

Emissions Inventory Report Summary

*Reporting Requirements for the
New Mexico Administrative Code, Title 20,
Chapter 2, Part 73 (20 NMAC 2.73) for
Calendar Year 1997*

Los Alamos
NATIONAL LABORATORY

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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 Laboratory has the potential to emit 100 tons per year of suspended particulate matter (PM), nitrogen oxides (NO_x), carbon monoxide (CO), and volatile organic compounds (VOCs). For 1997, combustion products from the industrial sources contributed the greatest amount of regulated air emissions from the Laboratory. Research and development activities contributed the greatest amount of VOCs. Emissions of beryllium and aluminum were reported for activities permitted under 20 NMAC 2.72, Construction Permits.

1.0 INTRODUCTION

Los Alamos National Laboratory (the Laboratory) has reported the regulated air pollutants generated from its operations since the late 1980s when the requirement under Title 20 of the New Mexico Administrative Code, Chapter 2, Part 73, (20 NMAC 2.73) Notice of Intent and Emissions Inventory Requirements, was first promulgated. The objective of the

reporting requirement is to ensure that regulated pollutant standards for both the State and Federal Acts are not violated. The air contaminants reported are total particulates (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 applies to any source 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. Emissions from units that emit more than 1 ton of lead or 10 tons per year of the pollutants listed above as well as emissions from permitted sources must be included in the report. On October 1, 1997, the emissions report requirements were revised to include VOC emissions. This required the Laboratory to include emission estimates from its Research and Development (R&D) operations not previously covered under the 20 NMAC 2.72 permitted sources.

3.0 CONTENT OF EMISSIONS INVENTORY REPORT

The information required in the report includes the following:

- The name, location, owner, and operator of the facility;
- Facility contact information;

- Signed certification statements by a responsible facility official; and
- Specific information for each emission point such as stack and exhaust parameters; type of control equipment with associated control efficiencies; schedule of operation; annual process or fuel combustion rates; the fuel heat, sulfur, and ash content; and estimated actual emissions.

4.0 REPORTED SOURCES AND METHODS FOR EMISSIONS ESTIMATES

The Laboratory's 1997 Emissions Inventory Requirements report included estimated actual emissions from industrial type sources such as the power plants, the large boilers, the asphalt plant, and the water pump. In addition, VOC emissions from R&D and painting operations were assessed and reported as appropriate. The beryllium emissions were reported at permitted emission levels.

4.1 Industrial Sources

Power and boiler plant operations produce steam for heating and/or electricity when sufficient power from outside sources is not available. The Asphalt Plant, pictured in Figure 1,



Figure 1. Asphalt Plant.

produces small amounts of asphalt for road repairs in and around the Laboratory. Finally, a natural gas burning water pump is used to pump potable water from underground wells. A list of the reported industrial sources, the location within the Laboratory, and the unit identification is as follows:

- Technical Area (TA) 3 Power Plant;
- TA-21 Power Plant;
- Boilers:
 - TA-16, Plants 4, 5, 6, and 13;
 - TA-48-1;
 - TA-53-365-1;
 - TA-53-365-2;
 - TA-55-6-1;
 - TA-55-6-2;
 - TA-55-6-3;
 - TA-55-6-4;
- Asphalt Plant; and
- Water Pump at TA-54.

4.1.1 Industrial Source Emission Estimates

Emissions from the Laboratory's industrial sources were estimated using fuel use, operating records, and the appropriate emission factors. These sources are primarily operated on natural gas.

Various methods and resources were used to determine individual site emissions. The NO_x emissions from the TA-3 Power Plant were calculated using an emission factor obtained from a stack test. A turbine from the main Power Plant is pictured in Figure 2. The NO_x and CO emission factors for the TA-16 boilers were calculated using data provided by the manufacturer. Emissions from the Asphalt Plant were based on the 1306 tons of asphalt produced in 1997. The PM emissions from the asphalt plant were calculated using an emission factor obtained from a stack test. Emission factors for NO_x, CO, and VOC emissions from the water pump were obtained from the manufacturer. Emissions from fuel combustion equipment were based on the actual or estimated fuel consumption. All other industrial source emissions were estimated using Environmental Protection Agency (EPA) guidance documents.

4.2 Research and Development Activities

The majority of the Laboratory's work is devoted to R&D activities. These activities vary in size, chemical use, and operating parameters. Furthermore, R&D activities occur at virtually all TAs within the Laboratory.



Figure 2. Turbine at the Main Power Plant.

4.2.1 VOC Emissions from R&D Activities

VOCs are any compound of carbon, with the exception of specific chemicals, which participates in atmospheric photochemical reactions. VOCs include commonly used chemicals such as ethanol, methanol, and isopropyl alcohol. Chemical use and process information were obtained for the VOCs that made up a large percentage of the 1997 total from the Laboratory's procurement records. Emissions were refined based on the process data received from the various users. Those chemicals, which had multiple users and multiple processes, were assumed to be 100% emitted as a conservative estimate. Ten tons of VOC emissions were estimated based on chemical procurement records. Figure 3 shows an example of chemicals that are tracked by the procurement records.

4.3 Additional Permitted Sources

Five sources are permitted under 20 NMAC 2.72, Construction Permits. These sources are beryllium machining operations and are subject to 40 CFR 61, Subpart C, National Emission

Standards for Beryllium. Emissions from these sources were reported at permitted emission levels. Actual emissions monitored during initial compliance stack tests are below these levels.

5.0 REPORTING EXEMPTIONS

As part of the evaluation of VOC emissions from the Laboratory, painting activities were considered. Painting activity information for calendar year 1997 was gathered from the following Laboratory databases:

- Work Order Control (WOC) database maintained by Johnson Controls of Northern New Mexico (JCNNM);
- Just-In-Time (JIT);
- Local Vendor Agreement (LVA);
- Purchase order (PO); and
- Automated Chemical Inventory System (ACIS).

The WOC database contained all JCNNM paint jobs and associated descriptions for calendar year 1997. Two hundred and one jobs were identified as being paint related. By using the job description field, a preliminary determina-



Figure 3. Gases ready for distribution within the Laboratory. The gases are tracked by the procurement record keeping.

tion was made as to whether the job was maintenance related. Of the two hundred and one jobs, ten jobs required detailed interviews with the respective paint supervisor. Of these ten jobs, nine were maintenance related and one did not use paint at all.

The JIT, LVA, PO, and ACIS database systems were used to capture paint procurement records. Requesters of paint were identified from the records and interviewed to determine paint usage. Figure 4 shows a paint booth at the Laboratory used exclusively for maintenance painting.

A determination was made based on the data received from the various paint users that all painting activities for 1997 were maintenance related and therefore were exempt from emission reporting requirements. Emissions from exempt activities are not required to appear on the emissions inventory report. As specified in the New Mexico Environment Department

(NMED) 'List of Trivial Activities', dated January 10, 1996, these activities include the following:

“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.”

6.0 EMISSIONS SUMMARY

The Laboratory's reported emissions for 1997 are summarized in Table 1. The largest sources of regulated pollutants emitted at the Laboratory were combustion products from industrial sources. Three sources (Stack No. 005, 009, and 012) listed on the forms provided by the state have never been built or operated.



Figure 4. Paint Booth.

9 Table 1. Summary of Estimated Emissions for 1997 Emissions Inventory Report (20 NMAC 2.73)

Emission Sources		Estimated Actual Emissions (lb/year)						
Stack No.		Aluminum	Beryllium	NO_x	SO_x	PM	CO	VOC
<i>Industrial Sources</i>								
002	Edgemoor BLRS 3EA TA-3-22	0.0	0.0	113299	417	3475	27803	973
003	Steam Plant TA-16-Bldg 540	0.0	0.0	0.0	0.0	0.0	0.0	0.0
004	Industrial BLRS 3 TA-21-357	0.0	0.0	8132	35	813	2033	163
005	TD Site Not Operating Stack	0.0	0.0	0.0	0.0	0.0	0.0	0.0
012	Solid Waste Fired Boiler	0.0	0.0	0.0	0.0	0.0	0.0	0.0
013	Asphalt Rotary Dryer TA-3-73	0.0	0.0	33	6.5	91	444	22
014	Pump Engine	0.0	0.0	41282	16.03	25	13210	826
<i>Other Permitted Sources</i>								
001	BE Shop, TA-3, Bldg 39, Room 16	0.0	0.008	0.0	0.0	0.008	0.0	0.0
006	BE Machining TA-35, Bldg 213	0.0	0.0008	0.0	0.0	0.0008	0.0	0.0
007	BE Machining TA-3, Bldg 141	0.0	0.0004	0.0	0.0	0.0004	0.0	0.0
008	BE Machining TA-3, Bldg 102	0.0	0.00014	0.0	0.0	0.00014	0.0	0.0
009	BE Shop, TA-3-35 Not Built Stack	0.0	0.0	0.0	0.0	0.0	0.0	0.0
010	BE Cutting and Bead Dressing	0.004	0.0042	0.0	0.0	0.0082	0.0	0.0
011	Metallography	0.0	0.003	0.0	0.0	0.003	0.0	0.0
	Subtotal in lb/yr:	0.004	0.0165	162746	475	4404	43490	1984
	Subtotal in ton/yr:	0.000002	0.0000004	81	0.2	2.2	22	0.99
<i>Non-Exempt Boilers</i>								
	Boiler Emission in lb/yr:	N/A	N/A	11438	98	1908	4488	846
	Boiler Emission in ton/yr:	N/A	N/A	5.8	0.05	0.95	2.2	0.4
<i>R&D Emissions</i>								
	Emissions in lb/yr:	N/A	N/A	N/A	N/A	N/A	N/A	19997
	Emissions in ton/yr:	N/A	N/A	N/A	N/A	N/A	N/A	10
1997 Emission Totals								
	Total Estimated Emissions in lb/yr:	0.004	0.0165	174183	573	6312	47979	22827
	Total Estimated Emissions in ton/yr:	0.000002	0.0000004	87.1	0.3	3.2	24	11

Therefore, these sources are listed with zero emissions. 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. Some pollutant emissions are not generated or applicable to the boilers operation and the research and development activities.

Figure 5 provides a comparison between 1995 and 1997 emissions reported to NMED.

The emissions decreased over the two-year period. The comparison cannot be used for the quantity of SO_x and VOC emissions that the Laboratory reported to NMED in 1997 because SO_x emissions and VOC emissions from R&D activities were not reported in 1995.

Figure 6 shows the criteria pollutants by source. The main Power Plant contributes the greatest amount of NO_x, SO_x, PM, and CO emissions. R&D activities contribute the most VOC emissions.

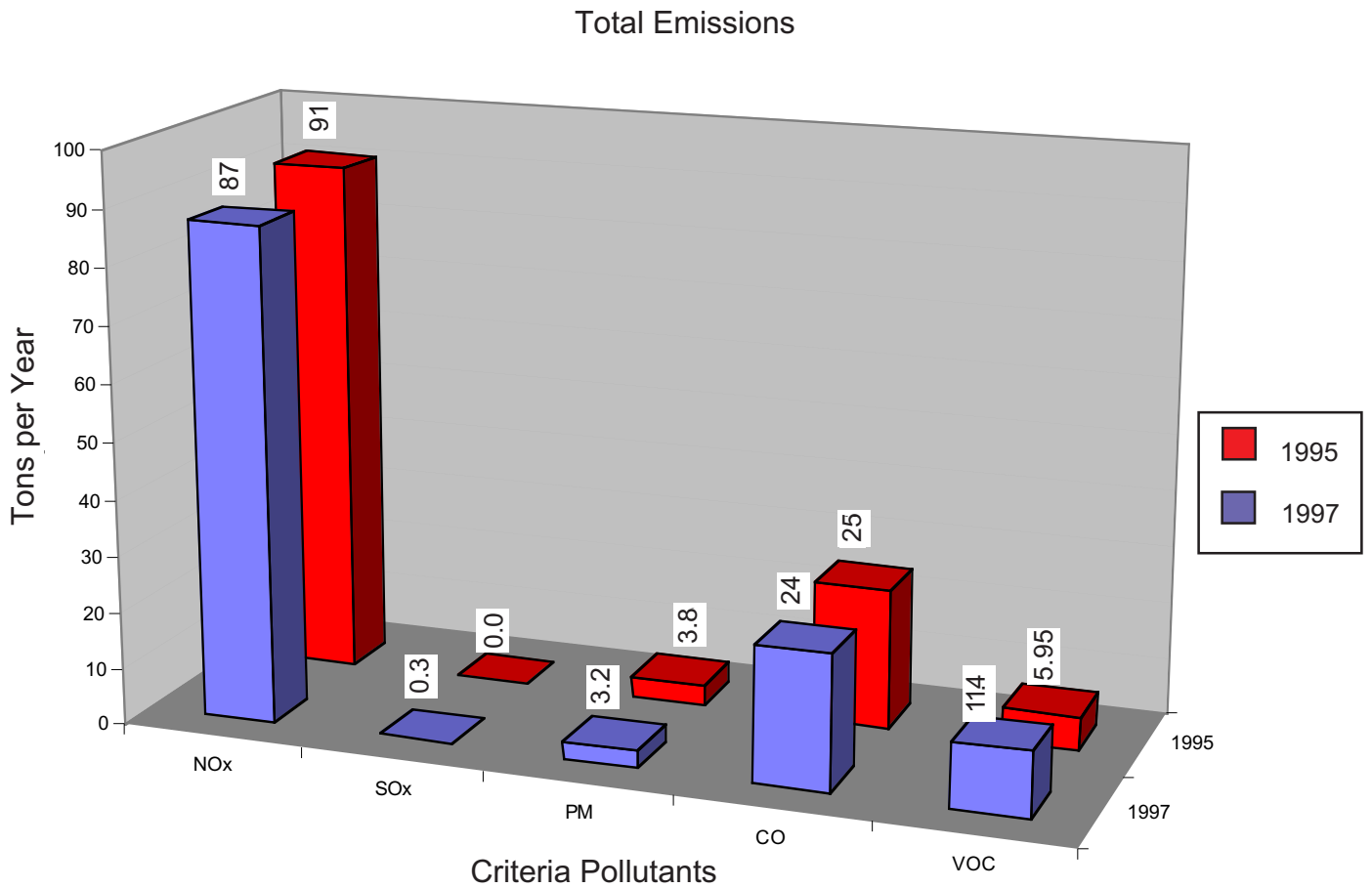


Figure 5. Criteria Pollutant Emissions Generated in 1995 and 1997

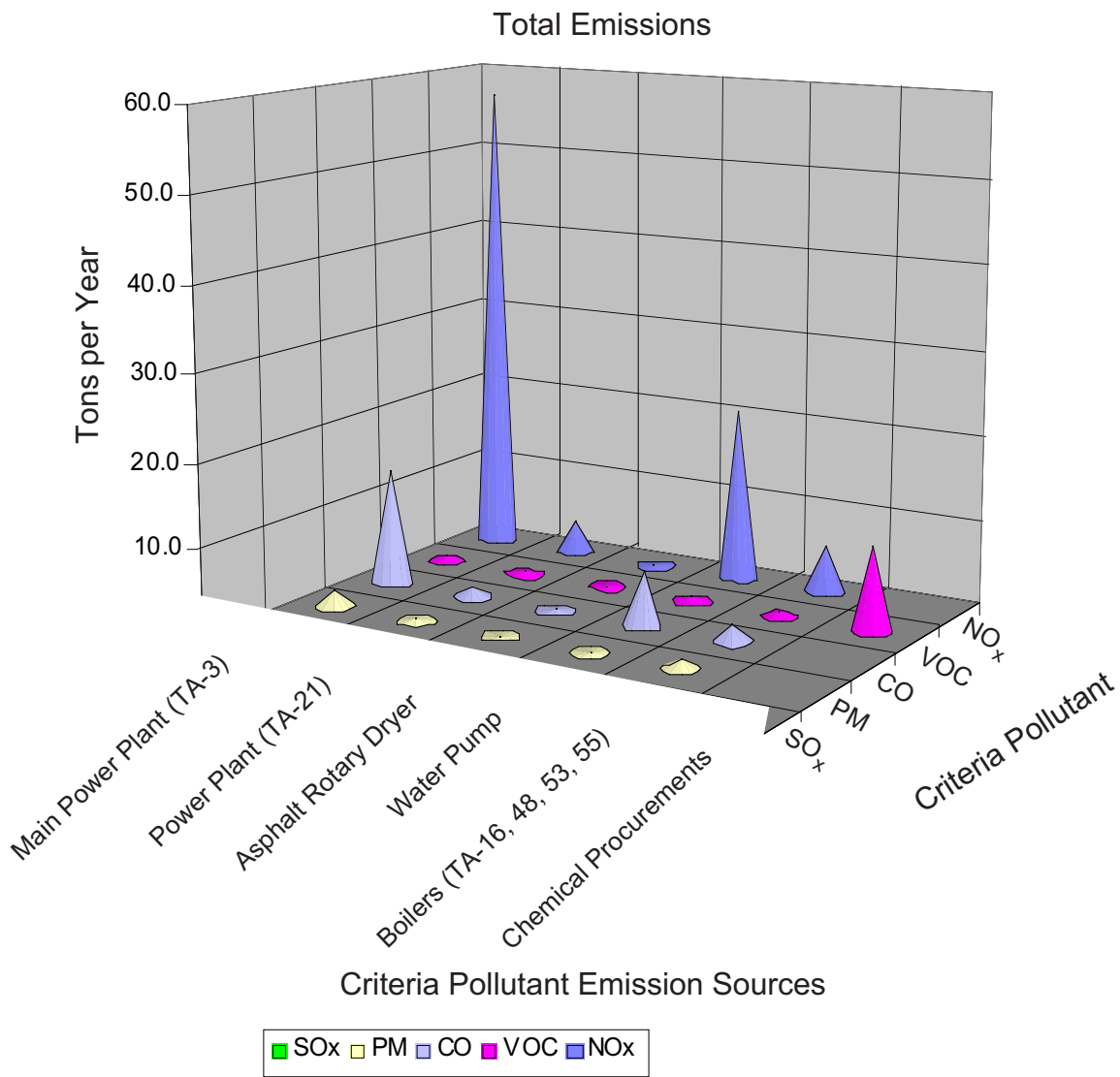


Figure 6. Criteria Pollutant Emissions by Source in 1997.

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