LA-13728-SR
Status Report

Emissions Inventory Report Summary

Reporting Requirements for the
New Mexico Administrative Code, Title 20,
Chapter 2, Part 73 (20 NMAC2.73) for
Calendar Year 1999

Los Alamos
NATIONAL LABORATORY

Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36.

Prepared by Jackie Hurtle, Group ESH-17
Edited by Ruth Barks, Group CIC-1

Abstract

Los Alamos National Laboratory (the Laboratory) is subject to emissions-reporting requirements for regulated air contaminants under Title 20 of the New Mexico Administrative Code, Chapter 2, Part 73 (20 NMAC 2.73), Notice of Intent and Emissions Inventory Requirements. The applicability of the requirement is based on the Laboratory's potential to emit 100 tons per year of suspended particulate matter, nitrogen oxides, carbon monoxide, sulfur oxides, and volatile organic compounds. For 1999, the boilers were the primary source of criteria air pollutants from the Laboratory. Research and development activities were the primary source of volatile organic compounds. Emissions of beryllium and aluminum were reported for activities permitted under 20 NMAC 2.72.

Previous reports in the unclassified series are LA-13528-SR and LA-13630-SR.

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Issued: September 2000

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Air Quality Group, ESH-17

Los Alamos
NATIONAL LABORATORY
Los Alamos, New Mexico 87545

TABLE OF CONTENTS

EMISSIONS INVENTORY REPORT SUMMARY
by
Air Quality Group, ESH-17

ABSTRACT

Los Alamos National Laboratory (the Laboratory) is subject to emissions-reporting requirements for regulated air contaminants under Title 20 of the New Mexico Administrative Code, Chapter 2, Part 73 (20 NMAC 2.73), ***Notice of Intent and Emissions Inventory Requirements*****. The applicability of the requirement is based on the Laboratory's potential to emit 100 tons per year of suspended particulate matter, nitrogen oxides, carbon monoxide, sulfur oxides, and volatile organic compounds. For 1999, the boilers were the primary source of criteria air pollutants from the Laboratory. Research and development activities were the primary source of volatile organic compounds. Emissions of beryllium and aluminum were reported for activities permitted under 20 NMAC 2.72.**

1.0 INTRODUCTION

Los Alamos National Laboratory (the Laboratory) has reported on air pollutants generated from its operations since the 1970s when Air Quality Control Regulation 703, *Registration of Air Contaminant Sources*, was promulgated. According to the regulation, the Laboratory was required to register air pollutant sources that emitted per year more than 2000 lb. of any air contaminant. This regulatory requirement has evolved into Title 20 of the New Mexico Administrative Code, Chapter 2, Part 73 (20 NMAC 2.73), *Notice of Intent and Emissions Inventory Requirements*. The objective of the reporting requirement is to ensure that regulated air pollutant standards for both the state and federal Acts are not violated. The air contaminants included in the annual *Emissions Inventory Report* are total particulate matter (PM), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur oxides (SO_x), volatile organic compounds (VOCs), beryllium, and aluminum.

2.0 EMISSIONS INVENTORY-REPORTING REQUIREMENTS

Annual emissions-reporting requirements under 20 NMAC 2.73 apply to any facility that emits or has the potential to emit 5 tons per year or more of lead or lead compounds or 100 tons per year or more of suspended particulate matter in the size range of 10 microns or less—(PM_{10}), SO_x, NO_x, CO, or VOCs. Emission units that emit in excess of 1 ton of lead per year or 10 tons per year of PM, PM_{10}, SO_x, NO_x, CO, or VOCs must be included in the report to the New Mexico Environment

Department (NMED). In addition, emissions from all permitted sources must be included in the report.

3.0 CONTENT OF THE EMISSIONS INVENTORY REPORT

The information required in the report includes the following:

- name, address, and physical location for the facility;
- facility contact information;
- signed certification statement by a responsible facility official; and
- specific information for each emission unit such as the type and efficiency of control equipment, schedule of operation, annual process or fuel combustion rates, and estimated actual emissions for the previous year.

4.0 REPORTED EMISSION SOURCES

The Laboratory's 1999 *Emissions Inventory Report* includes estimates of regulated air emissions from the following sources:

- steam plants,
- nonexempt boilers,
- asphalt plant,
- water pump,
- paper shredder,
- rock crusher,
- degreaser,
- research and development (R&D) activities, and
- permitted beryllium machining operations.

Descriptions of these sources are provided in the following subsections of this report.

4.1 Steam Plants

The Laboratory operates two steam plants, one located at Technical Area 3 (TA-3) and the other at TA-21. The TA-3 steam plant produces steam for heating and electricity when sufficient power from outside sources is not available. The steam plant at TA-21 provides steam for heating. The heat produced from both steam plants is used for comfort and hot water and to support processes. Each steam plant has three boilers that are fueled primarily with natural gas and with diesel fuel as a backup. Actual emissions are estimated on the basis of metered fuel consumption and emission factors. The primary source of emission factors is the US Environmental Protection Agency's *Compilation of Air Pollutant Emission Factors (AP-42)*. However, emission factors from stack tests conducted at the TA-3 steam plant when it was burning natural gas were also used as appropriate.

4.2 Nonexempt Boilers

The Laboratory recently completed a comprehensive boiler inventory in which it applied consistent criteria and reevaluated boilers for exemption status. Consequently, some boilers reported in previous years have been removed from this year's report and designated as exempt; some boilers not previously reported have been added to the report. The exemption analysis applied to the boilers is discussed in Section 5 of this report.

The nonexempt boilers include the following:

- four boilers at TA-16,
- three boilers at TA-48,
- two boilers at TA-53,
- two boilers at TA-55, and
- two boilers at TA-59.

All of the reported boilers burn natural gas. The TA-16 boilers have meters to track the fuel consumption. For all other boilers, the fuel consumption was estimated on the basis of the total natural gas used by the Laboratory minus the amount supplied to the metered sources. Some emission factors were available from stack tests (TA-55), some were provided by the boiler manufacturers (Sellers Engineering Company and Kewanee), and the rest were taken from *AP-42*.

4.3 Asphalt Plant

The asphalt plant produces small amounts of asphalt for road repairs in and around the Laboratory. Emissions from the asphalt plant are based on the amount of asphalt produced for the year. The PM emissions from the asphalt plant were calculated with an emission factor obtained from a source test. Otherwise, emission factors from *AP-42* were used.

4.4 Water Pump

A natural gas-fired water pump is used to pump potable water from underground wells. Emission factors for NO_x, CO, and VOC emissions from the water pump were obtained from the pump-engine manufacturer. Otherwise, emission factors from *AP-42* were used. The emission factors were used with the metered fuel consumption to estimate actual emissions.

4.5 Paper Shredder

The shredding operations of the paper shredder at TA-52-11 are a source of PM emissions. Estimates of actual emissions are based on an averaged monthly shredding rate and engineering estimates for controlled emissions. These PM emissions are controlled with a cyclone and a baghouse.

4.6 Rock Crusher

In June 1999, the Laboratory was issued a 20 NMAC 2.72 construction permit to operate an impact rock crusher to crush potentially radioactively contaminated concrete removed from buildings as part of the Laboratory's decontamination and decommissioning efforts. However, because the equipment was not operated in 1999, there were no PM emissions from the crushing activities and no combustion products from the crusher's diesel-fired engine.

4.7 Degreaser

The halogenated solvent cleaning machine at TA-55 Building PF-4 was reported to NMED's Air Quality Bureau as required under the National Emission Standards for Hazardous Air Pollutants, 40 CFR 63 Subpart T, *Halogenated Solvent Cleaning*. The solvent, trichloroethylene (CAS No. 79-01-6), is a VOC. Measured losses were reported for the VOC emissions.

4.8 VOC Emissions from Research and Development Activities

The majority of the Laboratory's work is devoted to R&D activities. Varying operating parameters as well as amounts and types of chemicals are used in these activities. R&D activities occur at virtually all TAs within the Laboratory.

With the exception of specific chemicals, VOCs are any compounds of carbon that participate in atmospheric photochemical reactions. The VOCs include commonly used chemicals such as ethanol, methanol, and isopropanol. As a conservative estimate, VOCs identified in the Laboratory's chemical-tracking records were assumed to be 100% emitted to the air. Chemical-tracking records were reviewed to

identify all VOCs. The following categories of chemicals were eliminated:

- inorganic chemicals,
- solid materials,
- chemicals used to calibrate equipment,
- container sizes of 1 lb. or less,
- chemicals with vapor pressures less than 10-mm Hg,
- non-VOC materials as defined by 40 CFR 51.100,
- fuels used for combustion purposes, and
- maintenance chemicals and oils.

The remaining chemical-tracking records were assumed to represent VOCs and resulted in an estimate of VOC emissions of 20 tons. The use of trivial and insignificant activities as exemptions is discussed in Section 5 of this report.

4.9 Permitted Beryllium-Machining Operations

The Laboratory operates under five 20 NMAC 2.72 construction permits for beryllium-machining operations that are subject to 40 CFR 61, Subpart C, *National Emission Standards for Beryllium. Emissions,* from these sources were reported to be at permitted emission levels; however, actual emissions monitored during initial compliance stack tests were below permitted levels. No beryllium machining was performed at TA-3-141 in 1999; therefore, there were no air emissions reported for the facility.

5.0 REPORTING EXEMPTIONS

Specific insignificant or trivial activities are exempt from reporting. NMED has designated exempt sources, activities, or thresholds in the following lists:

- *List of Insignificant Activities,* September 29, 1995; and
- *List of Trivial Activities,* January 10, 1996.

Laboratory sources and activities that qualify as insignificant or trivial as specified in these lists are not included in the emissions inventory. The following subsections of this report provide information and examples of the Laboratory's exempt activities as well as the analyses that are performed to determine the exempt status.

5.1 Boilers

The Laboratory's boiler inventory was evaluated against the *List of Insignificant Activities.* Specifically, a boiler was considered exempt from the emissions inventory reporting requirements if it met one of the following requirements:

- Any emissions unit...that has the potential to emit no more than one ton per year of any regulated pollutant…; or
- Fuel burning equipment which uses gaseous fuel, has a design rate less than or equal to five (5) million BTU per hour, and is used solely for heating buildings for personal comfort or for producing hot water for personal use.

Any boiler that was not used exclusively for comfort heating or hot water was evaluated for the one ton per year exemption. For purposes of determining the exemption, the boiler design ratings were used to estimate the potential to emit. Any boiler not qualifying for one of these two exemptions was included in the report.

5.2 VOC Emissions

A number of insignificant and trivial activities are applicable for exempting materials from the VOC R&D total in the report. The basis of the exemptions and the corresponding insignificant and trivial activity include the following:

Basis of Exemption	Activity Type	Activity
Chemicals used to calibrate equipment	Trivial	Routine calibration and maintenance of laboratory equipment or other analytical instruments, including gases used as part of those processes.
Container sizes of 1 pound or less	Trivial	Paint or nonpaint materials dispensed from prepackaged aerosol cans of 16 oz. or less capacity.
Chemicals with vapor pressures <10-mm Hg	Insignificant	Any emissions unit, operation, or activity that handles or stores a liquid with a vapor pressure of less than 10-mm Hg or in quantities of less than 500 gal.
Maintenance chemicals and oils	Trivial	Activities that occur strictly for maintenance of grounds or buildings, including lawn care, pest control, grinding, cutting, welding, painting, woodworking, sweeping, general repairs, janitorial activities, plumbing, retarring roofs, installing insulation, steam-cleaning and water-washing activities; and paving of roads, parking lots and other areas. Activities for maintenance and repair of equipment, pollution-control equipment, or motor vehicles either inside or outside of a building.

In addition, fuels such as acetylene were not included in the VOC total because, when burned in an open flame, almost all of these fuels are consumed and the emissions are minimal. Furthermore, under normal conditions, fuels burned with oxygen are reduced to carbon dioxide and water, which are not regulated air pollutants.

5.3 Paints

An exemption analysis was performed for VOC emissions resulting from painting activities conducted at the Laboratory. Paint information for 1999 was gathered from the work control databases maintained by Johnson Controls of Northern New Mexico and the Laboratory's procurement and inventory systems. The procurement records were evaluated for applicability of exemptions for trivial and insignificant activities on the basis of the types of painting performed. Many of the paints were exempt from reporting owing to container size (of 1 lb. or less) or because the paint was applied to maintain buildings, structures, or equipment.

For paints not exempt on the basis of size or for use in maintenance activities, the corresponding amounts of paints were totaled. For 1999, this total was 1.4 tons, an amount that qualified these paints for the following insignificant activity:

Surface coating of equipment, including spray painting and roll coating, for sources with facility-wide total cleanup solvent and coating actual emissions of less than two tons per year.

In summary, all emissions from paints and painting activities were exempt as insignificant or trivial activities and, therefore, were not included in the report.

5.4 Generators

The Laboratory submitted an exemption notice to NMED for the periodic relocation of 125 portable generators. This notification was required under 20 NMAC 2.72 Section 202 B.4. Portable generators are used at the Laboratory for temporary operations requiring remote power or to provide emergency backup power during power outages at various sites. The portable generators are fueled by gasoline and diesel fuel.

In addition to the portable generators, the Laboratory maintains and operates approximately 40 stationary generators. Stationary generators are used on standby (emergency) status to provide power to critical systems at the Laboratory during power outages. The stationary generators are fueled by natural gas, gasoline, or diesel.

The insignificant activity exemptions applicable to the Laboratory's generators are the following:

- Portable engines and portable turbines that have a design capacity…less than or equal to
  - 200-HP engine if fueled by diesel or natural gas, and
  - 500-HP engine if fueled by gasoline….
- Emergency generators that comply with the definition of standby equipment….

Standby equipment is defined as "an emissions unit which on a temporary basis replaces equipment used in normal operation, and which either has an allowable emission rate or potential to emit for each fee pollutant that is equal to or less than the equipment replaced, or which does not operate for a period exceeding 500 hours per calendar year."

On the basis of their size, the portable generators used for temporary power at remote locations are exempt from emissions inventory-reporting requirements. In addition to the size exemption, the Washington, DC Court of Appeals specifically exempted these sources from the requirements applicable to stationary sources such as those governing *Prevention of Significant Deterioration*. As discussed in this case, these portable generators are considered "nonroad engines." See *Engine Manufacturer's Association v. USEPA*, 1996 WL387416 (Washington, DC Circuit Court).

Since all of the stationary generators are designated as standby equipment under the Operating Permit Program and are used solely to provide emergency backup power for fewer than 500 hours per year, they are insignificant sources and, therefore, are exempt from emissions inventory reporting requirements.

5.5 Lead

The following two activities at the Laboratory were evaluated for reporting under the emissions inventory requirements:

- Melting and forming of lead into shielding for glove boxes and other equipment used to handle radioactive materials; and
- Shooting of ammunition containing lead at

the firing range.

Both of these activities result in small rates of air emissions. Melting activities result in 1.5 lb. of lead air emissions for every ton of lead melted[1] . Shooting exercises result in 2E-05 lb. of lead air emissions for every cartridge shot[2] . Typical emissions from these activities combined are below 50 lb. per year[3] . Therefore, the emissions of lead from these activities do not exceed the one ton per year exemption and need not be reported under the emissions inventory requirements.

6.0 EMISSIONS SUMMARY

The *Emissions Inventory Report* as submitted to NMED is presented in the appendix.

The Laboratory's reported emissions for 1999 are summarized in Attachment A of the Appendix. Six sources are listed with zero emissions. Three are listed in the Aerometric Information Retrieval System (AIRS) but have never been built or operated (Stack Nos. 005, 009, and 012); one is no longer in use (Stack No. 003); and two (Stack No. 007 and the Rock Crusher) did not operate in 1999. Emissions of beryllium and aluminum are reported for those sources that have emission limits required by 20 NMAC 2.72 construction permits. The beryllium and aluminum emissions are also reported under the PM emissions.

Figure 1 shows the air-pollutant emissions by source. The TA-3 steam plant is the primary source of NO_x, SO_x, PM, and CO emissions. R&D activities are the primary source of VOC emissions.

Figure 2 compares 1997, 1998, and 1999 emissions reported to NMED. There are some noteworthy differences in the emissions from 1998 to 1999. The VOC emissions from R&D activities are 60% higher than those in 1998. This evaluation does not necessarily indicate a 60% increase in the amount of chemicals used. Other factors affecting this evaluation are the improved tools for chemical management and the availability of electronic data for the physical properties and chemical formulas.

Overall, the Laboratory used more fuel in 1999. For example, the steam plant at TA-3 used 21% more natural gas than used in the previous year and the steam plant at TA-21 used 27% more natural gas than in the previous year. In addition, emissions from diesel combustion at the two steam plants were reported for 1999 and not for 1998. The diesel was used in 1999 as a preventative measure for Y2K concerns. Finally, emission estimates, where appropriate, have been updated to reflect significant changes in AP-42 emission factors for natural gas combustion.

In 1999, the Laboratory initiated a project to install flue gas recirculation equipment on the TA-3 steam plant boilers to reduce the NO_x emissions by approximately 70%. This project, when fully implemented, will significantly reduce emissions from the Laboratory. Implementation will begin in 2000.

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[1] AP-42, Fifth Edition, January 1995, Section 12.17 *Miscellaneous Lead Products*, Table 12.17-2

[2] Engineering calculations

[3] See LA-13560-MS, LA-13655-PR

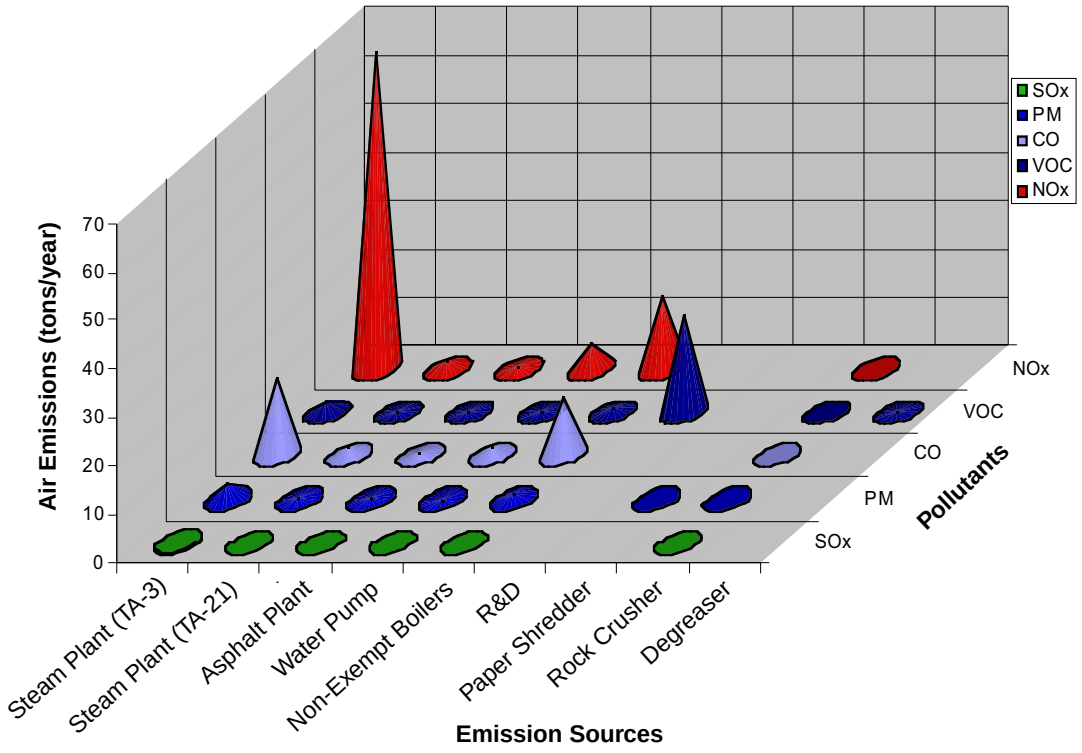

Fig. 1. Emissions by source in 1999

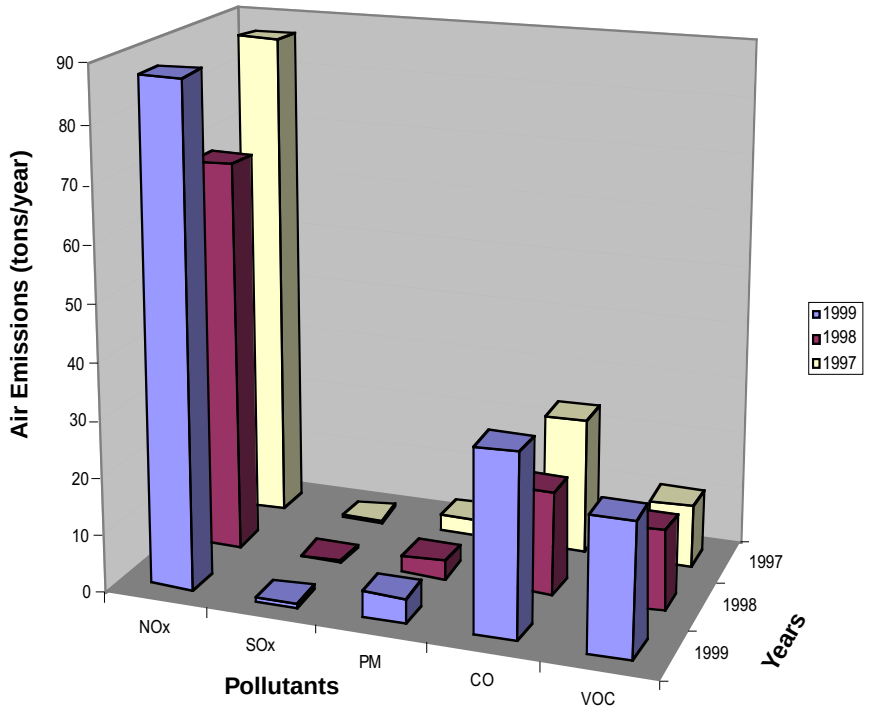

Fig. 2. Emissions generated in 1997, 1998, and 1999

APPENDIX

Los Alamos National Laboratory

Environment, Safety and Health Division
P.O. Box 1663, Mail Stop K491
Los Alamos, New Mexico 87545
(505) 667-4218/ FAX: (505) 665-3811

Date: March 23, 2000
Refer to: ESH-DO:00-026

Mr. George Lewellyn
New Mexico Environment Department
Air Quality Bureau
2048 Galisteo
Santa Fe, NM 87505

Dear Mr. Lewellyn:

Enclosed is the 1999 Emissions Inventory Report for Los Alamos National Laboratory (LANL or Laboratory), required by Title 20, Chapter 2, Part 73 of the New Mexico Administrative Code (20 NMAC 2.73), *Notice of Intent and Emissions Inventory Requirements*. While we understand that the Air Quality Bureau is not requiring LANL to submit an emissions inventory report for 1999, we have determined, after consultation with legal counsel, that the report is required under Section 301(A) and (B) of 20 NMAC 2.73. This report contains all of the Laboratory's air emissions information required by the statute and regulations.

This report was completed using the following exemptions for Operating Permit Program sources:

- *'List of Insignificant Activities'* dated September 29, 1995; and
- *'List of Trivial Activities'* dated January 10, 1996.

The exclusion of emissions from this report for insignificant sources or activities requires a departmental waiver as stated in Section 304 of the regulations. The use of exemptions was discussed and agreed upon during a meeting on March 5th, 1998, with Genevieve Grant and Phyllis Ludi.

This submittal has been formatted to correspond to what we believe will be required for the Operating Permit emissions report with the exception of hazardous air pollutant emissions. The enclosed report is submitted in the following attachments:

- Attachment A - Emissions Inventory Summary with estimated actual emissions for calendar year 1999;
- Attachment B - Source Information; and
- Attachment C - Volatile Organic Compound Analysis.

There have been some minor changes from last year's submittal. First, the rock crusher (Air Quality Permit No. 2195, AIRS No. 35-777-00789) did not operate in 1999. Second, the boilers have been re-evaluated for exemption status based on a recent comprehensive boiler inventory at LANL. As a result, four boilers were added to the report and two boilers, previously reported, were removed. Third, emission estimates, where appropriate, have been updated to reflect changes in AP-42 emission factors for natural gas combustion. Fourth, emissions from No. 2 fuel oil combustion at two of the steam plants were reported. The No. 2 fuel oil was used in 1999 as a preventative measure for Y2K concerns. Fifth, beryllium machining and foundry operations at Technical Area 3, Building 141 (Air Quality Permit No. 634-M2, AIRS No. 35-028-00001) did not operate in 1999.

If you have any questions regarding this report, please contact Leland Maez of my staff in the Laboratory's Air Quality Group at (505) 665-1240.

Sincerely,

Dennis J. Erickson
Division Director
Environment, Safety & Health Division

DJE/JH/ln

Att: a/s

Cy: J. Vozella, DOE/LAAO, A316
S. Fong, DOE/LAAO, A316
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L. Maez, ESH-17, J978
CIC-10, A150
20 NMAC 2.73 Project Files, J978
ESH-17 File, J978
ESH-DO File

LOS ALAMOS NATIONAL LABORATORY'S 1999 EMISSIONS INVENTORY REPORT

Submitted as Required by:

Title 20, Chapter 2, Part 73 of the New Mexico Administrative Code

Prepared by:

The University of California

For:

The United States Department of Energy

Information Contact:

Leland Maez, (505) 665-1240

Certification Statement

I, Dennis J. Erickson, hereby certify on behalf of Los Alamos National Laboratory and the University of California, that the information and statements contained in this emissions inventory report are true and accurate to the best of my knowledge and belief.

Dennis J. Erickson, Ph.D. — Date: 3/23/00

Division Director for Environment, Safety & Health
University of California
Los Alamos National Laboratory
(505) 667-4218

Table of Contents

Attachment A

Emissions Inventory Summary

Stack No.	Source ID	Status
001	BE Shop, TA-3, Bldg. 39, Room 16	No Updates Necessary
002	Edgemoor BLRS 3EA TA-3-22	Updated
003	Steam Plant TA-16, Bldg. 540	This source is no longer in operation
004	Industrial BLRS 3 TA-21-357	Updated
005	TD Site Not Operating Stack	No Updates Necessary
006	BE Machining TA-35, Bldg. 213	No Updates Necessary
007	BE Machining TA-3, Bldg. 141	This source did not operate
008	BE Machining TA-3, Bldg. 102	No Updates Necessary
009	BE Shop, TA-3-35 Not Built Stack	No Updates Necessary
010	BE Cutting and Bead Dressing	No Updates Necessary
011	Metallography	No Updates Necessary
012	Solid Waste Fired Boiler	Facility Not Constructed
013	Asphalt Rotary Dryer TA-3-73	Updated
014	Pump Engine	Updated

Attachment B

Source Information

- Steam Plants, Asphalt Plant, Pump Engine;
- Non-Exempt Boilers;
- Paper Shredder; and
- Degreaser.

Attachment C

Volatile Organic Compound Analysis

- Chemicals used for Research and Development; and
- Paints.

ATTACHMENT A

Emissions Inventory Summary

1999 Emissions Inventory Report

Summary of Emissions

(Pounds/Year = PY; shaded = Tons/Year = TY)

Sources		1999 Estimated Actual Emissions (PY)						
Stack Number		Al	Be	NOx	SOx	PM	CO	VOC
001	BE Shop, TA-3, Bldg 39, Room 16*	0.00	0.008	0.00	0.00	0.008	0.00	0.00
002	Edgemoor BLRS 3EA TA-3-22	0.00	0.00	130564	823	6094	32034	4401
003	Steam Plant TA-16-Bldg 540	0.00	0.00	0.00	0.00	0.00	0.00	0.00
004	Industrial BLRS 3 TA-21-357	0.00	0.00	3707	88	282	3098	203
005	TD Site Not Operating Stack	0.00	0.00	0.00	0.00	0.00	0.00	0.00
006	BE Machining TA-35, Bldg 213*	0.00	0.0008	0.00	0.00	0.0008	0.00	0.00
007	BE Machining TA-3, Bldg 141**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
008	BE Machining TA-3, Bldg 102*	0.00	0.00014	0.00	0.00	0.00014	0.00	0.00
009	BE Shop, TA-3-35 Not Built Stack	0.00	0.00	0.00	0.00	0.00	0.00	0.00
010	BE Cutting and Bead Dressing*	0.0041	0.0041	0.00	0.00	0.0082	0.00	0.00
011	Metallography*	0.00	0.0030	0.00	0.00	0.0030	0.00	0.00
012	Solid Waste Fired Boiler	0.00	0.00	0.00	0.00	0.00	0.00	0.00
013	Asphalt Rotary Dryer TA-3-73	0.00	0.00	73	15	205	997	50
014	Pump Engine	0.00	0.00	10340	4	6	3309	207
	Subtotal AIRS (PY):	0.004	0.016	144684	930	6587	39437	4861
	Subtotal AIRS (TY):	2.05E-06	8.02E-06	72.3	0.465	3.29	19.7	2.43
	Non-Exempt Boilers (PY):	NA	NA	30490	162	2363	24528	1504
	Non-Exempt Boilers (TY):	NA	NA	15.2	0.081	1.18	12.3	0.752
	Paper Shredder (PY):	NA	NA	NA	NA	1.08	NA	NA
	Paper Shredder (TY):	NA	NA	NA	NA	0.001	NA	NA
	Rock Crusher and Diesel Engine** (PY):	NA	NA	0.00	0.00	0.00	0.00	0.00
	Rock Crusher and Diesel Engine** (TY):	NA	NA	0.00	0.00	0.00	0.00	0.00
	Degreaser VOC (PY):	NA	NA	NA	NA	NA	NA	63.4
	Degreaser VOC (TY):	NA	NA	NA	NA	NA	NA	0.032
	R&D VOC (PY):	NA	NA	NA	NA	NA	NA	40000
	R&D VOC (TY):	NA	NA	NA	NA	NA	NA	20.0
	Total Emissions in PY:	0.004	0.016	175174	1092	8952	63965	46364
	Total Emissions in TY:	2.05E-06	8.02E-06	87.6	0.546	4.48	32.0	23.2

* Emissions based on allowables in permits

**Source did not operate in 1999

ATTACHMENT B

Source Information

1999 Emissions Inventory Report

Combustion Sources Listed in AIRS Emissions Inventory Report

(Pounds/Year = PY)

TA-3-22 Steam Plant (Edgemoor Boilers, 210 MMBTU/hr)						
Stack No. 002		Natural Gas Emission Factors (lb/MMSCF)[a]				
	Gas (MMCF)[b]	NO_x [c]	SO_x	PM	CO[l]	VOC
	800	163	0.6	7.6	40	5.5
	Emissions in PY	**130400**	**480**	**6080**	**32000**	**4400**
		Fuel Oil Emission Factors (lb/1000 gal)[d]				
	Oil (1000 gal)[b]	NO_x	SO_x[e]	PM	CO	VOC[f]
	6.84	24	50.22	2	5	0.2
	Emissions in PY	**164**	**343**	**14**	**34**	**1.4**
	TOTAL in PY	**130564**	**823**	**6094**	**32034**	**4401**
TA-21-357 Steam Plant (Industrial Boilers, 12 MMBTU/hr)						
Stack No. 004		Natural Gas Emission Factors (lb/MMSCF)[a]				
	Gas (MMCF)[b]	NO_x	SO_x	PM	CO	VOC
	37	100	0.6	7.6	84	5.5
	Emissions in PY	**3680**	**22**	**280**	**3091**	**202**
		Fuel Oil Emission Factors (lb/1000 gal)[d]				
	Oil (1000 gal)[b]	NO_x	SO_x[e]	PM	CO	VOC[f]
	1.35	20	49.0	2	5	0.2
	Emissions in PY	**27**	**66**	**2.7**	**6.8**	**0.27**
	TOTAL in PY	**3707**	**88**	**282**	**3098**	**203**
TA-3-73 Asphalt Plant						
Stack No. 013		Emission Factors (lb/ton)[g]				
	Asphalt Production (tons)	NO_x	SO_x	PM[h]	CO	VOC
	2,931	0.025	0.005	0.07	0.34	0.017
	Emissions in PY	**73**	**15**	**205**	**997**	**50**
TA-54 Water Pump					700	Horsepower
Stack No. 014		Emission Factors (g/hp-hr)[i]				
Hours of Operation[j]	Gas (MMCF)[b]	NO_x	SO_x (lb/MMSCF)[a]	PM[k]	CO	VOC
1340	6.7	5	0.6	0.003	1.6	0.1
	Emissions in PY	**10340**	**4.02**	**6.20**	**3309**	**207**

[a] AP-42, 7/98, Section. 1.4, *Natural Gas Combustion*, Tables 1.4-1, 1.4-2

[b] Fuel usage obtained from Jerry Gonzales, FWO-UI

[c] Source Test on Unit 3, 8/29/95 (Title V Application, December 1995)

[d] AP-42, 9/98, Section. 1.3, *Fuel Oil Combustion*, Table 1.3-1 with Errata

[e] S = weight % sulfur in oil (Title V Application, December 1995)

Boilers <100 MMBtu/hr: SO_x Emission Factor = 144 * S

Boilers >100 MMBtu/hr: SO_x Emission Factor = 147.7 * S

S(%)= 0.34

[f] AP-42, 9/98, Section 1.3, *Fuel Oil Combustion*, Table 1.3-3 NMTOC

[g] AP-42, 1/95, Section 11.1, *Hot Mix Asphalt Plants*, Table 11.1-7

[h] Source Test, 8/25/93 (Title V Application, December 1995)

[i] Emission Factors from Manufacturer

Sample Calculation: (hr of op)(hp)(EF g/hp-hr)/453.593 g/lb

Conversion: 453.593 g/lb

[j] Fuel Rate: 5000 scf= 1hour

[k] AP-42, 10/96, Section 3.2, *Heavy Duty Nat. Gas-fired Pipeline Compressor Engines and Turbines*, Table 3.2-3

[l] AP-42, 1/95, Section. 1.4, *Natural Gas Combustion*, Table 1.4-2. Consistent with previous stack tests.

1999 Emissions Inventory Report
Non-Exempt Boilers with Stack Parameters and Estimated Emissions
(Pounds/Year = PY; shaded = Tons/Year = TY)

								Emission Factors (tons/MMSCF)[1]				
								0.05	0.0003	0.0038	0.042	0.00275
Miscellaneous Boilers (Fuel Pro-Rated)								Emissions (tons/yr)[2]				
Location	ID	Stack Height (ft)	Stack Diameter (ft)	Exit Gas Temp (^{0}F)	Flow Rate (CFPM)	Design Rate (BTU/hr)	Natural Gas Consumption (MCF/yr)	NOx	SOx	PM	CO	VOC
TA-48-1	BS-1	50	2.3	300	2400	5,336,300	20000	1.000	0.006	0.076	0.840	0.055
TA-48-1	BS-2	50	2.3	300	2400	5,335,450	20000	1.000	0.006	0.076	0.840	0.055
TA-48-1	BS-6	50	2.3	300	3300	7,140,000	27000	1.350	0.008	0.103	1.134	0.074
TA-53-365	BHW-1	22	1.5	300	3400	7,114,500	27000	1.350	0.008	0.103	1.134	0.074
TA-53-365	BHW-2	22	1.5	300	3400	7,114,500	27000	1.350	0.008	0.103	1.134	0.074
TA-59-1	BHW-1	55	1.7	300	2600	5,335,450	20000	1.000	0.006	0.076	0.840	0.055
TA-59-1	BHW-2	55	1.7	300	2600	5,335,450	20000	1.000	0.006	0.076	0.840	0.055
							Subtotal (TY):	**8.050**	**0.048**	**0.612**	**6.762**	**0.443**
								Emission Factors (tons/MMSCF)[3]				
								0.121	0.0003	0.0038	0.147	0.00275
Miscellaneous Boilers (Fuel Pro-Rated)								Emissions (tons/yr)[2]				
TA-55-6	BHW-1	30	1.8	222	3600	7,113,650	27000	3.267	0.008	0.103	3.969	0.074
							Subtotal (TY):	**3.267**	**0.008**	**0.103**	**3.969**	**0.074**
								Emission Factors (tons/MMSCF)[4]				
								0.069	0.0003	0.0071	0.0191	0.00299
Miscellaneous Boilers (Fuel Pro-Rated)								Emissions (tons/yr)[2]				
TA-55-6[6]	BHW-2	30	2	333	5500	12,448,250	48000	3.312	0.014	0.341	0.917	0.144
							Subtotal (TY):	**3.312**	**0.014**	**0.341**	**0.917**	**0.144**
								Emission Factors (tons/MMSCF)[5]				
								0.0185	0.0003	0.0038	0.01854	0.00275
TA-16 Package Boilers (Fuel Metered)								Emissions (tons/yr)[2]				
TA-16	Plant 5-1	21	1.5	341	2280	6,350,110	20009	0.371	0.006	0.076	0.371	0.055
TA-16	Plant 5-2	Stand by										
TA-16	Plant 6-1	19	1.8	341	2148	7,842,913	13227	0.245	0.004	0.050	0.245	0.036
TA-16	Plant 6-2	Stand by										
							TA-16 Total (TY):	**0.616**	**0.010**	**0.126**	**0.616**	**0.091**
							Non-Exempt Boilers Total (TY):	**15.2**	**0.081**	**1.18**	**12.3**	**0.752**
							Non-Exempt Boilers Total (PY):	**30490**	**162**	**2363**	**24528**	**1504**

[1] AP-42, 7/98, Section 1.4, *Natural Gas Combustion*, Small Boilers

[2] Natural gas: Sulfur content is <0.1% and ash content is non-applicable.
Heat Value: 1030 BTU/scf
Conversions: 8760 hr/yr

[3] Stack test on 3/00 for NOx and CO. Otherwise, Emission factors obtained from AP-42, 7/98, Section 1.4, Natural Gas Combustion, Small Boilers.

[4] AP-42, 7/98, Section 1.4, *Natural Gas Combustion*, Small Boilers for SOx. Stack test on 3/00 for NOx. Otherwise, Emission factors from Sellers Engineering Co.

[5] AP-42, 7/98, Section 1.4, *Natural Gas Combustion*, Small Boilers; Emission factors for NOx and CO from Sellers Engineering Co.

[6] Boiler substitution took place in 1998.

1999 Emissions Inventory Report

Paper Shredder

Source:	SEM-1424 Disintegrator			
Manufacturer:	Security Engineered Machinery (SEM)			
Amount processed:	1803	boxes per Fiscal Year (FY)		
	150.3	boxes per month		
Amount processed:	1803	boxes per Calendar Year (CY)		
Weight Conversion:	60	lb/box		
Amount processed:	108180	lb/CY		
Emission Factor:	1	%	provided by SEM	
Uncontrolled emissions:	1081.8	lb/yr		
Controls:	Cyclone	90	% efficient	Based on engineering judgement
	Baghouse	99	% efficient	Based on engineering judgement

Controlled emissions:

1.0818 lb/yr Controlled PM emissions

Sample Calculations:

Uncontrolled PM Emissions (lb/yr): (lb paper processed/yr) * (1%)

Controlled PM Emissions: (lb/yr):

(Uncontrolled PM Emissions) * ((100- Cyclone Efficiency)/100) *((100- Baghouse Efficiency)/100)

1999 Emissions Inventory Report

Degreaser

Physical Location: TA-55 Building PF-4

Description of Equipment: Cold Ultrasonic Bath

Solvent/Air Interface Area: 0.0774 m^2 (10 in x 12 in)

Mechanical Controls
Not Applicable
Degreaser bath is located in a glovebox
Emissions exhausted out of building through duct and out an exterior stack

Manufacturer
Branson Ultrasonic Corporation

Model
Branson Transducerized Cleaning Tank, Model 1012

Installation Date:
September 1, 1998
Notification sent to NMED on December 4, 1998

Solvent: Trichloroethylene (CAS No. 79-01-6)

Actual Emissions: 63.4 lb. (0.032 tons) calculated from monthly measured losses

ATTACHMENT C

Volatile Organic Compound Analysis

Volatile Organic Compound (VOC) analysis included an assessment of painting activities and chemical emissions from Research and Development (R&D) operations. An analysis of the painting activities at LANL demonstrated that the air emissions qualify for exemptions. Therefore, VOC emissions from paints are not included in the emissions inventory. VOC emissions from R&D operations were estimated using LANL's chemical tracking systems and procurement tracking systems. Air emissions were estimated as 100% release of the chemicals used for R&D.

Volatile Organic Compound Analysis from Research and Development

The VOC quantity of chemicals from R&D was obtained by separation of:

- Inorganic chemicals;
- Calibration chemicals;
- Container sizes 1 pound or less;
- Solid materials;
- Organic chemicals with a vapor pressure <10 mmHg (specified in *'List of Insignificant Activities'*, dated September 29, 1995);
- Non-VOC materials by definition (Federal Register, 40 CFR 51);
- Fuels used for combustion purposes; and
- Maintenance chemicals and oils.

The estimated R&D VOC emissions for 1999 was approximately 40,000 pounds (20 tons).

Based on discussions and agreement between LANL and NMED during our March 1998 meeting, chemical mixtures that had incomplete information were not included in the VOC total. For 1999, there were 773 mixtures (approximately 5.4 tons). However, best judgement was used to evaluate the mixtures by name.

Exemptions Analysis for Paints

Exemptions:
The following exemptions from the New Mexico Environment Department (NMED) Air Pollution Control Bureau's Operating Permit Program *'List of Trivial Activities'*, dated January 10, 1996 were used in the VOC paint analysis:

- Activities that occur strictly for maintenance of grounds or buildings, including: lawn care, pest control, grinding, cutting, welding, **painting**, woodworking, sweeping, general repairs, janitorial activities, plumbing, re-tarring roofs, installing insulation,

steam cleaning and water washing activities, and paving of roads, parking lots and other areas.

- Activities for maintenance and repair of equipment, pollution control equipment, or motor vehicles either inside or outside of a building.

- Paint or non-paint materials dispensed from prepackaged aerosol cans of 16 ounce or less capacity.

The following exemption from the NMED Air Pollution Control Bureau's Operating Permit Program *'List of Insignificant Activities'* dated September 29, 1995 was used in the VOC paint analysis:

- Surface coating of equipment, including spray painting and roll coating, for sources with facility-wide total clean-up solvent and coating actual emissions of less **than two (2) tons per year**.

Methodology:
Records for paints and painting activities were obtained from procurement and job tracking sources at LANL. The records were evaluated for trivial and insignificant exemption applicability. The records for paint containers less than one pound were determined to be trivial and not evaluated for VOCs.

The analysis of the records showed that nearly all of the painting activities performed at LANL during 1999 were maintenance-related activities and were exempt from further VOC analysis.

For those painting activities that were not maintenance related, the corresponding amounts of paint were totaled. This total was 2,760 lb. (1.4 tons) qualifying as an insignificant activity because actual emissions were less than two tons per year.

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