the annual average background radiation dose in 2023 was measured at 39.2 mrem (0.392 mSv). The average annual perimeter dose was measured at 42.2 mrem (0.422 mSv). The reported perimeter dose is the actual measurement; the background radiation dose is not deducted. The average annual dose for the San Francisco Bay Area is estimated to be 43.8 mrem (Mauro and Briggs 2005). The annual average background radiation dose measured at 39.2 mrem was from the natural background dose in the area.





Canadian Goose (*Branta canadensis*) on nest

WASTE MANAGEMENT PROGRAM

A variety of waste streams are generated at SNL/CA, including hazardous, medical, low-level radioactive, and low-level mixed (combination of radioactive low-level and Resource Conservation and Recovery Act (RCRA) and/or non-RCRA hazardous), during ongoing operations.

The wastes are collected and managed (i.e., stored, treated, and packaged) at SNL/CA before shipment to off-site permitted facilities.

2023 Program activities and results:

In 2023, the following amounts of waste were handled and shipped: 1,080 pounds of low-level radioactive waste; 4,006 pounds of mixed low-level radioactive waste; 106,803 pounds of hazardous waste, and 128 pounds of medical waste.

The waste management facility at SNL/CA is managed and operated under a RCRA hazardous waste facility permit issued by the California Department of Toxic Substances Control. The permit allows for storing, consolidating, commingling, and packaging hazardous waste. The California Department of Toxic Substances Control conducted an audit in August 2023; there were no findings or observations.

Two facilities at SNL/CA generate medical waste. One is a small-quantity generator with no on-site treatment, and the other is a large-quantity generator with on-site treatment. The Alameda County Department of Environmental Health conducted an audit in November 2023; there were no findings or observations.





Delta to San Francisco Bay California

Drinking water is purchased from the Lawrence Livermore National Laboratory (LLNL), which is supplied by the San Francisco Public Utilities Commission but can be supplemented by the Alameda County Flood Control and Water Conservation District (known as Zone 7) as a backup source. The San Francisco Public Utilities Commission and Zone 7 are responsible for monitoring the quality of the incoming water, which is stored in LLNL-owned tanks located on the south hills at SNL/CA. From there, LLNL personnel maintain the (nonpublic) primary drinking water distribution system that feeds SNL/CA and screen for water quality. LLNL is also obligated to develop and send a consumer confidence report of the drinking water quality to Sandia personnel, displaying compliance with EPA and California State Water Resources Control Board prescribed regulations limits. The current consumer confidence report presented no known concerns with the drinking water at SNL/CA.

SAFE DRINKING WATER PROGRAM





Arroyo Seco in the morning at Sandia National Laboratories, California

STORMWATER PROGRAM

All industrial stormwater runoff at SNL/CA is conveyed to the Arroyo Seco, which discharges into Alameda Creek and eventually to the San Francisco Bay. Operations at SNL/CA comply with the California State Water Resources Control Board's General Permit for Stormwater Discharges Associated with Industrial Activities (Industrial General Permit) and General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit).

2023 Program activities and results:

During the Industrial General Permit's reporting year of 2022 to 2023, numeric action levels were exceeded for iron, aluminum, and pH. These exceedances are not a violation of the Industrial General Permit, however, an exceedance response action report that outlines the elevated parameters and actions that will take place to attempt to lower the observed levels is required. Operations at SNL/CA are in compliance with the Industrial General Permit, and exceedance response action reports have been submitted to the California State Water Resources Control Board. Construction projects under the Construction General Permit were compliant with the permit's requirements, and stormwater runoff from these activities was contained on-site properly.





Juvenile Red Foxes (*Vulpes vulpes*) Outside Building 960

GROUNDWATER AND REMEDIATION PROGRAM

There are seven groundwater monitoring wells at SNL/CA. Environmental Monitoring Program personnel monitor the groundwater at two former restoration areas and along the Arroyo Seco. Three groundwater monitoring wells are used to monitor residual contamination at former restoration areas under a 1989 site cleanup order issued by the Regional Water Quality Control Board, San Francisco Bay Region. Two of these wells are located at the Fuel Oil Spill site and one is at the Navy Landfill. The other four monitoring wells are located along the Arroyo Seco to monitor the effect of site operations on groundwater quality. The wells are monitored at different sampling schedules.

2023 Program activities and results:

The Fuel Oil Spill site wells were sampled during the first, third and fourth quarter of the calendar year 2023. In August 2023, there was a notable increase in total petroleum hydrocarbons diesel-methane for FM-1R. Although not required, additional confirmation sampling at FM-1R was performed in October 2023. The results indicated a decrease in total petroleum hydrocarbons diesel-methane for FM-1R.





Turkey Vultures (*Cathartes aura*) on Groundwater Wells

The Navy Landfill well was sampled in May 2023. Sample results for the first time showed no presence of carbon tetrachloride in this well. Carbon tetrachloride has been previously noted since well completion. The California State Water Resources Control Board requires this well continue to be monitored for carbon tetrachloride though the Navy Landfill is considered a closed site. It should be noted that Navy Landfill well does not draw water from drinking water or an irrigation aquifer.

The Arroyo Seco wells were sampled in May 2023. The sample results for the parameters were below the state and federal maximum contaminant levels.

GROUNDWATER AND
REMEDIATION PROGRAM
(CONTINUED)





Arroyo Seco Sandia National Laboratories, California

WASTEWATER PROGRAM

Wastewater effluent generated at SNL/CA consists of sanitary and laboratory discharges. Sanitary effluent is discharged directly to the sewer system. Sewer discharges exit the site through a sewer outfall located at the northern boundary and join with the LLNL sewer system which is discharged to the City of Livermore Water Reclamation Plant, a publicly owned treatment works. Laboratory discharges are generated from general research activities and from operations that qualify as categorical processes subject to federal pretreatment standards. Laboratory effluent from most laboratory areas is diverted to liquid effluent containment system holding tanks prior to discharge to the sanitary sewer. Program personnel monitor and sample wastewater at the sewer outfall, the liquid effluent containment system tanks, and categorical process point sources to ensure permit compliance.

The Livermore plant maintains a National Pollutant Discharge Elimination System permit and regulates industry discharges into its sewer system. A wastewater discharge permit issued by the City of Livermore Water Resources Division regulates wastewater discharges at SNL/CA and sets sampling requirements. In 2023, all liquid effluent discharged from the outfall was in compliance with the site outfall discharge limits for all parameters.

2023 Program activities and results:

In 2023, the City of Livermore Water Resources Division conducted their annual inspection in September of the three categorical processes and the wastewater discharge at the sewer outfall. No concerns or findings were identified.





Sandia National Laboratories



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