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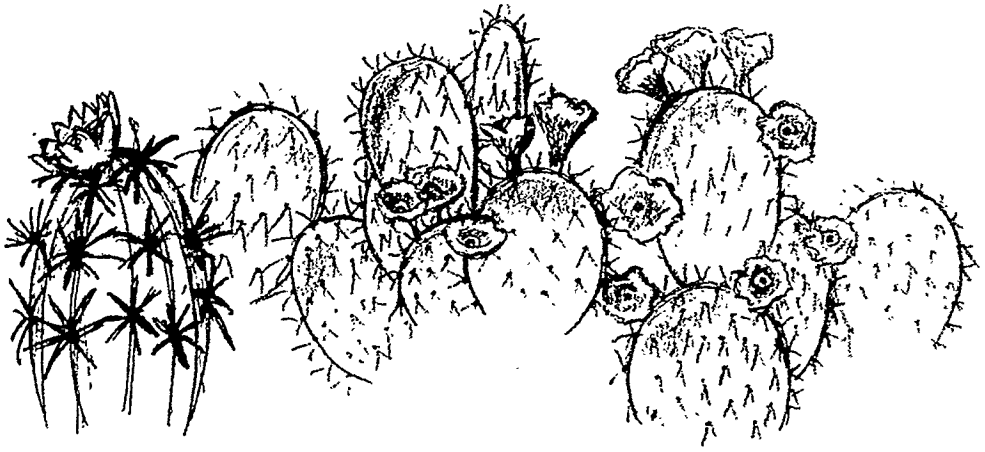
Sandia National Laboratories/New Mexico

1995 Site Environmental Report

Summary Pamphlet



Sandia National Laboratories
a U.S. Department of Energy multiprogram R&D laboratory

As required in U.S. Department of Energy (DOE) Order 5400.1, an Annual Site Environmental Report (ASER) has been prepared for Sandia National Laboratories/New Mexico (SNL/NM) for 1995. The ASER represents a key component of the DOE's effort to keep the public informed about environmental efforts and compliance status at SNL/NM.

This booklet was prepared by the Environmental Operations Center of SNL/NM and reviewed by Community Relations and Risk Management. Suggestions were incorporated from the students of New Futures High School as a part of the Environmental Education Program. This work is supported by the DOE under Contract DE-AC04-94AL85000.

A copy of the ASER can be obtained by calling the Environmental Monitoring and Reporting Department at 848-0927. This pamphlet provides a brief summary of the 1995 SNL/NM environmental programs and monitoring results. Additional copies of this pamphlet may be obtained by calling the number above.

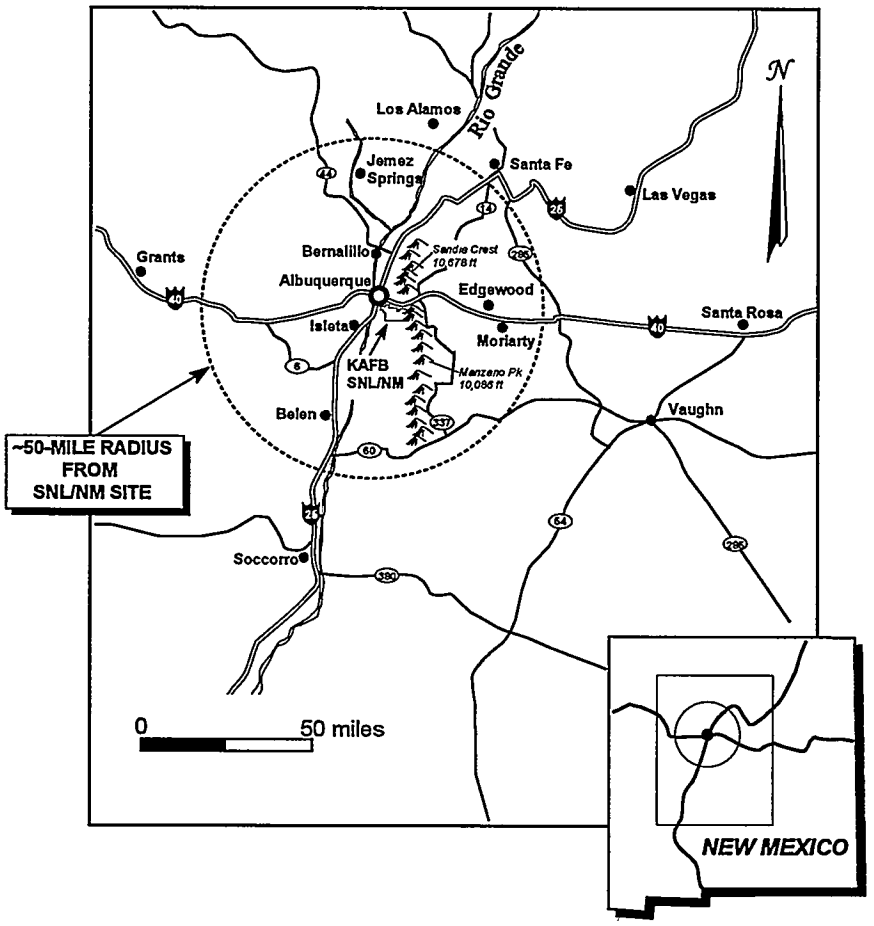


Figure 1. Map of SNL/NM and surrounding areas

DISCLAIMER

Sandia National Laboratories at a Glance...

Sandia National Laboratories/New Mexico (SNL/NM) is managed and operated by Sandia Corporation, a prime contractor of the U.S. Department of Energy (DOE). Sandia Corporation is a wholly owned subsidiary of Lockheed Martin Corporation.

SNL/NM is a thriving force in technology and strives to forge relationships with universities and industry in order to contribute to advances in science and technology. SNL/NM's major responsibility is meeting national needs in nuclear weapons and related defense systems, weapons security and reliability, and environmental integrity. Contributory programs include nuclear waste management, environmental management, and energy research. Other projects include nuclear reactor safety studies for the U.S. Nuclear Regulatory Commission, development of safe transport and storage systems for special nuclear materials, radioactive waste disposal techniques and site studies, and research in pulsed power, thermonuclear fusion, solar energy, and fossil fuel and geothermal energy.

SNL/NM consists of five technical areas and several remote test areas situated on the 118-square-mile Kirtland Air Force Base (KAFB). The closest population centers are the City of Albuquerque and the Isleta Indian Reservation (Figure 1) which are adjacent to the base. SNL/NM is located southeast of Albuquerque on KAFB at the foot of the Manzanita Mountains. East of KAFB, 20,486 acres in the Manzanita Mountains and foothills area has been withdrawn from the U.S. Forest Service for the exclusive use of the U.S. Air Force and DOE.

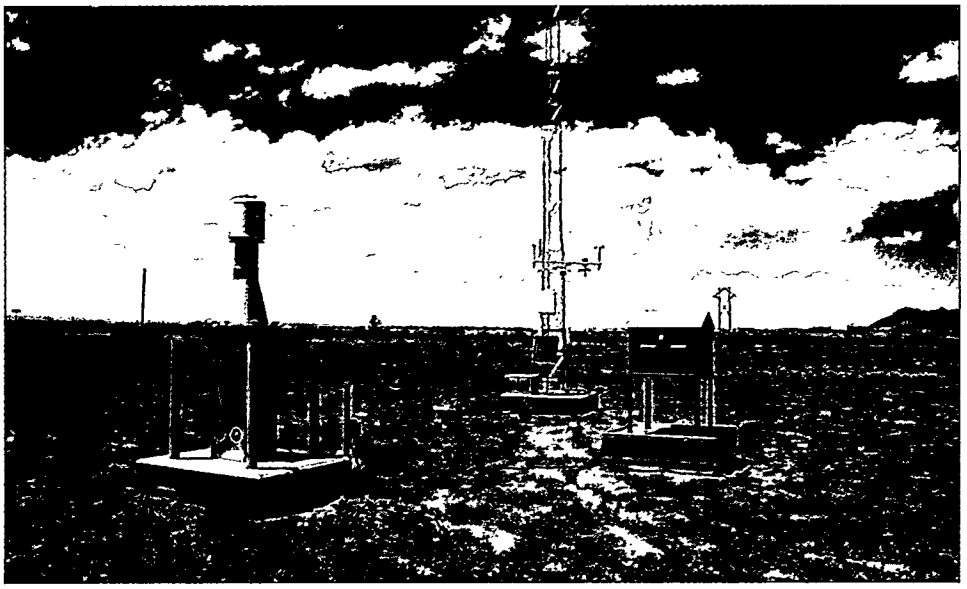


Figure 2. Air monitoring station at SNL/NM

An Introduction to Radiological and Non-radiological Sources...

Radiological

Radiation, as defined here, refers to the energy released from unstable radioactive atoms. This energy is characterized as either ionizing or non-ionizing. Ionizing radiation potentially causes biological damage. Alpha particles, beta particles, gamma rays, x-rays, and neutrons are all forms of ionizing radiation (Figure 3).

There are two major categories of ionizing radiation sources: natural and man-made (Figure 4). Natural sources include radon gas (decay of uranium in soil), solar radiation, terrestrial radiation (uranium in the earth's crust), and internal radiation (certain elements in the body). Man-made sources derive from nuclear medicine, industrial uses, and commercial products such as dental porcelain and smoke detectors.

ALARA

SNL/NM has not only maintained individual and collective dose well below DOE standards, but also ensures that any potential radiological impacts would be As Low As Reasonably Achievable (ALARA), as implemented through the SNL/NM ALARA program.

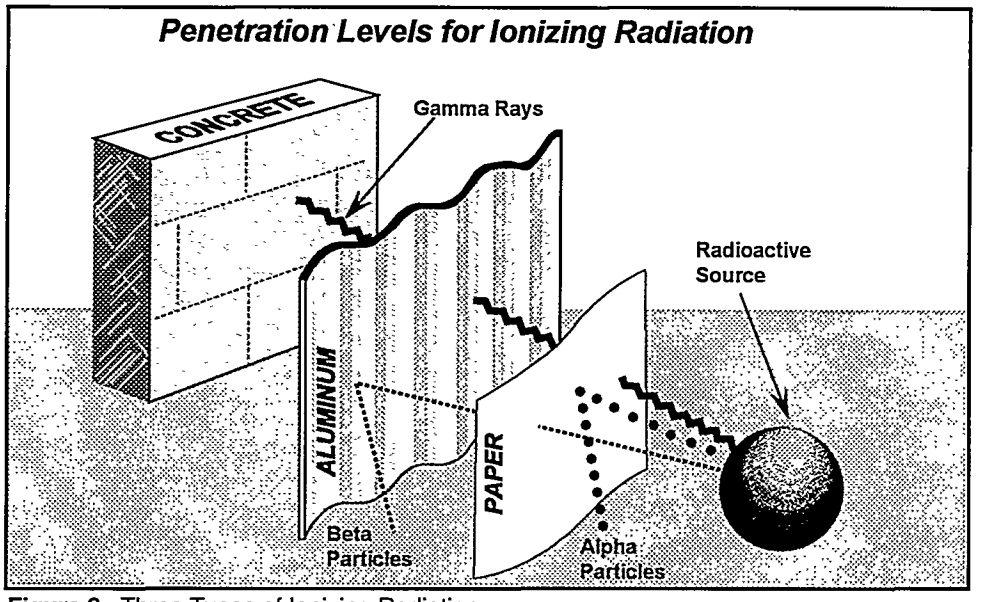


Figure 3. Three Types of Ionizing Radiation

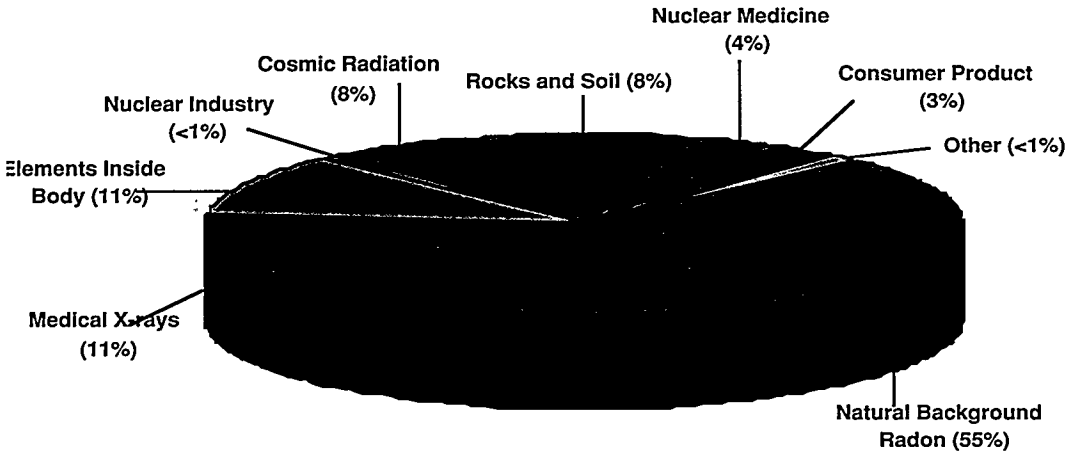


Figure 4. Sources of Radiation

Potential SNL/NM sources of ionizing radiation include small quantities of tritium (H-3), nitrogen (N-13), oxygen (O-15), and argon-41 (Ar-41) released from the research reactors, accelerators, and other small sources. SNL/NM site monitoring activities and results are discussed in the following sections.

Dose

Dose is the actual amount of radiation that an individual receives. Millirem (mrem) is the associated unit used to measure dose to an individual. Another common term is Dose Equivalent (DE). This measurement considers the amount of energy absorbed and the biological effect on a particular tissue. Currently, EPA's dose limit for air emissions to the general public is 10 mrem/yr. Effective Dose Equivalent (EDE) considers the amount of energy absorbed to the whole body. The EDE that an off-site individual could have received from SNL/NM operations is 1.8×10^{-4} mrem/yr. The average annual EDE received by the general U.S. population from background and man-made sources was 360 mrem.

Figure 5. Dose Equivalent Recieved from Commercial and Medical Products

EXPOSURE SOURCE	DOSE
CAT Scan of Brain	5,800 mrem/scan (to head)
Cigarettes (1.5packs/day)	8,000 mrem/yr. (to lungs)
Radium Dial Watch	6 mrem/yr. (to wrist)
Mammogram	400 mrem/test (to breast)
Dental X-ray	55 mrem/x-ray (to gums)
Thorium Tinted Glasses	4,000 mrem/yr. (to eyes)

Non-radiological

Non-radiological emissions are the most prevalent type of pollution within the environment and of potential concern in terms of exposure pathways (Figure 6). Pollutants of major concern to the human population are heavy metals, organic chemicals, volatile organic compounds (VOCs), and oxides of nitrogen.

Heavy metals are chemicals that include platinum, gold, cadmium, chromium, copper, lead, nickel, silver, zinc, vanadium, and thallium. The major concern regarding heavy metals is their ability to act as enzyme inhibitors which disrupt the metabolic processes in many organisms.

Polychlorinated biphenyls (PCBs) have received a large amount of publicity because they cause human health concerns and are able to bioaccumulate in the body. PCBs have been used as insulating materials in electric capacitors because they are fire resistant and stable at high temperatures. Although the manufacture of PCBs in the US was discontinued in 1977, they are still prevalent in equipment and waste materials, and guidelines have been established as to the proper procedures for disposal.

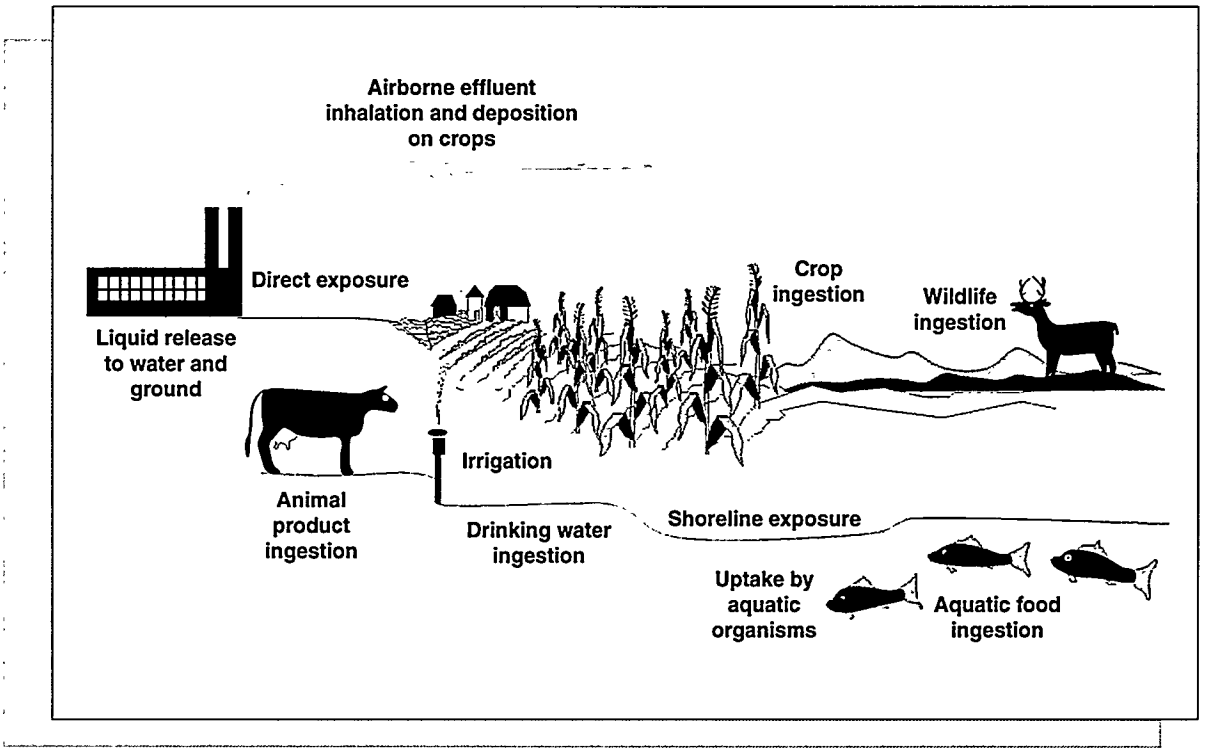


Figure 6. Exposure Pathways

Pollutant	Major Sources
Carbon Monoxide (CO)	Fuel burning, vehicle exhaust, some industrial processes
Nitrogen Oxides	Vehicle exhaust, heat and power generation, fuel combustion,
	explosives, fertilizer plants, nitric acid
Sulfur Dioxide (SO_2)	Fuel combustion, smelters
Suspended particulate matter	Vehicle exhaust, industrial processes,refuse incineration, heat
	and power generation, reaction of pollution gases in the atmoshpere
Organic Substances	Petrochemical solvents, combustion, paint, metabolic activity,
	pesticides, natural sources

Figure 7 . Major Non-radiological Pollutants

Oxides of nitrogen often include nitric oxide and nitrogen dioxide. The bulk of nitric oxide is produced from soil bacteria which release this oxide into the environment. Nitrogen dioxide is formed when nitric oxide combines with oxygen in the atmosphere. This oxide is potentially harmful to human health.

Current potential non-radiological releases at SNL/NM include various volatile organic compounds (VOCs), heavy metals, and fuel emissions such as SO_2, NO_X, ozone (O_3), particulate matter less than 10 microns (PM_{10}) CO, and lead (Figure 7). Most of these types of emissions are associated with routine activities at SNL/NM that include regulated burns, painting and solvent cleaning, construction, and other facility operations. Facilities producing these kinds of air emission pollutants must apply for applicable permits in order to maintain compliance with regulatory standards.

SNL/NM's Environmental Monitoring Programs currently monitors for non-radiological contaminants within air, soil, biota, and water. Analytical parameters include heavy metals, volatile and semi-volatile organic compounds, inorganic compounds, and phenolics.

Environmental Monitoring

Monitoring at SNL/NM is performed to ensure that potential radioactive and nonradioactive effluents are within regulatory standards and are not migrating off-site. Federal, state, and local regulations determine the discharge limits. SNL/NM's Environmental Monitoring and Surveillance Program consists of:

- Terrestrial Surveillance of surface water, soil, sediment, and vegetation
- Air quality ambient and emissions monitoring
- Groundwater monitoring
- Waste water monitoring

Terrestrial Surveillance

SNL/NM has been conducting radiological surveillance of the environment since 1959. In 1993, SNL/NM began conducting metal surveillance as well because of its potential persistence within the environment. Data from these monitoring activities are used to show whether contaminants are transported to areas inside and/or outside SNL/NM and to detect any increasing trend in contaminant levels. The terrestrial surveillance team at SNL/NM measures radiological and metal levels by sampling soil, arroyo and river sediments, vegetation, and surface water. Soil, sediment, vegetation, and surface water samples are collected at on-site, perimeter, and community locations once a year and results are compared to determine if on-site levels exceed the normal background levels from off-site community locations. Thermoluminescent dosimeters (TLDs) readings are also collected from various on-site locations in order to determine the ambient levels of gamma radiation.

How does SNL/NM choose sampling locations?

On-Site: SNL/NM locations near areas of known contamination, potential sources of contamination, or areas where contamination would be expected to accumulate.

Perimeter: Locations at the SNL/NM site boundary to detect potential contamination that may be moving off-site.

Community: Off-site locations unrelated to SNL/NM activities and used as background for comparison with perimeter and on-site locations.

Thermo-luminescent Dosimeters (TLDs)

These instruments measure the total gamma radiation dose. SNL/NM places these instruments at various sites. SNL/NM also offers TLDs in the form of badges to employees who may potentially be exposed to radiation. These TLDs are the size of a driver's license and are worn over the chest.

RESULTS

Results for Terrestrial Surveillance are classified according to the following categories:
Category 1 - Measured contamination is higher than off-site locations and is on an increasing trend.
Category 2 - Contamination is above off-site measurements but no trend is detected.
Category 3 - Contamination is below off-site measurements but shows an increasing trend.
Category 4 - No statistical difference with off-site measurements and therefore is of no concern.

Radiological

Vegetation:	Only one site was a Category 2 for tritium (H-3). All other locations were Category 4.
Soil:	Fourteen on-site locations were identified as Category 3, and 4 locations were Category 2 for either cesium-137, tritium, or uranium. Two perimeter locations were category 2 and six were category 3.
Sediments:	All locations were Category 4.
Surface Water:	Only one on-site location at Coyote Springs showed elevated concentration of uranium (access is controlled). All other sites were Category 4.
TLDs:	On-site readings were similar to off-site readings in 1995.

Non-radiological

Vegetation:	Non-radiological analysis not conducted on vegetation in 1995.
Soil:	Two on-site locations were identified as Category 2 and 3 on-site locations were Category 3 for one or more of the following metals: cadmium, cobalt, copper, and lead. Four perimeter locations were category 2 for cobalt, manganese, titanium, and zinc. Off-site locations were all Category 4.
Sediment:	One on-site location was identified as Category 3 for lead and 1 location was Category 3 for titanium.
Surface Water:	One on-site location at Coyote Spring showed elevated concentrations of strontium and manganese and was identified as Category 3.

Figure 8. Vegetation Sampling

Air Monitoring

Air monitoring measures radiological and non-radiological air contaminants at SNL/NM and the surrounding areas. Air monitoring programs provide information to protect the health of KAFB personnel and the surrounding communities, and to demonstrate compliance with local and Federal air quality regulations.

Meteorological Monitoring

The main objective of the program is to provide SNL/NM weather data for use in studies on contaminant dispersion. The data are collected via an eight tower meteorological monitoring network. Data are collected on wind speed and direction, and temperature on all towers (Figure 9) and meteorological parameters on selected towers.

Ambient Air Surveillance

The term "ambient," when referring to air, means the air present in the surrounding environment. Monitoring of ambient air includes sampling for radioactive and non-radioactive pollutants. The main objective of SNL/NM's ambient air surveillance program is to establish background concentration levels for pollutants of concern, and show compliance with the National Ambient Air Quality Standards (NAAQS). Ambient air monitoring equipment has been installed at seven locations on-site to collect the following data on the following pollutants: Criteria Pollutants (Sulfur dioxide {SO_2}, oxides of nitrogen {NO_X}, ozone {O_3}, carbon monoxide {CO}, suspended particles, lead {Pb} and other airborne heavy metals), PM_{10} (Respirable airborne particulate matter 10 microns or smaller in diameter), and Volatile Organic Compounds (VOCs).

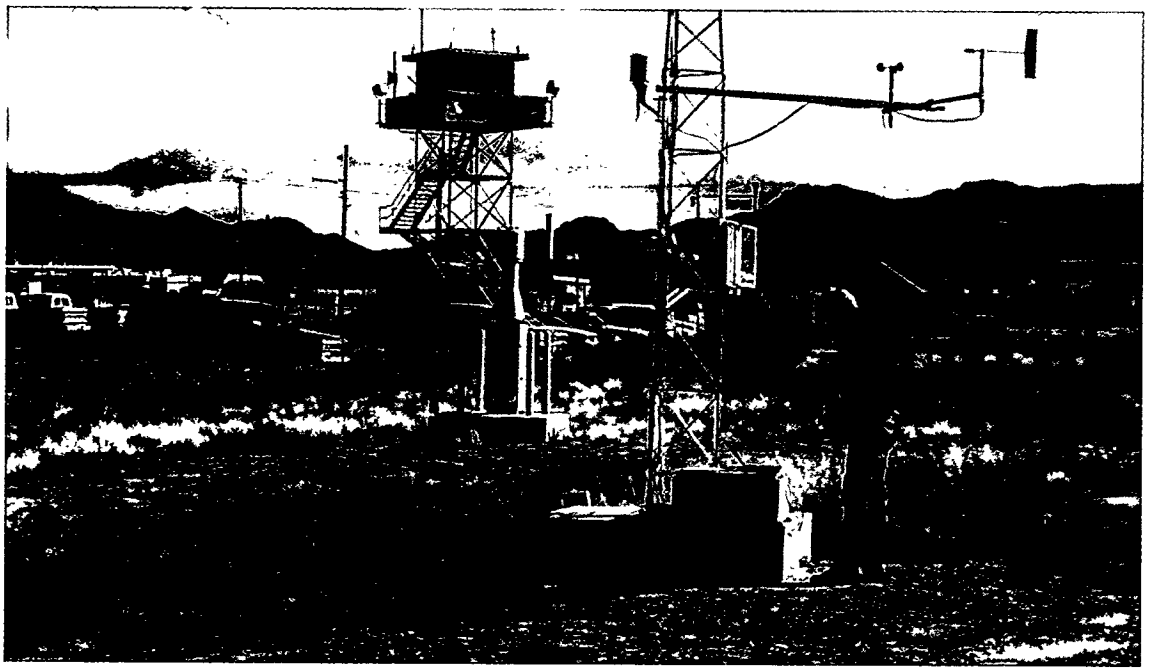


Figure 9. Data Collection at a Meteorological Tower

Radiological Effluent Monitoring

When speaking about air, the term "effluent" refers to air that flows from a contaminant source out into the environment. The SNL/NM facilities that generate radioactive effluents or emissions are primarily the reactors and accelerators. In fact, SNL/NM's radioactive air emissions are generally well below national standards. Primary radiological air emissions include trace amounts of tritium (H-3), argon-41 (Ar-41), and nitrogen-13 (N-13).

RESULTS

Radiological

SNL/NM releases in 1995 occurred from 12 different sources in all 5 technical areas. The EPA standard for an off-site effective dose equivalent (EDE) is 10 mrems/yr coming from all facilities on a site. SNL/NM is several magnitudes below this maximum allowable dose.

Parameters	1995 SNL/NM Calculated Dose	NESHAP Standard	Natural Background Radiation in Albuquerque area
EDE off-site	1.7×10^{-4} mrem/yr	10 mrem/yr	95 mrem/yr
EDE for maximally exposed individual on-site	8.5×10^{-4} mrem/yr	10 mrem/yr	95 mrem/yr
Annual KAFB Population Dose	1.6×10^{-2} person-rem/yr	^	>57,000 person-rem/yr
Annual Regional Population Dose	4.5×10^{-4} person-rem/yr	^	>57,000 person-rem/yr

Non-radiological

Ambient Air Surveillance

Criteria Pollutants: There were no violations of Federal regulations for measured criteria pollutants. However, short-term exceedences of state standards are allowed once a year due to meteorological conditions. This was the case in 1995 when the hourly limit for CO was exceeded three times in a 36 hour period.

VOCs: Analyses showed results in the tenths or hundredths of parts per billion. No standards were violated.

PM_{10}: PM_{10} concentrations were low except for several days in June when high winds aided in the production of airborne dust.

Effluent Monitoring

There were no violations of any air emission permits in 1995. SNL/NM was however, granted an exemption to the "Visible Air Contaminant" regulation for two facilities at a burn site.

Groundwater Monitoring

Groundwater, or water found below the surface of the land, exists in pore spaces and cracks within rocks and unconsolidated sediments. Groundwater depth underneath SNL/NM ranges from 50-500 ft depending on the distance and direction from the fault complex that separates the aquifer system. Groundwater is an important transport mechanism in potential migration of contaminants.

This program consists of two elements: the Groundwater Surveillance Task (basewide groundwater monitoring) and site-specific monitoring wells associated with the Environmental Restoration (ER) program. The objective of the Groundwater Surveillance Task includes detection of any contaminants leaving or entering SNL/NM and determining the impact of DOE operations on groundwater quantity and quality. Data provided by the Task team are used for baseline characterization. Springs and wells are sampled quarterly to characterize hydrogeochemical conditions. Water levels at 32 wells are measured monthly to establish groundwater flow patterns (Figure 10). This allows SNL/NM to determine if any contamination is in the groundwater and how it may be migrating.

Site-specific groundwater monitoring activities associated with the ER Program occur at the Chemical Waste Landfill, Mixed Waste Landfill, Technical Area II, and the Liquid Waste Disposal System site. Groundwater monitoring also occurs as part of the Site-wide Hydrogeological Characterization Project.

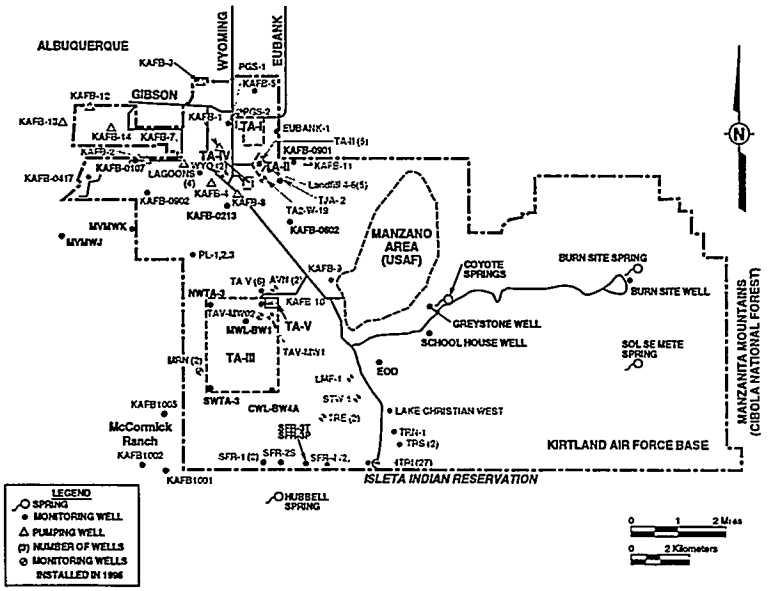


Figure 10. Location Map of SNL/NM and KAFB Wells and Springs

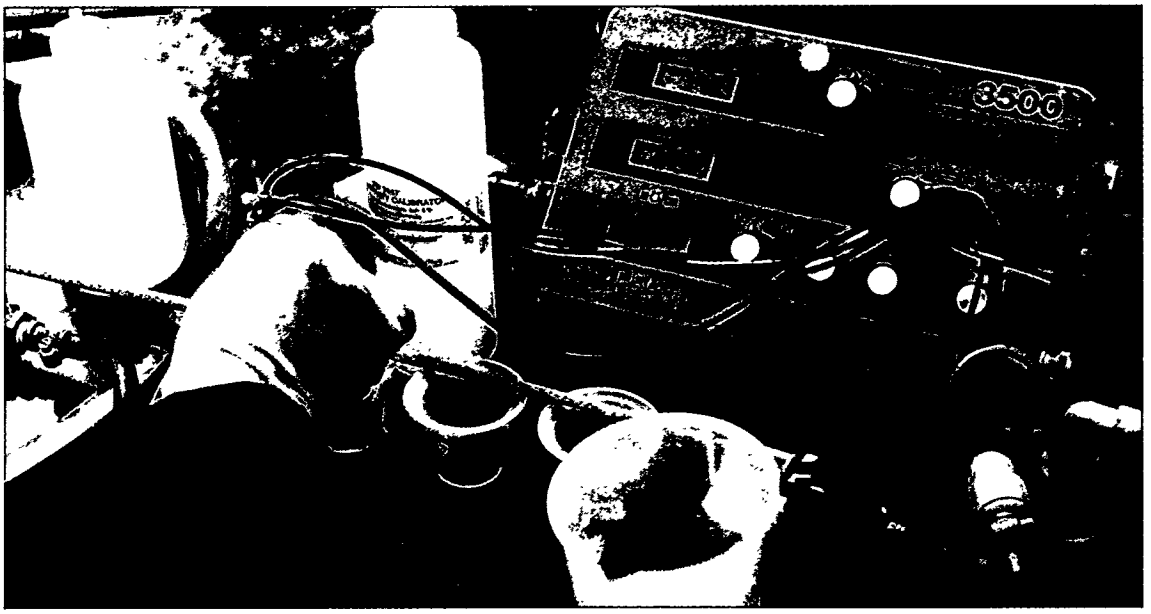


Figure 11. Collection of Groundwater Samples

RESULTS

Radiological

Groundwater Surveillance Task

Radionuclides above maximum contaminant levels (MCL) included gross alpha, uranium, and radium within two wells.

Site-Specific Programs

Chemical Waste Landfill (CWL) - One well exceeded MCL for radium.

Mixed Waste Landfill (MWL) - No target analyte list (TAL) radionuclides were detected in groundwater above background levels.

Technical Area II (TA-II) and Technical Area V (TA-V) - No radionuclides exceeded MAC.

Non-radiological

Groundwater Surveillance Task

Some metals were detected above the MCL. VOCs and inorganic compounds were within acceptable limits.

Site-Specific Programs

CWL - VOC contamination in wells have not migrated off-site. Chromium, iron, and nickel were the only metals to exceed the maximum allowable concentration (MAC). Fluoride also exceeded MAC.

MWL - The only contaminant above MAC was nickel.

TA-II - Organic contaminants of concern that exceeded MAC were TCE, nitrate plus nitrite, and bis(2-ethyhexl)phthalate.

TA-V - TCE was detected in one well above MAC. No other values were above MAC.

Wastewater Monitoring Programs

Wastewater Program

SNL/NM contains over 15 miles of sewer lines that are connected to KAFB lines. SNL/NM has two pretreatment operations and four general wastewater streams that discharge to the City of Albuquerque treatment works. SNL/NM has a Liquid Effluent Control System in TA-V that holds process wastewater for radionuclide screening prior to discharge into the sanitary sewer. Effluents from wastewater are categorized as sanitary sewer effluent (wastewater from lavatories, cafeteria sinks, etc.) or industrial wastewater effluents (such as lab sinks, process water discharge, etc.).

The City of Albuquerque requires SNL/NM to obtain permits for wastewater discharge to ensure that the wastewater quality is within acceptable limits. Samples are collected routinely and tested for total alpha and total beta particle activity, tritium, gamma emitters, heavy metals, and organics. Comparison samples are also collected from tap water.

Storm Water Program

SNL/NM routinely monitors storm water discharges associated with SNL/NM activities. In accordance with 40 CFR 125, industrial facilities such as the Process Development Laboratory, and the Microelectronics Development Facility must monitor storm water discharges. The program demonstrates that rainwater runoff is not contaminated and being transported off-site. Storm water is tested for VOCs, organo-chlorine pesticides, PCBs, and constituents from explosive testing. These pollutants were not detected in 1995 for the two out of three stations reporting.

Surface Discharge Program

As regulated by the New Mexico Water Quality Control Act (NMWQCA), discharges to surface impoundments are sampled semi-annually for contamination analysis which includes total dissolved solids, chloride, sulfate, VOCs, and calcium carbonate. Discharge lagoons contain process water in lined pits for evaporation. Water levels are measured quarterly in order to determine maximum capacity which has been set at 75% to prevent potential overflow due to rainfall.

RESULTS

Wastewater Program

In 1995, DOE received five Gold Awards for excellence in compliance in regard to 5 waste water discharge permits. There were no violations with sanitary sewer permits.

Storm Water Program

The National Pollutant Discharge Elimination System (NPDES) permit for storm water runoff is still pending approval from the EPA.

150 gallons of a rust inhibitor product was inadvertently released to a storm drain. The liquid was retrieved before it reached Tijeras Arroyo. The release was reported to the State of New Mexico; no fines were assessed.

Surface Discharge Program

Samples taken in June of 1995 from Lagoon II exceeded the New Mexico water quality standards for TDS by 40 milligrams per liter (mg/l); the standard is 1,000 mg/l. Lagoon II also slightly exceeded the NMWQCA maximum chloride concentration allowed by 38 mg/l; the standard is 250 mg/l.

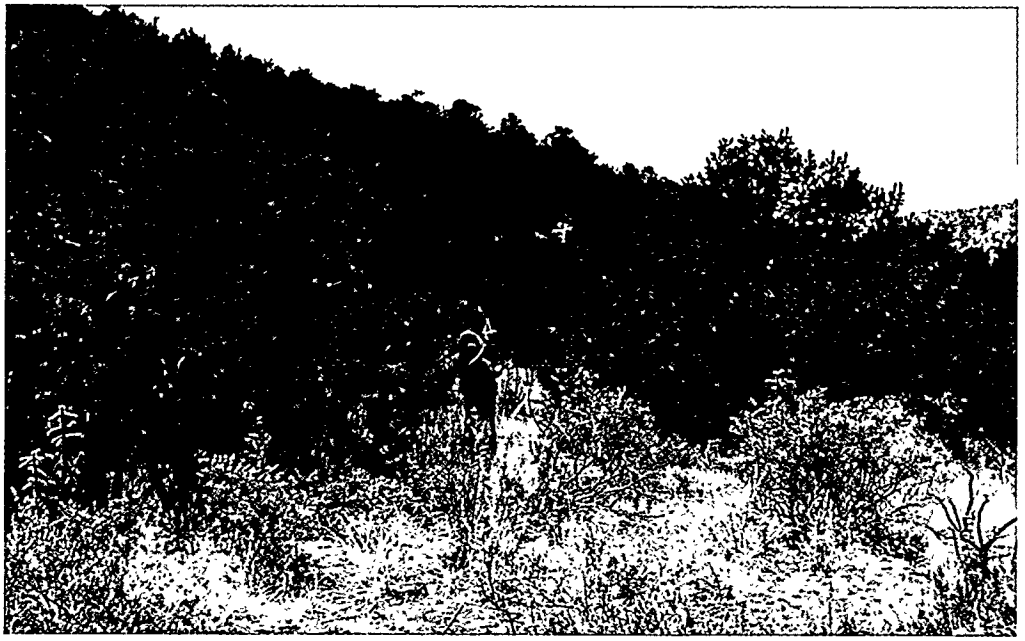
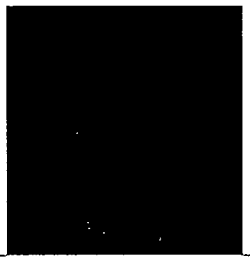


Figure 12. Manzanita Mountains

Environmental Restoration



There are currently 155 sites at SNL/NM that have been identified as potentially contaminated with hazardous and/or radioactive materials based on past activities. The SNL/NM ER project staff is in the process of determining whether these sites are contaminated above allowable standards. Sites that exceed regulatory contamination limits are subject to remediation.

The DOE Environmental Restoration (ER) Project identifies, assesses, and remediates sites at its facilities across the United States. Remediation of past contamination ensures compliance with environmental regulations and statutes that prescribe the reduction of risk to human health and the environment.

Contamination assessment is an ongoing process to decide which sites need to be decontaminated, remediated, and/or decommissioned. DOE's ER Project consists of two phases:

Assessment—Determines the extent and type of contamination at each site, and assesses the potential risk to human health and the environment. Sites of potential contamination identified during this assessment are grouped together within geographic and event-related boundaries. This grouping allows samples to be collected efficiently and economically.

Remediation—After assessment of sites, the ER Program determines whether it is necessary to take voluntary corrective measures (VCMs) for the site or to propose no further action. Once a site has been identified for clean-up action, an action plan to determine the possible remediation alternatives is devised. Finally, a plan is chosen and the site is remediated.

FY 95 Environmental Restoration Accomplishments

- The ER program successfully accomplished 39 voluntary clean-ups, which was 20 more than the stated goal.
- 64 "no further action" requests were submitted in 1995, exceeding the goal of 47.
- The ER program began remediation activities of the Gas Cylinder Disposal Pit.
- The ER program was able to develop a one-pass approach for the efficient approval of VCM's. Benefits include early public involvement and temporary authorization in conjunction with permit modifications.

Current ER activities

In 1995 there were a total of 155 ER sites. There are currently 19 voluntary corrective measures (VCMs) planned for fiscal year 1996. No sites on SNL/NM property qualify for EPA's National Priority List (NPL), a listing of the nation's highest priority cleanup sites. Assessment efforts are also being continued at the following sites and areas:

- Chemical Waste Landfill
- Mixed Waste Landfill
- Tijeras Arroyo
- Technical Areas I-IV
- Central Coyote Field
- Foothill Test Areas
- Southwest Test Areas
- Septic Tanks and Drainfields
- Canyons Test Areas
- Former storage tank sites
- Liquid Waste Disposal System
- Other remote facilities

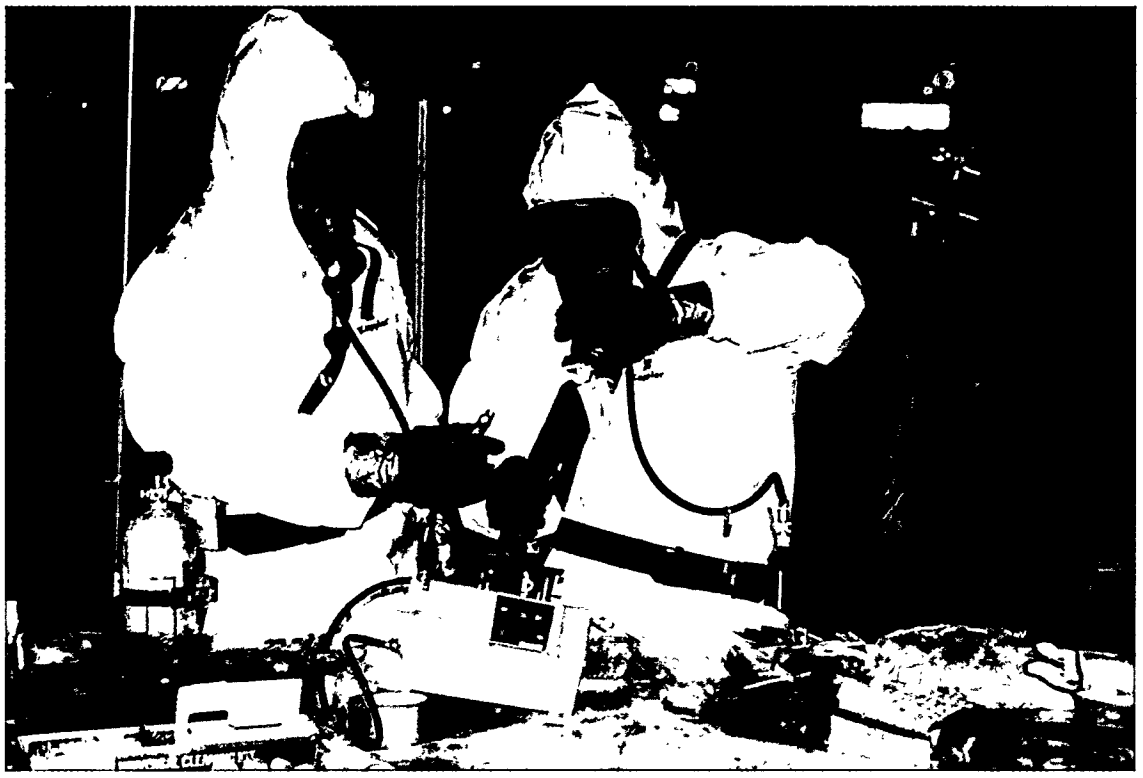


Figure 13. Remediation Activities at the Gas Cylinder Disposal Pit

Waste Management

Waste management is the safe and effective management of active and standby facilities and the treatment, storage, and disposal of radioactive, mixed and hazardous waste. Waste is defined as material that is no longer of use in activities at SNL/NM.

Hazardous Waste and RCRA

Hazardous waste consists primarily of hazardous chemicals and chemical contaminated materials. SNL/NM generated 91,876 kilograms (kg) of RCRA hazardous waste in 1995 and shipped 91,876 kg of regulated waste off-site in 1995. A New Mexico Environmental Department (NMED) audit resulted in only 4 minor violations concerning hazardous waste container management, and proposed a fine of $3,015.00. A total of 542,694 kg of solid waste, nonhazardous waste, and recycled material was generated.

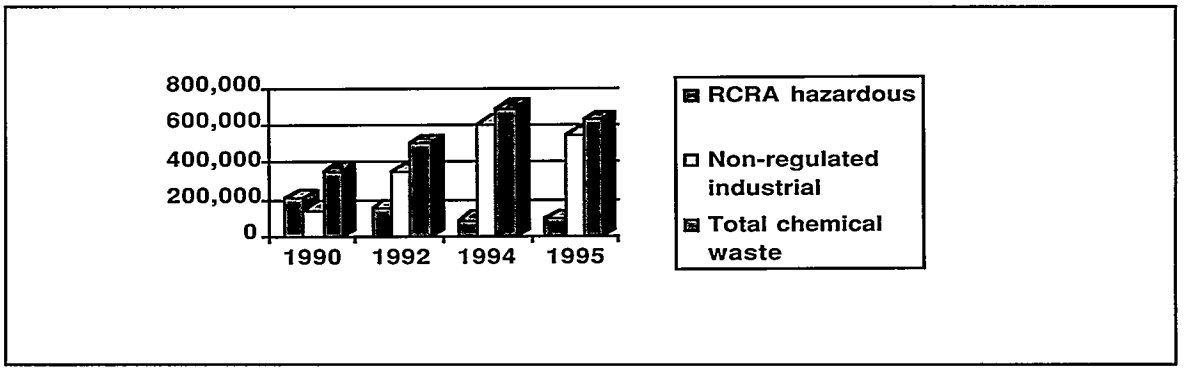


Figure 14. Trends in Hazardous Waste Generated at SNL/NM - A decrease in RCRA waste, but an increase in other waste due to recycling, KAFB solid waste landfill closure, and ER project remediation activities

Radioactive Waste

High Level Waste (HLW) - consists of highly radioactive short-lived fission products and long-lived isotopes. SNL/NM currently does not generate HLW.

Mixed Waste (MW) - consists of a combination of radioactive and hazardous materials. SNL/NM generated 506 ft^3 of mixed waste in 1995. SNL/NM accepted 392 ft^3 of mixed waste from facilities in Livermore, CA.

Transuranic Waste (TRU) - consists of isotopes with atomic numbers higher than uranium. SNL/NM does not currently generate TRU waste, however SNL/NM received 35 ft^3 of TRU waste from DOE related activities.

Low-Level Waste (LLW) - waste not classified as HLW, MW, TRU, or spent fuels. SNL/NM generated 1,839 cubic feet (ft^3) of low-level waste in 1995.

Asbestos Waste

SNL/NM disposed of 108,510 kg of asbestos waste in 1995. Asbestos materials create a potential health hazard if they are in a friable (easily disturbed) form.

Polychlorinated Biphenyl (PCB) Waste

SNL/NM is in the process of eliminating PCBs as quickly as possible. During 1995, SNL/NM sent approximately 12,400 kg of PCB-contaminated material for disposal and recycling off-site. PCB is a chemical compound used in various types of electrical equipment at SNL/NM.

Waste Minimization & Pollution Prevention Accomplishments

In 1989, SNL/NM initiated a waste minimization and pollution prevention program. 1995 accomplishments include:

Waste Prioritization Model—This computer based model tracks the pollution potential of different organizations in order to identify and prioritize hazardous and radioactive waste generators.

Pollution Prevention Opportunity Assessments (PPOAs)—These assessments identify the processes involved with waste production and facilitate and implement any alternative processes. 24 PPOAs were conducted.

Pollution Prevention Project—Fees are charged to waste generators in order to encourage waste minimization. "Chargeback Funds" money is then used to sponsor various waste minimization programs.

Return on Investments Projects—This project aims to show that within 2 years, the money spent on pollution saving measures, will pay for itself.

Quality Assurance

Quality Assurance is a series of planned or systematic actions required to provide adequate confidence that a product or service will satisfy given needs.

When monitoring releases and measuring radiation in the environment, data must be reliable. SNL/NM has a quality assurance and quality control (QA/QC) program to ensure that environmental monitoring is conducted properly and that results are reliable. State and Federal guidelines and U.S. Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) quality control requirements are incorporated into the SNL/NM QA/QC programs.

The subcontractor laboratories that provide analytical services for SNL/NM must show established QA/QC programs and must participate in interlaboratory comparisons and on-site evaluations and audits.

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