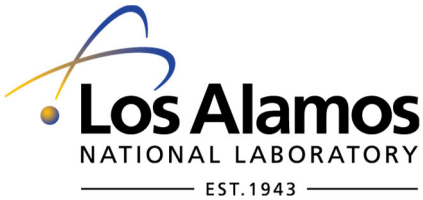
LA-UR-18-30767
Approved for public release; distribution is unlimited.

Title:	Emergency Planning and Community Right-To-Know Act of 1986, Title III, Section 313, Toxic Chemical Release Inventory Summary Report for 2017
Author(s):	Whetham, Walter Wiley
Intended for:	Report Environmental Regulatory Document
Issued:	2018-11-16 (rev.1)

LA-UR-18-30767
November 2018

Emergency Planning and Community Right-To-Know Act of 1986, Title III, Section 313, Toxic Chemical Release Inventory Summary Report for 2017



Prepared by the Environmental Protection Division

CONTENTS

Figures

Tables

This page intentionally left blank.

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_x	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_3	sulfur trioxide
SWSC	Sanitary Wastewater Systems Consolidation
TA	Technical Area
TRI	Toxic Release Inventory
TRI-DDS	TRI-Data Delivery System (software)

This page intentionally left blank.

EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT OF 1986, TITLE III, SECTION 313, TOXIC CHEMICAL RELEASE INVENTORY SUMMARY REPORT FOR 2017

By
Environmental Compliance Programs Group

ABSTRACT

For reporting year 2017, 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 2017 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 2017, 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.

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 2017, the Laboratory submitted a Form R for lead. No other EPCRA Section 313 chemicals were used in 2017 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 2017 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 2017. 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. Steve Story at (505) 665-2169
  - LANL public contact: Mr. Peter Hyde at (505) 667-3792
- Los Alamos DOE complex
  - TRI facility identification number: 87544SDLSL52835
  - 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 2017, a total of 47,668 records were added to ChemDB and evaluated; 13,319 were pure chemicals and 34,349 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.

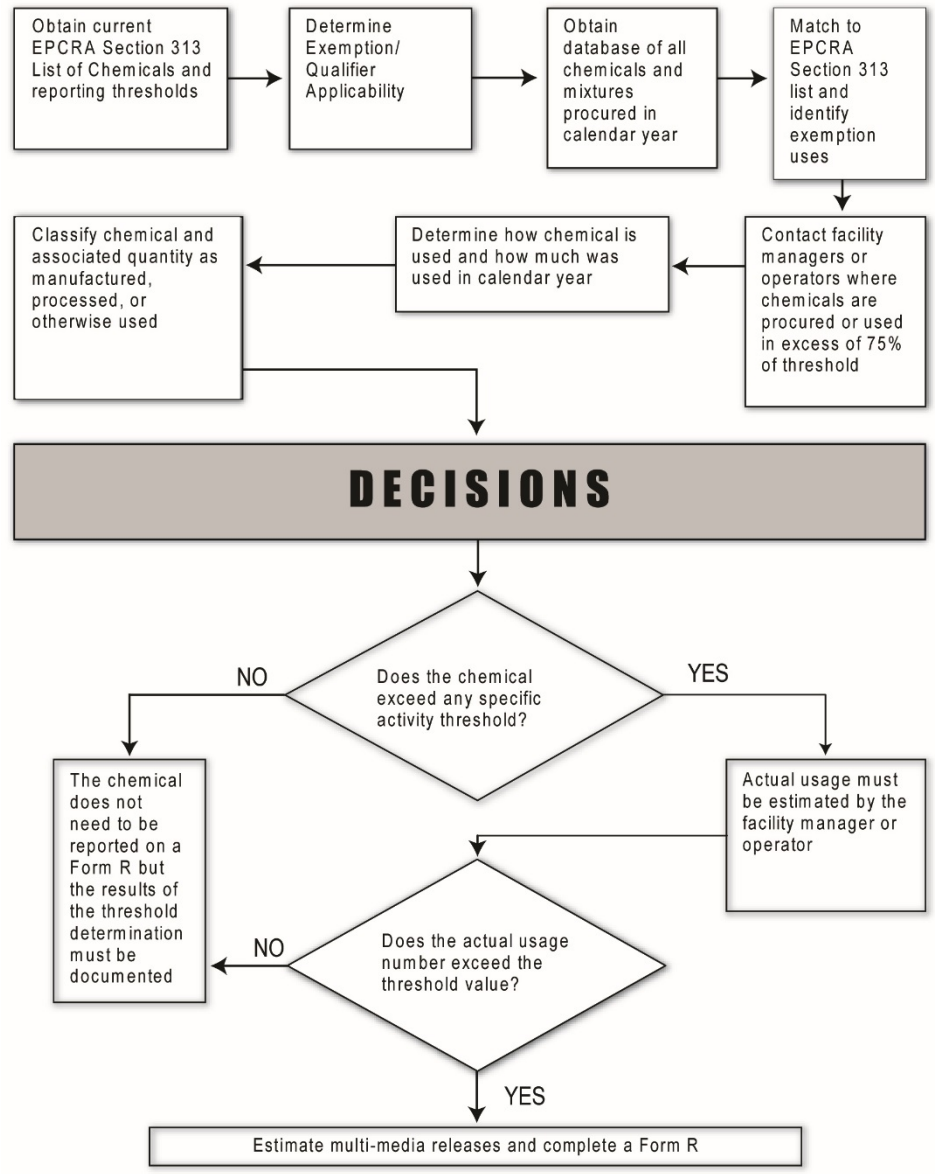


Figure 3-1. Flowchart process of analysis for EPCRA Section 313 reporting

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 Minimus***—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 2017 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 2017, the chemicals that were analyzed in more detail included:

- mercury compounds,
- sulfuric acid,
- PACs,
- nitric acid,
- nitrate compounds,
- 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 2017

CAS No	Chemical Name	Total Procured (lbs)
7647-01-0	Hydrochloric Acid (aerosol forms only)	136,046
7782-50-5	Chlorine	4,247
7697-37-2	Nitric Acid	4,098
7664-93-9	Sulfuric Acid	3,012
67-56-1	Methanol	2,534
75-52-5	Nitromethane	2,092
Polychlorinated Alkanes	Polychlorinated Alkanes (C10 to C13)	2,056
67-63-0	Isopropyl Alcohol	1,237
Cyanide Compounds	Cyanide Compounds	1,199
88-89-1	Picric Acid	1,109

* 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 2017 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 2017, mercury was used in four areas at the Laboratory. Each is described below.

4.1.1 Mercury Procurements

A listing of all procurements in 2017 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 2017 was 42.5 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 21.2 lbs of mercury was determined to

be laboratory exempt. Although 21.2 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 21.3 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 3.2 lbs from the mercuric nitrate.

The total amount of mercury applied to the otherwise used threshold from chemical purchases is 3.2 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 2017, minor maintenance was performed on the mercury shutter system. However, no mercury was removed or added to the shutter system in 2017. Similar maintenance is anticipated in 2017.

4.1.3 Fuel Combustion

In 2017, 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 0.54 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 40,640 gallons of diesel fuel in 2017 and this equates to 0.00029 lbs of mercury towards the otherwise used threshold.

4.1.4 Conclusion

The total amount of mercury qualifying as otherwise used equals 3.2 lbs, which is below the reporting threshold value of 10 lbs. The total amount of mercury compounds manufactured was 0.54 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 2017. A summary of the 2017 mercury threshold determination is provided in Table 4-1.

Table 4-1. Summary of 2017 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	21.2	Procurement data and facility personnel interviews	Laboratory Exempt	NA*
Other Procurement	3.2	Procurement Records	Otherwise Used	10
LANSCE Shutter System	0	LANSCE Facility Records		
Fuel Combustion	0.00029	Fuel Use Records and EPA Guidance		
Fuel Combustion	0.54	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 620.5 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_3) 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_3 emission factors are not available.

For 2017, ChemDB shows that a total of 3,012 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 2017

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	0.12	AP-42 and fuel use records	Manufactured	25,000
Natural Gas Combustion	617.07	AP-42 and facility records		
Asphalt Production	3.28	AP-42 and facility records		
Storage Tanks	0.003	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 7.04 lbs of PACs from 2017 chemical purchases.

4.3.2 PACs from Asphalt Production

In 2017, the Laboratory's onsite asphalt plant produced approximately 712 tons of asphalt. Additionally, Española Transit Mix provided 5,901 tons of asphalt amounts to LANL. Therefore, a total of 6,613 tons of asphalt was used at LANL in 2017.

A review of project management records for 2017 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.

For the 2017 reporting year, it was decided to include all projects, exempt and non-exempt. In 2017, using the 8 ppm concentration, the total amount of PACs otherwise used at LANL in asphalt was 5.27 lbs, which is far 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 0.79 lbs of benzo(g,h,i)perylene reportable towards its 10-lb otherwise use threshold.

4.3.3 PACs from Fuel Oil Combustion

Approximately 40,640 gallons of diesel fuel were used in 2017 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 6.4 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 2.6 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 6.71×10^{-4} lbs for total PACs and 9.18×10^{-5} lbs for benzo(g,h,i)perylene.

4.3.4 PACs from Natural Gas

Approximately 781.6 million standard cubic feet (MMscf) of natural gas were burned at the Laboratory facilities in 2017. Using AP-42 emission factors (EPA 1998b) and fuel records, approximately 0.013 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 2017. The total amount otherwise used from all sources was 18.67 lbs. The total amount manufactured from combustion of fuel oil and natural gas was 0.014 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 3.39 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 2017. Table 4-3 summarizes the PACs and benzo(g,h,i)perylene threshold determinations.

Table 4-3. LANL 2017 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	7.04	18.67	Otherwise Used	100
	Impurity in natural gas	0.0			
	Asphalt tar	5.27			
	Impurity in fuel oil	6.4			
	Natural gas combustion	0.013	0.014	Manufactured	100
	Fuel oil combustion	6.71×10^{-4}			
Benzo(g,h,i)perylene	Purchased	0.0	3.39	Otherwise Used	10
	Impurity in natural gas	0.0			
	Asphalt tar	0.79			
	Impurity in fuel oil	2.6			
	Natural gas combustion	0.001	0.001	Manufactured	10
	Fuel oil combustion	9.18×10^{-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 2017 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 2017 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 2017, a total of 4,098 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 2,874 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 2017 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 2017. TA-55 personnel did not purchase any bulk nitric acid for their bulk storage tank in 2017, nor did the facility perform any plutonium processing activities. The bulk nitric acid system was out of service for most of 2017. 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 2017 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 2017.

Table 4-4. Nitric Acid Threshold Determination for 2017

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	2,874		
• Plutonium Processing (TA-55 actual use)	0		
Total Otherwise Use	3,314		

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 2017 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 2017. 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 255 lbs of nitrate compounds were purchased in 2017. 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 2017 indicated that the average nitrate concentration of the influent was 2.12 milligrams per liter and the total flow into the system was 66,250,000 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 2.12 milligrams per liter, and adjusting the weight to include the sodium ion, the total sodium nitrate processed as an impurity was 1,606 lbs in 2017.

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 2017 was 90,740,000 gallons. The average nitrate concentration was 1.49 milligrams per liter. This calculates to a total of 1,546 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_x) 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 720 liters in 2017, however the facility did not the treat acid waste in 2017. 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 2017.

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 255 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 1,546 lbs. No nitrate compounds were formed due to nitric acid neutralization activities at the RLWTF in 2017.

The amount of nitrate compounds processed as an impurity at the SWSC Plant was 1,606 lbs. This applies to a separate 25,000 processing threshold. Table 4-5 provides a summary of nitrate compounds at LANL in 2017.

Table 4-5. Summary of Nitrate Compounds at LANL in 2017

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)	255	Otherwise Used	10,000
Processed at the SWSC Plant	1,606	Processed	25,000
Manufactured at the SWSC Plant	1,546		
Manufactured at the RLWTF	0	Manufactured	25,000
Total Manufactured	1,546		

4.6 Hydrochloric Acid

The total amount of HCl procured in calendar year 2017 was 428,422 lbs. A total of 427,100 lbs of 31% HCl was used at SERF. This equals 134,922 lbs of pure HCl. The remaining 1,322 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 2017.

Using a worst case assumption that all minor purchases of HCl end up in vapor form, we have a total of 1,322 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 2017.

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 2017.

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 1.58×10^{-3} grams in 2017.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 2.43×10^{-4} grams in 2017.

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 40,640 gallons of diesel fuel in 2017. Total dioxin formation from burning diesel fuel was calculated to be 0.000489 grams for 2017.

The total calculated dioxin emissions in 2017 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 2017.

Table 4-6. Dioxin Threshold Determination for 2017

Description	Amount of Dioxin Formed (grams)	EPCRA Section 313 Activity Determination	EPCRA Section 313 Threshold (grams)
HE Expended	1.58×10^{-3}	Manufactured	0.1
HE Burned	2.43×10^{-4}		
Fuel Combustion	4.89×10^{-4}		
Total Dioxin Formed	2.31×10^{-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 2017, 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 2017 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 2017 was 5.70 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 0.34 lbs. The total amount of lead and lead compounds from procurements applied to the otherwise used threshold is 5.36 lbs. This includes 0 lbs applied to the lead threshold and 5.36 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). The TRI-Data Delivery System (TRI-DDS) software was unavailable for 2017. 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 2017, the previous years (2002 through 2016) reports were used to supply information used in the 2017 calculations.

The total lead released to the environment at the firing range in 2017 was lower than the previous year. It was determined that 1,138 lbs of lead and 7.1 lbs of lead compounds were otherwise used.

The 2017 amount of lead released to land (non-air) was 1,138 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) 3.7 lbs of lead compounds as air emissions.

5.1.3 Lead from Fuel Combustion

In 2017, 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 781.6 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 0.39 lbs towards the manufactured threshold. The Laboratory also burned an

estimated 40,640 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 40,640 gallons of fuel oil contained 0.15 lbs of lead and 781.6 MMscf of natural gas contained 2.41 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 2,100 lbs of lead were shipped offsite for reuse in 2017.

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 2017, 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 2017.

The Laboratory installed a lead-bismuth test loop at LANSCE in 2001. The test loop contains approximately 9,500 lbs of lead bismuth. In 2017, 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 2017. 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 2017

Activity	Lead Use (lbs)	Lead Compound Use (lbs)	Comments
Lead Purchases (ChemDB)	5.36	0	Otherwise Used 7.36 lbs purchased, 0.33 lbs Lab Exempt
Firing Range	1,138	7.1	Otherwise Used
Firing Range	0	3.7	Manufactured
Fuel Combustion	0	0.44	Manufactured (sum of natural gas, diesel, and propane from asphalt plant)
Fuel Combustion	2.56	0	Otherwise Used
Lead Recycle/Resale from MRF (sold to Ace Metals)	2,100	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
TOTALS	**Otherwise Used – 1,145.9** **Processed – 2,100**	**Otherwise Used – 7.1** **Manufactured – 4.1**	**Reporting Thresholds = 100 lbs**

5.2 Environmental Releases and Offsite Disposal

For 2017, 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 2017, 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) 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 3.0 lbs of lead compounds were emitted as fugitive air emissions from the firing range in 2017.

5.2.1.2 Fuel Combustion

In 2017, 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 0.44 lbs 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 0.3 grams of lead, which equates to 0.0006 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 2017, the foundry did not melt any lead. Thus, there were no Sigma Foundry lead stack air emissions in 2017.

5.2.1.5 Conclusion

In 2017, the Laboratory emitted a total of 3.44 lbs of lead to the atmosphere, including 3.0 lbs of fugitive emissions and 0.44 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 2017

Emission Source	Total Lead Emissions (lbs)	Fugitive or Stack
Firing Range	3.0	Fugitive
Fuel Combustion	0.44	Stack
Sigma Foundry	0	Stack
RLWTF Evaporator	0.0006	Stack
Total	**3.44**	

5.2.2 Releases to Water

This section describes the amount of lead released to the environment from the Laboratory during 2017, 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 2017, 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 2017. Total lead release to streams was 0.257 lbs. Table 5-3 was used to complete Section 5.3.1 of the Form R.

Table 5-3. Lead Releases to Water in 2017 from LANL NPDES Outfall

Canyon	LANL NPDES Outfall Lead (lbs)
Mortandad Tributary to Rio Grande	0.008
Sandia Tributary to Rio Grande	0.152
Los Alamos Tributary to Rio Grande	0.058
Total of NPDES Discharges	**0.218**

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 1,138 lbs of lead was released to land at the firing range at LANL in 2017.

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 2017. 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 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 2017 was 482.9 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 2017 are summarized in Table 5-4. As per EPCRA guidelines, only those disposal facilities that received more than 0.5 lbs of lead in 2017 were included in the summary table and on the Form R.

Table 5-4. Summary of Waste Disposal Facilities Receiving LANL Waste in 2017

Company	Address	Facility EPA ID	Ultimate Fate of Waste	Total Lead (lbs)
Energy Solutions, LLC	Tooele County, I-80, Exit 49, Clive, UT 84029	UTD982598898	Landfill	**443.8**
National Security Technologies, LLC	National Nuclear Security Administration WM, Mercury NV 89023	NV890009002	Other Land Disposal	**1.2**
Perma-Fix Northwest, Inc.	2025 Batelle Rd, Richland, WA 99354	WAR000010355	Other Land Disposal	**1.8**
Veolia ES Technical Services, LLC	9131 East 96th Avenue, Henderson, CO 80640	COD980591184	Other Land Disposal	**1.2**
Waste Control Specialists, LLC, TSD Facility	9998 W. State Highway 176, Andrews, TX 79714	TXD9888088464	Other Land Disposal	**28.3**
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	**1.4**
			Total	**482.9**

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 3.44 lbs, 0.218 lbs, and 1,138 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 482.9 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 2017, 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 2017.

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 2017 was divided by the amount used in 2014 to obtain an activity ratio of 0.89.

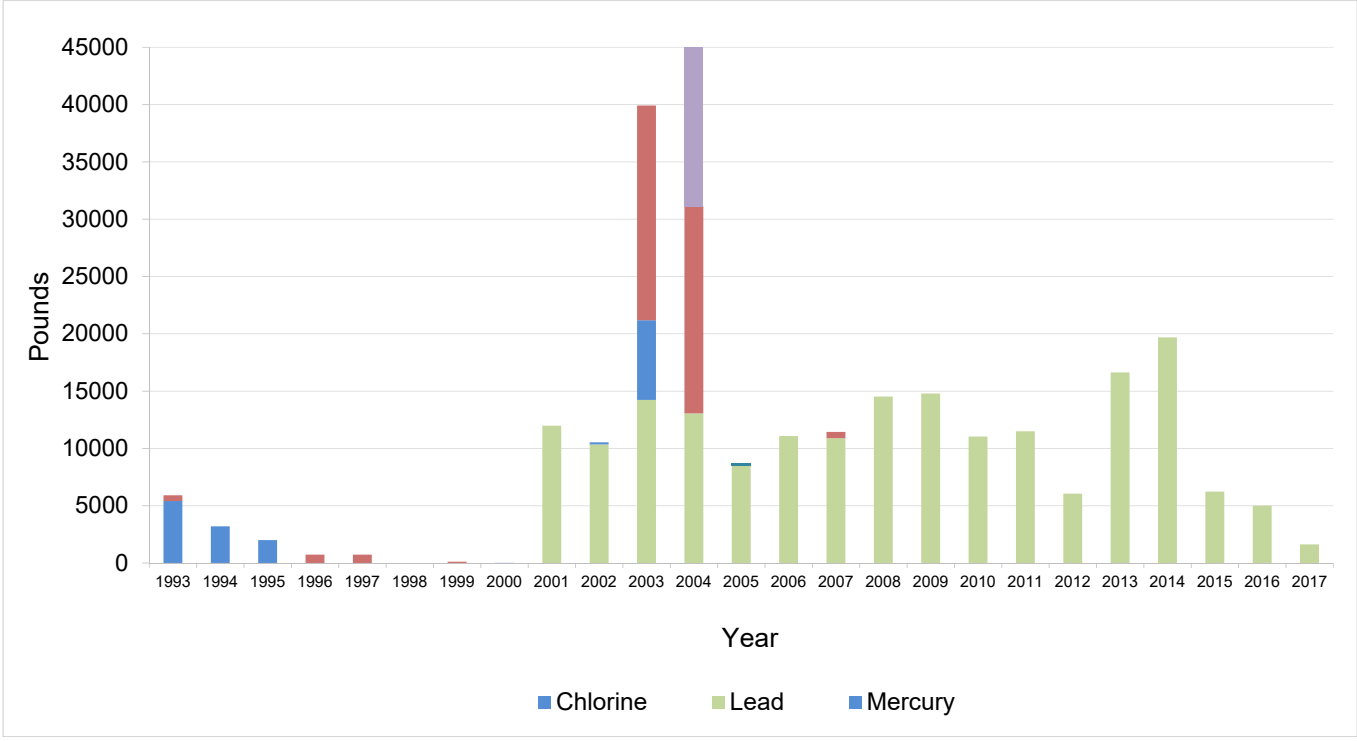
6.0 EPCRA SECTION 313 SUMMARY AND TRENDS

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 2017.



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_x 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. Although, 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.

REFERENCES

ASME (American Society of Mechanical Engineers), 1995. "Relationship Between Chlorine in Waste Streams and Dioxin Emissions from Combustors," CRTD Vol. 36 (December 1995).

Chevron-Texaco, 2001. "Guidance Recommendations for SARA 313 Reporting of Polycyclic Aromatic Compounds (PACs) and Benzo(g,h,i)perylene" (May 2001).

EPA (Environmental Protection Agency), 1998a. "Compilation of Air Pollutant Emission Factors," AP-42, Chapter 1.3—Fuel Oil Combustion (September 1998).

EPA (Environmental Protection Agency), 1998b. "Compilation of Air Pollutant Emission Factors," AP-42, Fifth Edition, Section 1.4—Natural Gas Combustion (July 1998).

EPA (Environmental Protection Agency), 1998c. "Emission Factors for the Disposal of Energetic Materials by Open Burn and Open Detonation" (1998).

EPA (Environmental Protection Agency), 1999a. "Emergency Planning and Community Right-to-Know Act—Section 313: Persistent Bioaccumulative Toxic Chemicals" 40 CFR Part 372 (October 1999).

EPA (Environmental Protection Agency), 1999b. "Emergency Planning and Community Right-to-Know Act—Section 313: Guidance for Reporting Hydrochloric Acid," EPA 745-B-014 (December 1999).

EPA (Environmental Protection Agency), 2000a. "List of Toxic Chemicals within the Water Dissociable Nitrate Compounds Category and Guidance for Reporting," EPA 745-R-00-006 (December 2000).

EPA (Environmental Protection Agency), 2000b. "Emergency Planning and Community Right-To-Know Act—Section 313: Guidance for Reporting Toxic Chemicals within the Dioxin and Dioxin-like Compounds Category," EPA 745-B-00-021 (December 2000).

EPA (Environmental Protection Agency), 2001a. "EPCRA Mercury Guidance Document," EPA-260-B-01-004, Table 3-1 (August 2001).

EPA (Environmental Protection Agency), 2001b. "Emergency Planning and Community Right-to-Know Act—Section 313: Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category," EPA 260-B-01-03 (June 2001).

EPA (Environmental Protection Agency), 2001c. "Emergency Planning and Community Right-to-Know Act—Section 313: Guidance for Reporting Toxic Chemicals: Pesticides and Other Persistent Bioaccumulative Toxic (PBT) Chemicals," EPA 260-B-01-005 (August 2001).

EPA (Environmental Protection Agency), 2001d, "Emergency Planning and Community Right-to-Know Act—Section 313: Guidance for Reporting Releases and Other Waste Management Quantities of Toxic Chemicals: Lead and Lead Compounds," EPA 260-B-01-027 (December 2001).

EPA (Environmental Protection Agency), 2006. "Toxic Chemical Release Inventory Reporting Form R and Instructions," Revised 2005 Version, EPA 260-B-06-001 (January 2006).

EPA (Environmental Protection Agency), 2008. "Toxic Chemical Release Inventory Reporting Forms and Instructions for RY2007," EPA-260-K-07-001 (March 2008).

Merck Index, 1989. An Encyclopedia of Chemicals, Drugs and Biologicals, Eleventh Edition. Merck and Co., Inc. Rahway, NJ.

APPENDIX A:

EPCRA Section 313 Chemicals Used or Procured in 2017

CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
7647-01-0	Hydrochloric acid (aerosol forms only)	10000	136045.87
7782-50-5	Chlorine	10000	4246.92
7697-37-2	Nitric acid	10000	4098.12
7664-93-9	Sulfuric acid (aerosol forms only)	10000	3011.84
67-56-1	Methanol	10000	2534.40
75-52-5	Nitromethane	10000	2092.44
Polychlorinated Alkanes	Polychlorinated alkanes (C10 to C13)	10000	2056.87
67-63-0	Isopropyl alcohol (mfg-strong acid process)	10000	1236.87
Cyanide	Cyanide Compounds	10000	1199.25
88-89-1	Picric acid	10000	1108.91
1344-28-1	Aluminum oxide (fibrous forms)	10000	841.67
107-21-1	Ethylene glycol	10000	771.58
110-54-3	n-Hexane	10000	739.84
872-50-4	N-Methyl-2-pyrrolidone	10000	695.98
67-66-3	Chloroform	10000	398.92
7664-41-7	Ammonia	10000	393.25
108-88-3	Toluene	10000	254.26
Nitrate	Nitrate compounds (water dissociable)	10000	253.69
75-05-8	Acetonitrile	10000	223.99
Glycol Ethers	Glycol Ethers	10000	215.61
75-09-2	Dichloromethane	10000	179.21
Zinc	Zinc Compounds	10000	176.45
110-86-1	Pyridine	10000	158.49
1330-20-7	Xylene (mixed isomers)	10000	138.16
123-31-9	Hydroquinone	10000	83.19
Copper	Copper Compounds	10000	81.89
Barium	Barium Compounds	10000	78.91
68-12-2	N,N-Dimethylformamide	10000	75.45
7429-90-5	Aluminum (fume or dust)	10000	55.34
7664-38-2	Phosphoric acid	10000	54.89
7440-47-3	Chromium	10000	54.59
62-53-3	Aniline	10000	50.00
Silver	Silver Compounds	10000	42.36
71-36-3	n-Butyl alcohol	10000	40.36
Nickel	Nickel Compounds	10000	36.32
78-93-3	Methyl ethyl ketone	10000	30.21
7664-39-3	Hydrogen fluoride	10000	26.82

CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
1634-04-4	Methyl tert-butyl ether	10000	26.12
1313-27-5	Molybdenum trioxide	10000	25.81
79-01-6	Trichloroethylene	10000	25.75
78-48-8	S,S,S-Tributyltrithiophosphate	10000	22.05
71-43-2	Benzene	10000	21.43
Mercury	Mercury Compounds	10	21.20
Lead	Lead Compounds	100	18.70
121-44-8	Triethylamine	10000	17.95
101-68-8	Methylenebis(phenylisocyanate)	<10000	13.33
Chromium	Chromium Compounds	10000	13.00
Cadmium	Cadmium Compounds	10000	12.74
7632-00-0	Sodium nitrite	10000	12.74
50-00-0	Formaldehyde	10000	12.28
98-95-3	Nitrobenzene	10000	10.62
123-91-1	1,4-Dioxane	10000	9.59
Cobalt	Cobalt Compounds	10000	7.94
94-36-0	Benzoyl peroxide	10000	7.84
127-18-4	Tetrachloroethylene	10000	7.19
79-10-7	Acrylic acid	10000	7.11
108-10-1	Methyl isobutyl ketone	10000	7.07
Polycyclic aromatic compounds	Polycyclic aromatic compounds (includes 21 chemicals and 51 mixtures)	100	7.04
26628-22-8	Sodium azide (Na(N3))	10000	6.53
7440-02-0	Nickel	10000	5.95
75-15-0	Carbon disulfide	10000	5.85
95-63-6	1,2,4-Trimethylbenzene	10000	5.82
123-72-8	Butyraldehyde	10000	5.31
7439-96-5	Manganese	10000	5.18
75-65-0	tert-Butyl alcohol	10000	5.16
56-23-5	Carbon tetrachloride	10000	4.91
107-13-1	Acrylonitrile	10000	4.41
80-62-6	Methyl methacrylate	10000	4.17
106-89-8	Epichlorohydrin	10000	3.90
Antimony	Antimony Compounds	10000	3.77
108-90-7	Chlorobenzene	10000	3.67
95-50-1	1,2-Dichlorobenzene	10000	3.17
74-88-4	Methyl iodide	10000	3.03
75-07-0	Acetaldehyde	10000	2.92
64-18-6	Formic acid	10000	2.77
95-47-6	o-Xylene	10000	2.43

CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
106-93-4	1,2-Dibromoethane	10000	2.40
108-39-4	m-Cresol	10000	2.20
77-73-6	Dicyclopentadiene	10000	2.20
108-95-2	Phenol	10000	2.13
140-88-5	Ethyl acrylate	10000	2.03
111-42-2	Diethanolamine	10000	1.65
Arsenic	Arsenic Compounds	10000	1.63
95-54-5	1,2-Phenylenediamine	10000	1.54
110-82-7	Cyclohexane	10000	1.50
7723-14-0	Phosphorus (yellow or white)	10000	1.39
554-13-2	Lithium carbonate	10000	1.10
61-82-5	Amitrole	10000	1.10
108-45-2	1,3-Phenylenediamine	10000	1.10
126-72-7	Tris(2,3-dibromopropyl) phosphate	10000	1.10
106-99-0	1,3-Butadiene	10000	1.10
109-86-4	2-Methoxyethanol	10000	1.06
98-86-2	Acetophenone	10000	1.02
Beryllium	Beryllium Compounds	10000	1.02
7440-66-6	Zinc (fume or dust)	10000	1.00
Selenium	Selenium Compounds	10000	0.76
98-88-4	Benzoyl chloride	10000	0.67
72-57-1	Trypan blue	10000	0.53
96-33-3	Methyl acrylate	10000	0.53
302-01-2	Hydrazine	10000	0.44
7550-45-0	Titanium tetrachloride	10000	0.44
107-11-9	Allylamine	10000	0.42
509-14-8	Tetranitromethane	10000	0.32
77-09-8	Phenolphthalein	10000	0.31
77-78-1	Dimethyl sulfate	10000	0.29
Thallium	Thallium Compounds	10000	0.29
135-20-6	Cupferron	10000	0.28
101-90-6	Diglycidyl resorcinol ether	10000	0.27
100-41-4	Ethylbenzene	10000	0.25
91-20-3	Naphthalene	10000	0.25
117-81-7	Di(2-ethylhexyl) phthalate	10000	0.23
76-02-8	Trichloroacetyl chloride	10000	0.22
7758-01-2	Potassium bromate	10000	0.22
104-94-9	p-Anisidine	10000	0.22
106-50-3	p-Phenylenediamine	10000	0.22
989-38-8	C.I. Basic Red 1	10000	0.22

CAS number	Chemical Name	Threshold (lbs)	Sum (lbs)
120-80-9	Catechol	10000	0.22
541-73-1	1,3-Dichlorobenzene	10000	0.22
108-31-6	Maleic anhydride	10000	0.22
107-05-1	Allyl chloride	10000	0.21
7783-06-4	Hydrogen sulfide	10000	0.20
124-40-3	Dimethylamine	10000	0.15
100-42-5	Styrene	10000	0.12
62-56-6	Thiourea	10000	0.11
Chlorophenols	Chlorophenols	10000	0.08
20816-12-0	Osmium tetroxide	10000	0.06
120-12-7	Anthracene	10000	0.06
357-57-3	Brucine	10000	0.06
107-30-2	Chloromethyl methyl ether	10000	0.06
13463-40-6	Iron, pentacarbonyl-	10000	0.05
7440-62-2	Vanadium (fume or dust)	10000	0.02
107-19-7	Propargyl alcohol	10000	0.01
101-80-4	4,4'-Diaminodiphenyl ether	10000	0.004
100-02-7	4-Nitrophenol	10000	0.003
30560-19-1	Acephate	10000	0.001
Strychnine and salts	Strychnine and Salts	10000	0.001
108-05-4	Vinyl acetate	10000	0.0002
92-87-5	Benzidine	10000	0.0002

APPENDIX B:

Form R for Lead (LANL)

This page intentionally left blank.

Environmental Protection & Compliance Division
Los Alamos National Laboratory
PO Box 1663, K491
Los Alamos, New Mexico 87545
(505) 667-2211

Date: JUN 15 2018
Symbol: EPC-DO: 18-220
LA-UR: 18-24667
Locates Action No.: *N/A*

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 2017 Toxic Chemical Release Inventory Report to the United States Environmental Protection Agency (USEPA)

Dear Ms. Nash:

Los Alamos National Laboratory (LANL) submitted their 2017 Toxic Chemical Release Inventory Report, Form R, to the Environmental Protection Agency (EPA) using the online reporting tool, TRIMEweb, for lead. 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 1st and was submitted on June 15th, 2018.

Should you have questions or comments regarding the information provided in this report, please contact Steve Story at (505) 665-2169.

Sincerely,

Enrique Torres
Division Leader

ET/SLS/WW:cmh

Enclosure: 2017 Toxic Chemical Release Inventory Report for the Emergency Planning and Community Right-to-Know Act, Title III, Section 313

Copy: Hai Shen, EM-SG, (E-File)
Annette E. Russell, EM-LA, (E-File)
Cindy Beyerly, EM-LA, (E-File)
Richard Kacich, DIR, (E-File)
Craig S. Leasure, PADOPS, (E-File)
William R. Mairson, ADESH, (E-File)
Enrique Torres, EP-DO, (E-File)
Taunia Van Valkenburg, EPC-CP, (E-File)
Steve L. Story, EPC-CP, (E-File)
Walter W. Whetham, EPC-CP, (E-File)
Ellena I. Martinez, EPC-CP, (E-File)
Peter Hyde, CPA-CO, (E-File)
Linda R. Nelson, OSH-PI, (E-File)
Timothy Dolan, LC-ESH, (E-File)
adesh-records@lanl.gov , (E-File)
locatesteam@lanl.gov, (E-File)
epc-correspondence@lanl.gov, (E-File)

ENCLOSURE 1

2017 Toxic Chemical Release Inventory Report for the Emergency Planning and Community Right-to-Know Act, Title III, Section 313

Electronic Submittal

EPC-DO: 18-220

LA-UR-18-24667

Date: JUN 15 2018

*** Do not send to EPA: This is the final copy of your form.***

Form Approved OMB Number: 2025-0009
Approval Expires: 2018-06-30

EPA United States Environmental Protection Agency	**FORM R** 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: 87545LSLMSLOSAL Toxic Chemical, Category, or Generic Name: Lead

WHERE TO SEND COMPLETED FORMS:	1. TRI Data Processing Center P.O. Box 10163 Fairfax, VA 22038	2. APPROPRIATE STATE OFFICE (See instructions in Appendix F)

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: 2017

SECTION 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 2 trade secret? [ ] Yes (Answer question 2.2; attach substantiation forms) [X] NO (Do not answer 2.2; go to Section 3)	2.2 Is this copy [ ] Sanitized [ ] Unsanitized (Answer only if "Yes" in 2.1)	

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

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

Name and official title of owner/operator or senior management official:	Signature:	Date Signed:
Steven Story Environmental Manager	Reference Copy: Copy of Record Resides in CDX	2018-06-15

SECTION 4. FACILITY IDENTIFICATION

4.1		TRI Facility ID Number	87545LSLMSLOSAL

Facility or Establishment Name: LOS ALAMOS NATIONAL SECURITY, LLC, LOS ALAMOS NATIONAL LAB

Street	Mailing Address (if different from physical street address)	
BIKINI ATOLL RD SM30	PO BOX 1663	
City/County/Tribe/State/ZIP Code	City/State/ZIP Code	Country (Non-US)
LOS ALAMOS / Los Alamos / BIA Code: / NM / 87545	LOS ALAMOS / NM / 87545	

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

4.3	Technical Contact name	STEVE STORY		Email Address: STORY@LANL.GOV		Telephone Number (include area code and ext.): 505-665-2169	
4.4	Public Contact name	Peter Hyde		Email Address: PAHYDE@LANL.GOV		Telephone Number (include area code and ext.): 505-667-3792	
4.5	NAICS Code(s) (6 digits)	a. 928110 (Primary)	b.	c.	d.	e.	f.

4.6	Dun and Bradstreet Number(s) (9 digits)
a.	NA
b.	

SECTION 5. PARENT COMPANY INFORMATION

5.1	Name of U.S. Parent Company (for TRI Reporting purposes)	US DEPARTMENT OF ENERGY	No U.S. Parent Company (for TRI Reporting purposes) [ ]
5.2	Parent Company's Dun & Bradstreet Number	NA [X]	

***** Do not send to EPA: This is the final copy of your form.*****

EPA FORM R PART II. CHEMICAL - SPECIFIC INFORMATION	TRI Facility ID Number 87545LSLMSLOSAL Toxic Chemical, Category, or Generic Name Lead

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.) 007439921
1.2	Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.) Lead
1.3	Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "Yes". Generic Name must be structurally descriptive). NA

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

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

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

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

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

4.1 [05] (Enter two-digit code from instruction package.)

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 [ ]	3	C	
5.2	Stack or point air emissions	NA [ ]	0.44	E1	
5.3	Discharges to receiving streams or water bodies (Enter one name per box)	NA [ ]			
	Stream or Water Body Name	Reach Code (optional)			
5.3.1	MORTANDAD TRIBUTARY TO RIO GRANDE		0.008	M2	0%
5.3.2	LOS ALAMOS TRIBUTARY TO RIO GRANDE		0.058	M2	0%
5.3.3	SANDIA TRIBUTARY TO RIO GRANDE		0.152	M2	0%

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

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

***** Do not send to EPA: This is the final copy of your form.*****

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

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	[]	1138	C

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.

*** Do not send to EPA: This is the final copy of your form.***

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

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS | NA [ ]

6.2.1 Off-Site EPA Identification Number (RCRA ID No.)	NV2890009002
Off-Site Location Name:	National Secuity Technologies, LLC for USDOE
Off-Site Address:	NNSS - Zone 2 National Nuclear Security Administration

City	Mercury	County	Nye	State	NV	ZIP	89023	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [X] 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 . 1.2	1 . O	1 . M65

6.2.2 Off-Site EPA Identification Number (RCRA ID No.)	UTD982598898
Off-Site Location Name:	ENERGY SOLUTIONS CLIVE FACILITY
Off-Site Address:	U.S. INTERSTATE 80, EXIT 49

City	GRANTSVILLE	County	Tooele	State	UT	ZIP	84029	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [X] 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 . 443.8	1 . O	1 . M65

6.2.3 Off-Site EPA Identification Number (RCRA ID No.)	WAR000010355
Off-Site Location Name:	PERMA-FIX NORTHWEST RICHLAND INC
Off-Site Address:	2025 BATTELLE BOULEVARD

City	RICHLAND	County	Benton	State	WA	ZIP	99354	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [X] 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 . 1.8	1 . O	1 . M64

6.2.4 Off-Site EPA Identification Number (RCRA ID No.)	COD980591184
Off-Site Location Name:	VEOLIA ES TECHNICAL SOLUTIONS LLC
Off-Site Address:	9131 EAST 96TH AVENUE

City	HENDERSON	County	Adams	State	CO	ZIP	80640	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [X] 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 . 1.2	1 . O	1 . M64

6.2.5 Off-Site EPA Identification Number (RCRA ID No.)	TXD988088464
Off-Site Location Name:	WASTE CONTROL SPECIALISTS
Off-Site Address:	9998 W STATE HIGHWAY 176

City	ANDREWS	County	Andrews	State	TX	ZIP	79714	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [X] 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 . 28.3	1 . O	1 . M64

6.2.6 Off-Site EPA Identification Number (RCRA ID No.)	NMD986683563
Off-Site Location Name:	WASTE MGMT OF NEW MEXICO
Off-Site Address:	33rd St./Northern Blvd.

City	RIO RANCHO	County	Sandoval	State	NM	ZIP	87124	Country (Non-US)	
Is location under control of reporting facility or parent company?						[ ] Yes [X] 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. 1.4	1. O	1. M64

6.2.7 Off-Site EPA Identification Number (RCRA ID No.)	NM4890139088
Off-Site Location Name:	Waste Isolation Pilot Plant
Off-Site Address:	4021 National Parks Highway

City	Carlsbad	County	Eddy	State	NM	ZIP	88221	Country (Non-US)	
Is location under control of reporting facility or parent company?						[X] Yes [ ] 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. 5.2	1. O	1. M41

SECTION 7A. ONSITE WASTE TREATMENT METHODS AND EFFICIENCY

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

a. General Waste Stream (enter code)	b. Waste Treatment Method(s) Sequence [enter 3-character code(s)]	c. Waste Treatment Efficiency Estimate
7A 1 a	7A 1 b	7A 1 c
W	2: H123 3: H077 4: H082 5: H124 6: H129 7: H122	E3
7A 2 a	7A 2 b	7A 2 c
S	2: H101	E6

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

EPA Form 9350-1 (Rev. 06/2014) - Previous editions are obsolete.

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

*** Do not send to EPA: This is the final copy of your form.***

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

SECTION 7B. ON-SITE ENERGY RECOVERY PROCESSES

[X] 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

[X] 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*)
8.1 - 8.7 Production-Related Waste Managed					
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	1190.417	1141.658	1200	1200
8.1c	Total off-site disposal to Class I Underground Injection Wells, RCRA Subtitle C landfills, and other landfills	3754.3	477.7	2000	2000
8.1d	Total other off-site disposal or other releases	50.6	5.2	20	20
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)		0.89		
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

Additional optional information on source reduction, recycling, or pollution control activities.

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

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