

*U.S. Department of Energy Report
2000 LANL Radionuclide Air Emissions*

Los Alamos
NATIONAL LABORATORY

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Keith W. Jacobson

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2000 EDE: 0.64 mrem

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LIST OF ACRONYMS

AIRNET	Los Alamos National Laboratory Air Monitoring Network
CAB	Citizens' Advisory Board
CMR	Chemistry and Metallurgy Research (building)
CR/MS	catalytic reactor and molecular sieve bed
DOE	Department of Energy
EDE	effective dose equivalent
EPA	Environmental Protection Agency
ESIDNUM	exhaust stack identification number
FFCA	Federal Facilities Compliance Agreement
GMAP	gaseous mixed activation products
HEPA	high-efficiency particulate air (filter)
ISV	in situ vitrification
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
LSC	liquid scintillation counting
ND	no detectable (emissions)
NESHAP	National Emissions Standards for Hazardous Air Pollutants
P/VAP	particulate/vapor activation products
PEDE	potential effective dose equivalent
PSR	Proton Storage Ring
RAMROD	Radioactive Materials Research Operations Demonstration
TA	technical area (at Los Alamos National Laboratory)
WETF	Weapons Engineering Tritium Facility

**U.S. DEPARTMENT OF ENERGY REPORT
2000 LANL RADIONUCLIDE AIR EMISSIONS**

by

Keith W. Jacobson

ABSTRACT

Presented herein is the Laboratory-wide certified report regarding radioactive effluents released into the air by Los Alamos National Laboratory (LANL) in CY 2000. This information is required under the Clean Air Act and is being reported to the U.S. Environmental Protection Agency (EPA). Included in this report are the effluents released during the Cerro Grande wildfire during mid-May, an event that despite its impact on LANL operations, did not affect the Laboratory's monitoring and data-quality objectives required for National Emissions Standards for Hazardous Air Pollutants (NESHAPs) compliance. The highest effective dose equivalent (EDE) to an off-site member of the public was calculated using EPA-specified procedures described in this report. For 2000, that dose was 0.64 mrem.

PREFACE

In 1990, the Clean Air Act was amended to add radionuclides to the National Emissions Standards for Hazardous Air Pollutants (NESHAPs). Specifically, a new subsection (H) of 40 CFR 61 established an annual limit on the impact to the public attributable to emissions of radionuclides from U.S. Department of Energy Facilities (DOE), such as the Los Alamos National Laboratory (LANL). As part of the new NESHAP regulations, LANL must also submit an annual report to the U.S. Environmental Protection Agency (EPA) headquarters and the regional office in Dallas by June 30th. This report includes results of monitoring at LANL and the dose calculations for the calendar year, 2000.

EXECUTIVE SUMMARY

Presented is the Laboratory-wide certified report regarding radioactive effluents released into the air by LANL in 2000. This information is required under the Clean Air Act and is being reported to the U.S. EPA. The highest effective dose equivalent (EDE) to an off-site member of the public was calculated using procedures specified by the U.S. EPA and described in this report. The "Rad-NESHAPs" section of LANL's Air Quality Group (ESH-17) prepared this report.

To comply with the Radionuclide-NESHAP regulation, LANL monitors radionuclide emissions at 30 release points or stacks. Also, the Air Quality group uses a network of air samplers around LANL to

monitor airborne levels of radionuclides. In addition, LANL maintains and operates meteorological monitoring systems.

The highest effective dose equivalent (EDE) to any member of the public at any off-site location where there is residence, school, business or office, for CY2000, was 0.64 mrem. This location was a business office located at 2470 East Gate Drive, on the northeastern boundary of LANL. This location differs from the highest off-site dose for 1999, which was a business office at the Los Alamos County landfill. This change was due to increases in airborne effluents from a linear particle accelerator located at the Los Alamos Neutron Science Center (LANSCE) near the northeastern boundary of LANL. Doses reported to the U.S. EPA for the past six years are shown in the following table. The U.S. EPA annual dose limit is 10 mrem.

Six Year Summary of NESHAPs Dose Assessment for LANL

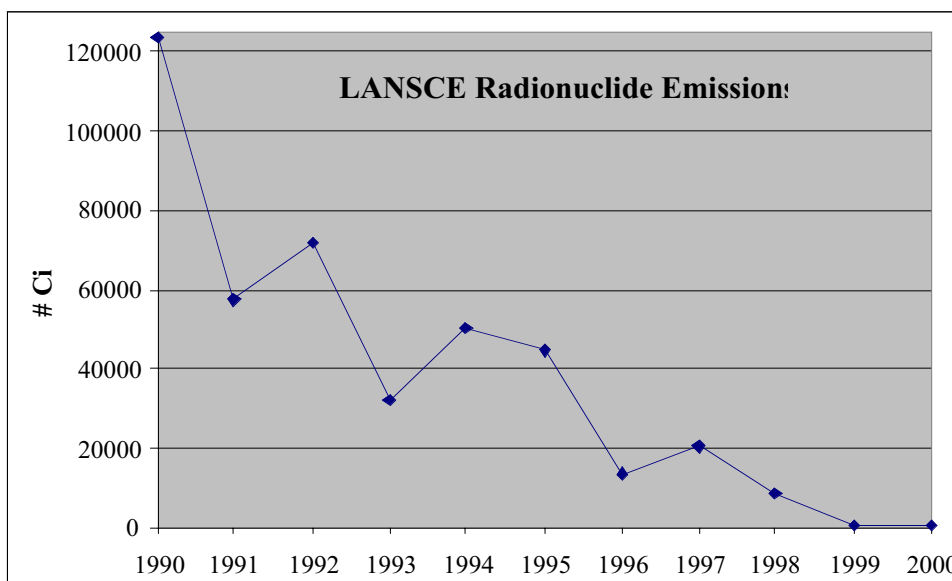
Year	EDE (mrem)	Highest EDE location
1995	5.05	2470 East Gate Dr
1996	1.93	2470 East Gate Dr
1997	3.51	2470 East Gate Dr
1998	1.72	2470 East Gate Dr
1999	0.32	County Landfill Office
2000	0.64	2470 East Gate Dr

Because of operational changes at the accelerator facility, radionuclide emissions have been decreasing from LANSCE for the past few years. Also in 1995, an additional emissions control system was implemented to reduce total emissions. In previous years, emissions from LANSCE (shown below) have contributed to over 90% of the total offsite dose. In 2000, the contribution was down to 60% of the total value. Future emissions from LANSCE are expected to remain near or slightly above the CY 2000 level.

In May 2000, Laboratory operations were impacted by the Cerro Grande wildfire, which began on May 4th and was not completely contained until early June. Despite the interruption caused by the fire and the subsequent general shutdown of LANL, the Laboratory's Rad-NESHAPs

program was able to meet all of the monitoring and data quality objectives required for compliance.

From May 10th to May 15th, the Cerro Grande wildfire burned out of control along the boundaries and into the interior of LANL. The Air Quality group conducted special sampling during this period to evaluate the potential for increased airborne emissions. Samples collected during the wildfire showed a significant increase in gross airborne alpha and beta activity. Further analysis of the samples showed that the radionuclides lead-210, bismuth-210, and polonium-210, which are radon decay products, to be the cause of the increase. Increased resuspension caused by the fire served as the enhanced source of these naturally occurring radionuclides.

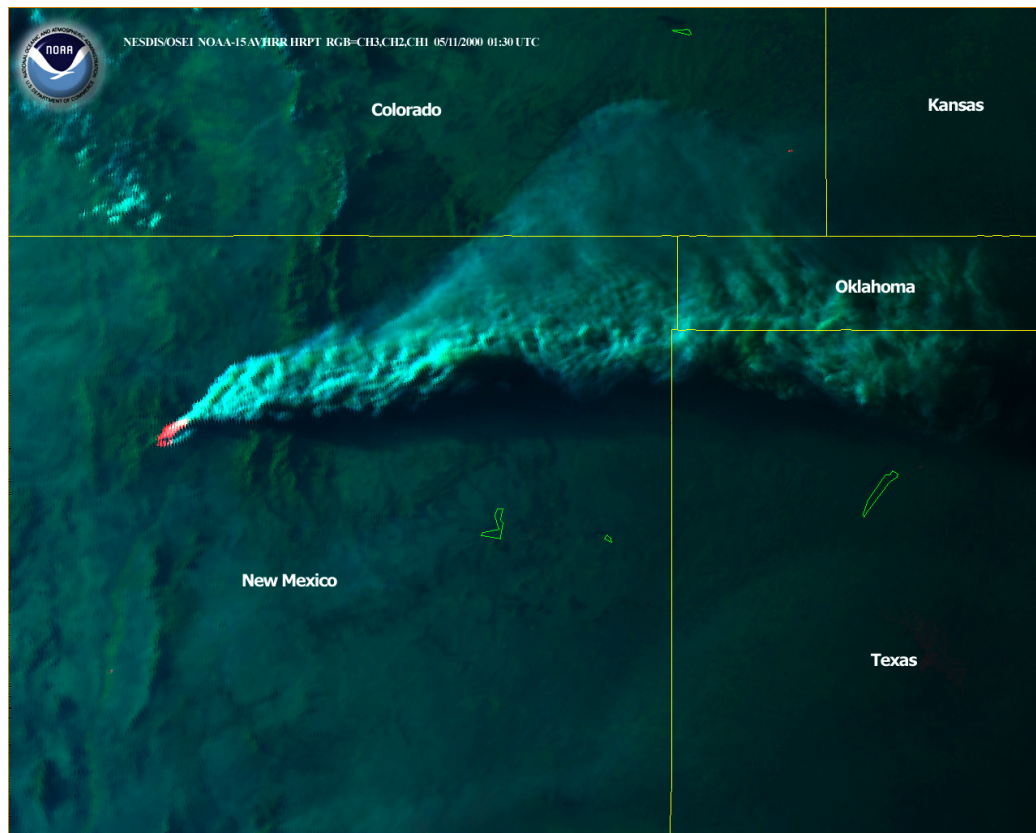


Approximate LANSCE Radionuclide Emissions for the Past Ten Years

It is estimated that the wildfire (photo, below) burned on and over 7,500 to 7,700 acres on LANL. The fire burned across many old disposal sites and open ground testing sites. The Air Quality group is collecting data on those sites with suspected radionuclide contamination that were affected by the wildfire. Upon completion of the data study, the Air Quality group will calculate the potential releases, atmospheric transport, and subsequent human exposure due to radionuclides released by the Cerro

Grande wildfire. It should be noted that on-site and perimeter air sampling did not detect higher than normal concentrations of man made radionuclides, such as tritium or plutonium, during or after the fire¹.

Also in 2000, the Air Quality group identified the need for a new air-sampling site for the compliance network; and the need to relocate an existing sampler to meet data quality objectives. Consequently a new sampler was added at the TA-3 Research



Satellite Photo of Smoke Plume from the Cerro Grande Wildfire on the Evening of May 10, 2000.

¹LA-UR 01-1169; Measurements of Radioactive Air Contaminants during the Cerro Grande Fire using the Los Alamos National Laboratory's Air Monitoring Network (AIRNET); March 2001; Craig F. Eberhart, Ernest S. Gladney, Jean M. Dewart, David H. Kraig, Michael W. McNaughton, Alice R. Baumann, C. Jake Martinez, and Angelique M. Luedeker, Air Quality Group, Los Alamos National Laboratory, Los Alamos, NM 87545

Park, and another (similar to that shown below) was added to replace the Los Alamos Shell station site. Additional discussion of these two changes is provided in the Environmental Data section of the report that begins on page 15.

This report describes the Rad-NESHAP program and compliance activities at LANL and in addition, contains tables of data required for reporting purposes; of these, Table 16 provides doses calculated at various public locations around LANL, and Table 17 summarizes the different LANL contributions to the total highest dose for CY2000.



Air Monitoring Station on LANL Property