LA-13764-PR
Progress Report

1999 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

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1999 Toxic Chemical Release Inventory Report for the Emergency Planning and Community Right-to-Know Act of 1986, Title III, Section 313

ESH-17 Air Quality Group

Los Alamos
NATIONAL LABORATORY
Los Alamos, New Mexico 87545

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ABSTRACT

On April 21, 2000, President Clinton signed Executive Order (EO) 13148, which requires all federal facilities to comply with the provisions of the Emergency Planning and Community Right-to-Know Act (EPCRA), or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986. Section 313 of EPCRA specifically requires facilities to submit a Toxic Chemical Release Inventory report (Form R) to the U.S. Environmental Protection Agency (EPA) and state agencies if the owners and operators manufacture, process, or otherwise use any of the listed toxic chemicals above listed threshold quantities. EPA compiles this data in the Toxic Release Inventory (TRI) database. A Form R must be submitted on or before July 1 each year and must cover activities that occurred at the facility during the previous year. For 1999, Los Alamos National Laboratory (LANL) submitted a Form R for nitric acid. No other EPCRA Section 313 chemicals were used in 1999 above the reportable thresholds. This document was prepared to provide a description of the evaluation of EPCRA Section 313 chemical usage and threshold determinations for LANL for calendar year 1999 as well as provide information supplied on the Form R report.

1.0 INTRODUCTION

On April 21, 2000, President Clinton signed Executive Order (EO) 13148, which requires all federal facilities to comply with the provisions of the Emergency Planning and Community Right-to-Know Act (EPCRA), or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986. EO 13148 supersedes EO 12856 of 1995. Section 313 of EPCRA specifically requires facilities to submit a Toxic Chemical Release Inventory report (Form R) to the U.S. Environmental Protection Agency (EPA) and state agencies if the owners and operators manufacture, process, or otherwise use any of the listed toxic chemicals above listed threshold quantities. EPA compiles this data in a Toxic Release Inventory (TRI) database. The TRI database provides the public with information on the releases of EPCRA Section 313 chemicals in their communities as well as provides EPA with release information to assist in determining the need for future

regulations. A Form R must be submitted on or before July 1 each year and must cover activities that occurred at the facility during the previous year. Even though federal facilities were not required to report under EPCRA Section 313 until 1995, Los Alamos National Laboratory (LANL) has been reporting under EPCRA Section 313 since 1987. For 1999, LANL submitted a Form R for nitric acid. No other EPCRA Section 313 chemicals were used in 1999 above the reportable thresholds. Toxic chemicals used in exempt activities as defined by the regulation, are excluded from analysis. Descriptions of these exempt activities are included in Section 4.0 of this report.

This report summarizes the data evaluation, exemption analysis, activity determinations, and threshold determinations for toxic chemical use in 1999 at LANL, and describes what was reported on the Form R report. Individual sections for certain toxic chemicals used at LANL are also included in the report. Appendix A presents a summary table of EPCRA Section 313 chemicals procured at LANL. Appendix B includes a copy of the Form R submitted to EPA and the state agency. Appendix C provides more detailed information on the calculation of air emissions for nitric acid. Appendix D provides a list of references used in this analysis.

2.0 FACILITY INFORMATION AND CONTACTS

LANL is located at latitude of 35°49'51" and longitude of 106°14'15" in Los Alamos County, New Mexico. LANL is owned by the Department of Energy (DOE) and is operated by the University of California (UC). LANL's TRI facility ID number is 87545LSLMSLOSAL. The TRI facility number for the Los Alamos DOE complex is 87544SDLSL52835. The 1999 EPCRA Section 313 contacts are Leland Maez, UC technical contact at (505) 665-1240; George Van Tiem, UC public contact at (505) 667-6211; Joseph Vozella, DOE technical contact at (505) 665-5027; and Mary J. Byrne, DOE public contact at (505) 665-5025.

3.0 ACTIVITY DETERMINATIONS AND ASSOCIATED THRESHOLDS

EPCRA Section 313 chemical usage is evaluated against three activity determinations.

Manufacture

The term "manufacture" means to produce, prepare, compound, or import an EPCRA Section 313 chemical. The term manufacture also includes coincidental production of an EPCRA Section 313 chemical as a result of the manufacture, processing, otherwise use, or treatment of other chemical substances. The threshold value for manufacture is 25,000 lb.

Process

The term "process" means the preparation of a listed EPCRA Section 313 chemical, after its manufacture, for distribution in commerce. Processing is usually the intentional incorporation of an EPCRA Section 313 chemical into a product. The threshold for process is 25,000 lb.

Otherwise Use

The term "Otherwise Use" usually means any use of an EPCRA Section 313 chemical, including in a mixture or trade name product or waste, that is not covered by the terms "manufacture" or "process." The threshold value for otherwise use is 10,000 lb.

4.0 EXEMPTIONS AND QUALIFIERS

4.1 Exemptions

Exemptions from EPCRA Section 313 toxic chemical reporting applicable to LANL include the following.

Laboratory Activities Exemption

Listed EPCRA Section 313 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 determinations and release calculations. However, pilot plant scale, specialty chemical production, or the use of the chemicals for laboratory support activities, do not qualify for this laboratory activities exemption.

Otherwise Use Exemption

Certain "Otherwise Uses" of listed EPCRA Section 313 chemicals are specifically exempted:

- 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 EPCRA Section 313 chemicals for the purpose of maintaining motor vehicles operated by the facility, or
- Otherwise use of EPCRA Section 313 chemicals contained in intake water (used for processing or noncontact cooling) or in intake air (used either as compressed air or for combustion).

Article Exemption

EPCRA Section 313 chemicals contained in articles that are processed or otherwise used are exempt from threshold determinations and release calculations. For an item to be exempt as part of an article, it must be a manufactured item that is formed to a specific shape or design during manufacture, have end use functions dependent in whole or in part upon its shape or design during end use, and must not release an EPCRA Section 313 chemical under normal circumstances of processing or otherwise use of the item at the facility. In addition, total releases from any item or like items qualifying as an article exemption must be equal to or less than 0.5 lb to remain exempt as articles.[1]

4.2 Qualifiers

In addition to exemptions, certain EPCRA Section 313 chemicals have parenthetic "qualifiers." These qualifiers indicate that these chemicals are subject to the reporting requirements only if manufactured, processed, or otherwise used in a specific form or when a certain activity is performed. Examples of qualifiers are found in Table 4-1.

Table 4-1. Examples of EPCRA Section 313 Chemical Qualifiers

Chemical	CAS number	Qualifier
Aluminum	7429-90-5	Only if it is a fume or dust form.
Hydrochloric Acid	7647-01-0	Only if it is an aerosol form.
Isopropyl alcohol	67-63-0	Only if it is being manufactured by the strong acid process.
Sulfuric Acid	7664-93-9	Only if it is an aerosol form.
Nitrate Compounds	NA	Only when in aqueous solution.

5.0 PROCESS OF ANALYSIS

There are several steps in determining if a Form R report and release calculations are required. Figure 5.1 is a flowchart that shows the steps that must be performed to determine if reporting under EPCRA Section 313 is required.

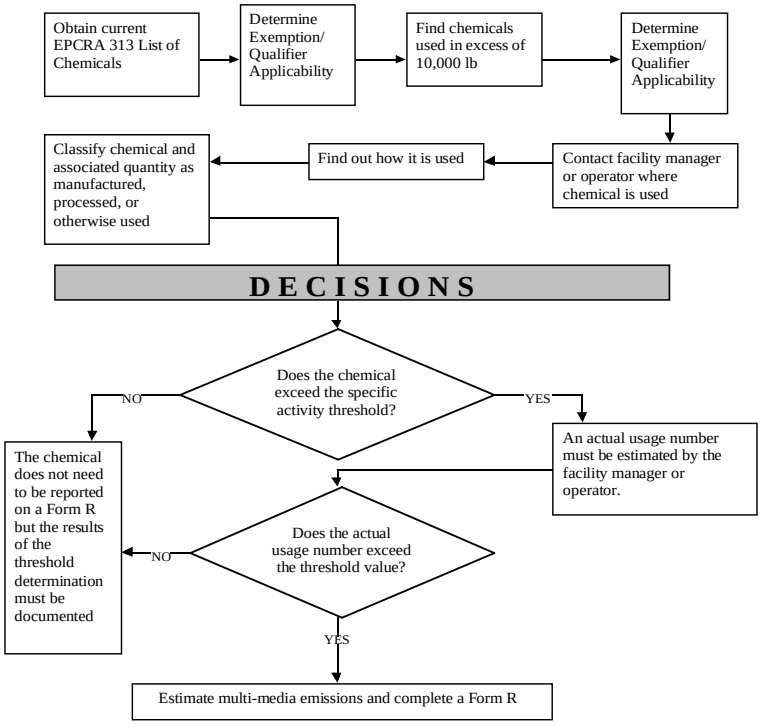

Figure 5-1. Flowchart of Process of Analysis for EPCRA Section 313 Reporting.

6.0 THRESHOLD DETERMINATIONS

6.1 Chemical Analysis

Chemicals at LANL may be purchased through various procurement systems. These systems include Just-in-Time (JIT), Local Vendor Agreements (LVAs), and Purchase Orders (POs). Purchase Card (PC) orders are not used for chemical purchases. However, as a conservative measure, PC records were also analyzed to determine if any EPCRA Section 313 chemicals were purchased via this system.

LANL's Automated Chemical Inventory System (ACIS) tracks the majority of chemicals purchased through the JIT and PO systems. However, in order to ensure that all EPCRA Section 313 chemicals are being captured, LANL's Air Quality Group, in coordination with LANL's Business Operations Division, developed an automated procurement tracking tool in 1999. This tool allows the capture of specific chemical purchases directly from the JIT and PO procurement systems and compiles the data in a Chemical Order Report. This report was used to capture any chemical procurements not in ACIS. LVA vendors were evaluated for the potential to sell EPCRA Section 313 chemicals. Additionally, LANL subcontractors that may potentially use chemicals were also contacted to determine chemical usage. Procurement records from all of these sources were combined to compare the amount of toxic chemicals brought on-site to the EPCRA Section 313 thresholds.

In 1999, over 126,000 total records were analyzed from the various procurement and tracking systems for EPCRA Section 313 chemicals. The breakdown of the total number of records analyzed per data source is in Figure 6-1.

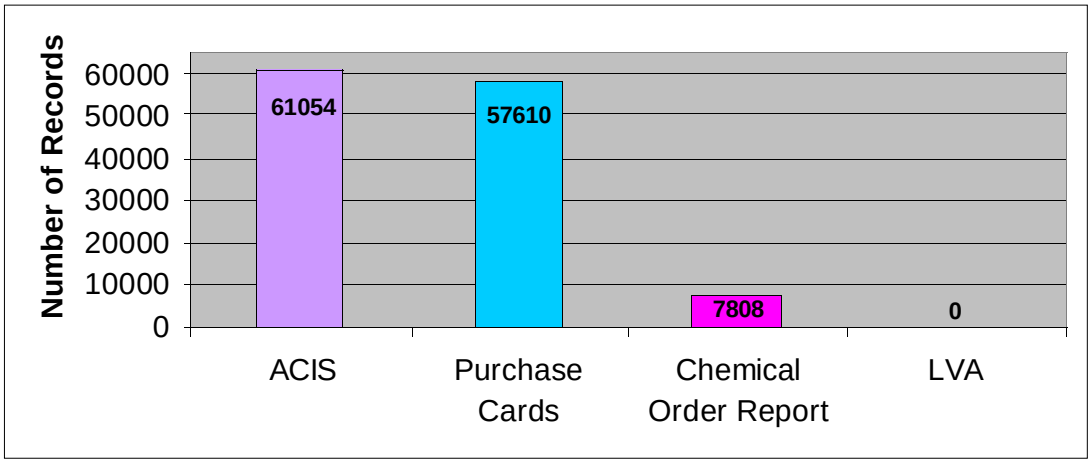

Figure 6-1. Number of Records from Procurement and Tracking Systems.

Chemicals with identifiable Chemical Abstract Service (CAS) numbers are considered pure chemicals. The total quantity of each pure EPCRA Section 313 chemical procured at LANL was summed by CAS number and compared to the most conservative chemical threshold of 10,000 lb. Any chemicals that were exempt or did not meet the chemical qualifiers were taken out of the analysis.

Chemicals that do not have CAS numbers are considered mixtures. As with the pure chemicals, any mixtures that were exempt or did not meet the chemical qualifiers were taken out of the analysis. Material Safety Data Sheets (MSDSs) for the remaining chemical mixtures purchased in quantities over 200 lb were reviewed to determine the presence and percent amount of EPCRA Section 313 chemicals as constituents. If EPCRA Section 313 chemical constituents were identified, the weight of each chemical component in the mixture was calculated and added to the quantities of pure EPCRA Section 313 chemicals.

A separate analysis for those mixtures less than 200 lb was performed. The sum of these unevaluated mixtures is less than the 10,000 lb threshold.

6.2 Threshold Determination Results

Procurement Totals

The ten highest EPCRA Section 313 chemicals procured in 1999 are listed in Table 6-1. Appendix A includes a listing of all EPCRA Section 313 chemicals purchased at LANL in 1999.

Table 6-1. Top Ten EPCRA Section 313 Chemicals Procured in 1999

Total Sum (lb)	Chemical Name	CAS Number
124,562	sulfuric acid (liquid form)	7664-93-9
31,932	nitric acid	7697-37-2
31,793	copper	7440-50-8
6,794	hydrochloric acid (liquid form)	7647-01-0
5,831	mercury	7439-97-6
3,566	phosphoric acid	7664-38-2
3,306	chlorodifluoromethane, Freon 22	75-45-6
1,815	methanol	67-56-1
1,674	acetonitrile	75-05-8
1,560	methylene chloride	75-09-2

As can be seen from the table, there are three chemicals that exceed the most conservative threshold value of 10,000 lb. They are sulfuric acid, nitric acid, and copper. A Form R report is required for nitric acid. Due to the applicability of exemptions and chemical qualifiers, Form R reports are not required for sulfuric acid and copper. The detailed analyses for these chemicals are included in Section 8.0.

7.0 NITRIC ACID AND FORM R REPORTING

A total of 21,393 lb of nitric acid was used at LANL in 1999. A total of 31,932 lb was procured. The difference between usage and procurement is in storage. At the end of 1999, approximately 10,000 lb of nitric acid were in the nitric acid storage tank (see Figure 7-1).

Figure 7-1. Nitric Acid Tank.

Of the amount of nitric acid used, 13,000 lb was used for plutonium processing. The remainder, 8,393 lb, was evaluated by contacting the large purchasers and end users to determine usage. It was determined that 70% (5,875 lb) of the remaining nitric acid purchases was used in laboratory exempt activities. Therefore, this amount is not included in threshold determinations or release reporting. The remaining 30% (2,518 lb) of nitric acid is considered "Otherwise Used" and is subject to the 10,000 lb threshold.

The nitric acid used for plutonium processing is used to recover plutonium through a multistep desolution and ion exchange process. The nitric acid is considered "Otherwise Used" in this application and is also subject to the 10,000 lb reporting threshold. Since the threshold of 10,000 lb is exceeded, a Form R report is required. A copy of the Form R report is in Appendix B.

Plutonium processing has been considered a production-type operation in previous years for the purpose of EPCRA Section 313 Form R reporting. However, most of the operations conducted at the plutonium processing facility involve projects related to actinide research. Nitric acid used to process plutonium has historically exceeded the 10,000 lb reporting threshold. Figure 7-2 shows the reporting history of nitric acid since LANL began reporting in 1987.

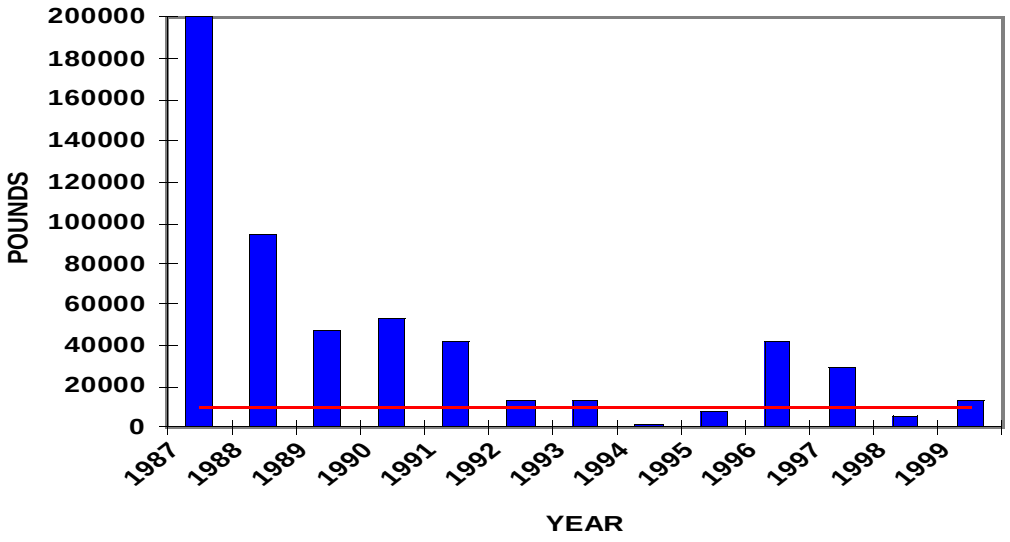

Figure 7-2. Historic Nitric Acid Use in Plutonium Processing 1987–1999.

The nitric acid quantity reported in 1987 was overestimated. The information obtained was based on the best data available at that time. In the years immediately after 1987, data collection, tracking, and calculation methodologies improved. Changes in more recent years are due to fluctuations in operational processes.

It was determined that the amount of nitric acid reported for 1997 was also overestimated. The amount was updated and the appropriate updated information submitted to the EPA and state agency in June 2000.

A summary of 1999 nitric acid use and applicable thresholds are shown in Figure 7-3.

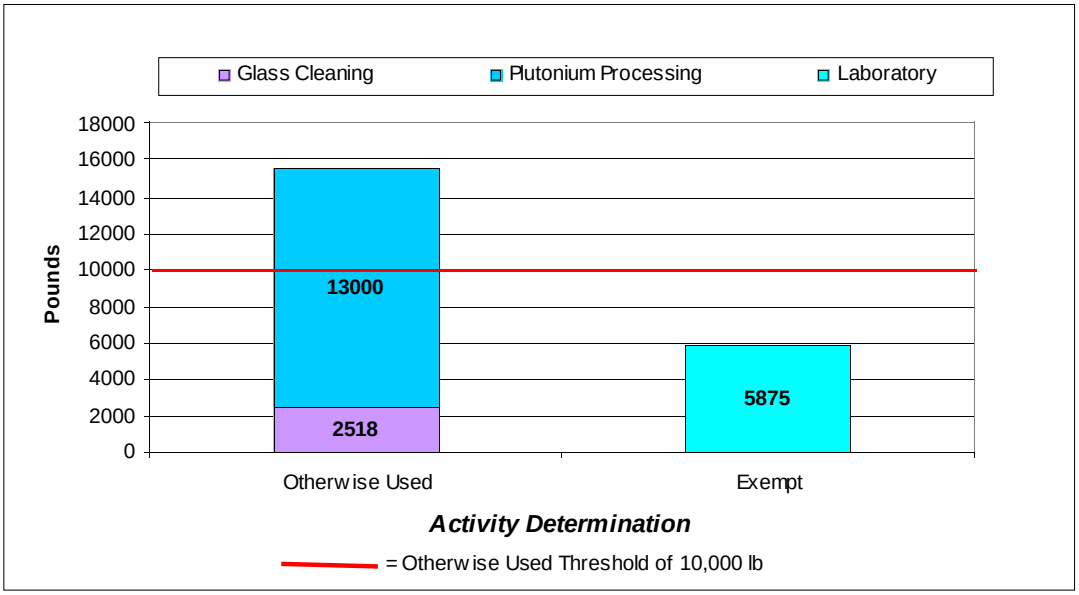

Figure 7-3. Summary of Nitric Acid Use at LANL in 1999.

7.1 Emission Calculations

In 1988, LANL conducted an emissions source test for the plutonium processing activities. 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 1999 usage quantity to calculate stack emissions. Mass balances and engineering judgment were used to estimate the emissions for several processes that were not tested. Controlled emissions from the plutonium processing activities totaled 97 lb.

Nitric acid emissions from the storage tank are calculated using EPA's TANKS 4.0 software. Calculated emissions from the tank are based on the amount of acid stored, the size of the storage tank, and the number of tank turnovers. For 1999, an estimated 9.1 lb of nitric acid emissions were released from the storage tank.

7.2 Form R Report

In the Form R report, the total release of the chemical is reported in Section 5, *Quantity of the Toxic Chemical Entering each Environmental Medium Onsite*. On-site releases to the environment include emissions to the air, discharges to surface waters, and releases to land and underground injection wells. For 1999, nitric acid was reported as being released to the air. All releases to the air must be classified as either point or non-point emissions. A point source release is a release of the chemical to the air that is released through a stack, vent, duct, pipe, or any other confined air stream. For total annual releases less than 1,000 lb, the amount may be reported either as an estimate or by using range codes. The total release reported by LANL for air emissions is summarized in Table 7-1.

Table 7-1. Total Reported Releases for Nitric Acid Air Emissions in 1999

Release Description	Code	Range (lb)
Fugitive or non-point air emissions	A	1–10
Stack or point air emissions	B	11–499

Transfers of the reported chemical to off-site locations, on-site waste treatment methods and efficiency, on-site energy recovery and recycling processes, and source reduction and recycling activities were also required in the Form R report, if applicable. No off-site transfers or on-site recovery and recycling processes of nitric acid were applicable. However, the on-site waste treatment methods and efficiencies were reported. On-site waste treatment methods must be reported for each type of waste stream being treated (i.e., gaseous, aqueous, liquid nonaqueous, and solids) as well as for each waste treatment method. The concentration of nitric acid as it enters the waste treatment process and the percent efficiency of the waste treatment is also reported. Table 7-2 shows the reported information in this section of the Form R report.

Table 7-2. On-site Waste Treatment Methods and Efficiency for Nitric Acid in 1999

General Waste Stream	Waste Treatment Methods	Range of Waste Stream Concentration (%)	Waste Treatment Efficiency (%)
Wastewater	Neutralization	>1	100
Gaseous	Scrubber	0.0001 – 0.01	70
Gaseous	Condenser	0.0001 – 0.01	50
Gaseous	Scrubber	0.0001 – 0.01	50

The final section of the Form R report, Section 8, *Source Reduction and Recycling Activities*, is required and must be completed. Information must be provided about source reduction activities and quantities of the reported chemical managed as waste. In addition, quantities of the reported chemical for the prior year, current year, as well as the following year and second following year must also be reported. For the 1999 Form R report, quantities for nitric acid in pounds were reported for 1998, 1999, 2000, and 2001. Table 7-3 shows the information supplied in this section of the Form R report.

Table 7-3. Source Reduction and Recycling Activities for Nitric Acid in 1999

Description of Activity	1998	1999	2000	2001
Quantity Released (lb)	71	106	106	106
Quantity Treated On-site (lb)	6680	9964	9964	9964

Because the use of nitric acid is dependent on many factors, it is difficult to predict future use. Therefore, LANL typically reports the current year's quantities as a conservative measure for future years' uses.

When nitric acid is used in the plutonium processing activities, nitrate compounds are also coincidentally manufactured. The analysis of nitrate compounds is included in Section 8.6.

8.0 ADDITIONAL EVALUATION OF CERTAIN TOXIC CHEMICALS

The toxic chemicals described below are either used in relatively high volumes at LANL, are of special interest, or have been historically reported in the past. Additional analyses were required to determine total usage of these chemicals. None of these chemicals presented in this section exceeded any of the applicable thresholds in 1999 and therefore no reporting was required.

8.1 Sulfuric Acid

EPCRA Section 313 reporting guidelines state that sulfuric acid must be reported only if it is in an aerosol form, including mists, vapors, gas, fog, and other airborne forms of any

particle size. This would include acid aerosols generated in storage tanks and from the combustion of fuel oil. Descriptions of sulfuric acid usage and emissions at LANL are provided below. Table 8-1 provides a summary of sulfuric acid threshold determinations for 1999.

Demineralizer Regeneration

In 1999, LANL used 9,387 gallons of 93.1% sulfuric acid for demineralizer regeneration of the water at the main steam plant. This represents approximately 140,000 lb of sulfuric acid. However, because the sulfuric acid used is in liquid form, it is not reportable under EPCRA Section 313.

Aerosol Tank Emissions

Sulfuric acid stored in storage tanks generates a small amount of sulfuric acid mist in the vapor space of the tank. Calculations on the amount of sulfuric acid mist generated are based on the amount of sulfuric acid stored, the size of the storage tank, and the number of tank turnovers. Using EPA's TANKS 4.0 software, an estimated 0.002 lb of sulfuric acid mist was generated in LANL's sulfuric acid tank in 1999.

Fuel Combustion Byproducts

Sulfuric acid mist is generated from the combustion of fuel oil, and to a lesser extent, natural gas. Because EPA guidance does not discuss or provide emission factors for sulfuric acid aerosol emissions from the combustion of fuel oil or natural gas, all sulfur oxides (SOx) are assumed to be sulfuric acid mist as a worst-case assumption for determining EPCRA Section 313 reporting requirements. Based on the amount of fuel oil and natural gas combusted in 1999, an estimated 1,092 lb of sulfuric acid mist was generated at LANL.

Sample Analysis at the Sanitary Waste Systems Consolidation (SWCS) Plant

Approximately 60 lb of liquid sulfuric acid were used at the analytical laboratory at the SWSC plant for the analysis of water samples. None of the laboratory techniques used converted the liquid sulfuric acid to an aerosolized form. Therefore this quantity is not reportable under EPCRA Section 313.

Procurements

An additional 31,868 lb of liquid sulfuric acid was procured at LANL at various locations for miscellaneous uses. It is unlikely that any operations using these quantities of sulfuric acid generate an aerosol. Therefore, these quantities are considered exempt for threshold determinations.

Table 8-1. Sulfuric Acid Threshold Determinations for 1999

Description	Amount of Sulfuric Acid (lb)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lb)
Demineralizer Regeneration	140,000	JCNNM	Not in aerosol form and not subject to EPCRA Section 313	NA
Water Analysis at the SWSC Plant	60	JCNNM		
Procurement	31,868	Procurement Data		
Storage Tank Air Emissions	0.002	EPA, TANKS 4.0 Software	Manufactured	25,000
Fuel Combustion Byproducts	1,092	1999 20 NMAC 2.73 Report[2]		

8.2 Chlorine

Chlorine historically has been reported in the past due to its primary use in water treatment at LANL. With new treatment methodologies and chemicals, along with transfers of some utilities, the use of chlorine gas has significantly decreased. As such, chlorine has not been reported under EPCRA Section 313 since 1995. The use of chlorine gas has been replaced with new treatment chemicals such as the use of bromine/chlorine tablets for treating cooling tower water, and mixed oxidants generated from sodium chloride that is being used for sewage water treatment. Chlorine is produced as a byproduct from these new treatment methods and is therefore subject to the "manufactured" threshold of 25,000 lb. It is estimated that the amount of chlorine manufactured from all of the water treatments combined in 1999 is less than 2,000 lb. This amount is significantly less than the threshold of 25,000 lb, and is not subject to reporting.

The potable water treatment system uses chlorine gas to disinfect the water. This system was turned over to Los Alamos County in September 1998. According to the 1998 EPCRA Section 313 Questions and Answers (EPA 745-B-98-004), question number 256: "You are not required to account for amounts of listed toxic chemical present in water that you draw into your facility from the environment or municipal sources." [3] Therefore, LANL need not evaluate the chlorine in the potable water purchased from Los Alamos County.

In 1999, only 47 lb of chlorine gas was purchased for miscellaneous use at LANL compared to more than 3,000 lb of chlorine gas purchased in 1998. The change in procurement amounts is primarily due to the transfer of the potable water treatment system to Los Alamos County. The 47 lb is subject to the "Otherwise Used" threshold of 10,000 lb and is not subject to reporting.

For additional information, refer to the 1998 EPCRA Section 313 report (LA-13655-PR).[4] The report provides detail on the various water treatment methodologies and the byproducts from these operations.

8.3 Lead and Lead Compounds

Lead and lead compounds were identified in procurement records and in activities that take place at LANL. These activities include melting of lead, decontamination of lead shields, and firing of ammunition containing lead. According to facility representatives, no lead melting activities occurred in 1999. Therefore, the remaining two activities and analysis from the procurement records are described in the following sections.

Lead Shielding Decontamination

In 1999, LANL decontaminated 17,780 lb of lead shielding. This treatment of lead qualifies for the article exemption because the specific shape and design of the lead shielding is not changed. In addition, the amount of lead released to the environment from these decontamination activities was calculated to be 0.02 lb, which is less than the 0.5 lb qualifier for the article exemption.

Lead Shot at the Firing Range

Lead is a component in various types of bullets. In 1999, approximately 7,294 lb of lead contained in ammunition was shot at the firing range. This resulted in emissions of lead to the air of approximately 13 lb in 1999. This is considered an "Otherwise Used" activity and subject to the 10,000 lb reporting threshold.

Procurement

Approximately 1,165 lb of lead and lead compounds was purchased through LANL's procurement systems. As a conservative assumption, the use of this lead was considered "Otherwise Used" and subject to the 10,000 lb reporting threshold.

The thresholds for the different activity determinations involving lead are listed in Table 8-2.

Table 8-2. Lead and Lead Compounds Threshold Determinations for 1999

Description	Amount of Lead (lb)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lb)
Lead Melting	0	Facility Representatives	Processed	25,000
Firing Range	7,294	Facility Representatives	Otherwise Used	10,000
Procurement	1,165	Procurement Data		
Decontamination	17,780	Facility Representatives	Article Exemption	NA

8.4 Beryllium and Beryllium Compounds

Less than 205 lb of beryllium was processed at LANL in 1999. Therefore, the use of beryllium at LANL did not exceed the "processed" threshold of 25,000 lb.

8.5 Cyanide and Cyanide Compounds

Explosives

Explosives are evaluated because many contain cyanides that are regulated under EPCRA Section 313. Facility reports were used to determine the types and amounts of explosives detonated and burned. Analyses showed that 20 lb of cyanide compounds were generated from the detonation of explosives, and 56 lb of cyanide compounds were generated from the burning of explosives.

Procurements

An additional 695 lb of cyanide compounds obtained from the various procurement systems were assumed to be "Otherwise Used." Since this amount is less than the 10,000 lb threshold, no reporting is required. Table 8-3 provides a summary of the cyanide threshold determinations for 1999.

Table 8-3. Cyanide and Cyanide Compounds Threshold Determinations for 1999

Description	Amount of Cyanide Compounds (lb)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lb)
Explosives Expended	20	Facility Representatives	Manufactured	25,000
Explosives Burned	56	Facility Representatives		
Procurement	695	Procurement Data	Otherwise Used	10,000

8.6 Nitrate Compounds

Nitrate compounds are reportable only when in aqueous solutions based on the EPCRA Section 313 qualifier. Nitrate compounds are used or generated in three different processes at LANL, as described below.

Plutonium Processing

Nitric acid is used to recover plutonium through a multistep desolution and ion exchange process. The nitric acid used in the desolution process is converted to a concentrated solution containing metal ions and nitrate ions. This solution is then run through an ion exchange process that also utilizes nitric acid to recover the desired metals. Once all of the metal of concern is recovered, a concentrated, nonaqueous nitrate solution remains (the solution contains very little water, only enough to maintain it as a solution rather

than a salt). This nitrate solution is mixed with dry concrete and allowed to solidify in 55-gallons drums prior to disposal.

An aqueous waste stream containing nitric acid is also generated by these desolution and ion exchange processes. This waste stream is neutralized with sodium hydroxide and the nitrates are precipitated and collected prior to discharge in accordance with LANL's NPDES permit. This waste stream is considered the incidental manufacture of an aqueous nitrate compound and is subject to the 25,000 lb reporting threshold. In 1999, 9,964 lb of nitric acid from plutonium processing were neutralized to form 13,440 lb of sodium nitrate. This is less than the 25,000 lb reporting threshold and therefore reporting of nitrate compounds is not required for 1999.

Procurements

Approximately 1,488 lb of nitrate compounds was procured at LANL. This total was applied to the 10,000 lb threshold of "Otherwise Used."

Explosives

According to the EPCRA 313, Toxic Chemical Release Inventory, nitrate compounds are reportable only when in aqueous solution. The nitrate components that are a part of or are produced from explosive activities are not in aqueous solutions and therefore are not subject to the threshold determinations.

Table 8-4 provides a summary of the threshold determinations for nitrate compounds in 1999.

Table 8-4. Nitrate Threshold Determinations for 1999

Description	Amount of Nitrates (lb)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lb)
Plutonium Processing	13,440	Facility Representatives	Manufactured	25,000
Procurement	1,488	Procurement Data	Otherwise Used	10,000
Explosives	NA	Facility Representatives	Not in liquid form and therefore exempt from reporting	NA

8.7 Copper and Copper Compounds

In 1999, over 30,000 lb of copper was procured at LANL. The large purchasers were contacted to verify the quantities of copper purchased and gain an understanding of how the copper is used. A description of how the large quantities of copper are used is provided below.

Accelerator Components

Copper is machined, brazed, and used in various accelerator components. In 1999, over 10,000 lb of copper were purchased for this purpose. However, only 2,000 lb of this copper was actually used. Since the remaining 8,000 lb of copper has not yet been used and remains in its original shape and form, this copper qualifies for an article exemption and is not subject to EPCRA Section 313 reporting requirements. In addition, because the copper is not being used and is just in inventory, the 8,000 lb of copper will not result in a release greater than 0.5 lb.

Diagnostic Testing

Copper is used as a component for diagnostic testing at LANL. The copper is sent off-site for machining and sent back to LANL when the final product is finished. Nondestructive diagnostics testing such as vacuum leak testing is then performed on-site. In 1999, LANL used 20,893 lb of copper for this operation. However, because the testing performed on-site is nondestructive, the use of the copper qualifies as an article exemption and is not subject to EPCRA Section 313 reporting requirements. Because there is no cutting, grinding, or melting of the product, emissions from these activities will not result in a release greater than 0.5 lb.

Procurement

Additional copper purchases were made in 1999 totaling 653 lb. This amount was assumed to be "Otherwise Used" and is less than the 10,000 lb threshold.

Table 8-5 provides a summary of the copper threshold determinations for 1999.

Table 8-5. Copper Threshold Determinations for 1999

Description	Amount of Copper (lb)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lb)
Accelerator Components	2,000	Facility Representatives	Processed	25,000
Procurement	653	Procurement Data	Otherwise Used	10,000
Diagnostic Testing	20,893	Facility Representatives	Article Exemption	NA
Storage for Accelerator Components	8,000	Facility Representatives	Article Exemption	NA

8.8 Chlorodifluoromethane

Chlorodifluoromethane (R-22) is used in chillers, refrigerators, and HVAC systems throughout LANL. In addition to the quantities that come on-site through the procurement system, refrigeration maintenance contractors may fill or "top-off" units when they conduct maintenance. In 1998, approximately 8,500 lb of R-22 was purchased

at LANL. Because this amount was close to the most conservative threshold of 10,000 lb, detailed analyses were performed on the usage of R-22 in 1998. However, in 1999, procurement systems show that 3,306 lb of R-22 was purchased by LANL, with an additional 140 lb brought on-site by outside maintenance contractors. All uses, estimated to be 3,446 lb, of R-22 are considered "Otherwise Used" and are less than the 10,000 lb threshold for EPCRA Section 313 reporting. Table 8-6 provides a summary of the threshold determinations for R-22 in 1999.

Table 8-6. R-22 Threshold Determinations for 1999

Description	Amount of R-22 (lb)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lb)
Use in Various Appliances	3,306	Procurement Data	Otherwise Used	10,000
Use by Outside Contractors	140	Facility Representatives		

APPENDIX A

EPCRA Section 313 List of Chemicals Procured at LANL in 1999

Total Pounds of EPCRA Section 313 Chemicals Procured at LANL in 1999

Total Sum (lb)	Chemical Name	CAS number
124,562	sulfuric acid	7664-93-9
31,932	nitric acid	7697-37-2
31,792	copper	7440-50-8
6,794	hydrochloric acid	7647-01-0
5,831	mercury	7439-97-6
3,566	phosphoric acid, solid	7664-38-2
3,306	chlorodifluoromethane, freon 22	75-45-6
1,815	methanol	67-56-1
1,674	acetonitrile	75-05-8
1,560	methylene chloride	75-09-2
1,288	aluminum oxide	1344-28-1
1,287	zinc shot	7440-66-6
1,181	isopropyl alcohol	67-63-0
1,139	2-butanone	78-93-3
808	fluorotrichloromethane	75-69-4
808	hydrofluoric acid 48%–51%	7664-39-3
806	trichloroethylene	79-01-6
730	1,1,1-trichloroethane	71-55-6
637	n-hexane	110-54-3
613	ethylene glycol	107-21-1
600	dichlorotrifluoroethane	34077-87-7
456	toluene	108-88-3
438	carbon tetrachloride	56-23-5
342	acrylamide	79-06-1
306	chloro-1,1,1,2-tetrafluoroethane	2837-89-0
279	chloroform	67-66-3
232	methyl chloride	74-87-3
221	n,n-dimethylformamide	68-12-2
186	methyl isobutyl ketone	108-10-1
127	n-methylolacrylamide	924-42-5
112	ethylene	74-85-1
103	perchlorethylene	127-18-4
99	ethylene dichloride	107-06-2
86	hydrogen sulfide	7783-06-4
79	formic acid	64-18-6
73	1-methyl-2-pyrrolidinone	872-50-4

Total Pounds of EPCRA Section 313 Chemicals Procured at LANL in 1999 (cont'd)

Total Sum (lb)	Chemical Name	CAS number
69	aluminum foil	7429-90-5
62	propylene	115-07-1
57	ammonia	7664-41-7
52	formaldehyde	50-00-0
51	cadmium	7440-43-9
47	chlorine	7782-50-5
46	di-(2-ethylhexyl) phthalate	117-81-7
41	sodium azide	26628-22-8
36	1,1-dichloro-1-fluoroethane	1717-00-6
34	butadiene, inhibited	106-99-0
30	peracetic acid	79-21-0
30	methyl tert-butyl ether	1634-04-4
30	1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1
30	1,2-dichloroethylene	540-59-0
29	cyclohexane	110-82-7
29	phenol	108-95-2
28	xylenes	1330-20-7
25	barium	7440-39-3
24	p-dioxane	123-91-1
24	benzene	71-43-2
23	fluorine	7782-41-4
23	antimony	7440-36-0
23	pyridine	110-86-1
21	silver foil	7440-22-4
20	hydroquinone	123-31-9
19	diethanolamine	111-42-2
18	nickel	7440-02-0
18	tert-butyl alcohol	75-65-0
15	sodium nitrite	7632-00-0
14	carbon disulfide	75-15-0
13	styrene monomer, inhibited	100-42-5
13	triethylamine	121-44-8
12	dichlorodifluromethane (freon 12)	75-71-8
12	chromium	7440-47-3
10	phosphine	7803-51-2
10	chlorobenzene	108-90-7
10	ethylene glycol monomethyl ether	109-86-4

Total Pounds of EPCRA Section 313 Chemicals Procured at LANL in 1999 (cont'd)

Total Sum (lb)	Chemical Name	CAS number
9	dimethyl sulfate	77-78-1
8	titanium tetrachloride	7550-45-0
8	1,1,2,2-tetrachloroethane	79-34-5
7	cobalt	7440-48-4
7	thallium	7440-28-0
7	bromide standard solution	7726-95-6
6	1,2-epoxybutane	106-88-7
6	n-butyl alcohol	71-36-3
6	alpha-naphthylamine	134-32-7
5	chloroacetic acid	79-11-8
5	lithium carbonate	554-13-2
5	iodomethane (methyl iodide)	74-88-4
5	benzyl chloride	100-44-7
5	dibutyl phthalate	84-74-2
4	arsenic	7440-38-2
4	catechol	120-80-9
4	molybdenum (vi)oxide	1313-27-5
4	p-xylene	106-42-3
4	phosphorus, red	7723-14-0
4	tolylene 2,4-diisocyanate	584-84-9
3	epichlorohydrin	106-89-8
3	nitrilotriacetic acid	139-13-9
3	1,1,2-trichloroethane	79-00-5
3	benzoyl chloride	98-88-4
3	nitrobenzene	98-95-3
3	boron trichloride	10294-34-5
3	sec-butyl alcohol	78-92-2
3	methyl methacrylate	80-62-6
2	ethylene dibromide	106-93-4
2	Chloroethane	75-00-3
2	methylene bis(4-cyclohexylisocyanate)	5124-30-1
2	p-nitrophenol	100-02-7
2	Biphenyl	92-52-4
2	phthalic anhydride	85-44-9
2	sodium pentachlorophenate	131-52-2
2	2-ethoxyethanol	110-80-5
2	vinyl acetate	108-05-4

Total Pounds of EPCRA Section 313 Chemicals Procured at LANL in 1999 (cont'd)

Total Sum (lb)	Chemical Name	CAS number
2	Acrylonitrile	107-13-1
2	ethyl acrylate	140-88-5
2	o-xylene	95-47-6
2	allyl alcohol	107-18-6
2	vanadium metal	7440-62-2
2	1,2-dichlorotetrafluoroethane	76-14-2
2	trypan blue stain (0.4%)	72-57-1
1	benzoyl peroxide	94-36-0
1	dimethylamine, anhydrous	124-40-3
1	Aniline	62-53-3
1	Manganese	7439-96-5
1	Thiourea	62-56-6
1	acrylic acid	79-10-7
1	methyl bromide	74-83-9
1	carbonyl sulfide	463-58-1
1	2,6-dimethylaniline	87-62-7
1	p-phenylenediamine	106-50-3
1	hydrazine sulfate	10034-93-2
1	Safranin	77-73-6
1	methyl acrylate	96-33-3
1	2-picoline	109-06-8
1	selenium powder	7782-49-2
1	hydrazine, anhydrous	302-01-2
1	Propionaldehyde	123-38-6
1	hexamethylene diisocyanate	822-06-0
1	lead powder	7439-92-1
1	Urethane	51-79-6
1	osmium tetroxide	20816-12-0
<1	Cumene	98-82-8
<1	tetracycline hydrochloride	64-75-5
<1	2,4-dinitrophenol	51-28-5
<1	m-cresol	108-39-4
<1	p-chloroaniline	106-47-8
<1	p-nitroaniline	100-01-6
<1	propargyl alcohol (2-propyn-1-ol)	107-19-7
<1	Methanethiol	74-93-1
<1	Acetamide	60-35-5

Total Pounds of EPCRA Section 313 Chemicals Procured at LANL in 1999 (cont'd)

Total Sum (lb)	Chemical Name	CAS number
<1	Pentachlorophenol	87-86-5
<1	o-dichlorobenzene	95-50-1
<1	3,3'-dimethylbenzidine	119-93-7
<1	2,6-dinitrotoluene	606-20-2
<1	chloromethyl methyl ether	107-30-2
<1	Acetaldehyde	75-07-0
<1	Amitrole	61-82-5
<1	Quinone	106-51-4
<1	Hexamethylphosphoramide	680-31-9
<1	rhodamine 590 chloride	989-38-8
<1	o-cresol	95-48-7
<1	n-butyraldehyde	123-72-8
<1	Malononitrile	109-77-3
<1	picric acid (2,4,6-trinitrophenol)	88-89-1
<1	p-dichlorobenzene	106-46-7
<1	1,1-dimethylhydrazine	57-14-7
<1	o-nitrophenol	88-75-5
<1	methyl chloroformate	79-22-1
<1	fast garnet gbc	97-56-3
<1	ethyl chloroformate	541-41-3
<1	2,4-dinitrotoluene	121-14-2
<1	2,2'-dichloroethyl ether	111-44-4
<1	2,4-dichlorophenoxyacetic acid	94-75-7
<1	allyl chloride	107-05-1
<1	Crotonaldehyde	4170-30-3
<1	2,4,6-trichlorophenol	88-06-2
<1	p-phenylenediamine dihydrochloride	624-18-0
<1	propane sultone	1120-71-4
<1	Acrolein	107-02-8
<1	hydrogen cyanide	74-90-8
<1	Beryllium	7440-41-7
<1	1,2-diphenylhydrazine	122-66-7
<1	Hexachlorocyclopentadiene	77-47-4
<1	2,4-dimethylphenol	105-67-9
<1	3-chloro-2-methylpropene	563-47-3
<1	Acetophenone	98-86-2
<1	methyl viologen hydrate	1910-42-5

Total Pounds of EPCRA Section 313 Chemicals Procured at LANL in 1999 (cont'd)

Total Sum (lb)	Chemical Name	CAS number
<1	Phosgene	75-44-5
<1	Quinoline	91-22-5
<1	m-dinitrobenzene	99-65-0
<1	Hexachloroethane	67-72-1
<1	Anthracene	120-12-7
<1	Benzamide	55-21-0
<1	propylene oxide	75-56-9
<1	beta-naphthylamine	91-59-8
<1	1-nitropyrene	5522-43-0
<1	rhodamine 610 chloride	81-88-9
<1	vinyl chloride	75-01-4
<1	Hexachlorobutadiene	87-68-3

APPENDIX B

Form R Report for Nitric Acid

(IMPORTANT: Type or print; read instructions before completing form)

Form Approved OMB Number: 2070-0093
Approval Expires: 01/01/2001

EPA United 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 1999

SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 2 trade secret? [ ] Yes (Answer question 2.2; Attach substantiation forms) [X] 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:	Signature:	Date Signed:
JOSEPH C. VOZELLA ASSISTANT AREA MANAGER FOR ENVIRONMENT		06/26/2000

SECTION 4. FACILITY IDENTIFICATION

4.1 TRI Facility ID Number: 87544SDLSL52835

Facility or Establishment Name	Facility or Establishment Name or Mailing Address(if different from street address)
U.S. DEPARTMENT OF ENERGY, LOS ALAMOS NATIONAL LABORATORY	
Street: SIX 35TH STREET	Mailing Address:
City/County/State/Zip Code: LOS ALAMOS LOS ALAMOS NM 87544	City/County/State/Zip Code:

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

4.3	Technical Contact Name	STEVE FONG	Telephone Number (include area code): (505) 665 - 5534
4.4	Public Contact Name	STEVE FONG	Telephone Number (include area code): (505) 665 - 5534

4.5 SIC Code (s) (4 digits)

Primary					
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)	4.8 EPA Identification Number (RCRA I.D. No.) (12 characters)	4.9 Facility NPDES Permit Number(s) (9 characters)	4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)
a. NA	a. NM0890010515	a. NM0028355	a. NA
b.	b. NA	b. NM0028576	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 [X]	

EPA FORM R
PART II. CHEMICAL-SPECIFIC INFORMATION

TRI Facility ID Number
87544-SDLSL-52835
Toxic Chemical, Category or Generic Name
NITRIC ACID

SECTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you completed 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 completed 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:	3.2 Process the toxic chemical:	3.3 Otherwise use the toxic chemical:
a. [ ] Produce b. [ ] Import		
If produce or import:		
c. [ ] For on-site use/processing	a. [ ] As a reactant	a. [ ] As a chemical processing aid
d. [ ] For sale/distribution	b. [ ] As a formulation component	b. [ ] As a manufacturing aid
e. [ ] As a byproduct	c. [ ] As an article component	c. [X] Ancillary or other use
f. [ ] As an impurity	d. [ ] Repackaging	

SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ONSITE 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 ONSITE

			A. Total Release (pounds/year) (Enter range code or estimate*)	B. Basis of Estimate (enter code)	C. % From Stormwater
5.1	Fugitive or non-point air emissions	NA [ ]	A	O	
5.2	Stack or point air emissions	NA [ ]	B	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 onsite to Class I Wells	NA [X]	NA		
5.4.2	Underground Injection onsite to Class II-V Wells	NA [X]	NA		

If additional pages of Part II, Section 5.3 are attached, indicate the total number of pages in this box [1]
and indicate the Part II, Section 5.3 page number in this box. [1] (example: 1,2,3, etc.)

EPA form 9350-1(Rev. 04/97) - Previous editions are obsolete.

* Range Codes: A= 1 - 10 pounds; B= 11- 499 pounds; C= 500 - 999 pounds.

EPA FORM R PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)	TRI Facility ID Number 87544-SDLSL-52835 Toxic Chemical, Category or Generic Name NITRIC ACID

SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ONSITE (Continued)

		NA	A. Total Release (pounds/year) (enter range code* or estimate)	B. Basis of Estimate (enter code)
5.5	Disposal to land onsite			
5.5.1A	RCRA Subtitle C landfills	X	NA	
5.5.1B	Other landfills	X	NA	
5.5.2	Land treatment/application farming	X	NA	
5.5.3	Surface Impoundment	X	NA	
5.5.4	Other disposal	X	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, indicate the total number of pages in this box [1] and indicate the Part II, Section 6.1 page number in this box [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 9350-1 (Rev.04/97) - Previous editions are obsolete.

* Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI Facility ID Number
87544-SDLSL-52835
Toxic Chemical, Category or Generic Name
NITRIC ACID

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

A. Total Transfers (pounds/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 (pounds/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 X / 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 X
	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 X
	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 X
	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 the Part II, Section 6.2/7A page number in this box : [1] (example: 1,2,3, etc)

EPA Form 9350-1 (Rev. 04/97) - Previous editions are obsolete.

* Range Codes: A = 1 - 10 pounds; B = 11 - 499 pounds; C = 500 - 999 pounds.

EPA FORM R PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)	TRI Facility ID Number 87544-SDLSL-52835 Toxic Chemical, Category or Generic Name NITRIC ACID

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

[X] 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 [ ] 4 [ ]

SECTION 7C. ON-SITE RECYCLING PROCESSES

[X] 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

		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 **	71	106	106	106
8.2	Quantity used for energy recovery onsite	NA	NA	NA	NA
8.3	Quantity used for energy recovery offsite	NA	NA	NA	NA
8.4	Quantity recycled onsite	NA	NA	NA	NA
8.5	Quantity recycled offsite	NA	NA	NA	NA
8.6	Quantity treated onsite	6680	9964	9964	9964
8.7	Quantity treated offsite	NA	NA	NA	NA
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			0001.49	

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 [X]

** 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 onsite or offsite.

EPA Form 9350-1 (Rev. 04/97) - Previous editions are obsolete.

APPENDIX C

Air Emission Estimates for Nitric Acid

C-1. NITRIC ACID AIR EMISSIONS

To better determine nitric acid emissions, LANL conducted a source test in 1988.[5] 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 1999 usage quantities to calculate 1999 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. Table C-1 shows the controlled emissions and the emission factors used for the estimates. Table C-2 provides a description of the processes and the basis for the emissions factors.

Table C-1. Controlled 1999 Nitric Acid 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)	41	0	0.001	0.0047	0.00	0.04	0.19
Cascade Dissolution (401)	3398	0.00136	0.00109	0.003	4.62	3.70	10.19
Cascade Dissolution (420)	0	0.075	0.0099	0.095	0.00	0.00	0.00
Distillation (401)[a]	6477	0.0016	0.0012	0.0034	10.36	7.77	22.02
Alpha Counting (116)	12	0	0.015	0.0442	0.00	0.18	0.53
Residue Leaching (209)	70	0.15	0.0104	0.112	10.50	0.73	7.84
Scrap Dissolution (209)	365	0.027	0.00675	0.0185	9.86	2.46	6.75
MPD (401)	291	0.15	0.0104	0.112	43.65	3.03	32.59
Anion Exchange (409)	8233	0.0012	0	0	9.88	0.00	0.00
ICP (106)	12	0	0.01	0.03	0.00	0.12	0.36
OH Cake Dissolution (409)	0	0.014	0.0069	0.019	0.00	0.00	0.00
Filtrate Concentration (209)[a]	14	0.0016	0.0012	0.0034	0.02	0.02	0.05
ATLAS (409)	570	0.0138	0.0069	0.019	7.87	3.93	10.83
Metallography (115)	9	0.0099	0	0	0.09	0.00	0.00
TOTAL	**13001**				**96.85**	**21.98**	**91.36**

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

Table C-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. 5—see Appendix D).
Cascade Dissolution (401)	Plutonium oxide dissolved in 15.6 M of nitric acid with calcium difluoride at 96^{o}C.	Use 1988 emission factors.
Cascade Dissolution (420)	Plutonium dioxide and magnesium oxide dissolved in 10 M of nitric acid at 100^{o}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^{o}C during analytical processing.	87.59% of nitric acid remains in product or waste. The difference converts to nitrogen oxide and nitrogen dioxide (Ref. 5).
Residue Leaching (209)	Plutonium-containing residues are leached in 15.6 M nitric acid with calcium difluoride or hydrofluoric acid at 103^{o}C.	Use plutonium oxide dissolution (cascade dissolution) emission factors.
Scrap Dissolution (209)	Plutonium is leached from metal scrap in 15.6 M nitric acid and hydrochloric acid at 110^{o}C.	Use 1988 emission factors.
Multi-Purpose Dissolution (MPD) (401)	Plutonium oxide is dissolved in nitric acid and calcium difluoride at 96^{o}C. Plutonium dioxide is dissolved in nitric acid and magnesium oxide at 98^{o}C.	Use cascade dissolution emission factors.
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. 5).
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).
Advanced Testing Line for Actinide Separation (ATLAS) (409)	Samples prepared for research and development with an integrated module of dissolution, ion exchange, precipitation, and calcination.	Use “OH Cake Dissolution (409)” 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.

APPENDIX D

References

References

1. U.S. Environmental Protection Agency, "Toxic Chemical Release Inventory Reporting Form R and Instructions," Revised 1999 Version, EPA 745-B-00-001, February 2000.

2. "1999 Emissions Inventory Report Summary," Los Alamos National Laboratory Report LA-13728-SR, September 2000.

3. U.S. Environmental Protection Agency. "EPCRA Section 313 Questions and Answers," Revised 1998, EPA 745-B-98-004, March 1998.

4. U.S. Department of Energy, "1998 Toxic Chemical Release Inventory Report for the Emergency Planning and Community Right-to-Know Act of 1986, Title III," LA-13655-PR, November 1999.

5. PEI Associates, "Process Emission Rates, Plutonium Processing Facility, Area 400 Ventilation Exhaust, Technical Area 55," PN 3003-26-7, February 1989.

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