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Section 313, Toxic Chemical Release Inventory Summary Report for 2018

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LA-UR-19-31034

November 2019

**Emergency Planning and Community  
Right-To-Know Act of 1986, Title III,  
Section 313, Toxic Chemical Release  
Inventory Summary Report for 2018**

Prepared by the Environmental Protection Division

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**Acronyms and Terms**

CAS	Chemical Abstracts Service
ChemDB	chemical inventory-tracking database
DEHP	di-(2-ethylhexyl) phthalate
DOE	U.S. Department of Energy
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
Form R	Toxic Chemical Release Inventory Report
HCl	hydrochloric acid
HE	high explosive
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Science Center
lbs	pounds
MMscf	million standard cubic feet
MO <sub>x</sub>	mixed oxide
MRF	Material Recycle Facility
NPDES	National Pollutant Discharge Elimination System
OB/OD	open burn/open detonation
PACs	polycyclic aromatic compounds
PBTs	bioaccumulative toxics
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RLWTF	Radioactive Liquid Waste Treatment Facility
SERF	Sanitary Effluent Reuse Facility
SO <sub>3</sub>	sulfur trioxide
SWSC	Sanitary Wastewater Systems Consolidation
TA	Technical Area
TRI	Toxic Release Inventory
TRI-DDS	TRI-Data Delivery System (software)

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**EMERGENCY PLANNING AND COMMUNITY  
RIGHT-TO-KNOW ACT OF 1986, TITLE III, SECTION 313,  
TOXIC CHEMICAL RELEASE INVENTORY  
SUMMARY REPORT FOR 2018**

**By  
Environmental Compliance Programs Group**

**ABSTRACT**

For reporting year 2018, Los Alamos National Laboratory (LANL) submitted a Toxic Chemical Release Inventory Report (Form R) for lead as required under the Emergency Planning and Community Right-to-Know Act (EPCRA) Section 313. No other EPCRA Section 313 chemicals were used in 2018 above the reportable thresholds. This document was prepared to provide a description of the evaluation of EPCRA Section 313 chemical use and threshold determinations for LANL for calendar year 2018, as well as to provide background information about data included on the Form Rs.

Section 313 of EPCRA specifically requires facilities to submit a 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 database. Form Rs for each chemical over threshold quantities must be submitted on or before July 1 each year and must cover activities that occurred at the facility during the previous year.

In 1999, EPA promulgated a final rule on persistent bioaccumulative toxics (PBTs). This rule added several chemicals to the EPCRA Section 313 list of toxic chemicals and established lower reporting thresholds for these and other PBT chemicals that were already reportable. These lower thresholds became applicable in reporting year 2000. In 2001, EPA expanded the PBT rule to include a lower reporting threshold for lead and lead compounds. Facilities that manufacture, process, or otherwise use more than 100 lbs of lead or lead compounds must submit a Form R.

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**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 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. On October 19, 1999, the EPA promulgated a final rule on persistent bioaccumulative toxics (PBTs) (EPA 1999a). This rule added several chemicals to the EPCRA Section 313 list of toxic chemicals and established lower reporting thresholds for these and other PBT chemicals that were already reportable under EPCRA Section 313. These lower thresholds became

applicable in reporting year 2000. On January 17, 2001, the PBT rule was amended to include lead and lead compounds. The rule lowered the reporting threshold for lead and lead compounds to 100 lbs. The lower threshold for lead became applicable in reporting year 2001.

The EPA compiles the data submitted on the Form Rs 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 the EPA with release information to assist in determining the need for future regulations (<http://www.epa.gov/tri/>). Form R must be submitted on or before July 1 each year and must cover activities that occurred at the facility during the previous calendar year. Even though federal facilities were not required to report under EPCRA Section 313 until 1995, Los Alamos National Laboratory (LANL or the Laboratory) had been voluntarily reporting under EPCRA Section 313 since 1987.

For reporting year 2018, the Laboratory submitted a Form R for lead. No other EPCRA Section 313 chemicals were used in 2018 above the reportable thresholds. Toxic chemicals used in exempt activities as defined by the regulation are excluded from the threshold determinations and release calculations. Descriptions of these exempt activities are included in Section 2.2 of this report.

This report summarizes the data evaluation, exemption analysis, activity determinations, and threshold determinations for toxic chemical use at the Laboratory in 2018 and describes the environmental release data reported on the Form R. Individual sections for certain toxic chemicals used at the Laboratory are included in this report. Appendix A presents a summary table of EPCRA Section 313 chemicals procured at the Laboratory in 2018. Appendix B includes a copy of the Form R submitted to the EPA and the New Mexico Environment Department.

## 1.1 Facility Information and Contacts

LANL is located at a latitude of 35°49'51" and longitude of 106°14'15" in Los Alamos County, New Mexico. The Laboratory is owned by the U.S. Department of Energy (DOE) and operated by Los Alamos National Security, LLC.

Facility information is as follows:

- LANL
  - TRI facility identification number: 87545LSLMSLOSAL
  - LANL technical contact: Mr. Walt Whetham at (505) 665-8885
  - LANL public contact: Mr. Peter Hyde at (505) 667-3792
- Los Alamos DOE complex
  - TRI facility identification number: 87544SDL52835
  - DOE technical and public contact: Ms. Adrienne Nash at (505) 665-5026

## **2.0 ACTIVITY DETERMINATIONS, EXEMPTIONS, AND QUALIFIERS**

### **2.1 Activity Determinations**

EPCRA Section 313 chemical usage is evaluated against three activity determinations. For listed chemicals that are not PBTs, the thresholds are described below.

#### **2.1.1 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 for reporting manufactured chemicals is 25,000 lbs.

#### **2.1.2 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 reporting processed chemicals is 25,000 lbs.

#### **2.1.3 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 for reporting otherwise use chemicals is 10,000 lbs.

#### **2.1.4 Persistent Bioaccumulative Toxics**

For the subset of chemicals listed as PBTs, lower reporting thresholds have been established for individual chemicals ranging from 100 lbs to 0.1 grams. These lower thresholds apply to each of the activity determinations: manufacture, process, and otherwise use. Although the threshold for each activity is the same, each chemical must be evaluated against the activity determinations to determine in which activity the chemical is used. Threshold determinations for PBTs are evaluated separately against the manufacture, process, and otherwise use activities described above.

### **2.2 Exemptions**

Exemptions from EPCRA Section 313 toxic chemical reporting applicable to the Laboratory are discussed below.

#### **2.2.1 Laboratory Activities Exemption**

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 chemicals for laboratory support activities do not qualify for this laboratory activities exemption.

### 2.2.2 Otherwise Use Exemption

Certain activities involving EPCRA Section 313 chemicals qualify as otherwise used and are specifically exempted. These include:

- 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 non-contact cooling) or in intake air (used either as compressed air or for combustion).

### 2.2.3 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 satisfy the following three criteria:

- 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 on 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. Total releases from any item or like items qualifying as article exempt must be equal to or less than 0.5 lbs to remain exempt as articles (EPA 2006).

### 2.2.4 De Minimis Exemption

The *de minimis* exemption allows facilities to exempt certain minimal concentrations of EPCRA Section 313 chemicals contained in mixtures or other trade name products when making threshold determinations and release calculations. The *de minimis* concentrations are set by EPA at either 1% or 0.1%, depending on whether or not the chemical is a suspected carcinogen or carcinogen.

EPA eliminated the *de minimis* exemption for the list of PBT chemicals. This means that facilities must include all amounts of PBTs in threshold determinations and release and other waste management calculations regardless of the concentration of the PBTs in mixtures or trade name products.

## 2.3 Qualifiers

In addition to exemptions, certain EPCRA Section 313 chemicals have qualifiers. 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 shown in Table 2-1.

**Table 2-1. Examples of EPCRA Section 313 Chemical Qualifiers**

Chemical Name	Chemical Abstracts Service (CAS) Number	Qualifier
Aluminum	7429-90-5	Only if it is a fume or dust form
Hydrochloric Acid (HCl)	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
Vanadium	7440-62-2	Except when contained in an alloy

\* NA = not applicable.

### 3.0 ANALYSIS FOR THRESHOLD DETERMINATIONS

There are several steps in determining when a chemical triggers reporting under EPCRA Section 313. When a chemical is manufactured, processed, or otherwise used in amounts greater than the threshold quantity, a Form R and release calculations are required. Figure 3-1 presents a flowchart that shows the steps the Laboratory performs to determine which chemicals must be reported under EPCRA Section 313.

#### 3.1 Threshold Determinations for Chemical Use

The Laboratory tracks chemicals brought onsite using a chemical inventory-tracking database called ChemDB. ChemDB captures the majority of procured chemicals and provides relevant data (e.g., chemical name, CAS number, quantity, etc.) to assist in threshold determinations. The underlying assumption used in the preliminary threshold determinations for reporting under EPCRA Section 313 is that chemicals are purchased and used in the same calendar year. If unusually large purchases are noted in this preliminary analysis, further investigation is performed to determine if bulk chemicals were purchased and only a portion of them used in the calendar year.

##### 3.1.1 Inventory

For calendar year 2018, a total of 44,584 records were added to ChemDB and evaluated; 14,512 were pure chemicals and 30,072 records were mixtures. Individual items with identifiable CAS numbers in ChemDB were considered pure chemicals. These items were matched by CAS number to the list of EPCRA Section 313 chemicals. The resulting records were summed in pounds for each pure chemical.

Individual items that did not have CAS numbers in ChemDB were considered mixtures. The exemptions discussed in Section 2.2 of this report were applied to the mixtures and each qualifying item was classified according to the applicable exemption. Material safety data sheets for the remaining mixtures purchased in quantities greater than 50 lbs were reviewed to determine the presence and amount of EPCRA Section 313 constituents. This was done to ensure that the chemicals with thresholds greater than 50 lbs would be identified. Listed chemicals with thresholds less than 50 lbs were examined individually, based on process knowledge and known potential sources. Each mixture that contained an EPCRA Section 313 chemical was further evaluated to determine the weight of each constituent. The totals for these amounts were then added to the quantities of pure EPCRA Section 313 chemicals.

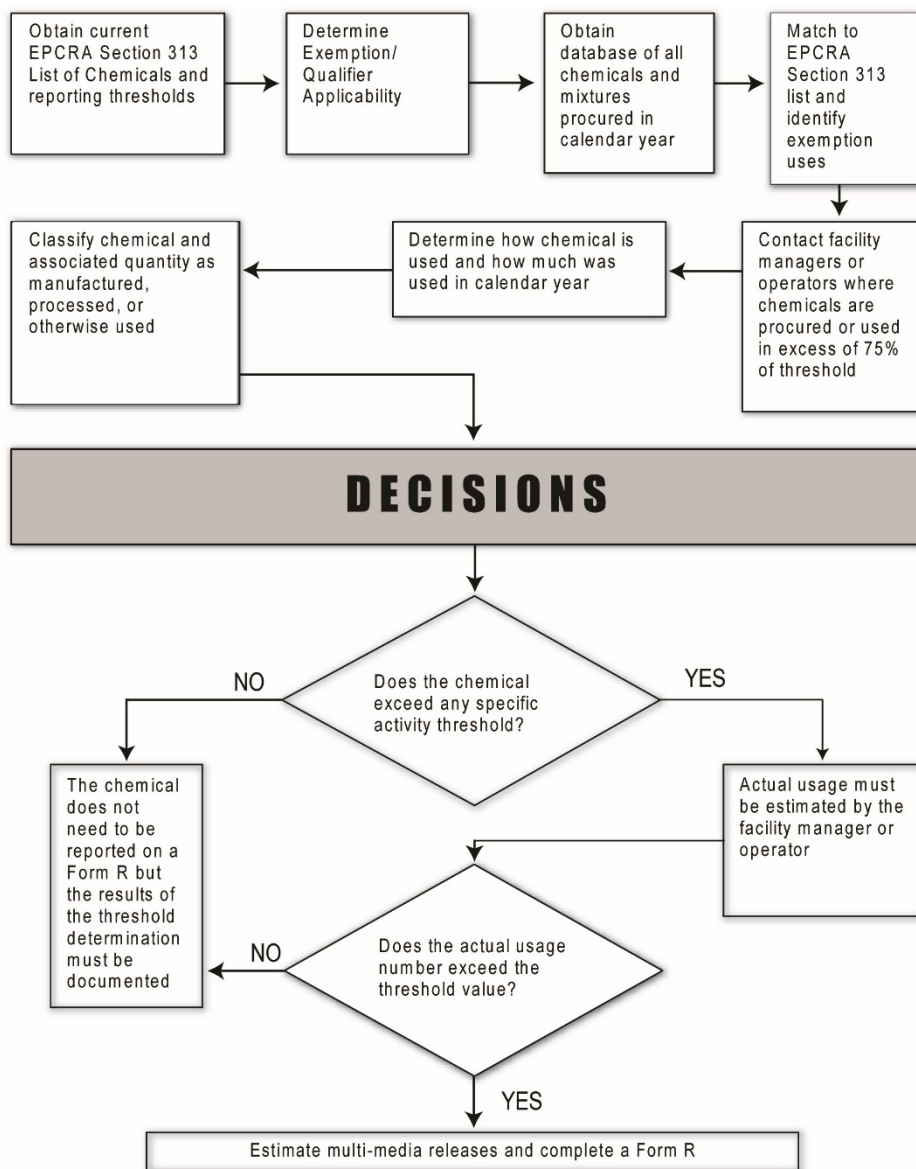


Figure 3-1. Flowchart process of analysis for EPCRA Section 313 reporting

### 3.1.2 EPCRA Reporting Tool

An automated search tool was developed using Microsoft Access to refine the data in ChemDB. The EPCRA reporting tool performs the following steps in the ChemDB data download:

- Identifies and labels exemptions through electronic text searches. The exemptions are from 40 Code of Federal Regulations 372.38, Exemptions for Toxic Release Reporting. When a chemical is exempt, it is not considered when determining whether an applicable threshold has been met. Specifically, chemical containers were classified as follows:
  - **Maintenance**—routine janitorial or facility grounds maintenance (e.g., cleaning supplies, paints, fertilizers, and pesticides);



- **Maintaining Motor Vehicles** (e.g., antifreeze, brake fluid);
  - **Personal Uses**—non-process related items for employee personal use;
  - **De Minimis**—the percent of a non-PBT Section 313 chemical in a mixture is less than 1% for a non-carcinogen or 0.1% for a carcinogen;
  - **Article**—structural component exemption; and
  - **Laboratory Activities**—if a toxic chemical is manufactured, processed, or used in a laboratory at a covered facility under the supervision of technically qualified individual.
- Identifies and labels EPCRA Section 313 compounds. There are 30 different chemical categories included on the EPCRA Section 313 list. Many of these categories do not have specific CAS numbers associated with them, except for polycyclic aromatic compounds (PACs) and dioxins. These two categories were evaluated in ChemDB as part of the pure chemical evaluation since they have searchable CAS numbers for compounds included in their categories. The other classes of compounds were searched in the 2018 ChemDB dataset by using chemical-specific text searches in the chemical name field.
  - Matches pure chemicals (chemical containers with an identifiable CAS number) with the list of EPCRA Section 313 chemicals by matching CAS numbers.

A few EPCRA Section 313 chemicals were selected for further analysis to determine if they were used in exempt activities. For 2018, the chemicals that were analyzed in more detail included:

- mercury compounds,
- sulfuric acid,
- PACs,
- nitric acid,
- nitrate compounds,
- aluminum oxide
- hydrochloric acid,
- dioxins, and
- lead compounds.

## 3.2 Threshold Determination Results

### 3.2.1 Procurement Totals

The amounts of listed EPCRA Section 313 chemicals identified in the ChemDB, direct procurement, and other sources were all summed together to perform preliminary threshold determinations. The resulting totals for the top 10 listed EPCRA Section 313 chemicals are summarized in Table 3-1.

A complete table of EPCRA Section 313 chemicals showing all contributing sources is provided in Appendix A. Chemicals that were procured in amounts greater than 75% of the applicable EPCRA Section 313 threshold were evaluated further and the analyses are summarized in Section 4 of this report.

**Table 3-1. Top 10 EPCRA Section 313 Chemicals Procured in 2018**

CAS No	Chemical Name	Total Procured (lbs)
7647-01-0	Hydrochloric Acid (aerosol forms only)	83,556*
1344-28-1	Aluminum Oxide	8,609
7697-37-2	Nitric Acid	5,212
7664-93-9	Sulfuric Acid (aerosol forms only)	4,939
7782-50-5	Chlorine	3,705
67-56-1	Methanol	3,398
Polychlorinated Alkanes	Polychlorinated Alkanes (C10 to C13)	2,811
78-48-8	S,S,S-Tributyltrithiophosphate	2,360
Barium	Barium Compounds	1,876
67-63-0	Isopropyl Alcohol	1,634

\* The total procured for HCl includes both aerosol and aqueous forms. See Section 4.6 for additional analysis.

#### 4.0 ADDITIONAL EVALUATION OF CERTAIN TOXIC CHEMICALS

The toxic chemicals described below either are used in relatively high volumes at the Laboratory, have very low reporting thresholds, are of special interest, or have been reported in the past. Additional analyses were required to determine total usage of these chemicals. None of the chemicals presented in this section exceeded any of the applicable thresholds in 2018 and therefore no reporting was required.

##### 4.1 Mercury

Mercury and mercury compounds are used in various places throughout the Laboratory. As part of the PBT rule, the threshold for EPCRA Section 313 reporting of mercury was reduced to 10 lbs. In 2018, mercury was used in four areas at the Laboratory. Each is described below.

##### 4.1.1 Mercury Procurements

A listing of all procurements in 2018 of mercury and mercury compounds was extracted from ChemDB. Line items containing a CAS number for mercury (7439-97-6) were included, as well as any line items containing the word “mercury” or the symbol “Hg” in the text description.

The total amount of mercury and mercury compounds in ChemDB for 2018 was 42.4 lbs. The purchasers or users of the mercury and mercury compounds were contacted to determine:

- If the purchase was actually mercury or contained mercury or mercury compounds,
- If a mixture or solution, what concentration of mercury the mixture or solution contained, and
- If the mercury was used in a laboratory experiment setting and, if so, it is subject to the laboratory exemption under EPCRA Section 313.

According to EPCRA Section 313 guidance documents, the laboratory exemption is applied to the quantity of a listed toxic chemical that is manufactured, processed, or otherwise used in a laboratory under the supervision of a technically qualified person. A total of 3.0 lbs of mercury was determined to be laboratory exempt. Although 3.0 lbs was determined to be laboratory exempt, the actual amount of mercury in chemical containers is considerably less. The chemical names of the exempted containers are “mercury standard solutions” which contain only parts per million (ppm) quantities of mercury.

A total of 37.9 lbs of mercuric nitrate was purchased at the Sanitary Effluent Reuse Facility (SERF) for chloride analysis in water. From the material safety data sheet, the solution contained 10 to 20% mercuric nitrate. In order to calculate the amount of mercury compound, 15% was used for a total of 5.7 lbs from the mercuric nitrate.

The total amount of mercury applied to the otherwise used threshold from chemical purchases is 7.1 lbs.

#### **4.1.2 Los Alamos Neutron Science Center Shutter System**

The largest use of mercury at the Laboratory is in the Los Alamos Neutron Science Center (LANSCE) shutter system. Reservoirs of mercury are used as shields on the neutron beam shutter system. When the beam is operated, pressurized helium is forced into the mercury reservoir, pushing the mercury up into a head space and allowing the neutron beam to pass through the shutter. LANSCE maintains 12 neutron beam shutter systems, each with a reservoir of mercury. The total amount of mercury in these reservoirs is approximately 12,000 lbs. Each reservoir is a closed system and only opened occasionally when minor repairs or maintenance are performed.

During 2018, minor maintenance was performed on the mercury shutter system. However, no mercury was removed or added to the shutter system in 2018.

#### **4.1.3 Fuel Combustion**

In 2018, the Laboratory generated mercury compound emissions from the following combustion sources: the asphalt plant, the Technical Area (TA) 3 power plant, the TA-3 combustion turbine, and from numerous small boilers. The mercury compound emissions from these sources totaled 1.37 lbs towards the manufactured threshold. Additionally, mercury is found in diesel fuel as an impurity. According to EPA guidance, the concentration of mercury in diesel fuel is 0.001 ppm (EPA 2001a). LANL used approximately 44,279 gallons of diesel fuel in 2018 and this equates to 0.00032 lbs of mercury towards the otherwise used threshold.

#### **4.1.4 Conclusion**

The total amount of mercury qualifying as otherwise used equals 7.1 lbs, which is below the reporting threshold value of 10 lbs. The total amount of mercury compounds manufactured was 1.4 lbs and is also below the reporting threshold of 10 lbs. Therefore, it was determined that reporting mercury under EPCRA Section 313 is not necessary for 2018. A summary of the 2018 mercury threshold determination is provided in Table 4-1.

**Table 4-1. Summary of 2018 Mercury Threshold Determination**

Description	Amount of Mercury (lbs)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lbs)
Purchasing of Mercury Standards and Instruments	3.0	Procurement data and facility personnel interviews	Laboratory Exempt	NA*
Other Procurement	7.1	Procurement Records	Otherwise Used	10
LANSCE Shutter System	0	LANSCE Facility Records		
Fuel Combustion	0.00032	Fuel Use Records and EPA Guidance		
Fuel Combustion	1.37	Fuel Use Records and EPA AP-42	Manufactured	10

\* NA = not applicable.

## 4.2 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 category would include acid aerosols generated in storage tanks and from fuel combustion.

No sulfuric acid was purchased for demineralizer regeneration at TA-3-22. Because the sulfuric acid used at the Sanitary Wastewater Systems Consolidation (SWSC) Plant and TA-3-22 is used in liquid form, it is not subject to EPCRA Section 313 reporting. TA-3-22 stores sulfuric acid in a 4,500-gallon tank.

Sulfuric acid aerosols are generated as a result of storage tank emissions, fuel combustion byproducts, natural gas combustion, and asphalt production. The total amount of sulfuric acid mist generated from these activities was 1,064.4 lbs, less than the 25,000-lb manufacture threshold and, therefore, not reportable under EPCRA. Based on EPA guidance for fuel oil (diesel fuel) combustion, it is assumed that all sulfur trioxide (SO<sub>3</sub>) emissions are in the form of sulfuric acid (EPA 1998a). For natural gas combustion, it is conservatively assumed that all sulfur oxides emissions are in the form of sulfuric acid mist because separate SO<sub>3</sub> emission factors are not available.

For 2018, ChemDB shows that a total of 10,201 lbs of sulfuric acid was procured and used at various locations at the Laboratory. Most of these were small purchases ranging from 1.0 to 30 lbs, and are most likely used in analytical chemistry work. This liquid form of sulfuric acid is not reportable under EPCRA. As for the other purchases of sulfuric acid captured in ChemDB, they are assumed to be in aerosol form since the specific usages are unknown. Total purchases do not exceed the otherwise use reporting threshold. A summary of the threshold determinations for sulfuric acid is provided in Table 4-2.

**Table 4-2. Sulfuric Acid Threshold Determination for 2018**

Description	Amount of Sulfuric Acid (lbs)	Data Source	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lbs)
TA-3-22 Demineralizer Regeneration	0	Site Support Contractor Logs	Not in aerosol form and not subject to EPCRA Section 313	NA*
Fuel Oil Combustion Byproducts	0.13	AP-42 and fuel use records	Manufactured	25,000
Natural Gas Combustion	1060.9	AP-42 and facility records		
Asphalt Production	3.6	AP-42 and facility records		
Storage Tanks	0	EPA Tanks 4.0 model		

\* NA = not applicable.

### 4.3 Polycyclic Aromatic Compounds

PACs are a chemical category included on the EPCRA Section 313 list as part of the PBT rule. The threshold for reporting PACs is 100 lbs. Benzo(g,h,i)perylene is a PAC that has its own separate threshold. The threshold for benzo(g,h,i)perylene is 10 lbs.

According to EPA's "EPCRA Section 313 Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category" (EPA 2001b), fuel oil and paving asphalt contain PACs. In addition, PACs may be generated from the combustion of natural gas and fuel oil and the manufacture of asphalt. Each of these sources of PACs was evaluated and is described below.

#### 4.3.1 Procurement of PACs

Under EPCRA Section 313, the PAC category includes 25 specific chemicals and an additional 51 chemical mixtures that are listed as potentially containing PACs. A search of the ChemDB dataset was done using CAS numbers for the 25 chemicals and text searches for the 51 chemical mixtures. No matches were identified. An analysis of ChemDB data showed a total of 11.2 lbs of PACs from 2018 chemical purchases.

#### 4.3.2 PACs from Asphalt Production

In 2018, the Laboratory's onsite asphalt plant produced approximately 785 tons of asphalt. Additionally, Española Transit Mix provided 41,147 tons of asphalt amounts to LANL. Therefore, a total of 41,932 tons of asphalt was used at LANL in 2018.

A review of project management records for 2018 identified projects that involved the purchase of asphalt from outside contractors. Work tickets and project management records were reviewed to identify asphalt jobs that qualify as routine facility maintenance and are exempt under EPCRA Section 313. Routine facility maintenance includes patching of potholes, repair of roads and parking lots, and resurfacing of existing parking lots.

According to EPA guidance, asphalt tar (used in making asphalt) may contain as high as 178 ppm of PACs (EPA 2001b). However, Chevron-Texaco, the supplier of the asphalt tar, provided information specific to their product (Chevron-Texaco 2001). The concentration of PACs in the asphalt tar is 8 ppm, which is significantly lower than the default value listed in the EPA's PACs guidance. The manufacturer-supplied value was used in the calculation of PACs.

In 2018, using the 8 ppm concentration, the total amount of PACs otherwise used at LANL in asphalt was 43.2 lbs, which is below the reporting threshold of 100 lbs.

The concentration of benzo(g,h,i)perylene in asphalt, from "EPA's Guidance for Reporting on Pesticides and other Persistent Bioaccumulative Toxics" (EPA 2001c), is 1.2 ppm. This figure adds 6.92 lbs of benzo(g,h,i)perylene reportable towards its 10-lb otherwise use threshold.

#### **4.3.3 PACs from Fuel Oil Combustion**

Approximately 44,278 gallons of diesel fuel were used in 2018 in the Laboratory's power plant and miscellaneous boilers and generators. According to EPA guidance, fuel oil may contain 10 ppm of PACs (EPA 2001b). However, data provided by Chevron-Texaco indicate diesel may contain 22 ppm of PACs (Chevron-Texaco 2001). The 22 ppm was used in these calculations. This equates to 6.9 lbs of PACs that apply to the otherwise use threshold. The concentration for benzo(g,h,i)perylene was found to be 0.05 ppm according to EPA guidance (EPA 2001c). Data provided by Chevron-Texaco indicated concentrations of 9 ppm. The 9 ppm value was used in these calculations and results in 2.8 lbs of benzo(g,h,i)perylene applicable to the 10-lb otherwise use threshold.

Combustion of fuel oil generates emissions of PACs that apply to the manufacture threshold. Using AP-42 emission factors (EPA 1998a), these amounts were calculated to be  $7.31 \times 10^{-4}$  lbs for total PACs and  $1.00 \times 10^{-4}$  lbs for benzo(g,h,i)perylene.

#### **4.3.4 PACs from Natural Gas**

Approximately 932.33 million standard cubic feet (MMscf) of natural gas were burned at the Laboratory facilities in 2018. Using AP-42 emission factors (EPA 1998b) and fuel records, approximately 0.015 lbs of PACs were produced from natural gas combustion, which is applied to the manufacture threshold. Approximately 0.001 lbs of benzo(g,h,i)perylene applies toward the 10-lb manufacture threshold. Due to the absence of information regarding total PAC and benzo(g,h,i)perylene concentrations in natural gas, it was assumed these substances are negligible in natural gas before combustion.

#### **4.3.5 Summary of PACs**

Chemical procurement was the largest source of PACs at the Laboratory in 2018. The total amount otherwise used from all sources was 61.3 lbs. The total amount manufactured from combustion of fuel oil and natural gas was 0.016 lbs. Both threshold quantities for otherwise use and manufacture were below the 100-lb threshold; therefore, it was determined that reporting of PACs under EPCRA Section 313 was not necessary.

Benzo(g,h,i)perylene concentrations in asphalt tar and diesel fuel totaled 9.3 lbs towards the otherwise used threshold. Combustion processes accounted for 0.001 lbs, which is considered to be manufactured. These values are below the reporting threshold of 10 lbs. Therefore, benzo(g,h,i)perylene reporting was

not necessary under EPCRA Section 313 in 2018. Table 4-3 summarizes the PACs and benzo(g,h,i)perylene threshold determinations.

**Table 4-3. LANL 2018 Threshold Determinations for PACs and Benzo(g,h,i)perylene**

EPCRA Chemical/Compound	Process or Material	Amount (lbs)	Total (lbs)	EPCRA Section 313 Activity Determination	EPCRA Activity Threshold (lbs)
Total PACs	Purchased	11.2	61.3	Otherwise Used	100
	Impurity in natural gas	0.0			
	Asphalt tar	43.2			
	Impurity in fuel oil	6.9			
	Natural gas combustion	0.015	0.016	Manufactured	100
	Fuel oil combustion	$7.31 \times 10^{-4}$			
Benzo(g,h,i)perylene	Purchased	0.0	9.3	Otherwise Used	10
	Impurity in natural gas	0.0			
	Asphalt tar	6.47			
	Impurity in fuel oil	2.8			
	Natural gas combustion	0.001	0.001	Manufactured	10
	Fuel oil combustion	$1.00 \times 10^{-5}$			

#### 4.4 Nitric Acid

In general, nitric acid is used in high volumes at the Laboratory every year. The main uses are research and development activities, sample preparation, plutonium processing, and the Laboratory's bioassay program. Small amounts of nitric acid are used for cleaning glassware. The total amount of nitric acid used at LANL in 2018 did not exceed the EPCRA Section 313 otherwise use threshold of 10,000 lbs.

##### 4.4.1 Procurement

Nitric acid procured and used at the Laboratory in 2018 was evaluated to determine the amounts that could be applied to the EPCRA Section 313 laboratory exemption. According to EPCRA Section 313 guidance documents, the laboratory exemption is applied to the quantity of a listed toxic chemical that is manufactured, processed, or otherwise used in a laboratory under the supervision of technically qualified personnel. However, quantities of a listed toxic chemical used for cleaning glassware do not qualify for this exemption.

In 2018, a total of 4,050 lbs of nitric acid was procured at the Laboratory, based on queries of the ChemDB system. Some of the purchase records indicate the nitric acid is actually 69 to 71% nitric acid in an aqueous solution, or more dilute solutions. In almost all cases, the nitric acid is purchased as "lab grade," which is 65% to 70% nitric acid in water. The concentration of the nitric acid purchases was taken into account and the resulting amount of pure nitric acid purchased was calculated to be 2,834 lbs.

Historically, between 70 to 75% of total nitric acid has been used in laboratory use, which is an exempt activity. Since the amount purchased in 2018 is less than 30% of the threshold for reporting, no attempt was made to separate the laboratory use and otherwise use.

#### 4.4.2 TA-55 Plutonium Processing

Plutonium processing facility management was contacted to obtain information on the amount of nitric acid used in plutonium processing in 2018. TA-55 personnel did not purchase any bulk nitric acid for their bulk storage tank in 2018, nor did the facility perform any plutonium processing activities. The bulk nitric acid system was out of service for most of 2018. No nitric acid was moved from the bulk storage tank to smaller storage tanks within some of the processing areas. Therefore, no nitric acid was used for plutonium processing activities, and there were no nitric acid emissions.

#### 4.4.3 Summary

Nitric acid use in 2018 is below the EPCRA 313 10,000-lb otherwise used threshold, and therefore is not reportable. Table 4-4 provides a summary of nitric acid use at LANL in 2018.

**Table 4-4. Nitric Acid Threshold Determination for 2018**

Description	Amount of Nitric Acid (lbs)	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lbs)
Laboratory Use	0	Lab Exempt	Exempt
Otherwise Use		Otherwise Use	10,000
• Non-Lab, or unknown use	2,834		
• Plutonium Processing (TA-55 actual use)	0		
Total Otherwise Use	2,834		

#### 4.5 Nitrate Compounds

According to the EPA's EPCRA Section 313 Guidance "List of Toxic Chemicals within the Water Dissociable Nitrate Compounds Category and Guidance for Reporting" (EPA 2000a), nitrate compounds may be manufactured through the elemental neutralization of nitric acid and through the collection and treatment of sanitary wastewater. These sources of nitrate compounds are applicable to the Laboratory and are discussed in this section. The reporting thresholds for nitrate compounds are 25,000 lbs for manufacture/import or process and 10,000 lbs for otherwise used. Only the manufacture and otherwise used thresholds apply to the Laboratory for 2018 EPCRA reporting.

The above listed guidance provides a list of approximately 50 nitrate compounds that are included as water dissociable nitrate compounds. Although this list is not exhaustive, it provides commonly identified nitrate compounds. Only those compounds in aqueous solution (>50% water) are required to be reported. Also, a *de minimis* concentration of 1% is applied to all nitrate compounds found in mixtures. When determining the reporting threshold for nitrate compounds, the entire nitrate compound is included (both the nitrate and its counter ion) toward determining the threshold. If the threshold is exceeded, only the nitrate portion of the compound is reported.

For the manufacture threshold, the sources reviewed included waste nitric acid treated at the Radioactive Liquid Waste Treatment Facility (RLWTF), which uses sodium hydroxide in an elementary neutralization process. The other source was the SWSC Plant. The nitrate compounds that were applied to the otherwise used threshold included nitrate compounds purchased or used during 2018. Other nitrate compounds



evaluated were determined to be non-aqueous and were not required to be included in threshold determinations.

#### 4.5.1 Chemical Review

A query of ChemDB was performed to determine the amount of chemicals applied to the otherwise used threshold. Approximately 264 lbs of nitrate compounds were purchased in 2018. A few of the larger quantity purchases were clearly nitrate compounds in a powder (non-aqueous) form and do not count towards the EPCRA threshold. These purchases are typically removed from the threshold totals. However, since the total pounds purchased was so small, all purchases were counted towards the threshold.

#### 4.5.2 Sanitary Wastewater

The SWSC Plant collects sanitary wastewater (sewage and other allowable discharges) from several LANL facilities and treats the wastewater in a standard primary (physical), secondary (biological) treatment system. Information was collected from the SWSC Plant on nitrate influent concentration and total flow rate for the purpose of EPCRA Section 313 threshold determination. The information provided for 2018 indicated that the average nitrate concentration of the influent was 1.84 milligrams per liter and the total flow into the system was 62,723,000 gallons.

Using the flow rate given by the plant, the total annual average amount of nitrate compound (as sodium nitrate) was calculated. At the average nitrate concentration of 1.84 milligrams per liter, and adjusting the weight to include the sodium ion, the total sodium nitrate processed as an impurity was 1,320 lbs in 2018.

The information provided by SWSC Plant personnel also included the amount and the nitrate concentration of the effluent treated water. The total amount of treated water out of the SWSC Plant in 2018 was 88,072,000 gallons. The average nitrate concentration was 1.03 milligrams per liter. This calculates to a total of 1,038 lbs of nitrates (as sodium nitrate) manufactured.

The SWSC Plant is a zero discharge facility and all treated water is kept in a holding pond and pumped to the TA-3 power plant for use in cooling towers. Therefore, there are no releases to the environment from the SWSC Plant.

#### 4.5.3 Nitric Acid Neutralization

Typically, waste nitric acid from the mixed oxide (MO<sub>x</sub>) fuel process and from the Nitric Acid Recycling System, both located at the Plutonium Facility, is sent to the RLWTF for treatment. At the RLWTF, the waste acid is collected in a 5,000-gallon holding tank. Once the tank is approximately 25% full, the waste is neutralized using 25% sodium hydroxide. Once neutralized, the wastewater is sent to a 20,000-gallon holding tank awaiting the evaporation process. Periodically, the wastewater collected is sent through an evaporator to reduce the volume of water. The distillate is about two-thirds the volume of the initial aqueous stream. The remaining one-third is concentrate, called evaporator bottoms, and is sent off site for drying, repackaging, and is then returned to LANL for disposal at TA-54.

The RLWTF received two neutral pH acid waste transfers from TA-55 from the wet vacuum system totaling 610 liters in 2018, however the facility did not treat acid waste in 2018. The amount of nitrate

compounds formed due to nitric acid treated at the RLWTF is usually calculated using the formula found in the EPA “Nitrate Compound Guidance” (EPA 2000a). However, the RLWTF did not treat acid waste in 2018.

#### 4.5.4 Summary

Nitrate compounds that apply to the otherwise used reporting threshold of 10,000 lbs includes the chemicals found in ChemDB. A total of 264 lbs of nitrate compounds were purchased and assumed to be in aqueous form. This is well below the 10,000-lb EPCRA 313 threshold.

Nitrate compounds that apply to the manufacture reporting threshold of 25,000 lbs includes those identified in the sanitary wastewater at the SWSC Plant and the nitrate compounds identified during the elementary neutralization of nitric acid at the RLWTF. The amount manufactured as a by-product at the SWSC Plant is 1,320 lbs. No nitrate compounds were formed due to nitric acid neutralization activities at the RLWTF in 2018.

The amount of nitrate compounds processed as an impurity at the SWSC Plant was 1,038 lbs. This applies to a separate 25,000 processing threshold. Table 4-5 provides a summary of nitrate compounds at LANL in 2018.

**Table 4-5. Summary of Nitrate Compounds at LANL in 2018**

Description	Amount of Nitrate Compounds (lbs)	EPCRA Section 313 Activity Determination	EPCRA Section 313 Activity Threshold (lbs)
Purchased in ChemDB (assumed in aqueous form and otherwise used)	264	Otherwise Used	10,000
Processed at the SWSC Plant	1,320	Processed	25,000
Manufactured at the SWSC Plant	1,038	Manufactured	25,000
Manufactured at the RLWTF	0		
Total Manufactured	1,038		

#### 4.6 Hydrochloric Acid

The total amount of HCl procured in calendar year 2018 was 271,219 lbs. A total of 269,200 lbs of 31% HCl was used at SERF. This equals 82,106 lbs of pure HCl. The remaining 2,109 lbs is attributed to many small users and is 34 to 38% HCl and is used in various laboratory settings.

The large quantity of HCl used at SERF is used for pH adjustment of treated sanitary effluent, and in the microfilter cleaning tanks. The HCl is received as a 31% aqueous solution in 300- to 330-gallon totes and transferred to a 1,500-gallon HCl storage tank where it is then piped to the two processes in a nearly closed system. The aqueous form of HCl is exempt from EPCRA 313 reporting and HCl in aerosol form needs to be considered for threshold determinations (EPA 1999b). However, when the HCl is transferred into the storage tank, HCl vapors in the head space of the tank are vented in aerosol form.

In 2013, the EPA TANKS 4.09 emissions estimating software was run to estimate the amount of HCl vapors formed based on the number of turnovers of the tank and tank and site conditions (see Table 1). HCl is not a listed chemical in the TANKS software. EPA instructions describe two options for using the

TANKS software for chemicals not included in the chemical list: (1) use a feature to add new chemicals with physical properties such as molecular weight, vapor pressure, liquid density, vapor density; (2) use a surrogate chemical that is included in the TANKS chemical list that has similar physical properties. For this analysis we have chosen a surrogate chemical, ethylcyclopentane, which has a similar, but slightly higher vapor pressure. This should result in a slightly higher (conservative) estimate of emissions. Meteorological data from Albuquerque was used from the TANKS program, which should also provide slightly conservative estimates since Albuquerque has slightly higher average temperatures than Los Alamos.

Results from the TANKS software showed a total of 114.6 lbs of HCl vapor formed and emitted from the tank in 2013 when total HCl was 510,000 lbs. Since the amount of HCl purchased and throughput to this tank is approximately 38% less, emissions would also be less. Therefore, it was deemed unnecessary to run the TANKS software again since the estimate from 2013 can be used as a worst case estimate for 2018.

Using a worst case assumption that all minor purchases of HCl end up in vapor form, we have a total of 2,109 lbs of HCl towards the otherwise used threshold, and 114.6 lbs of HCl from the SERF tank counted towards the manufactured threshold. Both of these are well below the reporting thresholds of 10,000 lbs for otherwise used, and 25,000 lbs for manufactured. Therefore, it is not necessary to report HCl in 2018.

#### **4.7 Di-(2-ethylhexyl) phthalate**

A capacitor bank located at TA-55 contains 18 capacitors that hold 1.8 gallons of GE Dilektrol oil each for a total of 32.4 gallons. A major component of the Dilektrol oil is di-(2-ethylhexyl) phthalate (DEHP). This material is reportable under EPCRA 313.

The threshold for DEHP is 10,000 lbs and capacitors are article exempt. Therefore, based on the quantity contained in the capacitor bank and the article exemption, it is not necessary to report DEHP in 2018.

#### **4.8 Dioxins**

Dioxins are a group of PBTs formed during combustion processes. The EPCRA Section 313 reporting threshold for the dioxins category is 0.1 gram manufactured, processed, or otherwise used. This limit applies to toxic-equivalent compounds, a category of dioxins consisting of 17 specific dioxin and dioxin-like compounds. These “compounds with chlorine substitution in the 2, 3, 7, 8-positions on the molecule are reportable under the EPCRA Section 313 dioxin and dioxin-like compounds category” (EPA 2000b).

Activities at the Laboratory that were evaluated for dioxins include explosives activities and fuel combustion. Each is described below.

##### **4.8.1 Explosives Activities**

Dioxins are formed by burning chlorine-based chemical compounds with hydrocarbons producing an unintentional byproduct in many industrial processes involving chlorine. One potential source of dioxin formation at the Laboratory is open burn/open detonation (OB/OD) of high explosives (HEs). This is because many binders and plasticizers found in HE materials have chlorine in their chemical make-up.

Therefore, analysis of HE materials and associated binders/plasticizers was performed to estimate dioxin emissions.

Information on HE materials, such as explosive type, explosive name, composition, and chemical formula, was obtained from Laboratory personnel and textbooks. Some HE materials contain binders and plasticizers. These binders and plasticizers were evaluated and screened for those that contained chlorine. For those chlorine-containing binders/plasticizers, the weight percent chlorine in each was determined and the HE materials having chlorine-containing binders were further evaluated. Knowing the weight percent binder/plasticizer in these explosives and the weight percent chlorine in each binder, the amount of binder and amount of chlorine in each HE material containing chlorine was determined. Due to the unique nature of these materials, no specific dioxin emission factors are available. Therefore, a dioxin emission factor for burning of polyvinyl chloride in accidental fires was used to estimate dioxin emissions from burning of the chlorine-containing materials (ASME 1995). An emission factor of 4 micrograms dioxin emitted per ton of material burned was used.

Based on available information, estimated emissions from dioxins formed by OB/OD of HE materials totaled  $6.47 \times 10^{-3}$  grams in 2018. Burning of HE materials at the LANL Burn Ground was evaluated separately for dioxin formation. A more conservative approach was used to estimate dioxin emissions from burning of HE materials. The assumption was made that all HE-contaminated waste could potentially result in dioxin formation. Emission factors developed by the EPA for the burning of ammonium perchlorate propellant were used (EPA 1998c). Based on estimating emissions from all waste materials burned, dioxin emissions were  $1.86 \times 10^{-4}$  grams in 2018.

#### 4.8.2 Fuel Combustion

The Laboratory burns natural gas and diesel fuel in numerous boilers, heaters, and generators. No emission factors for dioxins were found for natural gas combustion. However, EPA EPCRA guidance for dioxins provides an emission factor of 3,178.6 picograms per liter of diesel fuel burned (EPA 2000b). The Laboratory burned a total of 44,279 gallons of diesel fuel in 2018. Total dioxin formation from burning diesel fuel was calculated to be 0.000533 grams for 2018.

The total calculated dioxin emissions in 2018 are below the 0.1-gram threshold and, therefore, reporting under EPCRA Section 313 is not required. Table 4-6 summarizes the amount of dioxins formed from all sources characterized for 2018.

**Table 4-6. Dioxin Threshold Determination for 2018**

Description	Amount of Dioxin Formed (grams)	EPCRA Section 313 Activity Determination	EPCRA Section 313 Threshold (grams)
HE Expended	$6.47 \times 10^{-4}$	Manufactured	0.1
HE Burned	$1.86 \times 10^{-4}$		
Fuel Combustion	$5.33 \times 10^{-4}$		
Total Dioxin Formed	$1.37 \times 10^{-3}$		

## 5.0 LEAD FORM R REPORTING

### 5.1 Threshold Determination

Lead and lead compounds are used in various processes throughout the Laboratory. In January 2001, the EPA promulgated a rule lowering the threshold for EPCRA Section 313 reporting of lead and lead compounds to 100 lbs, effective for reporting year 2001. In 2018, lead and lead compounds were otherwise used, processed, or manufactured in the following operations at the Laboratory.

#### 5.1.1 Lead Procurements

A listing of all procurements in 2018 of lead and lead compounds was extracted from ChemDB. Line items containing a CAS number for lead (7439-92-1) were included, as well as any line items containing the word “lead” or the symbol “Pb” in the text description.

The total amount of lead and lead compounds added to ChemDB for 2018 was 12.3 lbs. Line items in ChemDB that were clearly described as lead standards were assumed to be used in a laboratory setting and exempt from reporting. Purchasers were also contacted to determine if their lead was used for exempt activities. This accounted for 2.7 lbs. The total amount of lead and lead compounds from procurements applied to the otherwise used threshold is 9.6 lbs. This includes 0 lbs applied to the lead threshold and 9.6 lbs applied to the lead compound threshold.

#### 5.1.2 Lead Use at the Firing Range

Lead is a component in various types of ammunition. The Laboratory maintains an onsite firing range for training security personnel. The firing range keeps detailed records of the amount and type of munitions expended. The U.S. Department of Defense developed software for estimating usage and releases of EPCRA Section 313 chemicals from various munitions activities ([www.epa.gov/tri](http://www.epa.gov/tri)). The TRI-Data Delivery System (TRI-DDS) software was unavailable for 2018. In order to calculate the amounts of toxic chemicals associated with munitions used at LANL for comparison with EPCRA Section 313 reporting thresholds and calculation of environmental releases for 2018, the previous years (2002 through 2016) reports were used to supply information used in the 2018 calculations.

The total lead released to the environment at the firing range in 2018 was lower than the previous year. It was determined that 1,139 lbs of lead and 6.6 lbs of lead compounds were otherwise used.

The 2018 amount of lead released to land (non-air) was 1,139 lbs. This amount equals the amount otherwise used. Lead compounds are also manufactured through the firing of ammunition. These lead compounds were calculated using the TRI-DDS software. Additionally, firing of ammunition containing lead created (manufactured) 3.4 lbs of lead compounds as air emissions.

#### 5.1.3 Lead from Fuel Combustion

In 2018, the Laboratory emitted lead compound emissions from the following combustion sources: the TA-3 power plant, the TA-3 combustion turbine, and from numerous small boilers, which used approximately 935.3 MMscf of natural gas. The AP-42 emission factor for lead compounds from natural gas combustion in both large and small boilers is 0.0005 lbs/MMscf. The lead compound emissions from these sources totaled 0.47 lbs towards the manufactured threshold. The Laboratory also burned an

estimated 44,279 gallons of diesel fuel in boilers, heaters, and diesel-fired generators. The AP-42 emission factor for diesel fuel combustion is 0.00123 lbs per 1,000 gallons, this equates to 0.05 lbs of lead compound manufactured.

Additionally, lead is found in fuel oil and natural gas as an impurity. According to EPA guidance (EPA 2001d), the concentration of lead in No. 2 fuel oil is 0.5 ppm and in natural gas is 0.05 milligrams per cubic meter. The 44,279 gallons of fuel oil contained 0.16 lbs of lead and 935.3 MMscf of natural gas contained 2.88 lbs of lead, which are added to the otherwise used threshold.

#### **5.1.4 Lead Use at LANSCE**

The Laboratory continues to maintain an inventory of lead shielding and lead bricks at LANSCE and other areas of the Laboratory. In recent years, the Laboratory has attempted to reduce the inventory by sending some of the lead offsite to be reused. According to the EPA's web-based TRI advanced training course presented by Science Applications International Corporation on May 10, 2005, "the recovery of a listed Section 313 chemical for further distribution in commerce or commercial use is 'processing' of that chemical." Also, materials sent offsite for direct reuse are not reported on Form R, but materials sent offsite for recycling are reported on Form R in Part II, Section 6.2. The EPA considers the direct recirculation of a toxic chemical within a process or between processes without any intervening reclamation or recovery to be reuse. Furthermore, reclamation or recovery does not include simple phase changing of the toxic chemical before further reuse (e.g., simple remelting of scrap metal).

The process for shipping scrap metal for reuse has been centralized at the Material Recycle Facility (MRF), part of LANL's salvage process. The MRF stages the metal and coordinates pick-up by a metal recycling company. The MRF estimates that 20,960 lbs of lead were shipped offsite for reuse in 2018.

The lead sent to the metal recycling company is considered processed because it is distributed for commercial use. The metal recycling company repackages the lead and then sends it to a lead smelter. Because the lead is simply remelted, it is defined as reused. Therefore, it will not be reported on Form R in Part II, Section 6.2.

#### **5.1.5 Other LANL Operations Using Lead and Lead Compounds**

The Sigma Foundry, located at TA-3-66, melts lead in order to declassify parts. In 2018, the foundry did not melt any lead and there were no stack air emissions as a result.

In previous years, the Laboratory has conducted operations to decontaminate lead shielding and lead melting and cutting operations to form new shielding. Onsite processing of both of these activities was suspended in 2000. However, LANSCE resumed processing in 2013 and reported that no lead was sent to Ace Metals for recycling in 2018.

The Laboratory installed a lead-bismuth test loop at LANSCE in 2001. The test loop contains approximately 9,500 lbs of lead bismuth. In 2018, no lead bismuth was added or removed from the loop.

#### **5.1.6 Conclusion**

Table 5-1 summarizes the threshold determination for lead and lead compounds for 2018. Based on these operations, it was determined that lead was otherwise used and processed over threshold quantities.

**Table 5-1. Summary of Threshold Determination for Lead and Lead Compounds for 2018**

Activity	Lead Use (lbs)	Lead Compound Use (lbs)	Comments
Lead Purchases (ChemDB)	0	9.6	Otherwise Used 7.36 lbs purchased, 0.33 lbs Lab Exempt
Firing Range	1,139	6.6	Otherwise Used
Firing Range	0	3.4	Manufactured
Fuel Combustion	0	0.52	Manufactured (sum of natural gas, diesel, and propane from asphalt plant)
Fuel Combustion	3.04	0	Otherwise Used
Lead Recycle/Resale from MRF (sold to Ace Metals)	20,960	0	Processed, all of it is reused and not reported on the Form Rs
Sigma Foundry	0	0	Processed
Lead-Bismuth Test Loop LANSCE	0	0	Manufactured
<b>TOTALS</b>	<b>Otherwise Used – 1,142 Processed – 20,960</b>	<b>Otherwise Used – 16.23 Manufactured – 3.9</b>	<b>Reporting Thresholds = 100 lbs</b>

## 5.2 Environmental Releases and Offsite Disposal

For 2018, LANL exceeded the otherwise used threshold of 100 lbs for lead and also exceeded the processed threshold of 100 lbs for lead. Therefore, a Form R for lead must be submitted, which includes reporting on air emissions, water discharges, land disposal, and offsite waste disposal.

### 5.2.1 Air Emissions

In 2018, LANL emitted lead compound emissions to the atmosphere in the form of both fugitive and stack emissions. The sources for the lead compound air emissions include the firing range, fuel combustion, Sigma Foundry, and the RLWTF evaporator.

#### 5.2.1.1 Firing Range

The Laboratory operates a firing range onsite for security personnel training. Monthly records are maintained detailing the type and amount of ammunition used at the firing range. For EPCRA Section 313 reporting purposes, the ammunition records are input to the U.S. Department of Defense TRI-DDS software ([www.epa.gov/tri](http://www.epa.gov/tri)) to estimate the amount of EPCRA chemical used and released to the environment. Based on the results of the TRI-DDS software, a total of 2.7 lbs of lead compounds were emitted as fugitive air emissions from the firing range in 2018.

#### 5.2.1.2 Fuel Combustion

In 2018, the Laboratory emitted lead compounds from the following combustion sources: the asphalt plant, the TA-3 power plant, generators, and from numerous small boilers and heaters. Emissions from

the burning of both natural gas and diesel fuel were calculated. The total emissions from these combustion sources totaled 0.52lbs of lead compound stack emissions.

### 5.2.1.3 RLWTF Evaporator

The RLWTF has an effluent evaporator at TA-55 in order to evaporate off water collected at the effluent outfall directly to the atmosphere. The effluent water contained 0.638 grams of lead, which equates to 0.001 lbs of lead emitted as stack air emissions.

### 5.2.1.4 Sigma Foundry

The Sigma Foundry, located at TA-3-66, melts lead in order to declassify parts. In 2018, the foundry did not melt any lead. Thus, there were no Sigma Foundry lead stack air emissions in 2018.

### 5.2.1.5 Conclusion

In 2018, the Laboratory emitted a total of 3.22 lbs of lead to the atmosphere, including 2.7 lbs of fugitive emissions and 0.52 lbs of stack emissions. The fugitive emissions are from the firing range. The stack emissions include emissions from fuel oil/diesel combustion sources and natural gas combustion sources from the RLWTF Evaporator. Table 5-2 summarizes lead air emissions from the Laboratory as reported on Form R.

**Table 5-2. Lead Air Emissions from LANL in 2018**

Emission Source	Total Lead Emissions (lbs)	Fugitive or Stack
Firing Range	2.7	Fugitive
Fuel Combustion	0.52	Stack
Sigma Foundry	0	Stack
RLWTF Evaporator	0.001	Stack
<b>Total</b>	<b>3.22</b>	

## 5.2.2 Releases to Water

This section describes the amount of lead released to the environment from the Laboratory during 2018, as measured at LANL's National Pollutant Discharge Elimination System (NPDES) outfalls, which quantifies the amount of listed chemicals released due to facility operations during the reporting period.

During prior year assessments, a second data source has been included in release estimates. The quantity of lead present in surface and storm water has been estimated and reported. These estimates were derived from analytical and flow volume data collected at surface water sampling stations, as well as flow estimates for stations where flow is not measured. Further calculations were performed to quantify the amount of lead attributable to naturally occurring sources, and then convert the anthropogenic fraction to derive a mass. The detailed methodology for the analysis of lead in surface and storm water and mass calculations is documented in annual EPCRA Summary Reports for calendar years 2001 through 2005.

EPCRA requires the reporting of TRI listed chemicals released to the environment during the year in which they are originally released. The inclusion of surface and storm water data within the annual release dataset is an overestimate as these data do not represent current year releases, but measure the



migration and transport of existing contaminant inventory that 1) was released to the environment before initiation of annual EPCRA reporting, 2) is unrelated to the original environmental release, and 3) cannot be differentiated from, and likely effectively masks, actual environmental releases. Therefore, annual EPCRA reporting will only include annual original release data as directly measured at NPDES outfalls.

NPDES outfall data, generated as part of the Laboratory's Outfall Monitoring Program, were obtained from the Water Quality and Resource Conservation and Recovery Act (RCRA) Group. Outfall 051 is the only LANL outfall that has discharge limits for lead. Since there are no limits at the other outfalls, LANL does not analyze for lead at these outfalls. In 2018, LANL sampled for a full slate of analytes (including lead) at each outfall as part of the NPDES Permit renewal process. The New Mexico Environment Department analyzes the concentration and determines if it is likely that the surface water standard for each analyte could be exceeded. If the standard is not likely to be exceeded then there is no permit limit for that constituent. Based on the 2004 sampling, there were no permit limits for lead at any outfall other than Outfall 051, so there are no data on lead concentrations for water sent to those outfalls from 2005–2010.

For the EPCRA Section 313 Form R, Section 5.3 reporting, the total amount of lead released to each receiving stream is reported. For NPDES outfall data, the receiving stream associated with each sample location was determined through the use of the Laboratory's Annual Site Environmental Report maps and information received from LANL's Water Quality and RCRA Group. The following table summarizes the total lead discharged from each of the three tributaries on Pajarito Plateau that LANL discharged to during 2018. Total lead release to streams was 0.218 lbs. Table 5-3 was used to complete Section 5.3.1 of the Form R.

**Table 5-3. Lead Releases to Water in 2018 from LANL NPDES Outfall**

Canyon	LANL NPDES Outfall Lead (lbs)
Mortandad Tributary to Rio Grande	0.008
Sandia Tributary to Rio Grande	0.155
Los Alamos Tributary to Rio Grande	0.056
<b>Total of NPDES Discharges</b>	<b>0.218</b>

### 5.2.3 Releases to Land

Lead releases to land at the Laboratory occur as a result of firing range activities. Lead releases to land are based on the amount of munitions used during the year and the lead content of the munitions used. Lead content for munitions used at the Laboratory was estimated by matching the munitions types with those listed in the TRI-DDS. A total of 1,139 lbs of lead was released to land at the firing range at LANL in 2018.

### 5.2.4 Offsite Waste Disposal

The Solid Waste Operations Group provided waste characterization and disposal data for lead wastes that were shipped offsite in 2018. Laboratory and article exempt waste was removed from the dataset. EPCRA article and laboratory exemptions have been documented in previous years' memos and are described in the EPA/TRI Guidance Document "Toxic Chemical Release Inventory Reporting Forms and Instructions for RY2008" (EPA 2008).

The data provided by Solid Waste Operations included the percent of lead for most of the waste shipments. However, this information was lacking for many of the waste items, and the Environmental Protection and Compliance Group had to obtain the necessary information from material safety data sheets or the Merck Index (1989). In most cases, the waste profile form provided sufficient information to complete the lead calculation. For some waste items, estimates of the percentage of lead were made by matching it with similarly described waste shipments from previous years' analyses. For those waste items weighing less than 1 kilogram, lead concentrations were estimated based on the item description. For example, lead percentage by weight in waste items comprised of a chemical compound, such as lead nitrate, were determined from the Merck Index (1989). In other wastes, where the description provided sufficient information about the nature of the item (e.g., lead pellets), the percentage of lead was estimated (e.g., lead pellets = 100% lead). If the material safety data sheet did not give the percentage of lead, the most conservative was assumed from the range given.

#### 5.2.4.1 Results

The amount of lead contained in waste that was shipped offsite from the Laboratory in 2018 was 17,419.1 lbs. This total weight of lead was calculated by multiplying the total waste weight (kilograms) by the percentage of lead within each waste item, and then converted to pounds.

EPCRA reportable waste items shipped offsite from the Laboratory to several waste treatment/disposal facilities in 2018 are summarized in Table 5-4. As per EPCRA guidelines, only those disposal facilities that received more than 0.5 lbs of lead in 2018 were included in the summary table and on the Form R.

**Table 5-4. Summary of Waste Disposal Facilities Receiving LANL Waste in 2018**

Company	Address	Facility EPA ID	Ultimate Fate of Waste	Total Lead (lbs)
Clean Harbors Grassy Mountain, LLC	Exit 41 I-80, Grassy Mountain, UT 84029	UTD991301748	Other Land Disposal	0.7
Energy Solutions, LLC	Tooele County, I-80, Exit 49, Clive, UT 84029	UTD982598898	Landfill	17,356.7
Perma-Fix	1940 NW 67th Place , Gainesville, FL 32653	FLD980711071	Other Land Disposal	8.3
Perma-Fix Northwest, Inc.	2025 Batelle Rd, Richland, WA 99354	WAR000010355	Other Land Disposal	5.3
Veolia ES Technical Services, LLC	9131 East 96 <sup>th</sup> Avenue, Henderson, CO 80640	COD980591184	Other Land Disposal	12.6
Waste Control Specialists, LLC, TSD Facility	9998 W. State Highway 176, Andrews, TX 79714	TXD9888088464	Other Land Disposal	20.2
Waste Isolation Pilot Plant	4021 National Parks Highway, Carlsbad, NM 88221	NM4890139088	Solidification/Stabilization of Metals	5.2
Waste Management of New Mexico	402 Industrial Park Loop, Rio Rancho, NM 87124-1412	NMD986683563	Other Land Disposal	10.1
			<b>Total</b>	<b>17,419.1</b>

#### 5.2.4.2 Disposal Fate

The EPCRA Form R requires information about each treatment/disposal facility that received waste from the Laboratory, including how much was sent to each waste treatment/disposal facility and additional information regarding waste treatment, recycling, or disposal conducted at each facility. A Waste Disposal/Treatment Code must be entered in Section 6.2.C of the Form R for each facility receiving waste. The Waste Disposal/Treatment Codes were updated by the EPA in 2005 and are included on pages 54 and 55 of the “Toxic Chemical Release Inventory Reporting Forms and Instructions for RY2008” (EPA 2008) guidance document.

### 5.3 Other Information Provided on Form R

Environmental releases of lead as air emissions, to surface waters, and onsite land releases were reported to be 3.22 lbs, 0.218 lbs, and 1,139 lbs, respectively. These values are included in Section 5 of the Form R, Quantity of the Toxic Chemical Entering Each Environmental Medium Onsite. A total of 17,419.1 lbs of lead was reported in Section 6.2 of the Form R, Transfers to Other Offsite Locations.

Methods of treating lead in wastewater effluent before discharge were included in Section 7A of the Form R, which details onsite waste treatment methods and efficiency. Wastewater from industrial processes at the Laboratory is discharged to the RLWTF before discharge to NPDES-permitted Outfall 051. The RLWTF conducts a series of treatment steps that reduce the amount of metals in the effluent. The wastewater stream goes through precipitation, filtration, neutralization, and reverse osmosis treatment. All wastewater is sampled for lead before and after treatment. Based on analytical results for 2018, the RLWTF resulted in a 99.98% treatment efficiency of lead in the wastewater. Sections 7B and 7C of the Form R relate to onsite energy recovery and recycling. The Laboratory performed no onsite processes applicable to these sections for lead in 2018.

Section 8 of the Form R refers to source reduction and recycling activities. The information provided by the EPA for this section states that no energy recovery is possible for lead, either onsite or offsite. The Laboratory also reported no onsite recycling or treatment.

Section 8.9 of the Form R reports the production or activity ratio, an estimated measure of production or activity involving the reported chemical, as compared to the previous year. Because the Laboratory is not a production facility, a surrogate measure was needed to complete this section of the Form R. To determine this value, the firing range was used as a representative activity that would maintain a consistent use of lead. The amount of lead munitions used in 2018 was divided by the amount used in 2017 to obtain an activity ratio of 0.9.

## 6.0 EPCRA SECTION 313 SUMMARY AND TRENDS

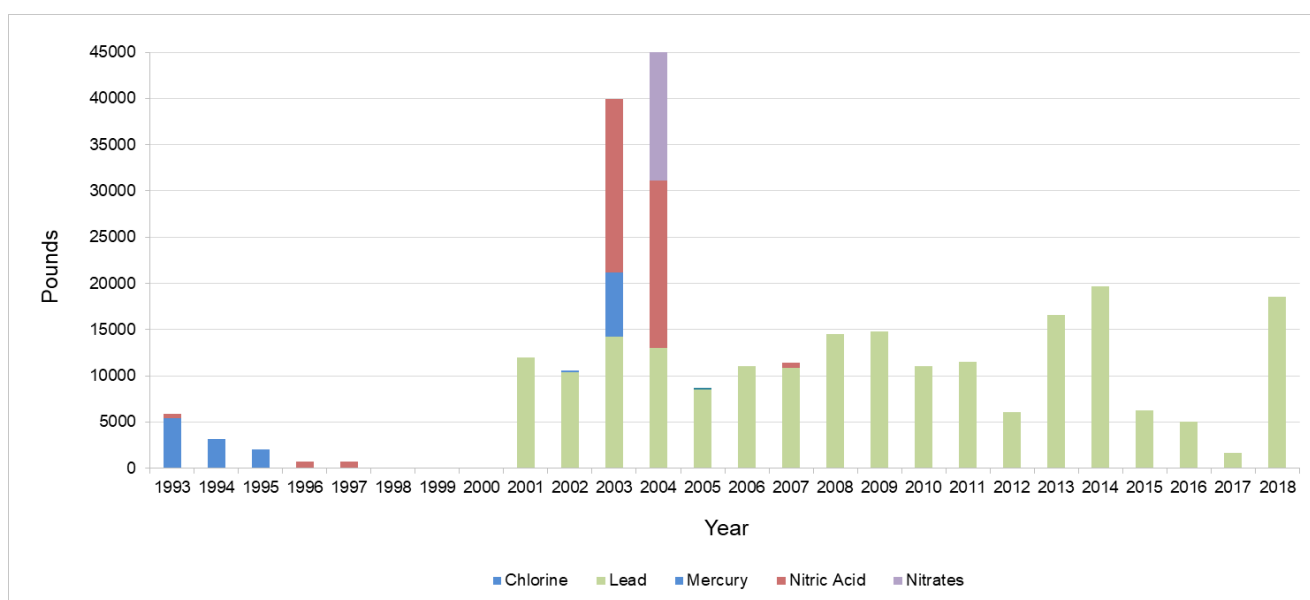
The Laboratory has submitted EPCRA Section 313 data to the EPA since 1987. From 1987 to 1994, this information was submitted by the University of California, operator of LANL. Starting with reporting year 1995, EO 12856 required all federal facilities to comply with EPCRA Section 313 requirements. As of 1995, EPCRA Section 313 information for the Laboratory has also been submitted by the DOE. Historical information on LANL-reported Section 313 releases is included in the EPA TRI database and can be accessed at <http://www.epa.gov/tri/>.

The Laboratory has implemented numerous pollution prevention projects to reduce use and releases of EPCRA Section 313 chemicals. However, two regulatory changes made by the EPA in recent years impact EPCRA Section 313 reporting:

- On October 19, 1999, the EPA promulgated a final rule on PBTs. This rule added several chemicals to the EPCRA Section 313 list and established lower reporting thresholds for PBT chemicals (EPA 1999a). These lower thresholds became applicable in reporting year 2000.
- On January 17, 2001, the EPA changed the PBT rule to reduce the EPCRA Section 313 reporting threshold for lead and lead compounds to 100 lbs (from 10,000 lbs). The new lead threshold became applicable with reporting year 2001.

As a result of these regulatory changes, the Laboratory has triggered EPCRA Section 313 reporting for lead and mercury in recent years. The regulatory changes resulted in reporting thresholds of 100 lbs for lead. Therefore, LANL has submitted environmental release data on lead since the rule changed.

Figure 6-1 provides a summary of LANL-reported releases for the period from 1993 through 2018.



**Note:** For 2003 through 2006, one-time waste disposal of lead from decontamination and demolition activities is not included on this chart.

**Figure 6-1. Trends in LANL’s reported releases to EPA TRI**

Several points are worth noting from this chart:

- In the early 1990s, the Laboratory implemented a new wastewater disinfection system that eliminated the use of chlorine. Chlorine gas was replaced with bromine tablets and mixed oxidants generated from sodium chloride. This pollution prevention project decreased use of chlorine to well below reporting thresholds.
- In the late 1990s, the Laboratory implemented a Nitric Acid Recycling System to reduce the amount of new nitric acid needed for plutonium processing. This closed-loop recycle system greatly reduced the need to purchase nitric acid, and due to recycling efforts, nitric acid use was below

reporting thresholds for several years. However, in 2003 and 2004 a new process to convert weapons-grade plutonium to MO<sub>x</sub> fuels for nuclear power plants was implemented. Due to quality specifications and facility constraints, this project was unable to use recycled nitric acid. Therefore, nitric acid was reportable for 2003 and 2004.

- In 2005, the plutonium processing facility had very limited operations due to ongoing facility maintenance and equipment upgrades. Therefore, nitric acid use was well below reporting thresholds for 2005. In late 2006, the maintenance and equipment upgrades were completed and operations restarted. Nitric acid use for 2006 was still just below reporting thresholds. In 2007 nitric acid was again reportable due to resumption of higher levels of plutonium processing activities.
- Because there were no identified users of recycled nitric acid, and limited storage capacity, in 2004, spent nitric acid from plutonium processing was sent to the RLWTF for treatment and disposal. However, the treatment process for nitric acid was neutralized and resulted in formation of nitrate compounds. For the first time in 2004, nitrate compounds were manufactured above reportable quantities and triggered reporting.
- Although the use of lead and lead compounds has been relatively constant over the years at the Laboratory, the threshold for reporting was lowered to 100 lbs in 2001. The Laboratory first began EPCRA Section 313 reporting on lead in that year. About that same time, LANL made a concerted effort to reduce onsite inventory of lead bricks and shielding that is no longer needed. Much of this lead shielding is radioactively contaminated and cannot be recycled. Therefore, large amounts of legacy lead were shipped offsite for disposal and reported on the Form Rs.
- The largest use of mercury at the Laboratory is in the LANSCE shutter system. Reservoirs of mercury are used as shields on the neutron beam shutter system. Each reservoir is a closed system and only opened occasionally when minor repairs or maintenance are needed. Mercury has only triggered reporting during the years that maintenance activities have occurred on the shutter systems. Environmental releases of mercury are very low.

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**APPENDIX A:*****EPCRA Section 313 Chemicals Used or Procured in 2018***

CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
7647-01-0	Hydrochloric acid (aerosol forms only)	10000	83556.3405
1344-28-1	Aluminum oxide (fibrous forms)	10000	8609.349
7697-37-2	Nitric acid	10000	5211.8503
7664-93-9	Sulfuric acid (aerosol forms only)	10000	4938.7483
7782-50-5	Chlorine	10000	3704.9347
67-56-1	Methanol	10000	3397.6286
Polychlorinated Alkanes	Polychlorinated alkanes (C10 to C13)	10000	2811.08
78-48-8	S,S,S-Tributyltrithiophosphate	10000	2359.6282
Barium	Barium Compounds	10000	1876.3373
67-63-0	Isopropyl alcohol (mfg-strong acid process)	10000	1634.2698
872-50-4	N-Methyl-2-pyrrolidone	10000	1199.4555
Glycol Ethers	Glycol Ethers	10000	1085.2417
68-12-2	N,N-Dimethylformamide	10000	1074.4188
110-54-3	n-Hexane	10000	1065.8699
Zinc	Zinc Compounds	10000	905.1014
107-21-1	Ethylene glycol	10000	881.3461
75-45-6	Chlorodifluoromethane	10000	572.4147
75-05-8	Acetonitrile	10000	543.7565
75-09-2	Dichloromethane	10000	378.601
1330-20-7	Xylene (mixed isomers)	10000	324.9581
88-89-1	Picric acid	10000	282.4092
108-88-3	Toluene	10000	273.2848
Nitrate	Nitrate compounds (water dissociable)	10000	264.372
67-66-3	Chloroform	10000	215.8114
Copper	Copper Compounds	10000	150.7866
123-31-9	Hydroquinone	10000	139.4409
78-93-3	Methyl ethyl ketone	10000	99.5072
7664-39-3	Hydrogen fluoride	10000	95.7322
123-91-1	1,4-Dioxane	10000	57.0976
7664-38-2	Phosphoric acid	10000	47.6216
61-82-5	Amitrole	10000	43.4832
Mercury	Mercury Compounds	10	42.3489
71-43-2	Benzene	10000	41.4186
Chromium	Chromium Compounds	10000	29.0624
84-74-2	Dibutyl phthalate	10000	27.7559
100-41-4	Ethylbenzene	10000	27.525
75-52-5	Nitromethane	10000	27.4682

CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
7632-00-0	Sodium nitrite	10000	26.5916
Polycyclic aromatic compounds	Polycyclic aromatic compounds (includes 21 chemicals and 51 mixtures)	100	24.9076
110-82-7	Cyclohexane	10000	22.3083
7429-90-5	Aluminum (fume or dust)	10000	22.023
Cyanide	Cyanide Compounds	10000	21.0693
79-01-6	Trichloroethylene	10000	20.4035
108-10-1	Methyl isobutyl ketone	10000	20.1474
50-00-0	Formaldehyde	10000	19.9129
127-18-4	Tetrachloroethylene	10000	17.9675
90-43-7	2-Phenylphenol	10000	15.0216
109-86-4	2-Methoxyethanol	10000	12.7779
Lead	Lead Compounds	100	12.2809
7439-96-5	Manganese	10000	12.048
Cadmium	Cadmium Compounds	10000	10.1195
108-90-7	Chlorobenzene	10000	9.7884
80-62-6	Methyl methacrylate	10000	9.3749
Silver	Silver Compounds	10000	9.1936
121-44-8	Triethylamine	10000	8.9995
71-36-3	n-Butyl alcohol	10000	8.9285
79-10-7	Acrylic acid	10000	8.1679
98-95-3	Nitrobenzene	10000	7.961
100-42-5	Styrene	10000	7.9355
64-18-6	Formic acid	10000	7.1536
56-23-5	Carbon tetrachloride	10000	7.0105
Cobalt	Cobalt Compounds	10000	5.8593
Manganese	Manganese Compounds	10000	5.8129
98-86-2	Acetophenone	10000	5.6658
7664-41-7	Ammonia	10000	5.6572
110-86-1	Pyridine	10000	4.9842
77-73-6	Dicyclopentadiene	10000	4.4092
26628-22-8	Sodium azide (Na(N <sub>3</sub> ))	10000	4.1991
62-56-6	Thiourea	10000	3.5273
95-63-6	1,2,4-Trimethylbenzene	10000	3.445
101-68-8	Methylenebis(phenylisocyanate)	<10000	3.445
95-50-1	1,2-Dichlorobenzene	10000	3.1671
7726-95-6	Bromine	10000	2.8005
74-95-3	Methylene bromide	10000	2.7524
106-89-8	Epichlorohydrin	10000	2.6014
Nickel	Nickel Compounds	10000	2.4925



CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
62-53-3	Aniline	10000	2.4783
108-39-4	m-Cresol	10000	2.2046
85-44-9	Phthalic anhydride	10000	2.2046
108-93-0	Cyclohexanol	10000	2.0877
140-88-5	Ethyl acrylate	10000	2.0348
Arsenic	Arsenic Compounds	10000	2.0198
Antimony	Antimony Compounds	10000	2.0059
77-09-8	Phenolphthalein	10000	1.99
141-32-2	Butyl acrylate	10000	1.9819
95-47-6	o-Xylene	10000	1.94
108-38-3	m-Xylene	10000	1.9047
106-42-3	p-Xylene	10000	1.8981
78-92-2	sec-Butyl alcohol	10000	1.7857
124-40-3	Dimethylamine	10000	1.4792
Chlorophenols	Chlorophenols	10000	1.3385
75-15-0	Carbon disulfide	10000	1.253
Selenium	Selenium Compounds	10000	1.186
556-52-5	Glycidol	10000	1.1023
108-31-6	Maleic anhydride	10000	1.1023
96-33-3	Methyl acrylate	10000	1.0538
75-07-0	Acetaldehyde	10000	0.8598
74-88-4	Methyl iodide	10000	0.6612
4170-30-3	Crotonaldehyde	10000	0.4701
55406-53-6	3-Iodo-2-propynyl butylcarbamate	10000	0.4588
7550-45-0	Titanium tetrachloride	10000	0.4409
Beryllium	Beryllium Compounds	10000	0.4078
123-72-8	Butyraldehyde	10000	0.354
10294-34-5	Boron trichloride	10000	0.2976
101-80-4	4,4'-Diaminodiphenyl ether	10000	0.2314
110-00-9	Furan	10000	0.2271
106-88-7	1,2-Butylene oxide	10000	0.2204
106-44-5	p-Cresol	10000	0.2204
90-94-8	Michler's ketone	10000	0.2204
842-07-9	C.I. Solvent Yellow 14	10000	0.2204
302-01-2	Hydrazine	10000	0.2204
108-95-2	Phenol	10000	0.2204
78-79-5	Isoprene	10000	0.1501
100-44-7	Benzyl chloride	10000	0.1102
62-55-5	Thioacetamide	10000	0.1102
81-88-9	C.I. Food Red 15	10000	0.1102

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CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
97-56-3	C.I. Solvent Yellow 3	10000	0.0743
3296-90-0	2,2-bis(Bromomethyl)-1,3-propanediol	10000	0.0551
7440-62-2	Vanadium (fume or dust)	10000	0.0551
1464-53-5	Diepoxybutane	10000	0.0551
108-05-4	Vinyl acetate	10000	0.0513
1313-27-5	Molybdenum trioxide	10000	0.022
94-36-0	Benzoyl peroxide	10000	0.022
Warfarin and salts	Warfarin and salts	10000	0.0024
51-79-6	Urethane	10000	0.0022

**APPENDIX B:**  
*Form R for Lead (LANL)*

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*Environmental Protection & Compliance  
Division*

Los Alamos National Laboratory  
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*Symbol:* EPC-DO:19-186  
*LAUR:* 19-25252  
*Date:* **JUN 24 2019**

Ms. Adrienne L. Nash  
National Security Missions  
Los Alamos Field Office, A316  
National Nuclear Security Administration  
Los Alamos, NM 87545


**Subject: Confirmation of Electronic Submittal of 2018 Toxic Chemical Release Inventory Report to the United States Environmental Protection Agency (USEPA)**

Dear Ms. Nash:

The 2018 Toxic Chemical Release Inventory Report, Form R, for Los Alamos National Laboratory (LANL) was submitted to the Environmental Protection Agency (EPA) using the online reporting tool, TRIMEweb. Similar to previous years, lead is the only reportable chemical. Per the Service Agreement/Work Authorization for Environmental Services (SAWA #M&O-003), Triad prepared and submitted the Form R with data input and concurrence from N3B. The report is required by Emergency Planning and Community Right-to-Know Act, Title III, Section 313. This year the EPA's deadline is July 1<sup>st</sup> and the report was submitted electronically on June 24<sup>th</sup>, 2019.

Should you have questions or comments regarding the information provided in this report, please contact Walt Whetham at (505) 665-8885.

Sincerely,

  
Enrique Torres  
Division Leader

ET/WW:jdm

Attachment(s): Attachment 1 2018 Toxic Chemical Release Inventory Report for the  
Emergency Planning and Community Right-to-Know Act, Title III, Section 313

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# **Attachment 1**

## **2018 Toxic Chemical Release Inventory Report for the Emergency Planning and Community Right-to-Know Act, Title III, Section 313**

### **Electronic Submittal**

**EPC-DO: 19-186**

**LA-UR-19-25252**

**Date:**                     **JUN 24 2019**

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Form Approved OMB Number: 2025-0009  
Approval Expires: 2021-10-31

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Complete form online via TRI-MEweb. For a trade secret submission, send completed forms to TRI Reporting Center, P. O. Box 10163, Fairfax, VA 22038. The annual public burden related to the Form R is estimated to average 35.71 hours per response for a facility filing a report on one chemical. See the Reporting Forms and Instructions for more information on submissions and the Paperwork Reduction Act.

<b>EPA</b> United States Environmental Protection Agency		<b>FORM R</b> 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.		TRI Facility ID Number <b>87545LSLMSLOSAL</b>				
This section only applies if you are revising or withdrawing a previously submitted form, otherwise leave blank:		Revision (Enter up to two code(s)) [ ] [ ]		Withdrawal (Enter up to two code(s)) [ ] [ ]				
Important: See Instructions to determine when "Not Applicable (NA)" boxes should be checked.								
Part I. FACILITY IDENTIFICATION INFORMATION								
SECTION 1. REPORTING YEAR: <b>2018</b>								
SECTION 2. TRADE SECRET INFORMATION								
2.1	Are you claiming the toxic chemical identified on page 2 trade secret? <input type="checkbox"/> Yes (Answer question 2.2; attach substantiation forms) <input checked="" type="checkbox"/> NO (Do not answer 2.2; go to Section 3)							
2.2	Is this copy <input type="checkbox"/> Sanitized <input type="checkbox"/> 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: <b>Enrique Torres Division Leader</b>			Signature: <b>Reference Copy: Copy of Record Resides in CDX</b>		Date Signed: <b>2019-06-24</b>			
SECTION 4. FACILITY IDENTIFICATION								
4.1	Facility or Establishment Name <b>TRIAD NATIONAL SECURITY, LLC, LOS ALAMOS NATIONAL LABORATORY</b>		TRI Facility ID Number <b>87545LSLMSLOSAL</b>		BIA Code			
	Street <b>BIKINI ATOLL RD SM30</b>			Facility or Establishment Mailing Address (if different from physical street address) <b>PO BOX 1663</b>				
	City/Country/State/ZIP Code <b>LOS ALAMOS / Los Alamos / NM / 87545</b>		City/State/ZIP Code <b>LOS ALAMOS / NM / 87545</b>		Country (Non-US)			
4.2	This report contains information for: (Important: check a or b; check c or d if applicable)		a. <input checked="" type="checkbox"/> An Entire facility	b. <input type="checkbox"/> Part of a facility	c. <input type="checkbox"/> A Federal facility	d. <input checked="" type="checkbox"/> GOC0		
4.3	Technical Contact name	<b>Walt Whetham</b>	Email Address <b>walt@lanl.gov</b>		Telephone Number (include area code and ext.) <b>505-665-8885</b>			
4.4	Public Contact name	<b>Peter Hyde</b>	Email Address <b>pahyde@lanl.gov</b>		Telephone Number (include area code and ext.) <b>505-667-3792</b>			
4.5	NAICS Code(s) (6 digits)		a. <b>928110 (Primary)</b>	b.	c.	d.	e.	f.
4.6	Dun and Bradstreet Number(s) (9 digits)							
	a. <b>NA</b>							
SECTION 5. PARENT COMPANY INFORMATION								
5.1	Name of U.S. Parent Company (for TRI Reporting purposes)			<b>US DEPARTMENT OF ENERGY</b>		No U.S. Parent Company (for TRI Reporting purposes) <input type="checkbox"/>		
5.2	Parent Company's Dun & Bradstreet Number		NA <input checked="" type="checkbox"/>					



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<b>EPA FORM R</b> <b>PART II. CHEMICAL - SPECIFIC INFORMATION</b>	TRI Facility ID Number <b>87545LSLMSLOSAL</b> Toxic Chemical, Category, or Generic Name <b>Lead</b>
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**SECTION 1. TOXIC CHEMICAL IDENTITY** (Important: DO NOT complete this section if you are reporting a mixture component in 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.) <b>007439921</b>
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.) <b>Lead</b>
1.3	Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive). <b>NA</b>

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

2.1	Generic Chemical Name Provided by Supplier (Important: Maximum of 70 characters, including numbers, spaces, and punctuation.) <b>NA</b>
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**SECTION 3. ACTIVITIES AND USES OF THE TOXIC CHEMICAL AT THE FACILITY**  
(Important: Check all that apply.)

3.1 Manufacture the toxic chemical: a. <input type="checkbox"/> Produce b. <input type="checkbox"/> Import  If produce or import: c. <input type="checkbox"/> For on-site use/processing d. <input type="checkbox"/> For sale/distribution e. <input type="checkbox"/> As a byproduct f. <input type="checkbox"/> As an impurity	3.2 Process the toxic chemical:  a. <input type="checkbox"/> As a reactant Sub-Uses: b. <input type="checkbox"/> As a formulation component Sub-Uses: c. <input type="checkbox"/> As an article component d. <input checked="" type="checkbox"/> Repackaging e. <input type="checkbox"/> As an impurity f. <input type="checkbox"/> Recycling	3.3 Otherwise use the toxic chemical:  a. <input type="checkbox"/> As a chemical processing aid Sub-Uses: b. <input type="checkbox"/> As a manufacturing aid Sub-Uses: c. <input checked="" type="checkbox"/> Ancillary or other use Sub-Uses: <b>Z399</b>
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**SECTION 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR**

4.1	<b>[ 05 ]</b> (Enter two-digit code from instruction package.)
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**SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE**

			A. Total Release (pounds/year*) (Enter range code or estimate**)	B. Basis of Estimate (Enter code)	C. Percent from Stormwater
5.1	Fugitive or non-point air emissions	NA <input type="checkbox"/>	<b>2.7</b>	<b>C</b>	
5.2	Stack or point air emissions	NA <input type="checkbox"/>	<b>0.52</b>	<b>E1</b>	
5.3	Discharges to receiving streams or water bodies (Enter one name per box)	NA <input type="checkbox"/>			
	Stream or Water Body Name	Reach Code (optional)			
5.3.1	<b>SANDIA TRIBUTARY TO RIO GRANDE</b>		<b>0.155</b>	<b>M2</b>	<b>0%</b>
5.3.2	<b>MORTANDAD TRIBUTARY TO RIO GRANDE</b>		<b>0.008</b>	<b>M2</b>	<b>0%</b>
5.3.3	<b>LOS ALAMOS TRIBUTARY TO RIO GRANDE</b>		<b>0.056</b>	<b>M2</b>	<b>0%</b>

\*For Dioxin and Dioxin-like Compounds, report in grams/year

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

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<p><b>EPA FORM R</b> <b>PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)</b></p>	TRI Facility ID Number <b>87545LSLMSLOSAL</b> Toxic Chemical, Category, or Generic Name <b>Lead</b>
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**SECTION 5. QUANTITY OF THE TOXIC CHEMICAL ENTERING EACH ENVIRONMENTAL MEDIUM ON-SITE (Continued)**

		NA	A. Total Release (pounds/year*) (Enter range code** or estimate)	B. Basis of Estimate (Enter code)
5.4-5.5	Disposal to land on-site			
5.4.1	Class I Underground Injection wells	[X]		
5.4.2	Class II-V Underground Injection wells	[X]		
5.5.1.A	RCRA subtitle C landfills	[X]		
5.5.1.B	Other landfills	[X]		
5.5.2	Land treatment/application farming	[X]		
5.5.3A	RCRA Subtitle C surface impoundments	[X]		
5.5.3B	Other surface impoundments	[X]		
5.5.4	Other disposal	[ ]	<b>1139</b>	<b>C</b>

**Optional Waste Rock Piles Information**

You may check this box if your Section 5.5 quantities include "waste rock piles." [ ] Enter quantity of "waste rock piles" (pounds/year\*)

**SECTION 6. TRANSFER(S) OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS**

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTWs) NA [X]

\*For Dioxin and Dioxin-like Compounds, report in grams/year  
 \*\*Range Codes: A=1-10 pounds; B=11-499 pounds; C=500-999 pounds.

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<b>EPA FORM R PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)</b>						TRI Facility ID Number <b>87545LSLMSLOSAL</b>		Toxic Chemical, Category, or Generic Name <b>Lead</b>	
SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS						NA <input type="checkbox"/>			
6.2.1 Off-Site EPA Identification Number (RCRA ID No.)						<b>FLD980711071</b>			
Off-Site Location Name:						<b>PERMA-FIX OF FLORIDA INC</b>			
Off-Site Address:						<b>1940 NW 67TH PL</b>			
City	<b>GAINESVILLE</b>	County	<b>Alachua</b>	State	<b>FL</b>	ZIP	<b>326531649</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
A. Total Transfer (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. <b>8.3</b>			1. <b>O</b>		1. <b>M41</b>				
6.2.2 Off-Site EPA Identification Number (RCRA ID No.)						<b>UTD982598898</b>			
Off-Site Location Name:						<b>ENERGY SOLUTIONS CLIVE FACILITY</b>			
Off-Site Address:						<b>U.S. INTERSTATE 80, EXIT 49</b>			
City	<b>GRANTSVILLE</b>	County	<b>Tooele</b>	State	<b>UT</b>	ZIP	<b>84029</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
A. Total Transfer (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. <b>17356.7</b>			1. <b>O</b>		1. <b>M65</b>				
6.2.3 Off-Site EPA Identification Number (RCRA ID No.)						<b>WAR000010355</b>			
Off-Site Location Name:						<b>PERMA-FIX NORTHWEST RICHLAND INC</b>			
Off-Site Address:						<b>2025 BATTELLE BOULEVARD</b>			
City	<b>RICHLAND</b>	County	<b>Benton</b>	State	<b>WA</b>	ZIP	<b>99354</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
A. Total Transfer (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. <b>5.3</b>			1. <b>O</b>		1. <b>M64</b>				
6.2.4 Off-Site EPA Identification Number (RCRA ID No.)						<b>COD980591184</b>			
Off-Site Location Name:						<b>VEOLIA ES TECHNICAL SOLUTIONS LLC</b>			
Off-Site Address:						<b>9131 EAST 96TH AVENUE</b>			
City	<b>HENDERSON</b>	County	<b>Adams</b>	State	<b>CO</b>	ZIP	<b>80640</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
A. Total Transfer (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. <b>12.6</b>			1. <b>O</b>		1. <b>M64</b>				
6.2.5 Off-Site EPA Identification Number (RCRA ID No.)						<b>TXD988088464</b>			
Off-Site Location Name:						<b>WASTE CONTROL SPECIALISTS</b>			
Off-Site Address:						<b>9998 W STATE HIGHWAY 176</b>			
City	<b>ANDREWS</b>	County	<b>Andrews</b>	State	<b>TX</b>	ZIP	<b>79714</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
A. Total Transfer (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. <b>20.2</b>			1. <b>O</b>		1. <b>M64</b>				
6.2.6 Off-Site EPA Identification Number (RCRA ID No.)						<b>NM4890139088</b>			
Off-Site Location Name:						<b>WASTE ISOLATION PILOT PLANT</b>			
Off-Site Address:						<b>4021 NATIONAL PARKS HIGHWAY</b>			

City	<b>CARLSBAD</b>	County	<b>Eddy</b>	State	<b>NM</b>	ZIP	<b>88221</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [ <b>X</b> ] No			
A. Total Transfer (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. <b>5.2</b>		1. <b>O</b>		1. <b>M41</b>					
6.2.7 Off-Site EPA Identification Number (RCRA ID No.)				<b>NMD986683563</b>					
Off-Site Location Name:				<b>WASTE MGMT OF NEW MEXICO</b>					
Off-Site Address:				<b>33RD ST./NORTHERN BLVD.</b>					
City	<b>RIO RANCHO</b>	County	<b>Sandoval</b>	State	<b>NM</b>	ZIP	<b>87124</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [ <b>X</b> ] No			
A. Total Transfer (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. <b>10.1</b>		1. <b>O</b>		1. <b>M64</b>					
6.2.8 Off-Site EPA Identification Number (RCRA ID No.)				<b>UTD991301748</b>					
Off-Site Location Name:				<b>CLEAN HARBORS GRASSY MOUNTAIN</b>					
Off-Site Address:				<b>3 MILES EAST, 7 MILES NORTH of KNOLLS</b>					
City	<b>KNOLLS</b>	County	<b>Tooele</b>	State	<b>UT</b>	ZIP	<b>84029</b>	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [ <b>X</b> ] No			
A. Total Transfer (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. <b>0.7</b>		1. <b>O</b>		1. <b>M64</b>					
<b>SECTION 7A. ONSITE WASTE TREATMENT METHODS AND EFFICIENCY</b>									
[ ] 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. Waste Treatment Efficiency Estimate				
<b>7A.1 a</b>	<b>7A.1 b</b>				<b>7A.1 c</b>				
<b>W</b>	2: <b>H123</b> 3: <b>H077</b> 4: <b>H082</b> 5: <b>H124</b> 6: <b>H129</b> 7: <b>H122</b>				<b>E3</b>				
<b>7A.2 a</b>	<b>7A.2 b</b>				<b>7A.2 c</b>				
<b>S</b>	2: <b>H101</b>				<b>E6</b>				

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<b>EPA FORM R</b> <b>PART II. CHEMICAL - SPECIFIC INFORMATION (CONTINUED)</b>	TRI Facility ID Number <b>87545LSLMSLOSAL</b>
	Toxic Chemical, Category, or Generic Name <b>Lead</b>

**SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES**  
 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)]

**SECTION 7C. ON-SITE RECYCLING PROCESSES**  
 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)]

SECTION 8. SOURCE REDUCTION AND WASTE MANAGEMENT		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*)
<b>8.1 - 8.7 Production-Related Waste Managed</b>					
8.1a	Total on-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills	NA	NA	NA	NA
8.1b	Total other on-site disposal or other releases	1141.658	1142.439	1200	1200
8.1c	Total off-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills	477.7	17405.6	5000	5000
8.1d	Total other off-site disposal or other releases	5.2	13.5	15	15
8.2	Quantity used for energy recovery on-site	NA	NA	NA	NA
8.3	Quantity used for energy recovery off-site	NA	NA	NA	NA
8.4	Quantity recycled on-site	NA	NA	NA	NA
8.5	Quantity recycled off-site	NA	NA	NA	NA
8.6	Quantity treated on-site	NA	NA	NA	NA
8.7	Quantity treated off-site	NA	NA	NA	NA
8.8	Non-production-related waste managed**		NA		
8.9	[ ] Production ratio or [X] Activity ratio (select one and enter value to right)		0.9		
8.10	Did your facility engage in any newly implemented source reduction activities for this chemical during the reporting year? If so, complete the following section; if not, check NA.		NA [X]		
	Source Reduction Activities (Enter code(s))	Methods to Identify Activity (Enter code(s))			Estimated annual reduction (Enter code(s)) (optional)
8.10.1	NA				

\*For Dioxin and Dioxin-like Compounds, report in grams/year  
 \*\* Includes quantities released to the environment or transferred off-site as a result of remedial actions, catastrophic events, or other one-time events not associated with production processes

TRI Facility ID Number
87545LSLMSLOSAL
Toxic Chemical, Category, or Generic Name
Lead

<b>Additional optional information on source reduction, recycling, or pollution control activities.</b>

<b>Section 8.11: If you wish to submit additional optional information on source reduction, recycling, or pollution control activities, provide it here.</b>	
Topic	Comment

<b>Section 9.1: If you wish to submit any miscellaneous, additional, or optional information regarding your Form R submission, provide it here.</b>	
Topic	Comment