RECEIVED
AUG 12 1989
OSTI

*1997 Toxic Chemical Release Inventory Report
for the Emergency Planning and
Community Right-to-Know Act of 1986,
Title III, Section 313*

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.*

Editing and Photocomposition by Lynne Atencio, Group CIC-1

An Affirmative Action/Equal Opportunity Employer

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither The Regents of the University of California, the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by The Regents of the University of California, the United States Government, or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of The Regents of the University of California, the United States Government, or any agency thereof. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

*1997 Toxic Chemical Release Inventory Report
for the Emergency Planning and
Community Right-to-Know Act of 1986,
Title III, Section 313*

Heather McBride

TABLE OF CONTENTS

Tables.....	vi
Abstract.....	1
1.0 Introduction.....	1
2.0 Facility Information and Contacts	2
3.0 Exemptions.....	2
4.0 Activity Determinations	3
5.0 Production Operations.....	3
6.0 Toxic Chemical Analysis.....	4
7.0 Toxic Chemical Requiring Form R Submittal.....	6
Nitric Acid	6
8.0 Toxic Chemicals Reviewed with No Reporting Required.....	9
Chlorine.....	9
Sulfuric Acid	14
Beryllium.....	15
Lead.....	16
Cyanide and Nitrate Compounds.....	18
References	20

Appendix A: Toxic Chemical Purchasing and Receiving Data Analysis

Appendix B: Subcontractor Chemical Usage Data

Appendix C: Form R Reports for Nitric Acid

Appendix D: TANKS 3.1 Emission Reports for Nitric Acid

Appendix E: Toxic Chemical Use Threshold Data Summary

TABLES

6-1	EPCRA 313 Constituents from 137 Mixtures.....	5
7-1	Controlled Emissions from Plutonium Processing.....	7
7-2	Nitric Acid Operations in Plutonium Processing.....	8
8-1	Sewage Treatment Air Emissions.....	10
8-2	Power Plant Cooling Water Air Emissions	11
8-3	Cooling Tower Air Emissions.....	12
8-4	Drinking Water Treatment Air Emissions.....	13
8-5	Drinking Water Treatment Water Releases.....	13
8-6	Total Water Treatment Air Emissions.....	13
8-7	Chlorine Threshold Determinations.....	14
8-8	Lead Threshold Determination.....	17
8-9	Lead Emissions.....	18
8-10	Chemical Constituents	19
8-11	Cyanide Threshold Determination.....	20

1997 Toxic Chemical Release Inventory Report
for the
Emergency Planning and
Community Right-to-Know Act of 1986,
Title III, Section 313

Heather McBride

Abstract

The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), Title III, Section 313 [also known as the Superfund Amendment and Reauthorization Act (SARA)], as modified by Executive Order 12856, requires all federal facilities to submit an annual Toxic Chemical Release Inventory report every July for the preceding calendar year. Owners and operators of manufacturing, processing, or production facilities are required to report their toxic chemical releases to all environmental mediums (air, water, soil, etc.). At Los Alamos National Laboratory (LANL), nitric acid was the only toxic chemical used in 1997 that met the reportable threshold limit of 10,000 lb. Form R is the only documentation required by the Environmental Protection Agency, and it is included in the appendix of this report. This report, as requested by DOE, is provided for documentation purposes. In addition, a detailed description of the evaluation and reporting process for chemicals and processes at LANL has been included.

1.0 INTRODUCTION

The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), Title III, Section 313 [also known as the Superfund Amendment and Reauthorization Act (SARA)] requires the owners and operators of certain manufacturing, processing, or production facilities that use more than a threshold amount of any listed "toxic chemicals" to annually submit a Toxic Chemical Release Inventory Reporting Form ("Form R") for those chemicals.

In addition, Executive Order 12856, dated August 3, 1993, requires that beginning in 1995, all federal facilities, regardless of their standard industrial classification code, must report their toxic chemical use and resulting releases reflecting the previous year as required by

EPCRA 313. Under this order, Los Alamos National Laboratory (the Laboratory or LANL), which is owned by the Department of Energy (DOE), is required to report quantities of toxic chemicals used for manufacturing, processing, or production that are equal to or greater than 25,000 lb per year and quantities of 10,000 lb or more for toxic chemicals otherwise used. Toxic chemicals used in laboratory activities (laboratory exemption) or for certain facility maintenance activities (activity exemption) remain exempt from reporting requirements.

This report has been written to summarize the data evaluation, exemption analysis, activity determinations, threshold determinations, emissions estimates, and the reporting process. Appendix A is a list of the pure chemicals and their total amounts purchased, appendix B provides information about subcontractors' chemical usage, appendix C contains copies of the Form R report for nitric acid, appendix D contains copies of nitric acid emission reports from storage tanks, and appendix E summarizes the toxic chemical-use threshold data.

2.0 FACILITY INFORMATION AND CONTACTS

LANL is located at a latitude of 35°49'51" and a longitude of 106°14'15" in Los Alamos County, New Mexico. The Laboratory is owned by the DOE and is operated by the University of California (UC). The Laboratory's Toxic Release Inventory (TRI) facility ID number is 87545LSLMSLOSAL. The TRI facility number for the Los Alamos DOE complex is 87544SDLSL52835. The 1997 Form R contacts are Leland Maez, UC technical contact at (505) 665-1240; George Van Tiem, UC public contact at (505) 667-6211; Herbert Plum, DOE technical contact at (505) 665-5042; and Greg Sahd, DOE public contact at (505) 665-5025.

Johnson Controls Northern New Mexico (JCNNM) is the first-tier subcontractor for the Laboratory and performs many of the Laboratory's industrial and maintenance operations, including power generation, water purification, structural maintenance, facility grounds maintenance, and motor vehicle maintenance.

3.0 EXEMPTIONS

Activities that are exempt from toxic chemical reporting include the following:

Laboratory Exemption

- **Laboratory Activities**—Listed toxic chemicals that are manufactured, processed, or otherwise used in laboratory activities at a covered facility under the direct supervision of a technically qualified individual do not have to be considered for

threshold and release calculations. However, pilot plant scale and specialty chemical production do not qualify for this laboratory activities exemption.

Activity Exemptions

- otherwise use as a structural component of the facility;
- otherwise use in routine janitorial or facility grounds maintenance;
- personal uses by employees or other persons;
- otherwise use of products containing toxic chemicals for the purpose of maintaining motor vehicles operated by the facility; or
- otherwise use of toxic chemicals contained in intake water (used for processing or noncontact cooling) or in intake air (used either as compressed air or for combustion).

4.0 ACTIVITY DETERMINATIONS

Activities at the Laboratory are subject to reporting based on three different activity determinations as defined by EPCRA 313.

“Manufacture” means to produce, prepare, compound, or import a listed toxic chemical.

“Process” means the preparation of a listed section 313 chemical, after its manufacture, for distribution in commerce. Processing is usually the intentional incorporation of a section 313 chemical into a product.

“Otherwise Use” encompasses any activity involving a listed toxic chemical at a facility that does not fall under the definitions of “manufacture” or “process.” A chemical that is otherwise used by a facility is not intentionally incorporated into a product distributed in commerce.

Each of these activity determinations has a corresponding threshold. The thresholds for “manufacture” and “process” are each 25,000 lb, and the threshold for “otherwise use” is 10,000 lb.

5.0 PRODUCTION OPERATIONS

Most of the chemicals at LANL are used in research or for industrial-type operations such as power production or water purification. Three Laboratory activities that are considered to be production operations are power production, plutonium metal processing, and drinking water treatment.

LANL has the potential to generate electrical power for the entire LANL complex (Fig. 5-1). Power production activities involve the use of large quantities of sulfuric acid, an EPCRA 313 listed chemical. The sulfuric acid is used to maintain ionization columns that generate deionized water for steam production. In addition, chemicals are used in the cooling tower and are discussed further in section 8.

Fig. 5-1. One of several turbines at the Laboratory's power plant.

Plutonium metal processing has been considered a production-type operation in previous years for the purpose of EPCRA 313 Form R reporting, although most of the operations conducted at the plutonium processing facility involve projects related to actinide research. Nitric acid used to process plutonium metal has historically exceeded the 10,000 lb reporting threshold.

Drinking water treatment operations involve treating or purifying water to drinking water standards. About 60% of the water that is treated by the Laboratory's first-tier subcontractor JCNNM is sold to the community for drinking water. The remaining 40% remains on Laboratory property and is used for process activities and employees' personal use.

The operations described above represent some of the production-type operations conducted at the Laboratory. These operations were chosen as a starting point for determining EPCRA 313 reporting applicability because they can potentially use large amounts of chemicals but do not qualify for the exemptions. For operations that are known to use large amounts of chemicals, the site managers or chemical users are contacted about what quantities are used and in what processes they are used. The Automated Chemical Inventory System (ACIS), procurement records, and the records from individual contractors are also examined.

6.0 TOXIC CHEMICAL ANALYSIS

For this 1997 EPCRA 313 report, the ACIS was used to determine which chemicals were purchased above threshold-level quantities. The ACIS contains information such as quantity, delivery location, and user data. Purchase records were used to obtain additional chemical information for chemicals that were not included in the ACIS database. This procurement information is used to determine or verify the amount of toxic chemicals brought on-site in quantities of 10,000 lb or more.

A recent analysis compared 1996 ACIS procurement records against wall-to-wall inventory records. This analysis indicated that the ACIS is approximately 89% accurate in capturing the Laboratory's chemical inventory.

In addition to pure chemicals [chemicals having an identifiable Chemical Abstracts Service (CAS) number], over 1,534 different chemical mixtures (totaling 23,584 lb) were evaluated. Material Safety Data Sheets (MSDSs) for 137 (totaling 20,278 lb) of the 1,534 chemical mixtures were further analyzed to determine if the mixtures contained EPCRA 313 chemical components. The remaining 1,397 chemical mixtures (totaling 3,306 lb) were not evaluated.

The table in appendix A shows the pure EPCRA 313 chemicals from ACIS, and their associated total weights, that were procured by the Laboratory in 1997. Chemicals with large total weights—for example, nitric acid and chlorine—are discussed further in sections 7.0 and 8.0, respectively. The rest of the chemicals contribute quantities that are significantly below the most conservative threshold (10,000 lb for “otherwise used”) and are not discussed further.

Table 6-1 shows the quantity of EPCRA 313 chemical constituents that were present in the mixtures that were evaluated from 137 MSDSs. This table shows that the amount of toxic chemicals contained in the mixtures used at the Laboratory do not contribute significantly to the threshold value for reporting when they are added to the amount of pure chemicals purchased by the Laboratory (appendix A).

Table 6-1. EPCRA 313 Constituents from 137 Mixtures

Total Weight (lb)	Toxic Chemical	CAS Number
238.5	chlorodifluoro-methane	75456
153	2-chloro-1,1,1,2-tetrafluoroethane	2837890
99.5	dichlorofluoroethane	1717006
95.4	methylene chloride	75092
32.5	xylene	1330207
21	1,1,1-trichloroethane	71556
6.2	butyl alcohol	71363
5.88	glycol ether	111466
3.75	phenol	108952
3.16	o-dichlorobenzene	95501
2.9	1,2,4-trimethyl benzene	95636
1.35	methyl alcohol	67561
1.12	trichlorotrifluoroethane	76131

7.0 TOXIC CHEMICAL REQUIRING FORM R SUBMITTAL

Nitric Acid

A total of 7,067 lb of nitric acid was received by the Laboratory and used in 1997 for exempt operations (laboratory research, soil characterization activities, etc.). An additional 29,400 lb of nitric acid acquired from large purchases was used in plutonium processing activities. This amount does not fall under the manufacturing or processing activity determination; therefore, it falls under otherwise use and it exceeds the 10,000 lb reporting threshold. Consequently, nitric acid is reported on the Form R.

In addition to nitric acid, the plutonium processing facility used hydrofluoric and hydrochloric acids. However, only 8 lb of hydrofluoric acid and 2,307 lb of hydrochloric acid were used—well below the “otherwise use” reporting threshold of 10,000 lb.

The amount of nitric acid used in 1997 was approximately 30% lower than that used in 1996 because several processes were not operational in 1997.

To better determine nitric acid emissions, LANL conducted a source test in 1988.¹ During the test, processes using the most nitric acid were run at maximum operating conditions. Because the processes have not changed significantly since that test, the emission factors determined from the source test were applied to the 1997 usage quantity to calculate 1997 stack emissions. Mass balances and engineering judgment were used to estimate the emissions for several processes that used only small amounts of nitric acid and, therefore, were not tested. Nitric acid emissions from the storage tank (Fig. 7-1) were calculated with the EPA-provided software TANKS 3.1 (emissions report is located in appendix D). The emissions from the nitric acid storage tank totaled 9 lb. Table 7-1 shows the controlled emissions and the emission factors used for the estimates. Table 7-2 includes a description of the processes and the basis for the emissions factors.

On the Form R, numerical values are required in Part II, section 5.2, “Stack or Point Air Emissions,” and in Part II, section 8.6, “Quantity Treated On-Site.” The stack or point air emission estimate can be calculated by adding the total nitric acid controlled emissions from plutonium processing (from Table 7-1) to the total emissions from the storage tank (from page 5 in appendix D). This formula yields a total air emission of 720 lb.

Fig. 7-1. Nitric acid storage tank.

The quantity treated on-site is calculated by using the following mass balance:

$$\text{Quantity treated on-site} = \text{Amount of nitric acid used} - \text{Amount of nitric acid reacted to nitrogen oxide and nitrogen dioxide} - \text{Amount of air emissions}$$

The quantity treated on-site refers to only that quantity that is chemically converted or destroyed, according to guidance received from the EPA. Therefore, the quantity treated on-site is the total amount of liquid nitric acid waste that is neutralized.

Table 7-1. Controlled Emissions from Plutonium Processing

Process (Room No.)	HNO ₃ (lb)	Emission Factors (lb/lb)			Controlled Emissions (lb/yr)		
		Nitric Acid	Nitrogen Oxide	Nitrogen Dioxide	Nitric Acid	Nitrogen Oxide	Nitrogen Dioxide
Waste Immobilization (401)	274	0.0	0.001	0.0047	0.0	0.27	1.29
Cascade Dissolution (401)	1270	0.00136	0.00109	0.003	1.73	1.38	3.81
Cascade Dissolution (420)	8752	0.075	0.0099	0.095	656	86.6	831
Distillation (401) ^a	14647	0.0016	0.0012	0.0034	23.4	17.6	49.8
Alpha Counting (116)	77	0.0	0.015	0.0442	0.0	1.16	3.40
Anion Exchange (409)	18435	0.0012	0.0	0.0	22.1	0.0	0.0
ICP (106)	77	0.0	0.01	0.03	0.0	0.77	2.31
OH Cake Dissolution (409)	456	0.014	0.0069	0.019	6.38	3.15	8.66
Filtrate Concentration (209) ^a	31	0.0016	0.0012	0.0034	0.0496	0.0372	0.105
Metallography (115)	59	0.0099	0.0	0.0	0.584	0.0	0.0
TOTAL	29,400				711	111	900

^a Usage total does not include distillation of filtrate concentration processes, which uses recovered nitric acid from other processes.

Table 7-2. Nitric Acid Operations in Plutonium Processing

Process (Room)	Description	Emission Basis
Waste Immobilization (401)	Ammonia-containing chemical waste is stored in a glovebox for a few days prior to its neutralization and solidification with cement in open cans. Nitric acid is used to clean the glovebox and is left in the cement-containing cans to oxidize overnight. The cans are loaded in lead-lined drums and shipped to TA-54 for waste disposal.	99.14% of nitric acid remains in product. The difference converts to nitrogen oxide and nitrogen dioxide (Ref. 1).
Cascade Dissolution (401)	Plutonium oxide dissolved in 15.6 M of nitric acid with calcium difluoride at 96°C.	Use 1988 emission factors.
Cascade Dissolution (420)	Plutonium dioxide and magnesium oxide dissolved in 10 M of nitric acid at 100°C.	Use 1988 emission factors.
Distillation (401)	Waste nitric acid, ammonia, and water are condensed before disposal. The distillate is condensed in a one-shell, two-pass condenser and sent to TA-50. Bottoms are sent to TA-54 for disposal.	Use 1988 emission factors.
Alpha Counting (116)	Radioactive samples are dissolved in nitric acid and heated to 122°C during analytical processing.	87.59% of nitric acid remains in product or waste. The difference converts to nitrogen oxide and nitrogen dioxide (Ref. 1).
Anion Exchange (409)	Plutonium solution is passed through a resin bed after the pH and concentration is adjusted to 7 M using a 15.6-M solution of nitric acid.	Assume the volume of nitric acid used displaces an equal volume of air saturated with nitric acid.
Inductively Coupled Plasma (ICP) Atomic Emission Spectroscopy (106)	An 8-M nitric acid solution is used to dilute plutonium solution samples and as a blank standard for ICP analysis.	Lab personnel estimate 4% of the nitric acid remains in the plasma and is emitted as nitrogen oxides (Ref. 1).
OH Cake Dissolution (409)	Plutonium hydroxide precipitates from various plutonium recovery processes are filtered, concentrated, and redissolved.	Use "Scrap Dissolution and Plutonium Oxide Dissolution (209)" emission factors (1988).
Filtrate Concentration (209)	Plutonium hydroxide precipitates from various plutonium recovery processes are filtered, concentrated, and redissolved.	Use "Distillation (401)" emission factors (1988).
Metallography (115)	Cut plutonium samples are placed in a nitric acid etching solution to clean the cut surfaces.	Assume 1% evaporates, based on engineering judgement.

8.0 TOXIC CHEMICALS REVIEWED WITH NO REPORTING REQUIRED

Chlorine

The bulk of the chlorine at the Laboratory is used in water treatment (i.e., sewage, power plant process water, cooling tower water, and drinking water). In addition to the chlorine used to treat water, 18 lb were used in laboratory processes other than water treatment. The chemicals used in water treatment include chlorine gas, sodium chloride, and chlorine-bromine tablets. Each water treatment application is described below, along with its appropriate activity determination.

Sewage Treatment

The Sanitary Waste Systems Consolidations (SWSC) plant treated 108.401 million gallons of sewage in 1997 in the SWSC plant's new mixed oxide (MIOX) treatment system (Fig. 8-1).

Fig. 8-1. New MIOX system for treating sanitary waste.

A brine solution made from salt (sodium chloride) is passed through an electrolytic cell where it is converted into a strong oxidizing solution that is composed of hypochlorous acid, chlorine, chlorine dioxide, and ozone. Of these four chemicals, chlorine, chlorine dioxide, and ozone are listed as toxic chemicals under EPCRA 313. Although these mixed oxidants are generally 20% to 40% more effective than chlorine gas treatment, the MIOX system is estimated to be about 5% as efficient for treating water compared to chlorine treatment [i.e., procurement records indicate that approximately 95% more salt

(by weight) was required to provide the same treatment effect as was provided the previous year with chlorine gas].

Salt, a compound of sodium and chloride, is not reported on a Form R because it does not fall into any of the regulated compound categories, it is not a chemical mixture, and its CAS number, 7647-14-5, is not included with the listed toxic chemicals. However, the quantities of chlorine, chlorine dioxide, and ozone that are produced as byproducts of the process apply to the threshold for "manufacture." The estimated quantities of these oxidants were calculated from manufacturer's data and represent the maximum quantities that could be produced by the full capacity operation of the three cells in the SWSC plant's treatment system. Up to 10,950 lb of chlorine, 228 lb of chlorine dioxide, and

228 lb of ozone could be produced. Because these chemicals are produced in quantities less than the threshold of 25,000 lb, they are not discussed further.

In addition to the byproducts generated from the MIOX, additional air emissions are generated from the treatment of wastewater with the MIOX system. Chloroform emissions were calculated using the most conservative emission factor available. The chloroform air emissions are shown in Table 8-1. Data was not available from the MIOX manufacturer to estimate chlorine, chlorine dioxide, and ozone emissions. There was no chlorine released in water because the water is dechlorinated before its release from the SWSC plant.

Table 8-1. Sewage Treatment Air Emissions

Pollutant	Emission Factor	Reference	Emissions (lb/yr)
Chloroform	1.68×10^{-7} lb/1000 gal.	EPA-450/2-90-011 (Ref. 2)	12.7
Chlorine	NA	NA	Undetermined

Power Plant Cooling Water Treatment

The power plant (Fig. 8-2) treated 18.6 million gallons of cooling water in 1997 with approximately 2,750 lb of chlorine-bromine tablets (Formula 314-T).

Fig. 8-2. Power plant cooling tower.

The Formula 314-T tablets are considered to be a compound and are, therefore, not subject to EPCRA 313 reporting requirements because they do not fall into any of the regulated compound categories, they are not a mixture, and their CAS number, 126-06-7, is not included in the listed toxic chemicals. However, the quantities of chlorine and bromine produced as byproducts of the process apply to the threshold for “manufacture.” According to the manufacturer, small amounts of chlorine can be produced from the treated water by exposure to ultraviolet light or ozone.

The chlorine produced, however, would be less than 0.1% of the total tablets added. Therefore, less than 2.75 lb of chlorine (as Cl_2) would be produced from the use of the tablets. The amount of bromine (as Br_2) that would be produced is significantly less than 0.1%. Other byproducts—hypochlorous acid (7790-92-3), hypobromous acid (13517-11-8), and hypochlorite (14380-61-1)—are not regulated under EPCRA 313.

Air emissions are calculated and shown in Table 8-2. Bromoform, chlorine, and chloroform are all released as air pollutants from cooling water treatment. Water releases are not considered because the water is chemically dechlorinated before it is released from the power plant.

Table 8-2. Power Plant Cooling Water Air Emissions

Pollutant	Emission Factor	Reference	Emissions (lb/yr)
Chloroform	6.25 lb/ 10^6 gal. of cooling water	EPA-450/2-90-011(Ref. 2)	116
Chlorine	0.02 lb/lb of chlorine in water	Ref. 3	1.0
Bromine	0.02 lb/lb of bromine in water ^a	Ref. 3	1.3
Bromoform	2.95 lb/ 10^6 gal. of cooling water	Engineering calculations based on molecular weight	54.8

^a Assumed the bromine residual is the same as the chlorine residual.

Cooling Tower Water Treatment

According to procurement records, 2881.8 lb of Formula 314-T tablets were used to treat the cooling tower water at TA-53 (Fig. 8-3). If the same analysis is used for the cooling tower water treatment as was used above for the power plant cooling water treatment, less than 2.88 lb of Cl_2 will be produced from the use of the tablets. This quantity is also applied to the “manufacture” threshold.

Fig. 8-3. Cooling tower at TA-53.

Air emissions are calculated and shown in Table 8-3. Bromoform, chlorine, and chloroform are all released as air pollutants in this process. Water releases are not considered because water is dechlorinated before release.

Table 8-3. Cooling Tower Air Emissions

Pollutant	Emission Factor	Reference	Emissions (lb/yr)
Chloroform	6.25 lb/10 ⁶ gal. of cooling water	EPA-450/2-90-011 (Ref. 2)	156
Chlorine	0.02 lb/lb of chlorine in water	Ref. 3	1.4
Bromine	0.02 lb/lb of bromine in water ^a	Ref. 3	1.7
Bromoform	2.95 lb/10 ⁶ gal. of cooling water	Engineering calculations based on molecular weight	73.7

^a Assumed the bromine residual is the same as the chlorine residual.

Drinking Water Treatment

Approximately 1.389 billion gallons of drinking water were treated in 1997 using chlorine gas (Fig. 8-4). Los Alamos County purchased 0.827 billion gallons of the water (60% of the quantity treated) for community use as potable water. The total amount of chlorine gas used to treat the water was estimated to be 11,500 lb. This estimate is based on the ratio of chlorine used to water treated in 1996.

Fig. 8-4. Chlorine gas cylinders.

The use of 11,500 lb of chlorine is applied to two different thresholds. The chlorine in the drinking water that is sold to the community falls under “the intentional incorporation of a listed toxic chemical into a product for distribution to commerce,” so by definition, 60% of the chlorine used in drinking water treatment was “processed.” The remaining 40% of the chlorine in the water that remained for use at LANL was applied to the threshold for “otherwise used” because it does not fall under either the definition for “manufacture” or “process.”

Air and water emissions from drinking water treatment are shown in Tables 8-4 and 8-5. Table 8-6 shows the total air emissions for all processes. Chloroform is the only pollutant released from the process into the air, and the residual chlorine is left in the water to prevent bacteria from growing during transport to its final location.

Table 8-4. Drinking Water Treatment Air Emissions

Pollutant	Emission Factor	Reference	Emissions (lb/yr)
Chloroform	3.42×10^{-4} lb/1000 gal.	EPA-450/2-90-011 (Ref. 3)	475

Table 8-5. Drinking Water Treatment Water Releases

Pollutant	Emission Factor	Reference	Emissions (lb/yr)
Residual Chlorine Released	0.2 mg/L	Operating Data	1570

Table 8-6. Total Water Treatment Air Emissions

Treatment Type	Air Emissions (lb/yr)	
	Chloroform	Chlorine
Wastewater	12.7	Undetermined
Power Plant Cooling	116	1.0
Cooling Tower	156	1.4
Drinking	475	—
TOTALS	759.7	2.4

Table 8-7 reviews the threshold determinations for chlorine. Chemicals such as chloroform and bromine were not subjected to threshold determination because their quantities did not come close to the most conservative threshold of 10,000 lb. No reporting thresholds were exceeded; therefore, no reporting for chlorine was required.

Table 8-7. Chlorine Threshold Determinations

Activity	Threshold (lb)	Chlorine Usage (lb)	Treatment	Total Chlorine Usage (lb)
Otherwise Used	10,000	4,600	Drinking Water	4,618
		18	NA	
Manufacture	25,000	10,950	Sewage	10,956
		3	Cooling Tower	
		3	Power Plant	
Process	25,000	6,900	Drinking	6,900

Sulfuric Acid

In 1995 and 1996, LANL did not report sulfuric acid because the EPCRA 313 reporting guidelines stated sulfuric acid must be reported “*only if it is an aerosol.*” In 1997, the EPA provided a revision and new guidance on the reporting of sulfuric acid aerosols.⁴ The guidance document for the reporting of aerosols now states:

The amounts of acid aerosols generated in storage tanks are to be applied towards the ‘manufacture’ threshold for sulfuric acid aerosols. The amount of acid aerosol to be applied towards the ‘manufacture’ threshold is the average amount that existed in the atmosphere above the acid solution during the year.

The EPA also provided guidance on estimating sulfuric acid aerosol emissions from the combustion of fuel oil.⁴ It states:

All sulfuric acid produced within the stack, including the gas not just the mist, falls under the EPCRA section 313 definition of a sulfuric acid aerosol . . . Sulfuric acid aerosols are produced during fuel oil combustion from the oxidation of sulfur contained in the fuel.

Aerosol Tank Emissions

Estimated sulfuric acid tank emissions are based on tank size (4,500 gal.; Fig. 8-5.) and the number of volume turnovers per year (4). According to the EPA-approved TANKS 3.1 program, no emissions were generated. However, if conservative estimates based on vapor pressure, transport line volumes, and tank air space volumes are used, approximately 0.02 lb was emitted.

Fig. 8-5. Sulfuric acid tank.

Combustion Byproducts

Industrial-type sources (boilers, generators, etc.) of combustion byproducts at the Laboratory operate primarily on natural gas, although in one instance, fuel oil is available as backup. In 1997, the Laboratory's industrial sources were fueled exclusively with natural gas. The EPA guidance does not discuss or provide emission factors for sulfuric acid aerosol emissions from the combustion of natural gas. However, according to the Laboratory's emissions inventory,⁵ 572 lb of sulfur oxides were released into the air from the combustion of natural gas by industrial sources at the Laboratory. For this air emissions estimate, it was assumed that natural gas contains a maximum of 0.1% sulfur. If it is assumed that the sulfur oxide emissions were sulfuric acid aerosols "manufactured" as a byproduct of fuel consumption, then 572 lb were generated. Therefore, the total sulfuric acid aerosol emissions generated from tank off-gassing and the combustion of natural gas was 572.02 lb and was below reporting requirements.

Beryllium

The Laboratory processed approximately 6,000 lb of beryllium. The reporting threshold for "processing" under EPCRA 313 is 25,000 lb; therefore, it was below reporting requirements.

Lead

Decontamination of Lead Shielding

The Laboratory decontaminated 40,000 lb of radioactively contaminated lead shielding (Fig. 8-6). This treatment of lead qualifies for an “article exemption” on the following basis:⁶

... it is formed to a specific shape or design during manufacture, that has end use functions dependent in whole or in part upon its shape or design during end use, and that do not release a toxic chemical under normal circumstances of processing or otherwise use of the item at the facility.

Fig. 8-6. Lead decontamination site.

Note: The decontamination of the lead removes only the radioactive contamination and does not change the form of the lead.

There were no emissions of lead into the air since decontamination is a wet operation. The total estimated release of lead to waste is 6 g (0.013 lb), well below the 0.5 lb “article exemption” release allowance. Form R instructions⁶ state:

EPA will allow this release to be rounded to zero, and the manufactured items remain exempt as articles.

Lead Shot at the Firing Range

Approximately 5,000 lb of lead contained in ammunition was shot at the firing range. This amount was applied to the “otherwise used” threshold of 10,000 lb.

Lead Melting

Approximately 5,100 lb of lead was melted and formed into specific shapes for glove box and exposure shielding. Lead melting as an activity is applied to the "process" threshold, based on the guidance provided by the EPA to DOE facilities in the Department of Energy Toxic Chemical Release Inventory Reporting "*Qs & As.*"⁷ Questions 34 and 37 apply to the lead-melting activities and the appropriate threshold determination. The questions and answers read as follows:

34. Lead shielding was used in the transportation of nuclear warheads. The lead shields are being recycled into containers for radioactive waste storage. Would the lead from the shields be exempt from TRI reporting under the article exemption?

No. Melting and reforming the lead shields to form storage containers would constitute manufacturing of an article, which negates the article exemption for the lead shield. Because the lead is intentionally incorporated into the radioactive waste storage containers, the lead is processed and subject to the 25,000 lb. threshold.

37. What is the difference between "process" and "otherwise use"?

"Process" implies incorporation; the chemical added is intended to become part of a product further distributed. "Otherwise use" implies non-incorporation; the chemical is not intended to become part of a product (e.g., use of toxic chemicals in the remediation of wastes is an "otherwise use" activity).

Lead Procurement

Approximately 11.18 lb of lead was procured, according to the ACIS database. This amount of lead was applied to the "otherwise used" threshold determination. The reporting threshold for "otherwise used" under EPCRA 313 is 10,000 lb.

The thresholds for the different activity determinations involving lead are listed in Table 8-8. A comparison to the threshold determinations reveals that reporting is not required.

Table 8-8. Lead Threshold Determination

Usage	Activity	Threshold (lb)	Lead (lb)
Decontamination	Article Exemption	NA	40,000
Firing Range	Otherwise Used	10,000	5,011
Miscellaneous Lab Activities	Otherwise Used	10,000	11
Melting	Process	25,000	5,100

Lead emissions for each of the three Laboratory uses are shown in Table 8-9.

Table 8-9. Lead Emissions

Lead Usage	Emission Factor	Emissions (lb/yr)	Emission Type
Decontamination	Engineering Calculation ^a	0.013	Solid/Water
Firing Range	2×10^{-5} lb/cartridge ^b	14.15	Air
Melting	1.5 lb/ton (Ref. 8)	3.83	Air

^a This calculation was performed by Leland Maez and was based on process information given by the user, Myrna Romero (5-2069) at CST-7.

^b All ammunition was standardized to cartridges. In the event specific conversion data was not available, the worst case conversion was assumed.

Cyanide and Nitrate Compounds

Explosives

Explosives were evaluated because many contain nitrates and/or cyanides that are regulated by EPCRA 313. Explosives data from project operations journals were used to determine the types and amounts of explosives detonated and burned at the Laboratory because explosives are not captured in the ACIS database.

Nitrates

Nitrate compounds are reportable only when in aqueous solutions, according to the EPCRA 313, Toxic Chemical Release Inventory instructions:⁶

Nitrate compounds (water dissociable; reportable only when in aqueous solution) . . .

The nitrate components that are part of or produced from the Laboratory's explosives activities are not in aqueous solutions.

According to procurement data, additional nitrate compounds used at the Laboratory totaled 1,108 lb. This total was applied to the "otherwise used" threshold determination for nitrate compounds. The reporting threshold for "otherwise used" is 10,000 lb; therefore, reporting is not required.

Cyanides

Cyanide compounds at the Laboratory were investigated according to EPCRA 313 guidance for both “otherwise used” and “manufactured” thresholds. The compounds would be classified as “otherwise used” if they were brought on-site and already contained cyanides as a chemical component of the explosives. However, a review of the chemicals contained in the explosives revealed that they do not contain cyanide compounds as defined by the EPCRA 313 instructions:⁶

Cyanide Compounds, X^+CN^- where $X = H^+$ or any other group where a formal dissociation may occur. For example KCN or $Ca(CN)_2$.

The chemical constituents reviewed are shown in Table 8-10.

Table 8-10. Chemical Constituents

Chemical Constituent
Hexahydro-1,3,5-trinitro-1,3,5-triazine
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
Polyurethane solution system
Bis(2,2-dinitropropyl)acetal/bis(2,2-dinitropropyl) formal (plasticizer)
2-Methyl-1,3,5-trinitrobenzene
Barium nitrate
1,1-(1,2-Ethenediyl) bis-(2,4,6-trinitrobenzene)
2,2-Bis[(nitroxy) methyl]-1,3-propanediol, dinitrate
2,4,6-Trinitro-1,3,5-benzenetriamine
N-methyl-N,2,4,6-tetranitrobenzenamine

Also classified under the threshold determination of “otherwise used” would be the cyanide compounds used for other “laboratory activities.” Approximately 65 lb of cyanides were used for other activities and were evaluated against the “otherwise used” reporting threshold of 10,000 lb.

The 25,000 lb “manufacture” threshold for reporting was applied to all cyanides produced from explosive activities. Approximately 219 lb of cyanides were “manufactured” from 15,070 lb of explosives; therefore, reporting is not required (Table 8-11).

Table 8-11. Cyanide Threshold Determination

Activity	Threshold (lb)	Cyanide (lb)	Usage
Manufactured	25,000	219	Explosives
Otherwise Used	10,000	65	Laboratory Activities

REFERENCES

1. PEI Associates, "Process Emission Rates, Plutonium Processing Facility, Area 400 Ventilation Exhaust, Technical Area 55," PN 3003-26-7 (February 1989).
2. U.S. Environmental Protection Agency, "Toxic Air Pollutant Emission Factors—A Compilation for Selected Air Toxic Compounds and Sources, Second Edition," EPA-450/2-90-011 (1990).
3. California Air Resources Board, "Cooling Tower Supplemental Instructions, Emission Inventory Criteria and Guidelines Regulation," June 1, 1989.
4. U.S. Environmental Protection Agency, "Guidance for Reporting Sulfuric Acid (Acid Aerosols Including Mists, Vapors, Gas, Fog, and Other Airborne Forms of Any Particle Size)," in "EPCRA, Section 313," EPA-745-R-97-007 (1997).
5. "Emissions Inventory Report Summary," Los Alamos National Laboratory report LA-13528-SR (January 1999).
6. U.S. Environmental Protection Agency, "Toxic Chemical Release Inventory Reporting Form R and Instructions," Revised 1997, EPA 745-K-98-001, p. 9.
7. Department of Energy, "Toxic Chemical Release Inventory Reporting 'Qs & As,'" DOE/EH-0374 (March 1994).
8. U.S. Environmental Protection Agency, "Compilation of Air Pollutant Emission Factors (AP-42), Fifth Edition," [Air CHIEF CD-ROM], (1995).

APPENDIX A

TOXIC CHEMICAL PURCHASING AND RECEIVING DATA ANALYSIS

Pure EPCRA 313 Chemicals from ACIS in Descending Order by Weight

Total Weight (lb)	TRI Chemicals	CAS Numbers
11223.58	CHLORINE	7782505
7066.84	NITRIC ACID	7697372
5933.21	HYDROCHLORIC ACID	7647010
3088.70	METHYL ETHYL KETONE	78933
2450.70	ETHYLENE GLYCOL	107211
2095.15	METHANOL	67561
1942.95	CHLORODIFLUOROMETHANE	75456
1690.83	DICHLOROMETHANE	75092
1542.02	BROMINE	7726956
1478.07	2-PROPANOL (2-PROPANOL, ANHYDROUS) (ISOPROPANOL)	67630
1328.60	ACETONITRILE	75058
1306.48	1,1,1-TRICHLORETHANE	71556
986.52	PHOSPHORIC ACID 85%	7664382
678.51	CHLOROFORM	67663
606.88	HYDROGEN SULFIDE	7783064
599.48	ALPHA ALUMINUM OXIDE	1344281
484.94	SULFURIC ACID	7664939
425.35	TOLUENE	108883
326.46	AMMONIA, 7N IN METHANOL	7664417
255.07	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76131
236.09	ALUMINUM	7429905
200.41	HYDROFLUORIC ACID	7664393
170.64	PHOSPHINE	7803512
143.97	BENZENE	71432
120.77	1,1,2-TRICHLOROETHANE	79005
108.64	PROPYLENE	115071
94.28	ETHYLENE DICHLORIDE	107062
74.32	N,N-DIMETHYLFORMAMIDE	68122
49.23	MERCURY	7439976
46.11	CYCLOHEXANE	110827
41.13	DICHLORODIFLUOROMETHANE	75718
39.88	1,4-DIOXANE	123911
38.81	XYLENE	1330207
30.16	STYRENE MONOMER, INHIBITED	100425

Total Weight (lb)	TRI Chemicals	CAS Numbers
28.83	PYRIDINE	110861
28.68	BROMOFORM	75252
28.66	1-METHYL-2-PYRROLIDINONE	872504
25.86	CHLORSULFURON	64902723
25.84	N-BUTYL ALCOHOL	71363
23.44	COPPER	7440508
22.85	CARBON TETRACHLORIDE	56235
20.44	FORMIC ACID 88%	64186
20.12	LEAD	7439921
19.38	TRICHLOROETHYLENE	79016
18.42	CARBON DISULFIDE	75150
18.11	FORMALDEHYDE SOLUTION	50000
16.09	4-NITROPHENOL	100027
16.02	ETHYLENE	74851
14.51	DIETHANOLAMINE	111422
13.35	MOLYBDENUM (VI)OXIDE	1313275
12.57	COLLODIAL SILVER	7440224
11.88	TITANIUM TETRACHLORIDE	7550450
11.78	TRIETHYLAMINE	121448
9.23	DIBUTYL PHTHALATE	84742
8.82	HYDROQUINONE	123319
8.27	1,2,3-TRICHLOROPROPANE	96184
8.23	ZINC	7440666
7.99	COBALT	7440484
7.96	PHENOL	108952
7.72	NICKEL	7440020
7.50	HEXANE	110543
6.80	P-XYLENE	106423
5.64	ANTIMONY	7440360
5.62	O-DICHLOROBENZENE	95501
5.29	METHYL ISOBUTYL KETONE	108101
5.28	1,1,2,2-TETRACHLOROETHANE	79345
5.06	METHYL TERT-BUTYL ETHER	1634044
4.98	ACRYLAMIDE	79061
4.98	LITHIUM CARBONATE	554132
4.52	BENZYL CHLORIDE	100447

Total Weight (lb)	TRI Chemicals	CAS Numbers
4.42	HEXAMETHYLPHOSPHORAMIDE	680319
3.97	ETHYL ACRYLATE	140885
3.97	METHYL IODIDE	74884
3.67	CHLOROBENZENE	108907
3.65	TERT-BUTYL ALCOHOL	75650
3.38	THALLIUM 10MG/ML IN 10% NITRIC ACID	7440280
3.31	MANGANESE	7439965
3.19	CHROMIUM	7440473
3.15	SELENIUM	7782492
2.43	NAPHTHALENE	91203
2.26	SODIUM AZIDE	26628228
2.20	MALEIC ANHYDRIDE	108316
2.20	BORON TRIFLUORIDE	7637072
2.20	O-XYLENE	95476
2.13	2-METHOXYETHANOL	109864
2.07	VINYL ACETATE	108054
1.92	M-XYLENE	108383
1.91	ETHYLBENZENE	100414
1.91	CADMIUM 10MG/ML IN 10% NITRIC ACID	7440439
1.87	CHLOROACETIC ACID	79118
1.87	BENZOYL PEROXIDE	94360
1.85	ACROLEIN, INHIBITED	107028
1.66	1,2,4-TRICHLOROBENZENE	120821
1.47	DIMETHYL SULFATE	77781
1.37	ANILINE	62533
1.30	ARSENIC STANDARD 10MG/ML 15%NITRIC ACID	7440382
1.10	SODIUM NITRITE	7632000
1.10	2-NITROPROPANE	79469
1.10	METHYL CHLOROFORMATE	79221
1.10	METHYLENE BISPHENYL ISOCYANATE	101688
1.05	BARIUM 99%	7440393
0.99	PROPYLENE OXIDE	75569
0.82	VANADIUM	7440622
0.78	2,4-DINITROTOLUENE	121142
0.77	URETHANE	51796
0.75	BROMOMETHANE 2.0 M IN ETH	74839

Total Weight (lb)	TRI Chemicals	CAS Numbers
0.56	ETHYLENE DIBROMIDE	106934
0.55	DINITRO-ORTHO-CRESOL	534521
0.55	ACETONE CYANOHYDRIN, STABILIZED	75865
0.54	GRAM SAFRANIN	77736
0.54	PROPARGYL ALCOHOL	107197
0.53	METHYL ACRYLATE, INHIBITED	96333
0.46	O-ANISIDINE	90040
0.44	HEXAMETHYLENE DIISOCYANATE	822060
0.44	THIOUREA	62566
0.44	3-CHLORO-2-METHYLPROPENE	563473
0.43	ACETALDEHYDE	75070
0.42	N,N-DIMETHYLANILINE	121697
0.38	2-ETHOXYETHANOL	110805
0.35	ISOBUTYLALDEHYDE	78842
0.28	ACETAMIDE	60355
0.23	O-CRESOL	95487
0.23	ALLYL CHLORIDE	107051
0.22	CHLOROMETHANE	74873
0.22	ALLYLAMINE	107119
0.22	PHOSPHORUS LUMP RED ION IMPLANTATION GR.	7723140
0.22	CHLOROMETHYL METHYL ETHER	107302
0.22	PICRIC ACID (2,4,6-TRINITROPHENOL)	88891
0.22	QUINONE	106514
0.22	CHLOROETHANE	75003
0.22	RHODAMINE B	81889
0.22	IRON PENTACARBONYL	13463406
0.22	RHODAMIN 6G	989388
0.19	ACRYLONITRILE	107131
0.19	ALLYL ALCOHOL	107186
0.14	FLUORINE 10% IN NITROGEN	7782414
0.13	BERYLLIUM	7440417
0.12	2,4,6-TRICHLOROPHENOL	88062
0.11	1,4-PHENYLENEDIAMINE	106503
0.11	2,6-DINITROTOLUENE	606202
0.11	BISPHENOL	80057
0.11	THORIUM DIOXIDE	1314201

Total Weight (lb)	TRI Chemicals	CAS Numbers
0.10	CYCLOHEXANOL	108930
0.07	1,3-DICHLOROPROPENE	542756
0.07	2,3-DICHLORO-1-PROPENE	78886
0.06	BETA-PROPIOLACTONE	57578
0.06	BIPHENYL	92524
0.06	1,2-DIPHENYLHYDRAZINE	122667
0.06	P-PHENYLENEDIAMINE DIHYDROCHLORIDE	624180
0.06	2,2-BIOXIRANE	1464535
0.06	NITRAPYRIN	1929824
0.02	BORON TRICHLORIDE 10% WT	10294345
0.02	P-CRESOL	106445
0.02	STYRENE OXIDE	96093
0.02	2,4-DIMETHYLPHENOL	105679
0.01	PENTACHLOROPHENOL	87865
0.01	2-NITROPHENOL	88755
0.01	2-METHYL-5-NITROANILINE [5-NITRO-O- TOLUIDINE]	99558
0.01	P-ANISIDINE	104949
0.01	1,1,1,2-TETRACHLOROETHANE	630206
0.01	2,4-DINITROPHENOL	51285
0.01	M-DINITROBENZENE	99650
0.01	3,3'-DIMETHOXYBENZIDINE	119904
0.01	2,4-DICHLOROPHENOL	120832
0.01	2-AMINO-4,6-DINITROTOLUEN	98953
0.00	BROMODICHLOROMETHANE	75274
0.00	BIS(2-CHLOROETHOXY)METHANE	111911
0.00	BIS(2-ETHYLHEXYL)PHTHALATE	117817
0.00	OSMIUM (VIII) OXIDE	20816120
0.00	1,1-DICHLOROETHANE	75343
0.00	BENZO(A)PYRENE	50328

APPENDIX B

SUBCONTRACTOR CHEMICAL USAGE DATA

LANL SUBCONTRACTOR'S ON-SITE CHEMICAL USE FOR 1997

Subcontractor	Chemical Type and Usage	Was Chemical Use Included in LANL's Chemical Inventory?	Subcontractor Contact/ Comments
SAIC	None	N/A	Carmella Romero
Weston	None	N/A	Pat Medina
Radian	None	N/A	Cindy Backlund
ICF Kaiser	Nitric Acid	Yes	Loraine Rios
ERM Golder	Methanol 1 gal Sulfuric acid 1 gal Hydrochloric acid 1 gal Nitric acid 1 gal Hydrogen cyanide 2 ml Isopropyl alcohol 1 gal	Yes	Jim Santo Mary Frank
JCNNM	Sulfuric acid 7,724 gal Chlorine 11,500 lb	Yes	Suzanne Moore
LATA	None	N/A	Bob Hull
Butler	None	N/A	Steve Garcia
IT	None	N/A	Glenn VanDerpoel
Merrick	None	N/A	Kirk Ellard
Weirich	None	N/A	Joanne Volak
The Plus Group	None	N/A	Ken Kollecker
Benchmark	None	N/A	Ed Horst
Com Force (Ray Rashkin)	None	N/A	Karen Neeley
Techlaw Inc.	None	N/A	Pat Shanley
Fire Department	Fire Suppressant Foam 25 gal	N/A	Juan Pacheco
Bectel	None	N/A	Bob Parks or John Sutton

APPENDIX C

FORM R REPORTS FOR NITRIC ACID

EPAUnited States
Environmental Protection
Agency**FORM R****TOXIC CHEMICAL RELEASE
INVENTORY REPORTING FORM**Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986,
also known as Title III of the Superfund Amendments and Reauthorization Act

WHERE TO SEND COMPLETED FORMS: 1. EPCRA Reporting Center
P.O. Box 3348
Merrifield, VA 22116-3348
ATTN: TOXIC CHEMICAL RELEASE INVENTORY

2. APPROPRIATE STATE OFFICE
(See instructions in Appendix F)

Enter "X" here if this
is a revision

For EPA use only

Important: See instructions to determine when "Not Applicable (NA)" boxes should be checked.**PART I. FACILITY IDENTIFICATION INFORMATION****SECTION 1. REPORTING YEAR 1997****SECTION 2. TRADE SECRET INFORMATION**

2.1 Are you claiming the toxic chemical identified on page 3 trade secret?
☐ Yes. (Answer question 2.2;
Attach substantiation forms) ☒ No (Do not answer 2.2;
Go to Section 3)

2.2 Is this copy: ☐ Sanitized ☐ Unsanitized
(Answer only if "YES" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted
information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates
using data available to the preparers of this report.

Name and official title of owner/operator or senior management official:
DOUGLAS STAVERT ACTING AIR QUALITY GROUP LEADER

Signature:

Date Signed:

06/26/98

SECTION 4. FACILITY IDENTIFICATION

TRI Facility ID Number
87545LSLMSLOSAL

4.1 Facility or Establishment Name
LOS ALAMOS NATIONAL LABORATORY

Facility or Establishment Name or Mailing Address (if different from street address)

Street
P.O. BOX 1663

Mailing Address
LOS ALAMOS AREA OFFICE

City/County/State/Zip Code

LOS ALAMOS LOS ALAMOS NM 87545-1663

City/County/State/Zip Code

LOS ALAMOS NM 87544-0000

4.2 This report contains information for:
(Important check a or b; check c if applicable) a. ☒ An entire facility b. ☐ Part of a facility c. ☒ A Federal facility

4.3 Technical Contact Name
LELAND MAEZ

Telephone Number (include area code)
(505) 665 - 1240

4.4 Public Contact Name
GEORGE VAN TIEM

Telephone Number (include area code)
(505) 667 - 6211

4.5 SIC Code (s) (4 digits) a. 9711 b. c. d. e. f.

4.6 Latitude Degrees Minutes Seconds Longitude Degrees Minutes Seconds
035 49 51 106 14 15

4.7 Dun & Bradstreet Number(s) (9 digits) a. NA b. NA

4.8 EPA identification Number (RCRA I.D. No.) (12 characters) a. NM0890010515 b. NA

4.9 Facility NPDES Permit Number(s) (9 characters) a. NM0028355 b. NM0028576

4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits) a. NA b.

SECTION 5. PARENT COMPANY INFORMATION

5.1 Name of Parent Company ☐ NA U.S. DEPARTMENT OF ENERGY

5.2 Parent Company's Dun & Bradstreet Number ☒ NA

EPA FORM R PART II. CHEMICAL-SPECIFIC INFORMATION	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">TRI FACILITY ID NUMBER</td> </tr> <tr> <td style="padding: 2px;">87545LSLMSLOSAL</td> </tr> <tr> <td style="padding: 2px;">Toxic Chemical, Category or Generic Name</td> </tr> <tr> <td style="padding: 2px;">NITRIC ACID</td> </tr> </table>	TRI FACILITY ID NUMBER	87545LSLMSLOSAL	Toxic Chemical, Category or Generic Name	NITRIC ACID
TRI FACILITY ID NUMBER					
87545LSLMSLOSAL					
Toxic Chemical, Category or Generic Name					
NITRIC ACID					

SECTION 1. TOXIC CHEMICAL IDENTITY	(Important: DO NOT complete this section if you complete Section 2 below.)
---	--

1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.) 007697372
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.) NITRIC ACID
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "yes". Generic Name must be structurally descriptive) NA

SECTION 2. MIXTURE COMPONENT IDENTITY	(Important: DO NOT complete this section if you complete Section 1 above.)
--	--

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.) NA
-----	--

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY (Important: Check all that apply.)

3.1 Manufacture the toxic chemical: a. ☐ Produce b. ☐ Import If produce or import: c. ☐ For on-site use/processing d. ☐ For sale/distribution e. ☐ As a byproduct f. ☐ As an impurity	3.2 Process the toxic chemical: a. ☐ As a reactant b. ☐ As a formulation component c. ☐ As an article component d. ☐ Repackaging	3.3 Otherwise use the toxic chemical: a. ☐ As a chemical processing aid b. ☐ As a manufacturing aid c. ☒ Ancillary or other use
---	---	---

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1	04	(Enter two-digit code from instruction package.)
-----	----	--

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

			A.Total Release (pounds/year)(enter range from instructions or estimate.	B. Basis of estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	NA ☒	NA		
5.2	Stack or point air emissions	NA ☐	720	0	
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
	Stream or Water Body Name				
5.3.1	NA				
5.3.2					
5.3.3					
5.4.1	Underground Injection on-site to Class I Wells	NA ☒	NA		
5.4.2	Underground injection on-site to Class II-V Wells	NA ☒	NA		

EPA FORM R PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)		TRI FACILITY ID NUMBER 87545LSLMSLOSAL	
		Toxic Chemical, Category, or Generic Name NITRIC ACID	
SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM			
		NA	A. Total Release (pounds/year) (enter range code from instructions or estimate)
			B. Basis of Estimate (enter code)
5.5	Disposal to land on-site		
5.5.1A	RCRA Subtitle C landfills	☒	NA
5.5.1B	Other landfills	☒	NA
5.5.2	Land treatment/application farming	☒	NA
5.5.3	Surface Impoundment	☒	NA
5.5.4	Other disposal	☒	NA
SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS			
6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)			
6.1.A Total Quantity Transferred to POTWs and Basis of Estimate			
6.1.A.1. Total Transfers (pounds/year) (enter range code or estimate)		6.1.A.2 Basis of Estimate (enter code)	
NA			
6.1.B.1	POTW Name NA		
POTW Address			
City		State	
County		Zip	
6.1.B.2	POTW Name		
POTW Address			
City		State	
County		Zip	
If additional pages of Part II, Section 6.1 are attached the total number of pages in this box <input type="text" value="1"/> and indicate which Part II, Section 6.1 page this is here <input type="text" value="1"/> (example: 1,2,3, etc.)			
SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS			
6.2.1 OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)		NA	
Off-Site Location Name		NA	
Off-Site Address			
City		State	
County		Zip	
Is location under control of reporting facility or parent company? ☐ Yes ☐ No			

EPA FORM R PART II CHEMICAL - SPECIFIC INFORMATION (CONTINUED)						TRI FACILITY ID NUMBER 87545LSLMSLOSAL			
						Toxic Chemical, Category or Generic Name NITRIC ACID			
SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (continued)									
A. Total Transfers (pound/year) (enter range code or estimate)			B. Basis of Estimate (enter code)			C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)			
1.			1.			1.			
2.			2.			2.			
3.			3.			3.			
4.			4.			4.			
6.2 <u>2</u> OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)									
Off-Site location Name									
Off-Site Address									
City		State		County		Zip			
Is location under control of reporting facility or parent company?						☐ Yes	☐ No		
A. Total Transfers (pound/year) (enter range code or estimate)			B. Basis of Estimate (enter code)			C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)			
1.			1.			1.			
2.			2.			2.			
3.			3.			3.			
4.			4.			4.			
SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY									
☐ Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.									
a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3-character code(s)]				c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data		
7A.1a	7A.1b	1	C11	2	NA	7A.1c	7A.1d	7A.1e	
W	3		4		5	1	100 %	Yes	No
	6		7		8			☐	☒ X
7A.2a	7A.2b	1	A03	2	NA	7A.2c	7A.2d	7A.2e	
A	3		4		5	3	70 %	Yes	No
	6		7		8			☐	☒ X
7A.3a	7A.3b	1	A02	2	NA	7A.3c	7A.3d	7A.3e	
A	3		4		5	3	50 %	Yes	No
	6		7		8			☐	☒ X
7A.4a	7A.4b	1	A03	2	NA	7A.4c	7A.4d	7A.4e	
A	3		4		5	3	50 %	Yes	No
	6		7		8			☐	☒ X
7A.5a	7A.5b	1		2		7A.5c	7A.5d	7A.5e	
	3		4		5		%	Yes	No
	6		7		8			☐	☐
If additional pages of Part II, Section 6.2/7A are attached, indicate the total number of pages in this box <input type="text" value="1"/> and indicate which page(of Part II, Section 6.2/7A) is provided here: <input type="text" value="1"/> (example: 1,2,3, etc)									

EPA FORM R PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)				TRI FACILITY ID NUMBER 87545LSLMSLOSAL	
				Toxic Chemical, Category or Generic Name NITRIC ACID	
SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES					
☒ Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.					
Energy Recovery Methods [enter 3-character code(s)]					
1	NA	2		3	
SECTION 7C. ON-SITE RECYCLING PROCESSES					
☒ Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.					
Recycling Methods [enter 3-character code(s)]					
1.	NA	2.		3.	
4.		5.		6.	
7.		8.		9.	
10.					
SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES					
All quantity estimates can be reported using up to two significant figures.		Column A Prior Year (pounds/year)	Column B Current Reporting Year (pounds/year)	Column C Following Year (pounds/year)	Column D Second Following Year (pounds/year)
8.1	Quantity released *	730	720	720	720
8.2	Quantity used for energy recovery on-site	NA	0	0	0
8.3	Quantity used for energy recovery off-site	NA	0	0	0
8.4	Quantity recycled on-site	NA	0	0	0
8.5	Quantity recycled off-site	NA	0	0	0
8.6	Quantity treated on-site	1555	26600	26600	26600
8.7	Quantity treated off-site	NA	0	0	0
8.8	Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year)			0	
8.9	Production ratio or activity index			0000.70	
8.10	Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.				
	Source Reduction Activities [enter code(s)]	Methods to Identify Activity (enter codes)			
8.10.1	NA	a.	b.	c.	
8.10.2		a.	b.	c.	
8.10.3		a.	b.	c.	
8.10.4		a.	b.	c.	
8.11	Is additional information on source reduction, recycling, or pollution control activities included with this report? (Check one box)			YES ☐	NO ☒

* Report releases pursuant to EPCRA Section 329(8) including, any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment." Do not include any quantity treated on-site or off-site.

EPAUnited States
Environmental Protection
Agency**FORM R****TOXIC CHEMICAL RELEASE
INVENTORY REPORTING FORM**Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986,
also known as Title III of the Superfund Amendments and Reauthorization Act

WHERE TO SEND COMPLETED FORMS: 1.

EPCRA Reporting Center
P.O. Box 3348
Merrifield, VA 22116-3348
ATTN: TOXIC CHEMICAL RELEASE INVENTORY2. APPROPRIATE STATE OFFICE
(See instructions in Appendix F)Enter "X" here if this
is a revision

For EPA use only

Important: See instructions to determine when "Not Applicable (NA)" boxes should be checked.**PART I. FACILITY IDENTIFICATION INFORMATION****SECTION 1. REPORTING YEAR 1997****SECTION 2. TRADE SECRET INFORMATION**

- 2.1 Are you claiming the toxic chemical identified on page 3 trade secret?
☐ Yes. (Answer question 2.2; Attach substantiation forms) ☒ No (Do not answer 2.2; Go to Section 3)
- 2.2 Is this copy: ☐ Sanitized ☐ Unsanitized
 (Answer only if "YES" in 2.1)

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hereby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official:
JOSEPH C. VOZELLA ASSISTANT AREA MANAGER FOR E&P

Signature:

Date Signed:

06/26/98

SECTION 4. FACILITY IDENTIFICATIONTRI Facility ID Number
87544SDLSL52835

- 4.1 Facility or Establishment Name
U.S. DEPARTMENT OF ENERGY LOS ALAMOS NATIONAL LABORATORY
- Facility or Establishment Name or Mailing Address (if different from street address)

Street
528 EAST 35TH STREET

Mailing Address
LOS ALAMOS AREA OFFICE

City/County/State/Zip Code
LOS ALAMOS LOS ALAMOS NM 87544-

City/County/State/Zip Code
LOS ALAMOS NM 87544-

- 4.2 This report contains information for:
 (Important check a or b; check c if applicable) a. ☒ An entire facility b. ☐ Part of a facility c. ☒ A Federal facility

- 4.3 Technical Contact Name
HERBERT PLUM
- Telephone Number (include area code)
(505) 665 - 5042

- 4.4 Public Contact Name
GREG SAHD
- Telephone Number (include area code)
(505) 665 - 5025

- 4.5 SIC Code (s) (4 digits) a. 9711 b. NA c. d. e. f.

- 4.6 Latitude Degrees Minutes Seconds Longitude Degrees Minutes Seconds
 035 49 51 106 14 15

- 4.7 Dun & Bradstreet Number(s) (9 digits) a. NA b. NA
- 4.8 EPA identification Number (RCRA I.D. No.) (12 characters) a. NM0890010515 b. NA
- 4.9 Facility NPDES Permit Number(s) (9 characters) a. NM0028355 b. NM0028576
- 4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits) a. NA b. NA

SECTION 5. PARENT COMPANY INFORMATION

- 5.1 Name of Parent Company ☐ NA U.S. DEPARTMENT OF ENERGY
- 5.2 Parent Company's Dun & Bradstreet Number ☒ NA

EPA FORM R PART II. CHEMICAL-SPECIFIC INFORMATION	TRI FACILITY ID NUMBER 87544SDLSL52835 Toxic Chemical, Category or Generic Name NITRIC ACID
--	--

SECTION 1. TOXIC CHEMICAL IDENTITY

(Important: DO NOT complete this section if you complete Section 2 below.)

1.1	CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list. Enter category code if reporting a chemical category.) 007697372
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.) NITRIC ACID
1.3	Generic Chemical Name (Important: Complete only if Part 1, Section 2.1 is checked "yes". Generic Name must be structurally descriptive) NA

SECTION 2. MIXTURE COMPONENT IDENTITY

(Important: DO NOT complete this section if you complete Section 1 above.)

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, letters, spaces, and punctuation.) NA
-----	--

SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY

(Important: Check all that apply.)

3.1 Manufacture the toxic chemical: a. ☐ Produce b. ☐ Import If produce or import: c. ☐ For on-site use/processing d. ☐ For sale/distribution e. ☐ As a byproduct f. ☐ As an impurity	3.2 Process the toxic chemical: a. ☐ As a reactant b. ☐ As a formulation component c. ☐ As an article component d. ☐ Repackaging	3.3 Otherwise use the toxic chemical: a. ☐ As a chemical processing aid b. ☐ As a manufacturing aid c. ☒ Ancillary or other use
---	---	---

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1	04	(Enter two-digit code from instruction package.)
-----	----	--

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

			A. Total Release (pounds/year)(enter range from instructions or estimate.)	B. Basis of estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	NA ☒	NA		
5.2	Stack or point air emissions	NA ☐	720	O	
5.3	Discharges to receiving streams or water bodies (enter one name per box)				
Stream or Water Body Name					
5.3.1	NA				
5.3.2					
5.3.3					
5.4.1	Underground Injection on-site to Class I Wells	NA ☒	NA		
5.4.2	Underground injection on-site to Class II-V Wells	NA ☒	NA		

EPA FORM R PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)	TRI FACILITY ID NUMBER
	87544SDLSL52835
	Toxic Chemical, Category, or Generic Name
	NITRIC ACID

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM

	NA	A. Total Release (pounds/year) (enter range code from instructions or estimate)	B. Basis of Estimate (enter code)
5.5			
5.5.1A	☒	NA	
5.5.1B	☒	NA	
5.5.2	☒	NA	
5.5.3	☒	NA	
5.5.4	☒	NA	

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS
6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs)
6.1.A Total Quantity Transferred to POTWs and Basis of Estimate

6.1.A.1. Total Transfers (pounds/year) (enter range code or estimate)	6.1.A.2 Basis of Estimate (enter code)
NA	

6.1.B.1	POTW Name	NA
POTW Address		
City	State	County Zip

6.1.B.2	POTW Name
POTW Address	
City	State County Zip

If additional pages of Part II, Section 6.1 are attached the total number of pages in this box and indicate which Part II, Section 6.1 page this is here (example: 1,2,3, etc.)

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.1 OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)	NA
Off-Site Location Name	NA
Off-Site Address	
City	State County Zip
Is location under control of reporting facility or parent company? ☐ Yes ☐ No	

EPA FORM R

PART II CHEMICAL - SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER

87544SDLSL52835

Toxic Chemical, Category or Generic Name

NITRIC ACID

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS (continued)

A. Total Transfers (pound/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.

6.2 2 OFF-SITE EPA IDENTIFICATION NUMBER (RCRA ID NO.)

Off-Site location Name

Off-Site Address

City

State

County

Zip

Is location under control of reporting facility or parent company?

☐ Yes☐ No

A. Total Transfers (pound/year) (enter range code or estimate)	B. Basis of Estimate (enter code)	C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code)
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.

SECTION 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

☐ Not Applicable (NA) - Check here if no on-site waste treatment is applied to any waste stream containing the toxic chemical or chemical category.

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence (enter 3-character code(s))					c. Range of Influent Concentration	d. Waste Treatment Efficiency Estimate	e. Based on Operating Data
7A.1a	7A.1b	1	C11	2	NA	7A.1c	7A.1d	7A.1e
W	3	4		5		1	100 %	Yes No
	6	7		8				☐ ☒
7A.2a	7A.2b	1	A03	2	NA	7A.2c	7A.2d	7A.2e
A	3	4		5		3	70 %	Yes No
	6	7		8				☐ ☒
7A.3a	7A.3b	1	A02	2	NA	7A.3c	7A.3d	7A.3e
A	3	4		5		3	50 %	Yes No
	6	7		8				☐ ☒
7A.4a	7A.4b	1	A03	2	NA	7A.4c	7A.4d	7A.4e
A	3	4		5		3	50 %	Yes No
	6	7		8				☐ ☒
7A.5a	7A.5b	1		2		7A.5c	7A.5d	7A.5e
	3	4		5			%	Yes No
	6	7		8				☐ ☐

If additional pages of Part II, Section 6.2/7A are attached, indicate the total number of pages in this

box 1 and indicate which page(of Part II, Section 6.2/7A) is provided here: 1 (example: 1,2,3, etc)

EPA FORM R PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)	TRI FACILITY ID NUMBER 87544SDLSL52835 Toxic Chemical, Category or Generic Name NITRIC ACID
--	--

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

☒ Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods [enter 3-character code(s)]

1 2 3 4

SECTION 7C. ON-SITE RECYCLING PROCESSES

☒ Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

Recycling Methods [enter 3-character code(s)]

1. 2. 3. 4. 5.
 6. 7. 8. 9. 10.

SECTION 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

All quantity estimates can be reported using up to two significant figures.		Column A Prior Year (pounds/year)	Column B Current Reporting Year (pounds/year)	Column C Following Year (pounds/year)	Column D Second Following Year (pounds/year)
8.1	Quantity released *	730	720	720	720
8.2	Quantity used for energy recovery on-site	NA	0	0	0
8.3	Quantity used for energy recovery off-site	NA	0	0	0
8.4	Quantity recycled on-site	NA	0	0	0
8.5	Quantity recycled off-site	NA	0	0	0
8.6	Quantity treated on-site	1555	26600	26600	26600
8.7	Quantity treated off-site	NA	0	0	0
8.8	Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year)	0			
8.9	Production ratio or activity index	0000.70			
8.10	Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" in Section 8.10.1 and answer Section 8.11.				
	Source Reduction Activities [enter code(s)]	Methods to Identify Activity (enter codes)			
8.10.1	NA	a.	b.	c.	
8.10.2		a.	b.	c.	
8.10.3		a.	b.	c.	
8.10.4		a.	b.	c.	
8.11	Is additional information on source reduction, recycling, or pollution control activities included with this report? (Check one box)			YES ☐	NO ☒

* Report releases pursuant to EPCRA Section 329(b) including, any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment. Do not include any quantity treated on-site or off-site.

APPENDIX D

TANKS 3.1 EMISSION REPORTS FOR NITRIC ACID

TANKS PROGRAM 3.1
EMISSIONS REPORT - DETAIL FORMAT
TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification
Identification No.: Nitricacid
City: Los Alamos
State: NM
Company: LANL
Type of Tank: Horizontal Fixed Roof
Description: 5381 gal Nitric Acid AST

Tank Dimensions
Shell Length (ft): 19.7
Diameter (ft): 7.5
Volume(gallons): 5381
Is tank underground? (Y/N): N
Turnovers: 1.0
Net Throughput (gal/yr): 5381

Paint Characteristics
Shell Color/Shade: White/White
Shell Condition: Good

Breather Vent Settings
Vacuum Setting (psig): -0.03
Pressure Setting (psig): 0.03

Meteorological Data Used in Emission Calculations: Los Alamos, New Mexico (Avg Atmospheric Pressure = 11.3 psia)

TANKS PROGRAM 3.1
EMISSIONS REPORT - DETAIL FORMAT
LIQUID CONTENTS OF STORAGE TANK

06/25/98
PAGE 2

ixture/Component	Month	Daily Liquid Surf. Temperatures (deg F)			Liquid Bulk Temp. (deg F)	Vapor Pressures (psia)			Vapor r			Mol. Weight	Mass Fract.	Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations	
		Avg.	Min.	Max.		Avg.	Min.	Max.	Mol. Weight	Mass Fract.	Mass Fract.						
Nitric Acid (70wt%)	All	50.56	44.12	57.00	48.12	0.0746	0.0610	0.0920	63.020							63.02	Option 1

TANKS PROGRAM 3.1
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

06/25/98
PAGE 3

Annual Emission Calculations

Standing Losses (lb):	8.1756
Vapor Space Volume (cu ft):	552.93
Vapor Density (lb/cu ft):	0.0009
Vapor Space Expansion Factor:	0.047891
Vented Vapor Saturation Factor:	0.985394

Tank Vapor Space Volume	
Vapor Space Volume (cu ft):	552.93
Tank Diameter (ft):	7.5
Effective Diameter (ft):	14
Vapor Space Outage (ft):	3.75
Tank Shell Height (ft):	19.7

Vapor Density	
Vapor Density (lb/cu ft):	0.0009
Vapor Molecular Weight (lb/lb-mole):	63.020000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.074578
Daily Avg. Liquid Surface Temp. (deg R):	510.23
Daily Average Ambient Temp. (deg. R):	507.77
Ideal Gas Constant R	
(psia cuft / (lb-mole-deg R)):	10.731
Liquid Bulk Temperature (deg R):	507.79
Tank Paint Solar Absorptance:	0.17
Daily Total Solar Insolation	
Factor (Btu/sqftday):	1827.00

Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.047891
Daily Vapor Temperature Range (deg R):	25.76
Daily Vapor Pressure Range (psia):	0.030990
Breather Vent Press. Setting Range (psia):	0.06
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.074578
Vapor Pressure at Daily Minimum Liquid	
Surface Temperature (psia):	0.061016
Vapor Pressure at Daily Maximum Liquid	
Surface Temperature (psia):	0.092006
Daily Avg. Liquid Surface Temp. (deg R):	510.23
Daily Min. Liquid Surface Temp. (deg R):	503.79
Daily Max. Liquid Surface Temp. (deg R):	516.67
Daily Ambient Temp. Range (deg.R):	23.70

TANKS PROGRAM 3.1
EMISSIONS REPORT
DETAIL FORMAT

06/25/98
PAGE 4

DETAIL CALCULATIONS (AP-42), CONT.

Annual Emission Calculations

Vented Vapor Saturation Factor

Vented Vapor Saturation Factor:	0.985394
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.074578
Vapor Space Outage (ft):	3.75

Working Losses (lb):

	0.6022
Vapor Molecular Weight (lb/lb-mole):	63.020000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.074578
Annual Net Throughput (gal/yr):	5381
Turnover Factor:	1.0000
Tank Diameter (ft):	7.5
Working Loss Product Factor:	1.00

Total Losses (lb):	8.78
--------------------	------

TANKS PROGRAM 3.1
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

06/25/98
PAGE 5

1 Emissions Report

1 Contents	Losses (lbs.):		Total
	Standing	Working	
2 Acid (70wt%)	8.18	0.60	8.78
3	8.18	0.60	8.78

APPENDIX E

TOXIC CHEMICAL USE THRESHOLD DATA SUMMARY

3

Toxic Chemical-Use-Threshold Data Summary

A variety of Laboratory resources were used in order to make the appropriate threshold determinations for toxic chemical use and subsequent Form R reporting under EPCRA 313. Below is an analysis of the data and an accuracy determination of that data.

Pure Chemicals

Data Source	Chemical Source or Type	Weight of EPCRA Chemicals Captured for Threshold Determination (lb)	% Capture of EPCRA Chemicals	Data Quality
ACIS	Fisher-supplied chemicals, maintenance chemicals	47,482	19	89 ^a
Large Purchases	Nitric and sulfuric acids	145,400	58	99 ^b
User-Supplied Process Records	Beryllium and lead metals	56,100	23	95 ^c
TOTAL		248,982	100	96^d

^a Analysis of 1996 procurement records evaluated against wall-to-wall inventory records indicated that ACIS is approximately 89% accurate at capturing the Laboratory's chemical inventory. This evaluation was submitted to the State of New Mexico in the Laboratory's 1997 emissions inventory report.¹

^b Identifiable purchase records are estimated to be 99% to 100% accurate.

^c Operation logbooks and records are estimated to be 95% accurate.

^d Overall data quality is determined by multiplying the "% Capture" and "Data Quality" columns and summing the products.

Mixtures

Data Source	Chemical Source or Type	Constituent Weight of EPCRA Chemicals Captured for Threshold Determination (lb)	% Capture of EPCRA Chemicals	Data Quality
ACIS	Fisher-supplied chemicals, maintenance chemicals	664	100	89 ^a
TOTAL		664	100	89^b

^a Analysis of 1996 procurement records evaluated against wall-to-wall inventory records indicated that ACIS is approximately 89% accurate at capturing the Laboratory's chemical inventory. This evaluation was submitted to the State of New Mexico in the Laboratory's 1997 emissions inventory report.¹

^b Overall data quality is determined by multiplying the "% Capture" and "Data Quality" columns and summing the products.

Compounds

Data Source	Chemical Source or Type	Weight of Compounds Evaluated for the Presence of EPCRA Chemicals for Threshold Determination (lb.)	% Capture of EPCRA Chemicals	Data Quality
ACIS	Fisher-supplied chemicals, maintenance chemicals	1,174	100	89 ^a
User-Supplied Process Records	Nitrates and cyanides from HE	15,070	0 ^b	0 ^c
TOTAL		16,244	100	89^d

^a Analysis of 1996 procurement records evaluated against wall-to-wall inventory records indicated that ACIS is approximately 89% accurate at capturing the Laboratory's chemical inventory. This evaluation was submitted to the State of New Mexico in the Laboratory's 1997 emissions inventory report.¹

^b No reportable EPCRA 313 chemicals were used or produced in explosive activities.

^c Operation logbooks and records are estimated to be 95% accurate.

^d Overall data quality is determined by multiplying the "% Capture" and "Data Quality" columns and summing the products.