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# Emissions Inventory Report Summary for Los Alamos National Laboratory for Calendar Year 2013

Los Alamos
NATIONAL LABORATORY
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Prepared by the Environmental Protection Division

# CONTENTS

## Figures



## Tables

## Acronyms

| | |
|---|---|
| AIRS | Aerometric Information Retrieval System |
| AQB | Air Quality Bureau |
| CAS | Chemical Abstracts Service |
| CFR | Code of Federal Regulations |
| CMRR | Chemistry and Metallurgy Research Replacement (Facility) |
| CO | carbon monoxide |
| EPA | (United States) Environmental Protection Agency |
| FGR | flue gas recirculation |
| gal. | gallon |
| HAP | hazardous air pollutant |
| hr | hour |
| LANL | Los Alamos National Laboratory |
| lb | pound |
| mmHg | millimeter of mercury |
| MSDS | material safety data sheet |
| NMAC | New Mexico Administrative Code |
| NMED | New Mexico Environment Department |
| $NO_x$ | nitrogen oxides |
| oz. | ounce |
| PM | particulate matter |
| $PM_{2.5}$ | particulate matter with diameter less than 2.5 micrometers |
| $PM_{10}$ | particulate matter with diameter less than 10 micrometers |
| PSD | Prevention of Significant Deterioration |
| R&D | research and development |
| RLUOB | Radiological Laboratory/Utility/Office Building |
| $SO_x$ | sulfur oxides |
| $SO_2$ | sulfur dioxide |
| TA | Technical Area |
| TSP | total suspended particulates |
| µm | micrometer |
| VOC | volatile organic compound |
| yr | year |

# EMISSIONS INVENTORY REPORT SUMMARY FOR LOS ALAMOS NATIONAL LABORATORY FOR CALENDAR YEAR 2013

**by**

**Environmental Stewardship Group**

## ABSTRACT

Los Alamos National Laboratory (LANL) is subject to annual emissions reporting requirements for regulated air pollutants under Title 20 of the New Mexico Administrative Code, Chapter 2, Part 73 (20.2.73 NMAC), Notice of Intent and Emissions Inventory Requirements. The applicability of the requirements is based on LANL's potential to emit 100 tons per year of suspended particulate matter, nitrogen oxides, carbon monoxide, sulfur oxides, or volatile organic compounds. Additionally, on April 30, 2004, LANL was issued a Title V Operating Permit from the New Mexico Environment Department/Air Quality Bureau, under 20.2.70 NMAC and the permit was modified on June 15, 2013. This Title V Operating Permit (Permit No. P100-R1-M1) includes emission limits and operating limits for all regulated sources of air pollution at LANL. The Title V Operating Permit also requires semi-annual emissions reporting for all sources included in the permit. This report summarizes both the annual emissions inventory reporting and the semi-annual emissions reporting for LANL for calendar year 2013. LANL's 2013 emissions are well below the emission limits in the Title V Operating Permit.

## 1.0 INTRODUCTION

### 1.1 Regulatory Basis

Los Alamos National Laboratory (LANL or the Laboratory) has reported on air pollutants generated from its operations since the 1970s when Air Quality Control Regulation 703, Registration of Air Contaminant Sources, was promulgated. According to the regulation, the Laboratory was required to register air pollutant sources that emitted more than 2,000 lbs per year of any air contaminant. This regulatory requirement later evolved into Title 20 of the New Mexico Administrative Code, Chapter 2, Part 73 (20.2.73 NMAC), Notice of Intent and Emissions Inventory Requirements. The objective of the reporting requirement is to provide emissions data to the New Mexico Environment Department (NMED)/Air Quality Bureau (AQB) so its staff can determine whether LANL meets state and federal air pollutant standards.

Annual emissions inventory reporting requirements under 20.2.73 NMAC apply to any stationary source that

- has been issued a construction permit under 20.2.72 NMAC;
- has been required to file a Notice of Intent under 20.2.73.200 NMAC; or

- emits in excess of
  - 1 ton per year of lead or
  - 10 tons per year of
    - total suspended particulates (TSP);
    - particulate matter (PM) with diameter less than 10 micrometers ($PM_{10}$);
    - PM with diameter less than 2.5 micrometers ($PM_{2.5}$);
    - sulfur dioxide ($SO_2$);
    - nitrogen oxides ($NO_x$);
    - carbon monoxide (CO); or
    - volatile organic compounds (VOCs).

The annual emissions inventory must be submitted to NMED/AQB by April 1 of each year. The NMED/AQB enters the data into the Aerometric Information Retrieval System (AIRS) (EPA 2013). This nationwide system, administered by the United States Environmental Protection Agency (EPA), is used to help ensure ambient air quality standards are maintained and to track the state's air pollutant emissions. AIRS is a large air pollution database that contains information, requirements, and data on air pollution and air quality in the United States and various World Health Organization member countries. The program is operated by the EPA and state/local air pollution control agencies. The AIRS database tracks each state's progress towards achieving and maintaining National Ambient Air Quality Standards for criteria pollutants. The database is also used as a tool to help improve each state's air quality programs by enabling program members to access and compare past data and view data from other states.

Additionally, on April 30, 2004, LANL was issued a Title V Operating Permit from the NMED/AQB, under 20.2.70 NMAC. The NMED/AQB issued a modified permit (P100-R1-M1) on June 15, 2013 (NMED 2013). A condition of the Title V Operating Permit is that LANL must submit semi-annual emissions reports to NMED documenting that emissions from all permitted sources are below permitted emission levels. Section A109.B of the permit states:

> "A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants $NO_x$, CO, $SO_2$, VOC, TSP, $PM_{10}$, and $PM_{2.5}$ shall not include fugitive emissions. Emissions estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occurred during the reporting period with the facility-wide allowable emission limits at Table106.B."

In 2004, the Laboratory began submitting the semi-annual emissions reports as well as the annual emissions inventory. There are a few differences in which sources are included in the two emissions reports. These differences are explained in the following sections.

### 1.2 Contents of Annual Emissions Inventory Submittal

NMED requested that LANL submit annual emissions inventory data for 2013 via electronic format for entry into AIRS. The information required for submittal includes the following:

- facility name, organization name, and agency ID;
- facility contact information;
- signed certification statement by a responsible facility official; and
- specific information for each emission unit such as fuel type, materials processed, materials consumed, fuel heating value, percent sulfur of fuel, percent ash of fuel, percent carbon content, and details of operating schedule.

This annual emissions inventory submittal includes air pollutant data for PM, $PM_{10}$, $PM_{2.5}$, CO, $NO_x$, sulfur oxides ($SO_x$), VOCs, beryllium, and hazardous air pollutants (HAPs).

### 1.3 Contents of the Semi-annual Title V Operating Permit Emissions Reports

The semi-annual Title V Operating Permit emissions reports include actual estimated emissions for the reporting period for each emission source or source category included in the Title V Operating Permit. For each source category, the actual emissions are compared with emission limits listed in the permit. The emissions are calculated using operating data from logbooks and records maintained on site. All emission calculations are consistent with calculation methods used for the annual emissions inventory.

The semi-annual emissions reports include a few source categories not included in the annual emissions inventory. The Laboratory requested emission limits in their Title V Operating Permit for two source categories that are considered insignificant sources for the annual emissions inventory. These source categories are 1) small boilers and heaters and 2) stationary standby generators. LANL requested emission limits for these source categories to obtain federally-enforceable limits that would keep the Laboratory under the major source threshold for Prevention of Significant Deterioration (PSD) applicability (20.2.74 NMAC). LANL's actual emissions from these insignificant sources have historically been very low; however, without federally-enforceable limits on their operation, the potential to emit from these sources was quite high. To demonstrate that LANL is below the PSD applicability and is in compliance with the emission limits placed on these emission sources, LANL now must include these emissions in the semi-annual Title V Operating Permit emissions reports.

## 2.0 REPORTED EMISSION SOURCES

Table 2.0-1 shows the emission sources included in the Laboratory's 2013 annual emissions inventory report (LANL 2013a) and the 2013 semi-annual emissions reports (LANL 2013b and 2014c). The source categories and the methodology used to calculate emissions are described in the following sections.

The following subsections describe emission sources included in the 2013 emissions inventory and semi-annual emissions reports and emission calculation methodology for each source type. A summary table of actual reported emissions by source is included in Section 2.12. Attachment A includes worksheets showing detailed emission calculations for individual emissions sources. A copy of the 2013 emissions inventory as submitted to NMED is presented in Attachment B. The 2013 semi-annual emissions reports are included as Attachment C.

**Table 2.0-1. Sources Included in LANL's 2013 Annual Emissions Inventory and Semi-annual Emissions Reports**

| Included in Annual Emissions Inventory | Included in Semi-annual Emissions Reports | Comment |
|---|---|---|
| Power Plant (TA-3) | Power Plant (TA-3) | n/a[a] |
| Boilers greater than 5 MMBTU/hr[b] (14 units) | All small and large boilers and heaters (approximately 175 units) | Small boilers less than 5 MMBTU/hr are exempt from annual emissions inventory requirements (see Section 3.1). |
| Asphalt Plant | Asphalt Plant | n/a |
| Degreasers | Degreasers | n/a |
| Data Disintegrator | Data Disintegrator | n/a |
| Permitted Beryllium Sources | Permitted Beryllium Sources | n/a |
| Facility-wide Chemical Use | Facility-wide Chemical Use | The semi-annual emissions reports also include separate emission data for the CMRR-RLUOB building. |
| Process Generators | Process Generators and Stationary Standby Generators (approximately 45 units) | Stationary standby generators are exempt from annual emissions inventory requirements (see Section 3.2). |
| TA-3 Turbine | TA-3 Turbine | n/a |

a: n/a = Not Applicable. b: one million British thermals units per hour.

## 2.1 Power Plant

The Laboratory operates a power plant at Technical Area (TA) 3. The power plant produces steam for heating and electricity for much of the Laboratory when sufficient power from outside sources is not available. The heat produced from the power plant is used for comfort heat and hot water and to support facility processes. The power plant has three boilers that are fueled primarily with natural gas with No. 2 fuel oil as a backup. The Laboratory operated a second power plant at TA-21 that was shut down in 2007.

For the 2013 emissions inventory, NMED requested that emissions from natural gas and No. 2 fuel oil be reported separately for the boilers located at each of the power plants. The TA-3 power plant was originally included in LANL's emissions inventory as a single unit. When a modification to the plant was made in 2001, the TA-3 power plant was separated into three separate units for emissions reporting purposes. Because each of the three boilers has the capability of burning either natural gas or No. 2 fuel oil, the TA-3 power plant is now reported as six units (ID 24, ID 25, and ID 26 for the natural gas and ID 137, ID 138, and ID 141 for the No. 2 fuel oil).

The 2013 emissions inventory reporting year used the updated emission factors for fuel oil for PM, $PM_{10}$, and $PM_{2.5}$ as described for the TA-3 power plant boilers.

Actual estimated emissions are calculated on the basis of metered fuel consumption and emission factors. The primary source of emission factors is AP-42, the EPA's Compilation of Air Pollutant Emission Factors (EPA 1998). However, emission factors from stack tests conducted at the TA-3 power plant when burning natural gas were also used, as appropriate.

The TA-3 power plant has historically been the largest source of $NO_x$ emissions at the Laboratory. In 2002, a voluntary project to install pollution control equipment on the three boilers at the TA-3 power plant was completed. The three boilers were fitted with flue gas recirculation (FGR) equipment to reduce $NO_x$ emissions. Stack testing for $NO_x$ and CO was conducted before FGR equipment was installed and again after it was operational. Based on these stack test results, FGR reduced $NO_x$ emissions by approximately 64%. Figure 2.1-1 shows a picture of the TA-3 power plant building and stacks.


**Figure 2.1-1. TA-3 power plant.**

## 2.2 Small Boilers and Heaters

The Laboratory operates approximately 175 small boilers and heaters, used primarily for seasonal comfort heat. Most of the boilers are exempt from permitting requirements because of their small size and use as comfort boilers and are not included in the annual emissions inventory. The exemption analysis applied to boilers is discussed in Section 3.1 of this report.

The boilers that are not exempt and reported in the 2013 annual emissions inventory include the following:

- two boilers at TA-53 (ID 11 and ID 12);
- two boilers at TA-55 (ID 29 and ID 30);
- five boilers at the Chemistry and Metallurgy Research Replacement (CMRR) Facility (ID 90, ID 104, ID 105, ID 106, and ID 107); and
- two boilers at TA-16 (ID 53 and ID 134).

All of the reported boilers burn natural gas. Operating logs of actual fuel used for the TA-55 and the CMRR boilers were used to quantify emissions from these units. Fuel use for all other boilers was estimated based on the total amount of natural gas used by the Laboratory minus the amount supplied to metered sources. The amount of natural gas left after subtracting out metered sources was apportioned to the various boilers based on their size. Since virtually all of the small boilers are seasonal boilers used for building heating, it was assumed they would all operate approximately the same amount of time over the course of the year. Some emission factors were available from stack tests (TA-55), some were provided by the boiler manufacturer (Sellers Engineering Company), and the rest were taken from AP-42

(EPA 1998). Copies of spreadsheets showing fuel use and emission factors for each boiler are included in Attachment A.

For the semi-annual emissions reports, emissions from small boilers are included as a source category. These boilers include TA-16-1484-BS-1, TA-16-1484-BS-2, TA-53-365-BHW-1, TA-53-365-BHW-2, TA-55-6-BHW-1, TA-55-6-BHW-2, CMRR-BWH-1, CMRR-BWH-2, CMRR-BWH-3, and CMRR-BWH-4. Additionally, emissions from each of the CMRR boilers are included as separate source categories. To estimate emissions, all unmetered fuel use was multiplied by AP-42 emission factors for small boilers burning natural gas (EPA 1998). Total emissions of each pollutant from all boilers and heaters in this source category were then summed and reported on the semi-annual emissions reports.

## 2.3 Asphalt Plant

The TA-60 asphalt plant (ID 116) began operations in July 2005. This unit replaced the TA-3 asphalt plant, which was dismantled and removed in September 2003. Information on the amount of asphalt produced and the duration of daily operation at the TA-60 asphalt plant was provided as part of a monthly site support contractor data deliverable. The total asphalt produced in 2013 was 335 tons.

The emissions from the asphalt plant include criteria pollutants, $NO_x$ and CO. None of the emissions were significant in regard to the overall Laboratory emissions. The largest pollutant emitted from the asphalt plant was CO at 0.53 tons per year.

## 2.4 Data Disintegrator

The data disintegrator is included in the 2013 emissions inventory as ID 89. Operation of this source started in August 2004. Emissions are calculated using the methodology described in the original permit application dated June 23, 2003. Emissions of PM, $PM_{10}$, and $PM_{2.5}$ are calculated based on the number of boxes shredded, the amount of dust estimated to enter the exhaust (provided by the manufacturer), and the control efficiency of the cyclone and baghouse (also provided by the manufacturer). The permit application included $PM_{2.5}$ emission estimates. Therefore, an emission methodology had to be developed for the emission inventory reporting. No specific PM size distribution data were available. However, the manufacturer reported that dust into the exhaust would be in the size range of 5 to 20 µm. Based on visual observation and engineering judgment, a particle size distribution in the exhaust was estimated as follows:

- $PM_{2.5}$ 15%
- $PM_{10}$ 90%
- TSP 100%

The number of boxes of material shredded is provided in a monthly data deliverable from the site support contractor. The total number of boxes shredded at the data disintegrator in 2013 was 1,752.

## 2.5 Degreasers

The halogenated solvent cleaning machine at TA-55 has a capacity of 18 liters and is registered with NMED/AQB as required under the National Emissions Standards for Hazardous Air Pollutants, 40 Code of Federal Regulations (CFR) 63 Subpart T, Halogenated Solvent Cleaning. The solvent used in the machine, trichloroethylene (Chemical Abstracts Service [CAS] No. 79-01-6), is a VOC and a HAP. This

emission unit is included in the annual emissions inventory as ID 21. LANL uses a mass balance approach to estimate emissions. Logbooks are kept on the amount of solvent added and removed from the machine. Additionally, solvent levels in the machine are logged monthly. LANL has two additional halogenated solvent cleaning machines registered with NMED (ID 29 and ID 30). These units were not operational in 2013. The emissions from the TA-55 degreaser for this reporting period are 15.8 lbs or 0.008 tons per year. This source category is reported in both the annual emissions inventory and the semi-annual emissions reports.

## 2.6 Permitted Beryllium-Machining Operations

The Laboratory operates four permitted beryllium-machining operations that are subject to 40 CFR 61, Subpart C, and National Emission Standards for Beryllium. Emissions reported for the Beryllium Test Facility (ID 3) are from actual stack emissions measurements. Emissions for the Target Fabrication Facility (ID 2) are from initial compliance stack testing and are reported as permitted emission levels. In addition, emissions from the Plutonium Facility (ID 6) are reported at permitted emission levels. Foundry operations within the Plutonium Facility did not occur during this reporting period. Total emissions from all permitted beryllium operations are included in the semi-annual emissions reports.

## 2.7 Generators

LANL has four permitted generators (ID 56, ID 119, ID 120, and ID 135) with internal combustion engines located at TA-33 to support research activities. NMED issued a construction permit (Permit No. 2195-F) in October 2002 for installing the initial generator, and this unit is included in LANL's Title V Operating Permit. The unit first operated in May 2006. The unit (ID 56) operated for 19.8 hours in 2013. This generator was replaced in December 2013 by a Cummins Portable Diesel Generator (ID 146). The new generator did not operate in 2013. Three more units were permitted in August 2007 at TA-33 (Permit No. 2195-P); they operated for a total of 63.2 hours in 2013.

LANL also has three permitted generators with internal combustion engines located at the CMRR Radiological Laboratory/Utility/Office Building (RLUOB), TA-55-400, which began operating in 2013. The generators were added to the newest Title V Operating Permit and are included in the semi-annual emissions report as three separate units. However, they are listed in the emissions inventory report as one unit. The three generators operated for a total of 92.8 hours in 2013.

The Laboratory maintains approximately 37 stationary standby generators that are considered exempt sources under the Construction Permit regulations (20.2.72.202.b NMAC) and the annual emissions inventory requirements. These sources are included in LANL's Title V Operating Permit with operating limits and emission limits. Therefore, these sources must be included in the semi-annual emissions reports. All stationary standby generators at LANL are tested on a routine schedule to ensure they are operational and will function properly if needed. All units are equipped with hour meters to document how many hours they are used. The Laboratory maintains records on a semi-annual basis to document hour meter readings. The number of hours each generator is used in a reporting period is multiplied by AP-42 emission factors for diesel-fired internal combustion engines or natural-gas-fired internal combustion engines (EPA 1996). Emissions are then summed for each pollutant and reported on the semi-annual emissions reports for this source category.

## 2.8 Combustion Turbine

LANL has one combustion turbine located at the TA-3 power plant (ID 112). A revised construction permit was issued by NMED July 2004 to add the TA-3 combustion turbine as a new permitted source. This unit started operations in September 2007. Emission calculations are based on the initial stack compliance tests performed in 2007, AP-42 Tables 3.1-2a and 3.1-3, and information provided by the manufacturer. In 2013, this combustion turbine operated for 465.8 hours.

## 2.9 Emissions from Chemical Use Activities

A significant amount of the Laboratory's work is devoted to research and development (R&D) activities. Varying operating parameters, as well as amounts and types of chemicals, are used in these activities. R&D activities occur at virtually all technical areas within the Laboratory, typically in small quantities in laboratory settings. Figure 2.9-1 shows a typical laboratory at LANL where chemicals are used.

For the purposes of annual emissions inventory reporting, one equipment number has been assigned for all R&D chemical use (ID 7). Facility-wide chemical use emissions are reported on both the annual emissions inventory and the semi-annual emissions reports. The methods used to quantify emissions of VOC and HAPs from R&D activities are discussed below.

**Figure 2.9-1. Example of a laboratory fume hood at LANL.**

### 2.9.1 VOC Emissions

The Laboratory tracks chemical purchases through a facility-wide chemical tracking system called ChemLog. A download from the ChemLog inventory system was created that included all chemical containers added to LANL's inventory between January 1, 2013, and December 31, 2013. This dataset included 41,365 separate line items of chemicals purchased.

The dataset was reviewed electronically to identify all VOCs purchased and received at LANL in 2013. With the exception of specific listed chemicals, VOCs are any compounds of carbon that participate in

atmospheric photochemical reactions. VOCs include commonly used chemicals such as ethanol, methanol, trichloroethylene, and isopropanol. The general assumption used in estimating VOC emissions from chemical use is

Purchasing = Use = Emissions

From the dataset of chemicals purchased in 2013, certain categories of chemicals were separated and eliminated from the analysis. The classifications assigned and corresponding reasons (noted in parentheses) for exclusion of chemicals from inventory records are noted below.

- Solid materials (not a significant source of air emissions based on their low vapor pressure)
- Non-VOC materials as defined by 40 CFR 51.100 (specific chemicals in 40 CFR 51.100 are listed as having negligible photochemical reactivity and are exempt from the definition of VOC)
- Paints (paints were evaluated separately—see Section 3.5)
- Inorganic chemicals (inorganics are not compounds of carbon)
- Oils (not a significant source of air emissions based on low vapor pressure and primarily used for maintenance)
- Fuels used for combustion purposes (emissions from fuel combustion are reported for each combustion unit)

The following categories of chemicals were eliminated based on guidance from NMED (NMED 2001).

- Container sizes of 1 lb or less
- Chemicals with vapor pressures less than 10 mmHg
- Chemicals used to calibrate equipment
- Maintenance chemicals
- Use of office equipment and products
- Chemicals used for boiler water treatment operations
- Chemicals used for oxygen scavenging (deaeration) of water
- Chemicals used in bench-scale chemical analysis[1]

After the elimination of chemicals and categories of chemicals listed above, the remaining chemical inventory records were matched with a list of known VOCs by CAS number. For mixtures (chemicals without CAS numbers), material safety data sheets (MSDSs) were reviewed to determine if any VOCs were present and, if so, to determine the associated percent volatile. As a conservative estimate, VOCs identified in ChemLog records were assumed to be 100% emitted to air. Estimated emissions of VOCs from chemical use in 2013 totaled 9.59 tons.

### 2.9.2 HAP Emissions

Section 112(b) of the 1990 Clean Air Act Amendments listed 188 unique HAPs identified for potential regulation by EPA. In 1995, caprolactam was delisted as a HAP, and methyl ethyl ketone was delisted in

[1] This exemption was applied only to biological research solutions. Otherwise, this exemption was not applied (see Table 3.3-1).

2005. Of the remaining 187 listed HAPs, 17 are classes of compounds (e.g., nickel compounds). Use of the 187 listed chemicals in activities at the Laboratory was evaluated and quantified for the annual emissions inventory submittal to NMED.

The ChemLog inventory system 2013 dataset was analyzed to identify HAPs. The identification process was similar to that used for VOCs. Pure chemicals (i.e., chemicals with CAS numbers), classes of compounds, and mixtures were evaluated to determine if the chemicals themselves were HAPs or if they contained HAP constituents. For mixtures, MSDSs were reviewed to determine if any HAPs were present and, if so, to determine the associated HAP percentages. Listed below are certain chemical types or categories that were identified and removed from this analysis (refer to Section 2.9.1 and Table 3.3-1 for explanations on removal of these chemicals):

- Paints;
- Oils;
- Maintenance chemicals;
- Chemicals used to calibrate equipment;
- Container sizes of 1 lb or less;
- Chemicals used in bench-scale chemical analysis;
- Use of office equipment and products;
- Chemicals used for boiler water treatment operations; and
- Chemicals used for oxygen scavenging (deaeration) of water.

Total HAP emissions were estimated by summing 1) pure HAP chemicals, 2) classes of compounds that are HAPs, and 3) the HAP constituents from mixtures. The resulting total amount of HAPs from chemical use reported for 2013 was 3.49 tons.

The HAP emissions reported generally reflect quantities procured in the calendar year. In a few cases, procurement values and operational processes were further evaluated so that actual air emissions could be reported instead of procurement quantities. Additional analyses for certain metals and acids were performed and are described below.

### 2.9.3 HAP Metals

Purchases of beryllium, chromium, lead, manganese, mercury, and nickel compounds were evaluated to determine usage and potential air emissions. Several of the purchases were identified as laboratory calibration standards containing only parts per million quantities of the metals. These were exempt from emissions inventory requirements because of their use as standards for calibrating laboratory equipment. Other purchasers of relatively large quantities of metal compounds that were contacted confirmed that the material was still in use or in storage and had not resulted in air emissions.

## 2.10 Emissions Summary by Source

Table 2.10-1 provides a summary of LANL's 2013 actual emissions, as submitted for the annual emissions inventory. The table presents emissions by pollutant and by source, with a facility total at the

bottom of the table. Attachment A provides detailed information on how emissions were calculated for each emission unit.

**Table 2.10-1. Summary of LANL 2013 Reported Emissions for Annual Emissions Inventory**

| | $NO_X$ (tons/yr) | $SO_x$ (tons/yr) | $PM_{10}$ (tons/yr) | $PM_{2.5}$ (tons/yr) | CO (tons/yr) | VOC (tons/yr) | HAPs (tons/yr) |
|---|---|---|---|---|---|---|---|
| TA-3 Power Plant Boilers | 12.40 | 0.15 | 1.63 | 1.62 | 8.55 | 1.18 | 0.40 |
| Non-Exempt Boilers | 2.98 | 0.02 | 0.32 | 0.32 | 1.74 | 0.18 | 0.056 |
| CMRR Boilers | 0.066 | 0.003 | 0.010 | n/a* | 0.082 | 0.056 | 0.004 |
| Asphalt Plant | 0.015 | 0.001 | 0.009 | n/a | 0.533 | 0.001 | 0.001 |
| Data Disintegrator | n/a | n/a | 0.07 | n/a | n/a | n/a | n/a |
| Degreaser | n/a | n/a | n/a | n/a | n/a | 0.008 | 0.008 |
| R&D Chemical Use | n/a | n/a | n/a | n/a | n/a | 9.59 | 3.49 |
| TA-33 Generators | 0.50 | 0.07 | 0.02 | n/a | 0.36 | 0.01 | 0.0005 |
| TA-3 Turbine | 2.40 | 0.16 | 0.32 | 0.32 | 0.50 | 0.10 | 0.07 |
| **TOTAL** | **18.36** | **0.40** | **2.38** | **2.26** | **11.77** | **11.13** | **4.03** |

* n/a = Not Applicable.

Table 2.12-2 provides a summary of 2013 emissions as reported on the semi-annual emissions reports required by the Title V Operating Permit. Attachment A provides detailed information on how emissions were calculated for each emission source category.

**Table 2.12-2. Summary of LANL 2013 Semi-annual Emissions as Reported Under Title V Operating Permit Requirements**

| | $NO_X$ (tons/yr) | $SO_x$ (tons/yr) | $PM_{10}$ (tons/yr) | $PM_{2.5}$ (tons/yr) | CO (tons/yr) | VOC (tons/yr) | HAPs (tons/yr) |
|---|---|---|---|---|---|---|---|
| TA-3 Power Plant Boilers | 12.40 | 0.15 | 1.63 | 1.62 | 8.55 | 1.18 | 0.40 |
| Small Boilers | 23.97 | 0.15 | 1.92 | n/a* | 19.40 | 1.39 | 0.46 |
| CMRR Boilers | 0.066 | 0.003 | 0.010 | n/a | 0.082 | 0.056 | 0.004 |
| Asphalt Plant | 0.015 | 0.001 | 0.009 | n/a | 0.533 | 0.001 | 0.001 |
| Data Disintegrator | n/a | n/a | 0.07 | n/a | n/a | n/a | n/a |
| Degreaser | n/a | n/a | n/a | n/a | n/a | 0.008 | 0.008 |
| R&D Chemical Use | n/a | n/a | n/a | n/a | n/a | 9.59 | 3.49 |
| CMRR Generators | 2.23 | 0.038 | 0.07 | n/a | 0.49 | 0.07 | 0.0004 |
| Stationary Standby Generators | 2.71 | 0.12 | 0.14 | n/a | 0.61 | 0.14 | 0.001 |
| TA-33 Generators | 0.50 | 0.07 | 0.02 | n/a | 0.36 | 0.01 | 0.0005 |
| TA-3 Turbine | 2.40 | 0.16 | 0.32 | 0.32 | 0.50 | 0.10 | 0.07 |
| **TOTAL** | **44.29** | **0.69** | **4.19** | **1.94** | **30.53** | **12.55** | **4.43** |

* n/a = Not Applicable.

## 3.0 REPORTING EXEMPTIONS

Specific activities that are determined to be insignificant under NMED's Operating Permit program (20.2.70 NMAC) are exempt from reporting under the emissions inventory requirements (20.2.73.300 NMAC). NMED has designated exempt sources, activities, or thresholds in the following lists:

- List of Insignificant Activities, March 25, 2005 (NMED 2005) and
- List of Trivial Activities, January 10, 1996 (NMED 1996).

Laboratory sources and activities that qualify as insignificant or trivial as specified in these lists are not included in the annual emissions inventory. The following subsections of this report provide information and examples of the Laboratory's exempt activities as well as analyses performed to determine exempt status.

### 3.1 Boilers

The Laboratory's boiler inventory was evaluated against the List of Insignificant Activities (NMED 2005). Specifically, boilers were exempted from emissions inventory reporting requirements if they met one of the following requirements:

- Fuel-burning equipment that uses gaseous fuel has a design rate less than or equal to 5 MMBTU/hr, and is used solely for heating buildings for personal comfort or for producing hot water for personal use, or
- Any emissions unit . . . that has the potential to emit no more than **1 ton/yr** of any regulated pollutant . . . .

Any boiler that was not used exclusively for comfort heating or hot water was evaluated for the one ton per year exemption. For purposes of determining exemptions, boiler design ratings were used to estimate potential to emit. Any boiler not qualifying for one of these two exemptions is included in the annual emissions inventory with its own unique equipment number.

For the semi-annual emissions reports, emissions from all boilers and heaters were summed and reported for the entire source category.

### 3.2 Generators

The Laboratory maintains an inventory of approximately 73 portable generators. Portable generators are used at the Laboratory for temporary operations requiring remote power or to provide emergency backup power during power outages at various sites. The portable generators are fueled by gasoline and/or diesel fuel.

In addition to portable generators, the Laboratory maintains and operates approximately 45 stationary standby generators. Stationary generators are used on standby (emergency) status to provide power to critical systems at the Laboratory during power outages. The stationary generators are fueled by natural gas, propane, gasoline, or diesel.

The insignificant activity exemptions applicable to the Laboratory's generators are the following:

- Portable engines and portable turbines that have a design capacity . . . less than or equal to
  - 200-horsepower engine if fueled by diesel or natural gas and
  - 500-horsepower engine if fueled by gasoline.
- Emergency generators which on a temporary basis replace equipment used in normal operation, and which either have an allowable emission rate or potential to emit for each pollutant that is equal to or less than the equipment replaced, or which do not operate for a period exceeding 500 hours per calendar year.

On the basis of size, portable generators used for temporary power at remote locations are exempt from emissions inventory reporting requirements. Further, LANL's small portable generators are considered trivial activities and are not included in the Title V Operating Permit or semi-annual emissions reports. All stationary generators are designated as standby equipment under the Operating Permit Program and are used solely to provide emergency backup power for less than 500 hours per year. Therefore, they are considered insignificant sources and are also exempt from annual emissions inventory reporting requirements. However, the stationary standby generators were voluntarily included as a source category in the Title V Operating Permit and are included in the semi-annual emissions reports.

## 3.3 VOC Emissions

A number of insignificant and trivial activities were applicable for exempting materials from the VOC chemical use total in the emissions inventory. The basis of the exemptions and corresponding insignificant or trivial activities are explained in Table 3.3-1.

Fuels such as propane, kerosene, and acetylene were analyzed separately and are not listed in Table 3.3-1. When fuels are burned in an open flame, almost all of the fuels are consumed and VOC emissions are minimal. Emissions from fuel combustion are accounted for using emission factors for each fuel-burning unit.

**Table 3.3-1. Exemptions Applied for Chemical Use Activities**

| Basis of Exemption | Activity Type | Activity |
|---|---|---|
| Container sizes of 1 lb or less | Trivial | Paint or nonpaint materials dispensed from prepackaged aerosol cans of 16-oz. capacity or less. |
| Chemicals with vapor pressures less than 10 mmHg | Insignificant | Any emissions unit, operation, or activity that handles or stores a liquid with vapor pressure less than 10 mmHg or in quantities less than 500 gal. |
| Calibration chemicals | Trivial | Routine calibration and maintenance of laboratory equipment or other analytical instruments, including gases used as part of those processes. |
| Maintenance chemicals and oils | Trivial | Activities that occur strictly for maintenance of grounds or buildings, including lawn care; pest control; grinding; cutting; welding; painting; woodworking; sweeping; general repairs; janitorial activities; plumbing; re-tarring roofs; installing insulation; steam-cleaning and water-washing activities; and paving of roads, parking lots, and other areas.<br>Activities for maintenance and repair of equipment, pollution-control equipment, or motor vehicles either inside or outside of a building. |
| Use of office equipment and products | Trivial | Use of office equipment and products, not including printers or businesses primarily involved in photographic reproduction. |
| Chemicals used for boiler water treatment | Trivial | Boiler water treatment operations, not including cooling towers. |
| Chemicals used for oxygen scavenging | Trivial | Oxygen scavenging (deaeration of water). |
| Chemicals used in bench-scale chemical analysis | Trivial | Bench-scale laboratory equipment used for physical or chemical analysis but not lab fume hoods or vents. Note: This exemption was applied only to biological research solutions. Otherwise, this exemption was not applied. |

## 3.4 HAP Emissions

The HAP chemical use exemption analysis, similar to the VOC chemical use exemption analysis, resulted in application of several of the same exemptions from NMED/AQB List of Insignificant Activities (NMED 2005) and List of Trivial Activities (NMED 1996) (refer to Table 3.3-1).

## 3.5 Paints

An analysis of VOC and HAP emissions resulting from painting activities at the Laboratory was performed to determine if certain exemptions apply. Paint information for 2013 was gathered from the ChemLog chemical inventory system. These records were evaluated for applicability of exemptions for trivial and insignificant activities.

The following exemptions from NMED/AQB Operating Permit Program List of Trivial Activities (NMED 1996) were used in the paint analysis:

- Activities that occur strictly for maintenance of grounds or buildings, including the following: lawn care; pest control; grinding; cutting; welding; painting; woodworking; sweeping; general repairs; janitorial activities; plumbing; re-tarring roofs; installing insulation; steam-cleaning and water-washing activities; and paving of roads, parking lots, and other areas.

- Activities for maintenance and repair of equipment, pollution control equipment, or motor vehicles either inside or outside of a building.
- Paint or nonpaint materials dispensed from prepackaged aerosol cans of 16 oz. or less capacity. The amount of paint that did not qualify for a Trivial Activity totaled to 3,960 lbs (1.98 tons) which is less than the two-ton emission limit for insignificant activities.
- Surface coating of equipment, including spray painting and roll coating, for sources with facility-wide total cleanup solvent and coating actual emissions of less than two tons per year.

# 4.0 EMISSIONS SUMMARY

## 4.1 2013 Emissions Summary

Table 4.1-1 presents facility-wide estimated actual emissions of criteria pollutants for 2013 as reported in the annual emissions inventory and the semi-annual emissions reports. In addition, the Title V Operating Permit emissions limits are included. Table 4.1-2 presents estimated actual emissions for HAPs from chemical use. Emission unit information and detailed emissions calculations are included in Attachment A. The 2013 emissions inventory report as submitted to NMED is presented in Attachment B. Attachment C includes semi-annual emissions reports for 2013.

**Table 4.1-1. LANL Facility-Wide Criteria Pollutant Emissions for 2013**

| Pollutant | Estimated actual Emissions for Annual Emissions Reporting (tons/yr) | Estimated actual Emissions for Semi-annual Title V Operating Permit Reporting (tons/yr) | Title V Operating Permit Facility-Wide Emission Limits (tons/yr) |
|---|---|---|---|
| $NO_x$ | 18.36 | 44.3 | 245 |
| $SO_x$ | 0.40 | 0.69 | 150 |
| CO | 11.77 | 30.53 | 225 |
| PM | 2.38 | 4.19 | 120 |
| $PM_{10}$ | 2.38 | 4.19 | 120 |
| $PM_{2.5}$ | 2.26 | 1.94 | 120 |
| VOC | 11.13 | 12.55 | 200 |

**Table 4.1-2. LANL HAP Emissions from Top Five Chemicals Used in 2013**

| Pollutant | Chemical Use HAP Emissions (tons/yr) |
|---|---|
| Hydrochloric Acid | 0.83 |
| Methanol | 0.42 |
| Glycol Ethers | 0.38 |
| Methylene Chloride | 0.34 |
| Ethylene Glycol | 0.32 |
| All other HAPs from Chemical Use | 1.20 |
| **Total HAPs** | **3.49** |

HAP emissions from combustion sources are included in the emissions reports; however, they are negligible and do not contribute significantly to facility-wide HAP emissions.

Figure 4.1-1 shows criteria air pollutant emissions by source for 2013, excluding the very small emissions sources such as the data disintegrator, asphalt plant, degreasers, and carpenter shop. As the figure shows, the TA-3 power plant and the sum of emissions from small boilers and were the largest sources of CO and $NO_x$ emissions in 2013. R&D chemical use was the largest source of VOC emissions.

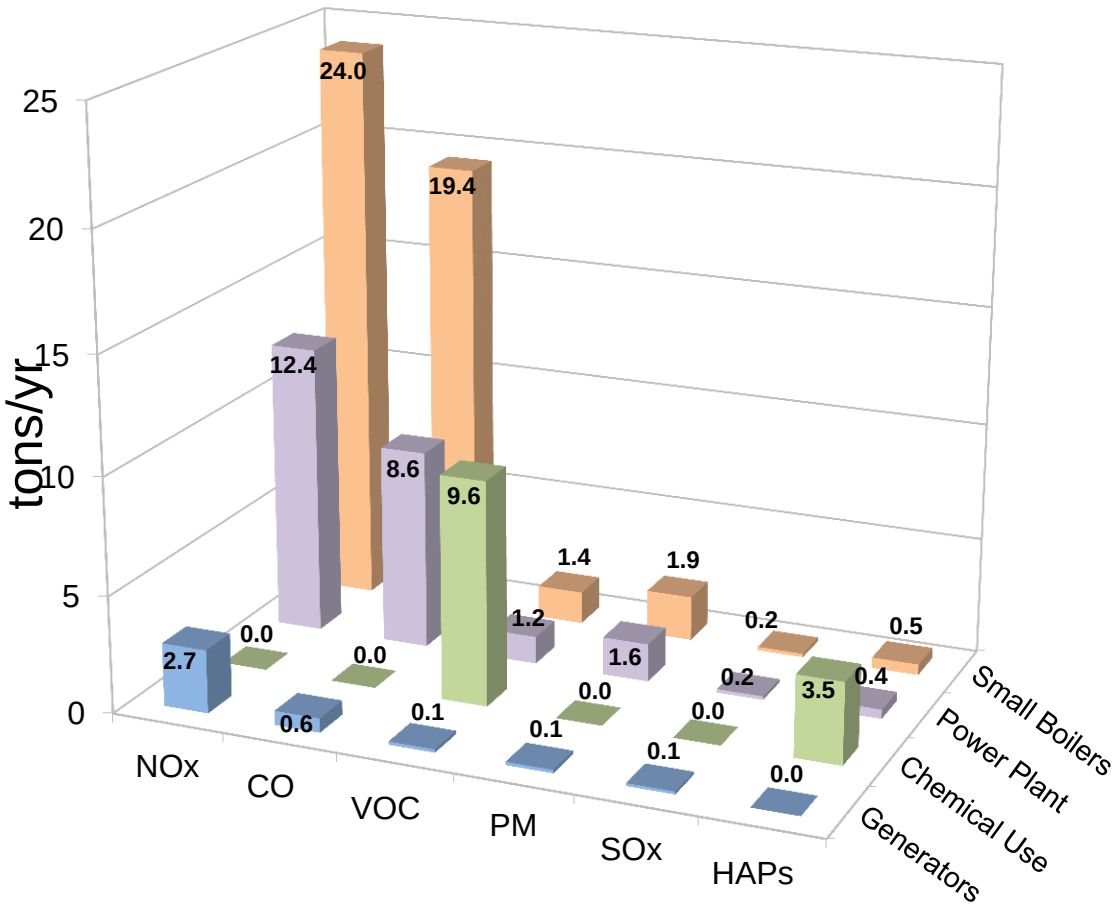


**Figure 4.1-1. Emissions of criteria pollutants by source in 2013.**

### Emission Trends and Title V Permit Limits

A comparison of historical emissions to the facility-wide emission limits in the Title V Operating Permit is provided in this section. It should be noted that the facility-wide emission limits in the Operating Permit include emissions from some sources that are not included in the annual emissions inventory, most notably small (insignificant) boilers and emergency standby generators. However, historical data are only available for emission sources that were included in the annual emissions inventory submittals.

Figure 4.1-2 provides a comparison of the past 10 years' facility-wide emissions for criteria air pollutants as reported to NMED in the annual emissions inventory submittal. The facility-wide emission limits included in LANL's Title V Operating Permit are also shown on the graph.

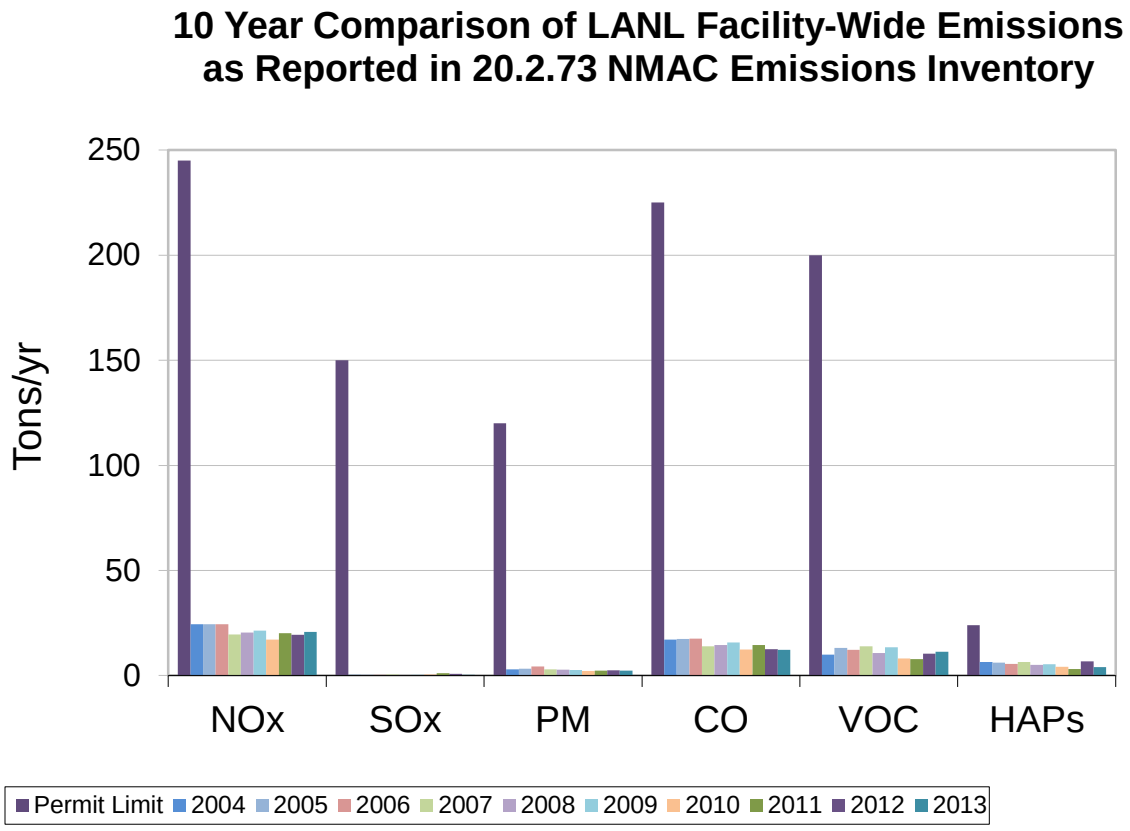


**Figure 4.1-2. Comparison of facility-wide annual reported emissions from 2004 to 2013.**

Figure 4.1-3 presents VOC and HAP emissions from chemical use activities for the last 11 years. The continued fluctuation in both VOC and HAP emissions is due to both variations in actual chemical purchases and improvements the Laboratory has made to the chemical tracking system.

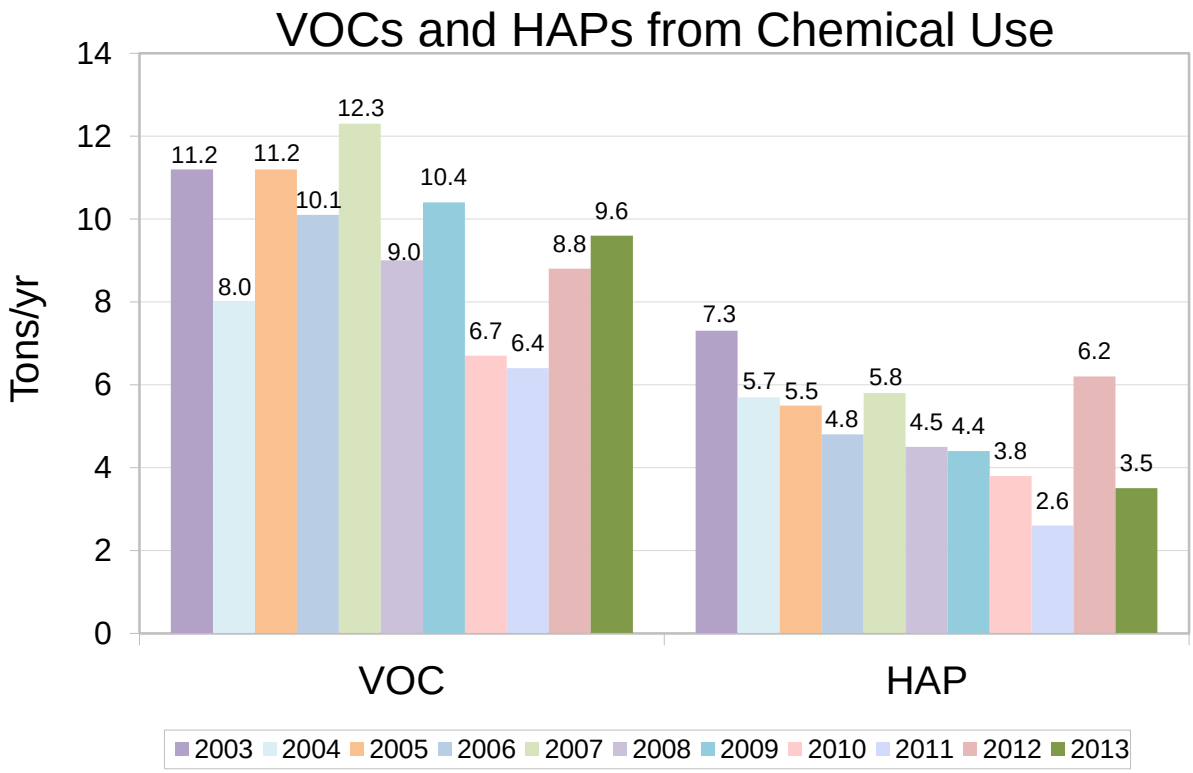


**Figure 4.1-3. VOC and HAP emissions from chemical use from 2003 to 2013.**

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## ATTACHMENT A:

***Emission Calculation Worksheets for Individual Emission Units***

# 2013 TA-60 BDM Asphalt Plant

**Data Reviewed By / Date:** _____

| Month | Data Entry Asphalt Produced (Tons) | 12-Month Rolling Total | Month | Data Entry Asphalt Produced (Tons) | 12-Month Rolling Total |
|---|---|---|---|---|---|
| January | 4 | 786 | July | 44 | 292 |
| February | 24 | 757 | August | 0 | 269 |
| March | 0 | 630 | September | 0 | 269 |
| April | 127 | 641 | October | 73 | 342 |
| May | 44 | 439 | November | 0 | 342 |
| June | 19 | 307 | December | 0 | 335 |
| 6 mo. Total | 218 | | 6 mo. Total: | 117 | |

| 2013 Asphalt Produced (Tons): | 335 |
|---|---|

**12-Month Rolling Permit Limit is 13,000 Tons**

| Annual Hours | | | |
|---|---|---|---|
| Month | Hours | Month | Hours |
| Jan | 0.8 | Jul | 4.1 |
| Feb | 8.8 | Aug | 0 |
| Mar | 0.0 | Sep | 0 |
| Apr | 16.5 | Oct | 11.6 |
| May | 9.5 | Nov | 0.0 |
| Jun | 3.3 | Dec | 0.0 |
| Total: | 38.9 | Total: | 15.7 |

Annual Total (to date): 54.58 Hours

**Hours are Limited to 4380 per Year.**

## Emission Calculations

| Pollutant | Emission Factor (lbs/hr) | Annual Emissions (tons) | Emissions (tons) Jan-June | Emissions July-Dec (tons) | Reference |
|---|---|---|---|---|---|
| NOx | 0.56 | 0.015 | 0.011 | 0.004 | (b) |
| CO | 19.53 | 0.533 | 0.380 | 0.153 | (b) |
| PM | 0.33 | 0.009 | 0.006 | 0.003 | (b) |
| **Pollutant** | **Emission Factor (lb/ton)** | **Annual Emissions (tons)** | **Emissions (tons) Jan-June** | **Emissions (tons) July-Dec** | **Reference** |
| PM-10 | 0.006 | 0.001 | 0.001 | 0.000 | (c) |
| PM-2.5 | 0.006 | 0.001 | 0.001 | 0.000 | (c) |
| SOx | 0.0046 | 0.001 | 0.001 | 0.000 | (a) |
| VOC | 0.0082 | 0.001 | 0.001 | 0.000 | (a) |
| HAPs | | | | | |
| Acetaldehyde | 0.00032 | 0.000 | 0.000 | 0.000 | (d) |
| Benzene | 0.00028 | 0.000 | 0.000 | 0.000 | (d) |
| EthylBenzene | 0.0022 | 0.000 | 0.000 | 0.000 | (d) |
| Formaldehyde | 0.00074 | 0.000 | 0.000 | 0.000 | (d) |
| Napthalene | 0.000036 | 0.0000 | 0.000 | 0.000 | (d) |
| POM | 0.00011 | 0.0000 | 0.000 | 0.000 | (d) |
| Quinone | 0.00027 | 0.000 | 0.000 | 0.000 | (d) |
| Toluene | 0.001 | 0.000 | 0.000 | 0.000 | (d) |
| Xylene | 0.0027 | 0.000 | 0.000 | 0.000 | (d) |
| TOTAL HAPS | | 0.001 | 0.001 | 0.000 | |
| EPCRA 313 | | tons | lbs./year | | |

| Reference |
|---|
| **(a)** AP-42, Sec. 11.1, *Hot Mix Asphalt Plants* , Table 11.1-5 & 11.1-6, Updated 4/2004 |
| **(b)** Calculated using stack test results performed on May 18, 2009 by TRC Air Mesurements. Pound per hour values were determined at a throughput rate of 45 tons/hour (the highest achievable rate during the test). |
| **(c)** PM-10 emission factor is calculated as 64% of the PM emission factor (from stack test), using the same ratio of PM to PM-10 as provided in AP-42 Table 11.1-1. No data provided for PM-2.5, assume same as PM-10. Convert to lb/ton by dividing by 45 tons/hr (test rate). |
| **(d)** AP-42, Table 11.1-9, *Hot Mix Asphalt Plants,* Updated 4/2004 |
| **(e)** AP-42, Table 11.1-11, *Hot Mix Asphalt Plants,* Updated 4/2004 |
| **(f)** Assume all SOx is converted to sulfuric acid |
| **(g)** EPCRA PAC Guidance Document, EPA-260-B-01-03, June 2001, Table 2-3 |
| **(h)** Emission Factor is from 40 CFR Part 98, Subpart C, Table C-1, "Default CO2 Emission Factors and High Heat Values for Various Types of Fuel." (Federal Register/Vol. 74, No. 209, 10/30/2009). |

| | | | | | |
|---|---|---|---|---|---|
| **Lead** | 8.90E-07 | 1.49E-07 | 0.0003 | | (e) |
| **Sulfuric Acid** | 0.0046 | 7.71E-04 | 1.54 | | (f) |
| **Mercury** | 4.10E-07 | 6.87E-08 | 0.0001 | | (e) |
| **PACs** | 2.70E-08 | 4.52E-09 | 9.05E-06 | | (d) |
| **Benzo(g,h,i) perylene** | 5.00E-10 | 8.38E-11 | 1.68E-07 | | (g) |

| **Greenhouse Gases Emissions** | **Emission Factors (kg / mmbtu) [(h) (i)]** | **Calendar Year (metric tons)** | **Fiscal Year (metric tons)** | | (l) |
|---|---|---|---|---|---|
| **Carbon Dioxide ($CO_2$)** | 61.46 | 76.35 | 73.39 | | (h) |
| **Methane ($CH_4$)** | 0.003 | 0.0037 | 0.0036 | | (i) |
| **Nitrous Oxide ($N_2O$)** | 0.0006 | 0.0007 | 0.0007 | | (j) |
| **TOTAL $CO_2$ EQUIVALENT[(k)]:** | | 76.66 | 73.69 | | (k) |

(Federal Register/Vol. 74, No. 209, 10/30/2009).

**(i)** Emission Factor is from 40 CFR Part 98, Subpart C, Table C-2, "Default CH4 and N2O Emission Factors for Various Types of Fuel." (Federal Register/Vol. 74, No. 209, 10/30/2009).

**(j)** Heat content was taken from National Propane Gas Association web page (http://npga.org/i4a/pages/index.cfm?pageid=633). The EPA value of 0.091 mmBtu/gallon, listed in 40 CFR Part 98, Subpart C, Table C-1, "Default CO2 Emission Factors and High Heat Values for Various Types of Fuel" is consistant with this value. The NPGA value is used as it includes more accuracy.

**(k)** $CO_2$ equivalent values were calculated using 40 CFR Part 98, Subpart A, Table A-1, "Global Warming Potentials." (Federal Register/Vol. 74, No. 209, 10/30/2009).

**(l)** Fiscal year begins on October 1st and ends on September 30th of the following year.

# 2013 TA-52 Data Disintegrator (EQPT 89)

**Reviewed By / Date:** _____

| | Data Entry | | Data Entry |
|---|---|---|---|
| **Month** | Boxes[c] Shredded | **Month** | Boxes[c] Shredded |
| **January** | 88 | **July** | 119 |
| **February** | 117 | **August** | 228 |
| **March** | 117 | **September** | 153 |
| **April** | 125 | **October** | 118 |
| **May** | 201 | **November** | 170 |
| **June** | 171 | **December** | 145 |
| **6 mo. Total:** | 819 | **6 mo. Total:** | 933 |

| | |
|---|---|
| **Annual Boxes:** | **1,752** |

## Emission Calculations

| | Percent Material in Exhaust[b] | % in Exhaust[e] | Control[d] Efficiency (Cyclone) | Control[d] Efficiency (Baghouse) |
|---|---|---|---|---|
| PM 2.5 | 15% | 15% | 0% | 95.0% |
| PM 10 | 15% | 90% | 75% | 95.0% |
| TSP | 15% | 100% | 75% | 95.0% |

| **Average Box Weight[a]** | |
|---|---|
| 45 | Pounds |

| | Amount Processed (pounds) | PM-2.5 Emissions (pounds) | PM-2.5 Emissions (tons) | PM-10 Emissions (pounds) | PM-10 Emissions (tons) | TSP Emissions (pounds) | TSP Emissions (tons) |
|---|---|---|---|---|---|---|---|
| **Annual** | 78,840 | 88.7 | 0.04 | 133.0 | 0.07 | 147.8 | 0.07 |
| **January - June** | 36,855 | 41.5 | 0.02 | 62.2 | 0.03 | 69.1 | 0.03 |
| **July - December** | 41,985 | 47.2 | 0.02 | 70.8 | 0.04 | 78.7 | 0.04 |
| **July - Dec 2012** | | | 0.02 | | 0.04 | | 0.04 |
| **Semi- Annual Rolling Total [f]** | | | 0.04 | | 0.07 | | 0.07 |

Reference

**(a).** Estimated maximum box weight is 45 pounds. Information provided by shredding operations. Full box weight of tightly packed paper.

**(b).** Emission Factor (percentage of material shredded that will enter into the exhaust) obtained from the manufacturer of the air handling system, AGET Manufacturing Co. 15% is also listed in the construction permit application.

**(c).** Information provided by the shredding operations personnel.

**(d).** Information on control equipment efficiencies was provided by the manufacturer (SEM) of the Data Disintegrator. Those values not given were extrapolated using manufacturer data. Efficiencies of 75% for the Cyclone and 95% for the bag house are listed in the construction permit application. (see cyclone efficiency tab for more info.)

**(e).** Manufacturer provided info that the dust into the exhaust would be in the size range of 5-20 um. Conservative assumption that 15% is PM2.5, and 90% is PM10.

**(f).** Emissions calculated by summing the emissions from January-June of current year plus July-December of previous year.

**Maximum Annual emission rate is:** **9.9 tpy or 2.3 lb/hr of Total Suspended Particulate (TSP) per year.**
**9.9 tpy or 2.3 lb/hr of Particulate Matter <10µm (PM-10) per year.**

2013 Permitted Generators

## Permitted Generators

| TA | Bldg | ID # | Make | Serial # | MODEL | KW | Fuel Type | Reading 2nd half of previous year | | First Half: 6 Month Reading Date | First Half: Reading | First Half: Hours Run | Second Half: 12 Month Reading Date | Second Half: Reading | Second Half: Hours Run | * Total Run Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | 290 | G-0012 | Kohler | 375801 | 1600ROZD | 1600 | Diesel | Dec. 12 | 335.2 | May-13 | 335.2 | 0.0 | Dec. 13 | 355.0 | 19.8 | 19.8 |
| 33 | 151 | G-0007 | Caterpillar | 6PK01065 | XQ225 | 225 | Diesel | Dec. 12 | 3423.0 | May-13 | 3434.0 | 11.0 | Dec. 13 | 3434.0 | 0.0 | 11.0 |
| 33 | 209 | G-0008 | Kohler | 2025460 | 20EORZ | 20 | Diesel | Dec. 12 | 403.1 | May-13 | 403.1 | 0.0 | Dec. 13 | 427.6 | 24.5 | 24.5 |
| 33 | 280 | G-0010 | Kohler | 2025461 | 20EORZ | 20 | Diesel | Dec. 12 | 185.9 | May-13 | 186.1 | 0.2 | Dec. 13 | 213.6 | 27.5 | 27.7 |
| 55 | 440 | G-0058 | Cummins | 106970810 | DFLE-5754172 | 1500 | Diesel | Dec-12 | 119.8 | May-13 | 129.7 | 9.9 | Dec. 13 | 143.6 | 13.9 | 23.8 |
| 55 | 440 | G-0059 | Cummins | 106970811 | DFLE-5754172 | 1500 | Diesel | Dec-12 | 78.4 | May-13 | 84.0 | 5.6 | Dec. 13 | 103.3 | 19.3 | 24.9 |
| 55 | 440 | G-0060 | Cummins | 106970812 | DFLE-5754172 | 1500 | Diesel | Dec-12 | 64.4 | May-13 | 91.4 | 27.0 | Dec. 13 | 108.5 | 17.1 | 44.1 |

*** The TA-33 225 kW and the two 20 kW generators have a limit of 500 hours of operation per year. The 1600 kW unit is limited to 900 hours per year.**

| Permit ID | ID # | Unit | First 6 Month Emissions: NOx (lbs) | CO (lbs) | SOx (lbs) | PM (lbs) | VOC (lbs) | HAPs (lbs) | Second 6 Month Emissions: NOx (lbs) | CO (lbs) | SOx (lbs) | PM (lbs) | VOC (lbs) | HAPs (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TA-33-G-1 | G-0012 | 33-290 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 855.4 | 697.0 | 126.7 | 28.5 | 15.8 | 1.8E-01 |
| TA-33-G-4 | G-0007 | 33-151 | 104.0 | 22.3 | 7.4 | 7.4 | 7.4 | 3.3E-02 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| TA-33-G-2 | G-0008 | 33-209 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 20.6 | 4.4 | 1.5 | 1.5 | 1.5 | 6.6E-03 |
| TA-33-G-3 | G-0010 | 33-280 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 5.4E-05 | 23.1 | 5.0 | 1.7 | 1.7 | 1.7 | 7.4E-03 |
| CMRR-GEN-1 | | 55-440 | 475.2 | 104.0 | 8.0 | 14.9 | 14.9 | 8.6E-02 | 667.2 | 146.0 | 11.3 | 20.9 | 20.9 | 1.2E-01 |
| CMRR-GEN-2 | | 55-440 | 268.8 | 58.8 | 4.5 | 8.4 | 8.4 | 4.9E-02 | 926.4 | 202.7 | 15.6 | 29.0 | 29.0 | 1.7E-01 |
| CMRR-GEN-3 | | 55-440 | 1296.0 | 283.5 | 21.9 | 40.5 | 40.5 | 2.4E-01 | 820.8 | 179.6 | 13.9 | 25.7 | 25.7 | 1.5E-01 |
| **Permit ID** | **ID #** | ***Unit*** | ***NOx (tons)*** | ***CO (tons)*** | ***SOx (tons)*** | ***PM (tons)*** | ***VOC (tons)*** | ***HAPs (tons)*** | ***NOx (tons)*** | ***CO (tons)*** | ***SOx (tons)*** | ***PM (tons)*** | ***VOC (tons)*** | ***HAPs (tons)*** |
| TA-33-G-1 | G-0012 | 33-290 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00E+00 | 0.428 | 0.348 | 0.063 | 0.014 | 0.008 | 9.22E-05 |
| TA-33-G-4 | G-0007 | 33-151 | 0.052 | 0.011 | 0.004 | 0.004 | 0.004 | 1.67E-05 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00E+00 |
| TA-33-G-2 | G-0008 | 33-209 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.00E+00 | 0.010 | 0.002 | 0.001 | 0.001 | 0.001 | 3.31E-06 |
| TA-33-G-3 | G-0010 | 33-280 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 2.70E-08 | 0.012 | 0.002 | 0.001 | 0.001 | 0.001 | 3.72E-06 |
| CMRR-GEN-1 | | 55-440 | 0.238 | 0.052 | 0.004 | 0.007 | 0.007 | 4.32E-05 | 0.334 | 0.073 | 0.006 | 0.010 | 0.010 | 6.07E-05 |
| CMRR-GEN-2 | | 55-440 | 0.134 | 0.029 | 0.002 | 0.004 | 0.004 | 2.44E-05 | 0.463 | 0.101 | 0.008 | 0.014 | 0.014 | 8.42E-05 |
| CMRR-GEN-3 | | 55-440 | 0.648 | 0.142 | 0.011 | 0.020 | 0.020 | 1.18E-04 | 0.410 | 0.090 | 0.007 | 0.013 | 0.013 | 7.46E-05 |

**ANNUAL TOTALS (tons)**

| Permit ID | NOx | CO | SOx | PM | VOC | HAPs | Permit ID | NOx | CO | SOx | PM | VOC | HAPs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TA-33-G-1 | 0.428 | 0.348 | 0.063 | 0.014 | 0.008 | 9.2E-05 | CMRR-GEN-1 | 0.571 | 0.125 | 0.010 | 0.018 | 0.018 | 1.0E-04 |
| TA-33-G-4 | 0.052 | 0.011 | 0.004 | 0.004 | 0.004 | 1.7E-05 | CMRR-GEN-2 | 0.598 | 0.131 | 0.010 | 0.019 | 0.019 | 1.1E-04 |
| TA-33-G-2 | 0.010 | 0.002 | 0.001 | 0.001 | 0.001 | 3.3E-06 | CMRR-GEN-3 | 1.058 | 0.232 | 0.018 | 0.033 | 0.033 | 1.9E-04 |
| TA-33-G-3 | 0.012 | 0.002 | 0.001 | 0.001 | 0.001 | 3.7E-06 | Total 3 CMRR Gen | 2.227 | 0.487 | 0.038 | 0.070 | 0.070 | 0.000 |
| **TPY** | **0.50** | **0.36** | **0.07** | **0.02** | **0.01** | **5.21E-04** | | | | | | | |

Reviewed by / Date: _____

2013 Permitted Generators

| EMISSION FACTORS | NOx lb/kw-hr | CO lb/kw-hr | SOx lb/kw-hr | PM lb/kw-hr | $PM_{10}$ lb/kw-hr | VOC lb/kw-hr |
|---|---|---|---|---|---|---|
| TA-33 1600kW [(a)] | 0.027 | 0.022 | 0.004 | 0.0009 | 0.0009 | 0.0005 |
| Small Diesel fired [(b)] | 0.042 | 0.009 | 0.003 | 0.003 | 0.003 | 0.003 |
| TA-55 (RLUOB) [(c)] | 0.032 | 0.007 | 5.4E-04 | 0.001 | 0.001 | 0.001 |

**References:**

447 kw is the size limit for determining large vs. small diesel fired generator. This information was taken from the operating permit application.

(a) TA-33-290 1600kw generator uses manufacturer supplied emission factors for NOx, CO, and VOCs. Emission factors for SOx, PM, and PM10 from AP-42, Table 3.3-1 & Table 3.4-1. The AP-42 (fifth edition) emissions factor uses units of lb/hp-hr. There are 1.341 hp-hrs in a kwh. Therefore, take pounds/hp-hr x 1.341 hp-hr/kwh to obtain the emission factor in lb/kwh.

(b) Emission factors for small diesel fired boilers were taken from AP-42 (fifth edition) Tables 3.3-1 and 3.3-2.

(c) TA-55 (RLUOB) generator emission factors were taken from AP-42 (fifth edition) Tables 3.4-1, 3.4-2, 3.4-3, and 3.4-4.

**TA-33-G-1 - 2013**
**(1600 kW Generator, 1500 kW Derated for Altitude)**
**12-Month Rolling kilowatt-hours**

| Month | Hour Meter Reading | Hours Operated | Rolling Total kw-hr | Month | Hour Meter Reading | Hours Operated | Rolling Total kw-hr |
|---|---|---|---|---|---|---|---|
| **January** | 335.2 | 0.0 | **9,750** | **July** | 335.2 | 0.0 | **9,750** |
| **February** | 335.2 | 0.0 | **9,750** | **August** | 335.2 | 0.0 | **9,750** |
| **March** | 335.2 | 0.0 | **9,750** | **September** | 335.2 | 0.0 | **7,800** |
| **April** | 335.2 | 0.0 | **9,750** | **October** | 335.2 | 0.0 | **0** |
| **May** | 335.2 | 0.0 | **9,750** | **November** | 355.0 | 19.8 | **29,700** |
| **June** | 335.2 | 0.0 | **9,750** | **December** | 355.0 | 0.0 | **29,700** |

**Generator is limited to 1,350,000 kWh/year**

2013 Permitted Generators

| | HAPS (lbs) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Emission Factors (lb/kwh)** | Benzene | | Toluene | | Xylenes | | 1,3-Butadiene | | Formaldehyde | |
| **Diesel (small)** | 3.19E-06 | | 1.40E-06 | | 9.73E-07 | | 1.34E-07 | | 4.03E-06 | |
| **Diesel (large)** | 2.65E-06 | | 9.60E-07 | | 6.59E-07 | | | | 2.69E-07 | |
| **Location** | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half |
| 33-290 | 0.00E+00 | 8.40E-02 | 0.00E+00 | 3.04E-02 | 0.00E+00 | 2.09E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.54E-03 |
| 33-151 | 7.89E-03 | 0.00E+00 | 3.46E-03 | 0.00E+00 | 2.41E-03 | 0.00E+00 | 3.31E-04 | 0.00E+00 | 9.97E-03 | 0.00E+00 |
| 33-209 | 0.00E+00 | 1.56E-03 | 0.00E+00 | 6.84E-04 | 0.00E+00 | 4.77E-04 | 0.00E+00 | 6.54E-05 | 0.00E+00 | 1.97E-03 |
| 33-280 | 1.27E-05 | 1.75E-03 | 5.59E-06 | 7.68E-04 | 3.89E-06 | 5.35E-04 | 5.34E-07 | 7.34E-05 | 1.61E-05 | 2.22E-03 |
| 55-440 | 3.94E-02 | 5.53E-02 | 1.43E-02 | 2.00E-02 | 9.79E-03 | 1.37E-02 | 0.00E+00 | 0.00E+00 | 4.00E-03 | 5.62E-03 |
| 55-440 | 2.23E-02 | 7.67E-02 | 8.06E-03 | 2.78E-02 | 5.54E-03 | 1.91E-02 | 0.00E+00 | 0.00E+00 | 2.26E-03 | 7.80E-03 |
| 55-440 | 1.07E-01 | 6.80E-02 | 3.89E-02 | 2.46E-02 | 2.67E-02 | 1.69E-02 | 0.00E+00 | 0.00E+00 | 1.09E-02 | 6.91E-03 |
| **(lbs)** | **1.77E-01** | **2.87E-01** | **6.46E-02** | **1.04E-01** | **4.44E-02** | **7.16E-02** | **3.31E-04** | **1.39E-04** | **2.72E-02** | **3.31E-02** |
| **Tons/Half/HAP** | **8.84E-05** | **1.44E-04** | **3.23E-05** | **5.21E-05** | **2.22E-05** | **3.58E-05** | **1.66E-07** | **6.94E-08** | **1.36E-05** | **1.65E-05** |
| **Tons/year/HAP** | **2.32E-04** | | **8.45E-05** | | **5.80E-05** | | **2.35E-07** | | **3.01E-05** | |
| **Tons/Year Total** | **5.21E-04** | | | | | | | | | |

Emission Factors from AP-42, Volume 1, Fifth Edition (Small Diesel Engines Table 3.3-2, Large Diesel Engines Table 3.4-4, Natural Gas 4-Stroke Engines Table 3.2-3)

## Greenhouse Gas Emission Calculations

| Unit | | Fuel Use | | Calendar Year | | | Fiscal Year [e] | | |
|---|---|---|---|---|---|---|---|---|---|
| **Permit ID** | ***Unit Location*** | ***Fuel Use Rate [d] (GPH)*** | ***Annual Fuel Use (Gal.)*** | ***CO2 (metric tons)*** | ***CH4 (metric tons)*** | ***N2O (metric tons)*** | ***CO2 (metric tons)*** | ***CH4 (metric tons)*** | ***N2O (metric tons)*** |
| TA-33-G-1 | TA-33-290 | 148 | 2930.4 | 29.91 | 1.21E-03 | 2.43E-04 | 19.86 | 8.06E-04 | 1.61E-04 |
| TA-33-G-4 | TA-33-151 | 15.8 | 173.8 | 1.77 | 7.20E-05 | 1.44E-05 | 1.77 | 7.20E-05 | 1.44E-05 |
| TA-33-G-2 | TA-33-209 | 1.7 | 41.65 | 0.43 | 1.72E-05 | 3.45E-06 | 0.22 | 8.73E-06 | 1.75E-06 |
| TA-33-G-3 | TA-33-114 | 1.7 | 47.09 | 0.48 | 1.95E-05 | 3.90E-06 | 0.24 | 9.89E-06 | 1.98E-06 |
| CMRR-Gen-1 | TA-55-440 | 103.6 | 2465.68 | 25.17 | 1.02E-03 | 2.04E-04 | 0.24 | 9.89E-06 | 1.98E-06 |
| CMRR-Gen-2 | TA-55-440 | 103.6 | 2579.64 | 26.33 | 1.07E-03 | 2.14E-04 | 0.24 | 9.89E-06 | 1.98E-06 |
| CMRR-Gen-3 | TA-55-440 | 103.6 | 4568.76 | 46.63 | 1.89E-03 | 3.78E-04 | 0.24 | 9.89E-06 | 1.98E-06 |
| | | | **Totals:** | **130.71** | **5.30E-03** | **1.06E-03** | **22.83** | **0.001** | **0.000** |
| | | | **Total $CO_2$ Equivalent:** | **131.16** | | | **22.91** | | |
| | | **Annual Fuel Use:** | 12807.02 | | | | | | |

2013 Permitted Generators

| *HAPS (lbs)* | | | | | | | | Individual Generator HAP Emissions (lbs) | |
|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | | Acrolein | | Naphthalene | | PAH | | | |
| 2.62E-06 | | 3.16E-07 | | 2.90E-07 | | 5.74E-07 | | | |
| 8.61E-08 | | 2.69E-08 | | 4.44E-07 | | 7.24E-07 | | | |
| 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half |
| 0.00E+00 | 2.73E-03 | 0.00E+00 | 8.53E-04 | 0.00E+00 | 1.41E-02 | 0.00E+00 | 2.29E-02 | 0.00E+00 | 1.84E-01 |
| 6.48E-03 | 0.00E+00 | 7.82E-04 | 0.00E+00 | 7.17E-04 | 0.00E+00 | 1.42E-03 | 0.00E+00 | 3.35E-02 | 0.00E+00 |
| 0.00E+00 | 1.28E-03 | 0.00E+00 | 1.55E-04 | 0.00E+00 | 1.42E-04 | 0.00E+00 | 2.81E-04 | 0.00E+00 | 6.62E-03 |
| 1.05E-05 | 1.44E-03 | 1.26E-06 | 1.74E-04 | 1.16E-06 | 1.59E-04 | 2.30E-06 | 3.16E-04 | 5.41E-05 | 7.44E-03 |
| 1.28E-03 | 1.79E-03 | 4.00E-04 | 5.61E-04 | 6.59E-03 | 9.26E-03 | 1.08E-02 | 1.51E-02 | 8.64E-02 | 1.21E-01 |
| 7.23E-04 | 2.49E-03 | 2.26E-04 | 7.79E-04 | 3.73E-03 | 1.29E-02 | 6.08E-03 | 2.10E-02 | 4.89E-02 | 1.68E-01 |
| 3.49E-03 | 2.21E-03 | 1.09E-03 | 6.90E-04 | 1.80E-02 | 1.14E-02 | 2.93E-02 | 1.86E-02 | 2.36E-01 | 1.49E-01 |
| **1.20E-02** | **1.19E-02** | **2.50E-03** | **3.21E-03** | **2.90E-02** | **4.79E-02** | **4.76E-02** | **7.82E-02** | **4.05E-01** | **6.38E-01** |
| **5.99E-06** | **5.97E-06** | **1.25E-06** | **1.61E-06** | **1.45E-05** | **2.39E-05** | **2.38E-05** | **3.91E-05** | | |
| **1.20E-05** | | **2.86E-06** | | **3.84E-05** | | **6.29E-05** | | | |

**References:**

(a) Emission Factor/High Heat Value is from 40 CFR Part 98, Subpart C, Table C-1, "Default $CO_2$ Emission Factors and High Heat Values for Various Types of Fuel." (Federal Register/Vol. 74, No. 209, 10/30/2009)

(b) Emission Factor is from 40 CFR Part 98, Subpart C, Table C-2, "Default $CH_4$ and $N_2O$ Emission Factors for Various Types of Fuel." (Federal Register/Vol. 74, No. 209, 10/30/2009).

(c) Hour readings for each of the generators listed are collected twice a year by ENV-ES.

(d) Fuel use rates were taken from manufacturer literature. Data for some units may not be available due to age, but data for a similar unit was used when unit specific data was not available.

(e) Fiscal year begins on October 1st of the following year and ends on September 30th of the current year.

**Emission Factors**

| Fuel Oil Heat Value[(a)] (mmBtu/Gal) | CO2[(a)] (kg/mmBtu) | CH4[(b)] (kg/mmBtu) | N2O[(b)] (kg/mmBtu) |
|---|---|---|---|
| 0.138 | 73.96 | 0.003 | 0.0006 |

Emergency Stand-by Generators Hour Meter Readings - 2013

| | | | | | | | | | First 6 Month Readings | | | Second 6 Month Readings | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TA | Bldg | ID # | Manufacturer | MODEL | KW | Fuel Type | Previous Reading Date | Previous Reading | 6 Month Reading Date | Reading | Hours Run | 12 Month Reading Date | Reading | Hours Run | Annual Total Hours |
| 3 | 40 | G-0013 | Onan Sons | 1500DVE15R31374B | 150 | Diesel | Dec-12 | 50.0 | Jun-13 | 55.0 | 5.0 | Dec-13 | 60.0 | 5.0 | 10.0 |
| 3 | 440 | G-0020 | Cummins | DFGA-5005210 | 500 | Diesel | Dec-12 | 203.0 | Jul-13 | 210.0 | 7.0 | Dec-13 | 215.1 | 5.1 | 12.1 |
| 3 | 1076 | G-0022 | Cummins | DGBB-5601289 | 35 | Diesel | Dec-12 | 235.8 | Jun-13 | 238.0 | 2.2 | Dec-13 | 288.0 | 50.0 | 52.2 |
| 3 | 1400 | G-0024 | Cummins | DFEH-5699616 | 400 | Diesel | Dec-12 | 191.0 | Jun-13 | 196.0 | 5.0 | Dec-13 | 200.0 | 4.0 | 9.0 |
| 3 | 1404 | G-0023 | Cummins | DFLC-5554001 | 1250 | Diesel | Dec-12 | 591.9 | Jun-13 | 594.0 | 2.1 | Dec-13 | 595.2 | 1.2 | 3.3 |
| 3 | 1498 | G-0017 | Caterpillar | SR-4 | 600 | Diesel | Dec-12 | 399.0 | Jul-13 | 404.0 | 5.0 | Dec-13 | 411.0 | 7.0 | 12.0 |
| 3 | 2322 | G-0021 | Onan Sons | DGDA-5005757 | 80 | Diesel | Dec-12 | 414.3 | Jul-13 | 417.3 | 3.0 | Dec-13 | 424.0 | 6.7 | 9.7 |
| 16 | 980 | G-0033 | Cummins | KTA50-G2 | 1100 | Diesel | Dec-12 | 428.0 | Jul-13 | 431.0 | 3.0 | Dec-13 | 432.6 | 1.6 | 4.6 |
| 16 | 1374 | G-0032 | Onan Sons | 60ENA | 60 | Nat. Gas | Dec-12 | 1414.0 | Jul-13 | 1451.8 | 37.8 | Dec-13 | 1479.0 | 27.2 | 65.0 |
| 35 | 2 | G-0034 | Onan Sons | 100DGDB | 100 | Diesel | Dec-12 | 115.5 | Jun-13 | 115.5 | 0.0 | Dec-13 | 115.5 | 0.0 | 0.0 |
| 35 | 402 | G-0037 | Cummins | DGCB-5674244 | 60 | Diesel | Dec-12 | 377.2 | Jun-13 | 400.0 | 22.8 | Jan-14 | 423.4 | 23.4 | 46.2 |
| 43 | 1 | G-0031 | Cummins | 4BT3.9-GC | 50 | Diesel | Dec-12 | 463.0 | Jul-13 | 472.6 | 9.6 | Dec-13 | 478.0 | 5.4 | 15.0 |
| 43 | 1 | G-0030 | Onan Sons | DVE | 150 | Diesel | Dec-12 | 910.0 | Jul-13 | 943.0 | 33.0 | Dec-13 | 967.0 | 24.0 | 57.0 |
| 46 | 335 | G-0036 | Onan Sons | 300DEFCB | 300 | Diesel | Dec-12 | 1330.2 | Jul-13 | 1374.0 | 43.8 | Dec-13 | 1411.0 | 37.0 | 80.8 |
| 48 | 45 | G-0043 | Onan Sons | DFCB-5740130 | 300 | Diesel | Dec-12 | 215.0 | Jun-13 | 231.0 | 16.0 | Dec-13 | 238.0 | 7.0 | 23.0 |
| 50 | 37 | G-0039 | Cummins | 680FDR5059FF | 500 | Diesel | Dec-12 | 502.8 | Jul-13 | 502.8 | 0.0 | Dec-13 | 502.8 | 0.0 | 0.0 |
| 50 | 69 | G-0040 | Onan | DGDB4487482 | 100 | Diesel | Dec-12 | 359.7 | Jun-13 | 365.6 | 5.9 | Dec-13 | 367.9 | 2.3 | 8.2 |
| 50 | 184 | G-0044 | Onan Sons | DGFA-568741 | 150 | Diesel | Dec-12 | 492.0 | Jun-13 | 523.0 | 31.0 | Dec-13 | 523.0 | 0.0 | 31.0 |
| 50 | 188 | G-0038 | Onan Sons | L940563879 | 1250 | Diesel | Dec-12 | 149.0 | Jun-13 | 149.0 | 0.0 | Dec-13 | 149.0 | 0.0 | 0.0 |
| 53 | 1 | G-0004 | Onan Sons | 60ENA | 60 | Nat. Gas | Dec-12 | 1847.0 | Jul-13 | 1852.6 | 5.6 | Dec-13 | 1859.0 | 6.4 | 12.0 |
| 53 | 2 | G-0005 | Kato Eng. | Kamag-14 | 50 | Diesel | Dec-12 | 196.5 | Jun-13 | 196.5 | 0.0 | Dec-13 | 196.5 | 0.0 | 0.0 |
| 53 | 3N | G-0011 | Onan | 15.0JC-18R | 15 | Propane | Dec-12 | 408.6 | Jun-13 | 408.6 | 0.0 | Dec-13 | 409.9 | 1.3 | 1.3 |
| 54 | 412 | G-0045 | Olympian | 95M-07874-F | 500 | Diesel | Dec-12 | 349.1 | Jun-13 | 349.1 | 0.0 | Dec-13 | Out of service | 0.0 | 0.0 |
| 55 | 5 | G-0049 | Kohler | 100RZ71 | 100 | Propane | Dec-12 | 182.4 | Jul-13 | 182.4 | 0.0 | Dec-13 | 182.4 | 0.0 | 0.0 |
| 55 | 8 | G-0050 | Delco/Detroit | E7014DD | 600 | Diesel | Dec-12 | 889.7 | Jul-13 | 896.0 | 6.3 | Dec-13 | 896.0 | 0.0 | 6.3 |
| 55 | 364 | G-0051 | Onan Sons | 1250DFLC-4987 | 1250 | Diesel | Dec-12 | 246.7 | Jul-13 | 261.4 | 14.7 | Dec-13 | 278.0 | 16.6 | 31.3 |
| 55 | 28 | G-0047 | Onan Sons | 40DL6T | 40 | Diesel | Dec-12 | 144.1 | Jul-13 | 144.1 | 0.0 | Dec-13 | 145.2 | 1.1 | 1.1 |
| 55 | 47 | G-0048 | Onan Sons | 1465 | 200 | Diesel | Dec-12 | 619.0 | Jul-13 | 619.0 | 0.0 | Dec-13 | 619.3 | 0.3 | 0.3 |
| 55 | 142 | G-0046 | Cummins | DFEB-4963414 | 400 | Diesel | Dec-12 | 183.0 | Jul-13 | 185.6 | 2.6 | Dec-13 | 186.3 | 0.7 | 3.3 |
| 55 | 371 | | Caterpillar | | 900 | Diesel | | | Jul-13 | 0.0 | 0.0 | Dec-13 | 22.5 | 22.5 | 22.5 |
| 60 | yard | G-0053 | Cummins | DFHD-4964979 | 1000 | Diesel | Dec-12 | 673.0 | Jun-13 | 673.0 | 0.0 | Dec-13 | 673.0 | 0.0 | 0.0 |
| 64 | 1 | G-0041 | Onan Sons | 250DVG | 250 | Diesel | Dec-12 | 240.0 | Jul-13 | 249.0 | 9.0 | Dec-13 | 283.0 | 34.0 | 43.0 |
| 69 | 33 | G-0055 | Cummins | DFLC-5568730 | 1250 | Diesel | Dec-12 | 175.0 | Jul-13 | 182.0 | 7.0 | Dec-13 | 185.3 | 3.3 | 10.3 |
| | **33** | **Generators** | | | | | | | | **TOTAL** | 277.4 | | **TOTAL** | 293.1 | |

N/R = Not Read

| | |
|---|---|
| **First half average hours per unit** | **8.4** |
| **Second half average hours per unit** | **8.9** |
| **Annual Average of hours per unit** | **10.2** |

**Reviewed By / Date:** _____

| EMISSION FACTORS | NOx | CO | SOx[e] | PM | PM10 | VOC |
|---|---|---|---|---|---|---|
| | lb/kw-hr | lb/kw-hr | lb/kw-hr | lb/kw-hr | lb/kw-hr | lb/kw-hr |
| Large Diesel fired [a][b] | 0.032 | 0.007 | 5.4E-04 | 0.001 | 0.001 | 0.001 |
| Small Diesel fired [a][c] | 0.042 | 0.009 | 0.003 | 0.003 | 0.003 | 0.003 |
| Natural Gas Fired[d] | 0.008 | 0.013 | 2.0E-06 | 3.4E-05 | 3.2E-05 | 1.0E-04 |

**References:**

| | |
|---|---|
| 447 | 447 kw (600 hp) is the size limit for determining large vs. small diesel fired generator. This information was taken from the operating permit application and is also found in AP-42. |

**(a)** The AP-42 (fifth edition), table 3.4-1,emissions factor uses units of lb/hp-hr. There are 1.341 hp-hrs in a kwh. Therefore, take pounds/hp-hr x 1.341 hp-hr/kwh to obtain the emission factor in lb/kwh.

**(b)** Emission factors for **large diesel fired engines** were taken from AP-42 (fifth edition) Tables 3.4-1, 3.4-2, 3.4-3, and 3.4-4.

**(c)** Emission factors for **small diesel fired engines** were taken from AP-42 (fifth edition) Tables 3.3-1 and 3.3-2.

**(d)** The AP-42 (fifth edition) emission factors for **natural gas burning** 4-stroke rich-burn engines (Table 3.2-3) provides units of lb/MMBTU. There are 3413 Btus in a kilowatt-hr (kwh) or 2.928 x 10-4 kwh per BTU. Therefore, take lb/MMBTU x 3413 / 1 x $10^6$ or lb/MMbtu /106/2.928 x $10^4$ to obtain the emissions factor in lb/kwh. The differences between the Title V application emission factors and those listed here, are that the application used the 2-stroke table, and the above emission factors are for rich burn 4-stroke engines. Most generator engines have been verified with the KSL generator crew to be 4-stroke.

**(e)** The Sulfur Oxide (SOx) emission factor for large diesel engines was calculated using AP-42 Table 3.4-1(fifth edition). The calculation requires the sulfur percent found in the fuel. It was verified in March of 2007, that future fuel supplied to the generators around LANL will be Ultra Low Sulfur Diesel (ULSD) (Sulfur <=15 ppm). Due to the low hours (and associated low fuel use) of most generators, the previous LANL tested fuel sulfur concentration of 0.05% will continue to be used for the rest of 2007 to allow for refueling of generators and use of the new ULSD. Calculation is 0.00809 * 0.05 * 0.608 * 2.2 = **$5.4 \times 10^{-4}$**

Emergency Stand-by Generators Hour Meter Readings - 2013

| | First 6 Month Emissions | | | | | | Second 6 Month Emissions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Location* | *NOx (lb)* | *CO (lb)* | *SOx (lb)* | *PM (lb)* | *VOC (lb)* | *HAPs (lb)* | *NOx (lb)* | *CO (lb)* | *SOx (lb)* | *PM (lb)* | *VOC (lb)* | *HAPs (lb)* |
| 3-40 | 31.5 | 6.8 | 2.3 | 2.3 | 2.3 | 1.1E-02 | 31.5 | 6.8 | 2.3 | 2.3 | 2.3 | 1.0E-02 |
| 3-440 | 112.0 | 24.5 | 1.9 | 3.5 | 3.5 | 2.4E-02 | 81.6 | 17.9 | 1.4 | 2.6 | 2.6 | 1.5E-02 |
| 3-1076 | 3.2 | 0.7 | 0.2 | 0.2 | 0.2 | 1.1E-03 | 73.5 | 15.8 | 5.3 | 5.3 | 5.3 | 2.4E-02 |
| 3-1400 | 84.0 | 18.0 | 6.0 | 6.0 | 6.0 | 2.8E-02 | 67.2 | 14.4 | 4.8 | 4.8 | 4.8 | 2.2E-02 |
| 3-1404 | 84.0 | 18.4 | 1.4 | 2.6 | 2.6 | 1.8E-02 | 48.0 | 10.5 | 0.8 | 1.5 | 1.5 | 8.7E-03 |
| 3-1498 | 96.0 | 21.0 | 1.6 | 3.0 | 3.0 | 2.0E-02 | 134.4 | 29.4 | 2.3 | 4.2 | 4.2 | 2.4E-02 |
| 3-2322 | 10.1 | 2.2 | 0.7 | 0.7 | 0.7 | 3.4E-03 | 22.5 | 4.8 | 1.6 | 1.6 | 1.6 | 7.2E-03 |
| 16-980 | 105.6 | 23.1 | 1.8 | 3.3 | 3.3 | 2.2E-02 | 56.3 | 12.3 | 1.0 | 1.8 | 1.8 | 1.0E-02 |
| 16-1374 | 18.1 | 29.5 | 0.0 | 0.1 | 0.2 | 2.6E-01 | 13.1 | 21.2 | 0.0 | 0.1 | 0.2 | 1.8E-01 |
| 35-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 35-402 | 57.5 | 12.3 | 4.1 | 4.1 | 4.1 | 1.9E-02 | 59.0 | 12.6 | 4.2 | 4.2 | 4.2 | 1.9E-02 |
| 43-1 | 20.2 | 4.3 | 1.4 | 1.4 | 1.4 | 6.7E-03 | 11.3 | 2.4 | 0.8 | 0.8 | 0.8 | 3.7E-03 |
| 43-1 | 207.9 | 44.6 | 14.9 | 14.9 | 14.9 | 6.9E-02 | 151.2 | 32.4 | 10.8 | 10.8 | 10.8 | 4.9E-02 |
| 46-335 | 551.9 | 118.3 | 39.4 | 39.4 | 39.4 | 1.8E-01 | 466.2 | 99.9 | 33.3 | 33.3 | 33.3 | 1.5E-01 |
| 48-45 | 201.6 | 43.2 | 14.4 | 14.4 | 14.4 | 6.7E-02 | 88.2 | 18.9 | 6.3 | 6.3 | 6.3 | 2.8E-02 |
| 50-37 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 50-69 | 24.8 | 5.3 | 1.8 | 1.8 | 1.8 | 8.3E-03 | 9.7 | 2.1 | 0.7 | 0.7 | 0.7 | 3.1E-03 |
| 50-184 | 195.3 | 41.9 | 14.0 | 14.0 | 14.0 | 6.5E-02 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 50-188 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 53-1 | 2.7 | 4.4 | 0.0 | 0.0 | 0.0 | 3.8E-02 | 3.1 | 5.0 | 0.0 | 0.0 | 0.0 | 4.3E-02 |
| 53-2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 53-3N | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.2 | 0.3 | 0.0 | 0.0 | 0.0 | 1.9E-03 |
| 54-412 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 55-5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 55-8 | 121.0 | 26.5 | 2.0 | 3.8 | 3.8 | 2.6E-02 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 55-364 | 588.0 | 128.6 | 9.9 | 18.4 | 18.4 | 1.2E-01 | 664.0 | 145.3 | 11.2 | 20.8 | 20.8 | 1.2E-01 |
| 55-28 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 1.8 | 0.4 | 0.1 | 0.1 | 0.1 | 5.9E-04 |
| 55-47 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 2.5 | 0.5 | 0.2 | 0.2 | 0.2 | 8.1E-04 |
| 55-142 | 43.7 | 9.4 | 3.1 | 3.1 | 3.1 | 1.5E-02 | 11.8 | 2.5 | 0.8 | 0.8 | 0.8 | 3.8E-03 |
| 55-371 | | | | | | | | | | | | |
| 60-yard | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 64-1 | 94.5 | 20.3 | 6.8 | 6.8 | 6.8 | 3.2E-02 | 357.0 | 76.5 | 25.5 | 25.5 | 25.5 | 1.1E-01 |
| 69-33 | 280.0 | 61.3 | 4.7 | 8.8 | 8.8 | 5.9E-02 | 132.0 | 28.9 | 2.2 | 4.1 | 4.1 | 2.4E-02 |
| **lbs/6 months** | 2933.5 | 664.2 | 132.4 | 152.4 | 152.6 | 1.1 | 2486.0 | 560.7 | 115.5 | 131.6 | 131.8 | 0.9 |
| **Tons/6 months** | **1.47** | **0.33** | **0.07** | **0.08** | **0.08** | **5.48E-04** | **1.24** | **0.28** | **0.06** | **0.07** | **0.07** | **4.34E-04** |

| YEARLY TOTAL | NOx | CO | SOx | PM | VOC | HAPs |
|---|---|---|---|---|---|---|
| Tons/Year | 2.71 | 0.61 | 0.12 | 0.14 | 0.14 | 0.001 |

## Greenhouse Gas Emissions

| Unit Data | | | | Calendar Year | | | Fiscal Year[e] | | | References |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | ID # | Fuel Use Rate[d][e] (GPH)(SCFH) | Annual Fuel Use (Gal. or MMSCF) | $CO_2$ (metric tons) | $CH_4$ (metric tons) | $N_2O$ (metric tons) | $CO_2$ (metric tons) | $CH_4$ (metric tons) | $N_2O$ (metric tons) | |
| 3-40 | G-0013 | 12.3 | 122.5 | 1.3 | 5.1E-05 | 1.0E-05 | 1.3 | 5.3E-05 | 1.1E-05 | **(a)** Emission Factor/High Heat Value is from 40 CFR Part 98, Subpart C, Table C-1, "Default CO2 Emission Factors and High Heat Values for Various Types of Fuel." |
| 3-440 | G-0020 | 21.8 | 263.9 | 2.7 | 1.1E-04 | 2.2E-05 | 3.0 | 1.2E-04 | 2.4E-05 | |
| 3-1076 | G-0022 | 2.9 | 151.4 | 1.5 | 6.3E-05 | 1.3E-05 | 0.8 | 3.3E-05 | 6.5E-06 | |
| 3-1400 | G-0024 | 27.3 | 245.7 | 2.5 | 1.0E-04 | 2.0E-05 | 2.8 | 1.1E-04 | 2.3E-05 | |
| 3-1404 | G-0023 | 87.3 | 288.1 | 2.9 | 1.2E-04 | 2.4E-05 | 12.5 | 5.1E-04 | 1.0E-04 | |
| 3-1498 | G-0017 | 42.7 | 512.4 | 5.2 | 2.1E-04 | 4.2E-05 | 6.1 | 2.5E-04 | 4.9E-05 | **(b)** Emission Factor is from 40 CFR Part 98, Subpart C, Table C-2, "Default CH4 and N2O Emission Factors for Various Types of Fuel." (Federal Register/Vol. 74, No. 209, 10/30/2009). |
| 3-2322 | G-0021 | 6.3 | 61.1 | 0.6 | 2.5E-05 | 5.1E-06 | 0.6 | 2.3E-05 | 4.6E-06 | |
| 16-980 | G-0033 | 79.4 | 365.2 | 3.7 | 1.5E-04 | 3.0E-05 | 7.8 | 3.2E-04 | 6.3E-05 | |
| 16-1374 | G-0032 | 850.1 | 0.0553 | 3.0 | 5.6E-05 | 5.6E-06 | 3.4 | 6.5E-05 | 6.5E-06 | |
| 35-2 | G-0034 | 7.5 | 0.0 | 0.0 | 0.0E+00 | 0.0E+00 | 0.0 | 0.0E+00 | 0.0E+00 | |
| 35-402 | G-0037 | 4.7 | 217.1 | 2.2 | 9.0E-05 | 1.8E-05 | 2.2 | 9.1E-05 | 1.8E-05 | **(c)** Hour readings were taken from the criteria pollutant emission calculation spreadsheet for standby generators. Hours are collected twice a year. |
| 43-1 | G-0031 | 4.2 | 63.0 | 0.6 | 2.6E-05 | 5.2E-06 | 0.7 | 2.7E-05 | 5.3E-06 | |
| 43-1 | G-0030 | 12.3 | 698.3 | 7.1 | 2.9E-04 | 5.8E-05 | 9.1 | 3.7E-04 | 7.4E-05 | |
| 46-335 | G-0036 | 22.5 | 1818.0 | 18.6 | 7.5E-04 | 1.5E-04 | 18.1 | 7.3E-04 | 1.5E-04 | |
| 48-45 | G-0043 | 22.5 | 517.5 | 5.3 | 2.1E-04 | 4.3E-05 | 6.5 | 2.7E-04 | 5.3E-05 | **(d)** Fuel use rates were taken from manufacturer literature. Data for some units may not be available due to age, but data for a similar unit was used when unit specific data was not available. |
| 50-37 | G-0039 | 34.4 | 0.0 | 0.0 | 0.0E+00 | 0.0E+00 | 0.0 | 0.0E+00 | 0.0E+00 | |
| 50-69 | G-0040 | 7.5 | 61.5 | 0.6 | 2.5E-05 | 5.1E-06 | 0.8 | 3.1E-05 | 6.1E-06 | |
| 50-184 | G-0044 | 11.1 | 344.1 | 3.5 | 1.4E-04 | 2.8E-05 | 5.6 | 2.3E-04 | 4.5E-05 | |
| 50-188 | G-0038 | 87.3 | 0.0 | 0.0 | 0.0E+00 | 0.0E+00 | 0.0 | 0.0E+00 | 0.0E+00 | |
| 53-1 | G-0004 | 850.1 | 0.0102 | 0.6 | 1.0E-05 | 1.0E-06 | 0.5 | 9.8E-06 | 1.5E-05 | **(e)** High Heat Value (HHV) for natural gas is taken from the monthly "Plant Quantities Report". Natural gas HHV is determined using a gas chromatagraph located at the TA-3 Power |
| 53-2 | G-0005 | 4.2 | 0.0 | 0.0 | 0.0E+00 | 0.0E+00 | 0.0 | 0.0E+00 | 0.0E+00 | |
| 53-3N | G-0011 | 116.6 | 0.0002 | 0.0 | 1.1E-06 | 2.3E-07 | 0.1 | 3.3E-06 | 6.5E-07 | |
| 54-412 | G-0045 | 36.6 | 0.0 | 0.0 | 0.0E+00 | 0.0E+00 | 0.0 | 0.0E+00 | 0.0E+00 | |
| 55-5 | G-0049 | 511.0 | 0.0000 | 0.0 | 0.0E+00 | 0.0E+00 | 0.1 | 6.6E-06 | 1.3E-06 | **(f)** The Btu value for propane vapor was taken from the National Propane Gas Association web page (http://npga.org/i4a/pages/index.cfm?pageid=633) |
| 55-8 | G-0050 | 42.7 | 269.0 | 2.7 | 1.1E-04 | 2.2E-05 | 2.7 | 1.1E-04 | 2.2E-05 | |
| 55-364 | G-0051 | 87.3 | 2732.5 | 27.9 | 1.1E-03 | 2.3E-04 | 27.8 | 1.1E-03 | 2.3E-04 | |
| 55-28 | G-0047 | 4.5 | 4.9 | 0.1 | 2.0E-06 | 4.1E-07 | 0.1 | 4.8E-06 | 9.7E-07 | |
| 55-47 | G-0048 | 16.4 | 4.9 | 0.1 | 2.0E-06 | 4.1E-07 | 0.0 | 1.0E-06 | 2.0E-07 | |
| 55-142 | G-0046 | 27.3 | 90.1 | 0.9 | 3.7E-05 | 7.5E-06 | 2.1 | 8.4E-05 | 1.7E-05 | **(e)** Fiscal year begins on October 1st of the following year and ends on September 30th of the current year. |
| 55-371 | G-xxxx | 70.0 | 1575.0 | 16.1 | 6.5E-04 | 1.3E-04 | 9.1 | 3.7E-04 | 7.4E-05 | |
| 60-yard | G-0053 | 87.3 | 0.0 | 0.0 | 0.0E+00 | 0.0E+00 | 1.3 | 5.4E-05 | 1.1E-05 | |
| 64-1 | G-0041 | 89.3 | 3839.9 | 39.2 | 1.6E-03 | 3.2E-04 | 28.7 | 1.2E-03 | 2.3E-04 | |
| 69-33 | G-0055 | 90.3 | 930.1 | 9.5 | 3.9E-04 | 7.7E-05 | 13.5 | 5.5E-04 | 1.1E-04 | |
| | | | **Totals:** | 158.46 | 6.4E-03 | 1.3E-03 | 167.49 | 6.7E-03 | 1.3E-03 | |
| | | | **Total $CO_2$ Equivalent:** | | 159.00 | | | 168.06 | | |
| | | | Emissions From Diesel | 154.90 | 6.28E-03 | 1.26E-03 | | | | |
| | | | Emissions From Natural Gas | 3.5429 | 0.0001 | 0.0000 | | | | |
| | | | Emissions From Propane | 0.0234 | 0.0000 | 0.0000 | | | | |

Total Fuel Oil Use: 15176.3 Gallons

| Fuel Type | HHV[a][e][f] | Emission Factors (kg/mmBtu) | | |
|---|---|---|---|---|
| | | $CO_2$[a] (kg/mmBtu) | $CH_4$[b] (kg/mmBtu) | $N_2O$[b] (kg/mmBtu) |
| Diesel | 0.138 | 73.96 | 0.003 | 0.0006 |
| Nat. Gas | 1021 | 53.02 | 0.001 | 0.0001 |
| Propane | 2516 | 61.46 | 0.003 | 0.0006 |

HHV is in units of mmbtu/gal for liquids and mmbtu/mmscf for gases.

| | HAPS (lbs) | | | | | | | | | | | | | | | | HAPS (lbs) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Emission Factors (lb/kwh)** | Benzene | | Toluene | | Xylenes | | 1,3-Butadiene | | Formaldehyde | | Acetaldehyde | | Acrolein | | Naphthalene | | 1,1,2,2-Tetrachloroethane | | 1,1,2-Trichloroethane | |
| **Natural Gas** | 5.40E-06 | | 1.91E-06 | | 6.66E-07 | | 2.26E-06 | | 7.00E-05 | | 9.53E-06 | | 8.98E-06 | | 3.32E-07 | | 8.64E-08 | | 5.23E-08 | |
| **Diesel (small)** | 3.19E-06 | | 1.40E-06 | | 9.73E-07 | | 1.34E-07 | | 4.03E-06 | | 2.62E-06 | | 3.16E-07 | | 2.90E-07 | | | | | |
| **Diesel (large)** | 2.65E-06 | | 9.60E-07 | | 6.59E-07 | | | | 2.69E-07 | | 8.61E-08 | | 2.69E-08 | | 4.44E-07 | | | | | |
| **Location** | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half |
| 3-40 | 2.39E-03 | 2.39E-03 | 1.43E-03 | 1.05E-03 | 7.30E-04 | 7.30E-04 | 1.00E-04 | 1.00E-04 | 3.02E-03 | 3.02E-03 | 1.96E-03 | 1.96E-03 | 2.37E-04 | 2.37E-04 | 2.17E-04 | 2.17E-04 | | | | |
| 3-440 | 9.28E-03 | 6.76E-03 | 6.67E-03 | 2.45E-03 | 2.31E-03 | 1.68E-03 | 0.00E+00 | 0.00E+00 | 9.43E-04 | 6.87E-04 | 3.01E-04 | 2.19E-04 | 9.42E-05 | 6.86E-05 | 1.55E-03 | 1.13E-03 | | | | |
| 3-1076 | 2.45E-04 | 5.58E-03 | 1.47E-04 | 2.44E-03 | 7.49E-05 | 1.70E-03 | 1.03E-05 | 2.34E-04 | 3.10E-04 | 7.05E-03 | 2.02E-04 | 4.58E-03 | 2.43E-05 | 5.53E-04 | 2.23E-05 | 5.07E-04 | | | | |
| 3-1400 | 6.37E-03 | 5.10E-03 | 3.81E-03 | 2.23E-03 | 1.95E-03 | 1.56E-03 | 2.67E-04 | 2.14E-04 | 8.06E-03 | 6.45E-03 | 5.24E-03 | 4.19E-03 | 6.32E-04 | 5.05E-04 | 5.79E-04 | 4.63E-04 | | | | |
| 3-1404 | 6.96E-03 | 3.98E-03 | 5.00E-03 | 1.44E-03 | 1.73E-03 | 9.89E-04 | 0.00E+00 | 0.00E+00 | 7.07E-04 | 4.04E-04 | 2.26E-04 | 1.29E-04 | 7.06E-05 | 4.04E-05 | 1.17E-03 | 6.66E-04 | | | | |
| 3-1498 | 7.95E-03 | 1.11E-02 | 5.72E-03 | 4.03E-03 | 1.98E-03 | 2.77E-03 | 0.00E+00 | 0.00E+00 | 8.08E-04 | 1.13E-03 | 2.58E-04 | 3.61E-04 | 8.07E-05 | 1.13E-04 | 1.33E-03 | 1.86E-03 | | | | |
| 3-2322 | 7.65E-04 | 1.71E-03 | 4.57E-04 | 7.49E-04 | 2.34E-04 | 5.22E-04 | 3.20E-05 | 7.16E-05 | 9.67E-04 | 2.16E-03 | 6.29E-04 | 1.40E-03 | 7.58E-05 | 1.69E-04 | 6.95E-05 | 1.55E-04 | | | | |
| 16-980 | 8.75E-03 | 4.66E-03 | 6.29E-03 | 1.69E-03 | 2.18E-03 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 8.89E-04 | 4.74E-04 | 2.84E-04 | 1.51E-04 | 8.88E-05 | 4.74E-05 | 1.47E-03 | 7.81E-04 | | | | |
| 16-1374 | 1.22E-02 | 8.81E-03 | 4.32E-03 | 3.11E-03 | 1.51E-03 | 1.09E-03 | 5.14E-03 | 3.70E-03 | 1.59E-01 | 1.14E-01 | 2.16E-02 | 1.56E-02 | 2.04E-02 | 1.47E-02 | 7.52E-04 | 5.41E-04 | 1.96E-04 | 1.41E-04 | 1.19E-04 | 8.53E-05 |
| 35-2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | | |
| 35-402 | 4.36E-03 | 4.47E-03 | 2.61E-03 | 1.96E-03 | 1.33E-03 | 1.37E-03 | 1.83E-04 | 1.87E-04 | 5.51E-03 | 5.66E-03 | 3.58E-03 | 3.68E-03 | 4.32E-04 | 4.44E-04 | 3.96E-04 | 4.07E-04 | | | | |
| 43-1 | 1.53E-03 | 8.60E-04 | 9.15E-04 | 3.77E-04 | 4.67E-04 | 2.63E-04 | 6.41E-05 | 3.61E-05 | 1.93E-03 | 1.09E-03 | 1.26E-03 | 7.07E-04 | 1.52E-04 | 8.53E-05 | 1.39E-04 | 7.82E-05 | | | | |
| 43-1 | 1.58E-02 | 1.15E-02 | 9.43E-03 | 5.03E-03 | 4.82E-03 | 3.50E-03 | 6.61E-04 | 4.81E-04 | 1.99E-02 | 1.45E-02 | 1.30E-02 | 9.43E-03 | 1.56E-03 | 1.14E-03 | 1.43E-03 | 1.04E-03 | | | | |
| 46-335 | 4.19E-02 | 3.54E-02 | 2.50E-02 | 1.55E-02 | 1.28E-02 | 1.08E-02 | 1.75E-03 | 1.48E-03 | 5.30E-02 | 4.47E-02 | 3.44E-02 | 2.91E-02 | 4.15E-03 | 3.51E-03 | 3.81E-03 | 3.21E-03 | | | | |
| 48-45 | 1.53E-02 | 6.69E-03 | 9.15E-03 | 2.93E-03 | 4.67E-03 | 2.04E-03 | 6.41E-04 | 2.80E-04 | 1.93E-02 | 8.46E-03 | 1.26E-02 | 5.50E-03 | 1.52E-03 | 6.63E-04 | 1.39E-03 | 6.08E-04 | | | | |
| 50-37 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | | |
| 50-69 | 1.88E-03 | 7.33E-04 | 1.12E-03 | 3.21E-04 | 5.74E-04 | 2.24E-04 | 7.88E-05 | 3.07E-05 | 2.38E-03 | 9.27E-04 | 1.55E-03 | 6.02E-04 | 1.86E-04 | 7.27E-05 | 1.71E-04 | 6.66E-05 | | | | |
| 50-184 | 1.48E-02 | 0.00E+00 | 8.86E-03 | 0.00E+00 | 4.53E-03 | 0.00E+00 | 6.21E-04 | 0.00E+00 | 1.87E-02 | 0.00E+00 | 1.22E-02 | 0.00E+00 | 1.47E-03 | 0.00E+00 | 1.35E-03 | 0.00E+00 | | | | |
| 50-188 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | | |
| 53-1 | 1.81E-03 | 2.07E-03 | 6.40E-04 | 7.32E-04 | 2.24E-04 | 2.56E-04 | 7.61E-04 | 8.70E-04 | 2.35E-02 | 2.69E-02 | 3.20E-03 | 3.66E-03 | 3.02E-03 | 3.45E-03 | 1.11E-04 | 1.27E-04 | 2.90E-05 | 3.32E-05 | 1.76E-05 | 2.01E-05 |
| 53-2 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | | |
| 53-3N | 0.00E+00 | 1.05E-04 | 0.00E+00 | 3.72E-05 | 0.00E+00 | 1.30E-05 | 0.00E+00 | 4.42E-05 | 0.00E+00 | 1.37E-03 | 0.00E+00 | 1.86E-04 | 0.00E+00 | 1.75E-04 | 0.00E+00 | 6.47E-06 | | | | |
| 54-412 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | | |
| 55-5 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | | |
| 55-8 | 1.00E-02 | 0.00E+00 | 7.20E-03 | 0.00E+00 | 2.49E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.02E-03 | 0.00E+00 | 3.25E-04 | 0.00E+00 | 1.02E-04 | 0.00E+00 | 1.68E-03 | 0.00E+00 | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 55-364 | 4.87E-02 | 5.50E-02 | 3.50E-02 | 1.99E-02 | 1.21E-02 | 1.37E-02 | 0.00E+00 | 0.00E+00 | 4.95E-03 | 5.59E-03 | 1.58E-03 | 1.79E-03 | 4.95E-04 | 5.58E-04 | 8.16E-03 | 9.21E-03 | | | | |
| 55-28 | 0.00E+00 | 1.40E-04 | 0.00E+00 | 6.15E-05 | 0.00E+00 | 4.28E-05 | 0.00E+00 | 5.88E-06 | 0.00E+00 | 1.77E-04 | 0.00E+00 | 1.15E-04 | 0.00E+00 | 1.39E-05 | 0.00E+00 | 1.27E-05 | | | | |
| 55-47 | 0.00E+00 | 1.91E-04 | 0.00E+00 | 8.38E-05 | 0.00E+00 | 5.84E-05 | 0.00E+00 | 8.01E-06 | 0.00E+00 | 2.42E-04 | 0.00E+00 | 1.57E-04 | 0.00E+00 | 1.90E-05 | 0.00E+00 | 1.74E-05 | | | | |
| 55-142 | 3.31E-03 | 8.92E-04 | 1.98E-03 | 3.91E-04 | 1.01E-03 | 2.73E-04 | 1.39E-04 | 3.74E-05 | 4.19E-03 | 1.13E-03 | 2.72E-03 | 7.33E-04 | 3.29E-04 | 8.85E-05 | 3.01E-04 | 8.11E-05 | | | | |
| 60-yard | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | | |
| 64-1 | 7.17E-03 | 2.71E-02 | 4.29E-03 | 1.19E-02 | 2.19E-03 | 8.27E-03 | 3.00E-04 | 1.14E-03 | 9.07E-03 | 3.43E-02 | 5.89E-03 | 2.23E-02 | 7.11E-04 | 2.69E-03 | 6.52E-04 | 2.46E-03 | | | | |
| 69-33 | 2.32E-02 | 1.09E-02 | 1.67E-02 | 3.96E-03 | 5.77E-03 | 2.72E-03 | 0.00E+00 | 0.00E+00 | 2.36E-03 | 1.11E-03 | 7.53E-04 | 3.55E-04 | 2.35E-04 | 1.11E-04 | 3.88E-03 | 1.83E-03 | | | | |
| **lbs** | **2.45E-01** | **2.06E-01** | **1.57E-01** | **8.24E-02** | **6.57E-02** | **5.57E-02** | **1.07E-02** | **8.91E-03** | **3.40E-01** | **2.82E-01** | **1.24E-01** | **1.07E-01** | **3.60E-02** | **2.94E-02** | **3.06E-02** | **2.55E-02** | **2.25E-04** | **1.74E-04** | **1.36E-04** | **1.05E-04** |
| **Tons/Half/HAP** | **1.22E-04** | **1.03E-04** | **7.84E-05** | **4.12E-05** | **3.28E-05** | **2.79E-05** | **5.37E-06** | **4.46E-06** | **1.70E-04** | **1.41E-04** | **6.19E-05** | **5.34E-05** | **1.80E-05** | **1.47E-05** | **1.53E-05** | **1.27E-05** | **1.13E-07** | **8.71E-08** | **6.80E-08** | **5.27E-08** |
| **Tons/year/HAP** | **2.25E-04** | | **1.20E-04** | | **6.07E-05** | | **9.83E-06** | | **3.11E-04** | | **1.15E-04** | | **3.27E-05** | | **2.81E-05** | | **2.00E-07** | | **1.21E-07** | |
| **Tons/Year Total** | **9.82E-04** | | | | | | | | | | | | | | | | | | | |

Emission Factors from AP-42, Volume 1, Fifth Edition (Small Diesel Engines Table 3.3-2, Large Diesel Engines Table 3.4-4, Natural Gas 4-Stroke Engines Table 3.2-3)

| HAPS (lbs) | | | | | | | | | | | | | | | | HAPS (lbs) | | | | | | | | Individual Generator HAP Emissions (lbs) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Dichloropropene | | Carbon Tetrachloride | | Chlorobenzene | | Chloroform | | Ethylbenzene | | Ethylene Dibromide | | Methanol | | Methylene Chloride | | PAH | | Styrene | | Toluene | | Vinyl Chloride | | | |
| 4.34E-08 | | 6.05E-08 | | 4.41E-08 | | 4.68E-08 | | 8.47E-08 | | 7.27E-08 | | 1.05E-05 | | 1.41E-07 | | 4.82E-07 | | 4.06E-08 | | 1.91E-06 | | 2.45E-08 | | | |
| | | | | | | | | | | | | | | | | 5.74E-07 | | | | | | | | | |
| | | | | | | | | | | | | | | | | 7.24E-07 | | | | | | | | | |
| 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half | 1st Half | 2nd Half |
| | | | | | | | | | | | | | | | | 4.30E-04 | 4.30E-04 | | | | | | | 1.05E-02 | 1.01E-02 |
| | | | | | | | | | | | | | | | | 2.53E-03 | 1.85E-03 | | | | | | | 2.37E-02 | 1.48E-02 |
| | | | | | | | | | | | | | | | | 4.42E-05 | 1.00E-03 | | | | | | | 1.08E-03 | 2.37E-02 |
| | | | | | | | | | | | | | | | | 1.15E-03 | 9.18E-04 | | | | | | | 2.81E-02 | 2.16E-02 |
| | | | | | | | | | | | | | | | | 1.90E-03 | 1.09E-03 | | | | | | | 1.78E-02 | 8.73E-03 |
| | | | | | | | | | | | | | | | | 2.17E-03 | 3.04E-03 | | | | | | | 2.03E-02 | 2.44E-02 |
| | | | | | | | | | | | | | | | | 1.38E-04 | 3.08E-04 | | | | | | | 3.37E-03 | 7.25E-03 |
| | | | | | | | | | | | | | | | | 2.39E-03 | 1.27E-03 | | | | | | | 2.23E-02 | 1.02E-02 |
| 9.84E-05 | 7.08E-05 | 1.37E-04 | 9.87E-05 | 9.99E-05 | 7.19E-05 | 1.06E-04 | 7.64E-05 | 1.92E-04 | 1.38E-04 | 1.65E-04 | 1.19E-04 | 2.37E-02 | 1.71E-02 | 3.19E-04 | 2.30E-04 | 1.09E-03 | 7.86E-04 | 9.22E-05 | 6.63E-05 | 4.32E-03 | 3.11E-03 | 5.56E-05 | 4.00E-05 | 2.55E-01 | 1.84E-01 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 0.00E+00 | | | | | | | 0.00E+00 | 0.00E+00 |
| | | | | | | | | | | | | | | | | 7.85E-04 | 8.06E-04 | | | | | | | 1.92E-02 | 1.90E-02 |
| | | | | | | | | | | | | | | | | 2.75E-04 | 1.55E-04 | | | | | | | 6.73E-03 | 3.65E-03 |
| | | | | | | | | | | | | | | | | 2.84E-03 | 2.07E-03 | | | | | | | 6.94E-02 | 4.87E-02 |
| | | | | | | | | | | | | | | | | 7.54E-03 | 6.37E-03 | | | | | | | 1.84E-01 | 1.50E-01 |
| | | | | | | | | | | | | | | | | 2.75E-03 | 1.20E-03 | | | | | | | 6.73E-02 | 2.84E-02 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 0.00E+00 | | | | | | | 0.00E+00 | 0.00E+00 |
| | | | | | | | | | | | | | | | | 3.39E-04 | 1.32E-04 | | | | | | | 8.28E-03 | 3.11E-03 |
| | | | | | | | | | | | | | | | | 2.67E-03 | 0.00E+00 | | | | | | | 6.52E-02 | 0.00E+00 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 0.00E+00 | | | | | | | 0.00E+00 | 0.00E+00 |
| 1.46E-05 | 1.67E-05 | 2.03E-05 | 2.32E-05 | 1.48E-05 | 1.69E-05 | 1.57E-05 | 1.80E-05 | 2.85E-05 | 3.25E-05 | 2.44E-05 | 2.79E-05 | 3.51E-03 | 4.01E-03 | 4.73E-05 | 5.40E-05 | 1.62E-04 | 1.85E-04 | 1.37E-05 | 1.56E-05 | 6.40E-04 | 7.32E-04 | 8.24E-06 | 9.42E-06 | 3.78E-02 | 4.32E-02 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 0.00E+00 | | | | | | | 0.00E+00 | 0.00E+00 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 9.39E-06 | | | | | | | 0.00E+00 | 1.94E-03 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 0.00E+00 | | | | | | | 0.00E+00 | 0.00E+00 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 0.00E+00 | | | | | | | 0.00E+00 | 0.00E+00 |
| | | | | | | | | | | | | | | | | 2.74E-03 | 0.00E+00 | | | | | | | 2.56E-02 | 0.00E+00 |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | 1.33E-02 | 1.50E-02 | | | | | | | 1.24E-01 | 1.21E-01 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 2.52E-05 | | | | | | | 0.00E+00 | 5.95E-04 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 3.44E-05 | | | | | | | 0.00E+00 | 8.11E-04 |
| | | | | | | | | | | | | | | | | 5.97E-04 | 1.61E-04 | | | | | | | 1.46E-02 | 3.79E-03 |
| | | | | | | | | | | | | | | | | 0.00E+00 | 0.00E+00 | | | | | | | 0.00E+00 | 0.00E+00 |
| | | | | | | | | | | | | | | | | 1.29E-03 | 4.88E-03 | | | | | | | 3.16E-02 | 1.15E-01 |
| | | | | | | | | | | | | | | | | 6.34E-03 | 2.99E-03 | | | | | | | 5.92E-02 | 2.40E-02 |
| **1.13E-04** | **8.74E-05** | **1.57E-04** | **1.22E-04** | **1.15E-04** | **8.88E-05** | **1.22E-04** | **9.43E-05** | **2.21E-04** | **1.71E-04** | **1.89E-04** | **1.47E-04** | **2.72E-02** | **2.11E-02** | **3.66E-04** | **2.84E-04** | **5.35E-02** | **4.47E-02** | **1.06E-04** | **8.19E-05** | **4.96E-03** | **3.84E-03** | **6.39E-05** | **4.94E-05** | **1.10E+00** | **8.68E-01** |
| **5.65E-08** | **4.37E-08** | **7.87E-08** | **6.09E-08** | **5.74E-08** | **4.44E-08** | **6.09E-08** | **4.72E-08** | **1.10E-07** | | **9.47E-08** | **7.33E-08** | **1.36E-05** | **1.05E-05** | **1.83E-07** | **1.42E-07** | **2.67E-05** | **2.24E-05** | **5.29E-08** | **4.10E-08** | **2.48E-06** | **1.92E-06** | **3.19E-08** | **2.47E-08** | | |
| **1.00E-07** | | **1.40E-07** | | **1.02E-07** | | **1.08E-07** | | **1.10E-07** | | **1.68E-07** | | **2.41E-05** | | **3.25E-07** | | **4.91E-05** | | **9.39E-08** | | **4.40E-06** | | **5.66E-08** | | | |

# 2013 Small Boilers Data Entry / Gas Use

| | Month | Metered Boilers: TA-55 Boiler Gas Use (Mscf)[c] BHW-1B (B-602) ID (B-0016) | Metered Boilers: TA-55 Boiler Gas Use (Mscf)[c] BHW-2B (B-603) ID (B-0017) | Metered Boilers: CMRR-RLUOB Gas Use (Mscf) All 3 Boilers NMED IDs 90, 104, and 105 | Total Gas Use[a] (Mscf) | Total Gas Use[a] (MMscf) | Non-Metered Gas Use (MMscf) | 12-Month Rolling Total for all Small Boilers (MMscf)[e] |
|---|---|---|---|---|---|---|---|---|
| Data Entry | January | 2639 | 548 | 569 | 83,623 | 83.62 | 79.87 | 520.61 |
| | February | 1952 | 33 | 546 | 67,185 | 67.19 | 64.65 | 522.88 |
| | March | 1359 | 592 | 449 | 54,795 | 54.80 | 52.40 | 522.23 |
| | April | 1738 | 2.0 | 412 | 43,060 | 43.06 | 40.91 | 524.94 |
| | May | 1507 | 0.8 | 277 | 25,295 | 25.30 | 23.51 | 527.63 |
| | June | 790 | 0 | 237 | 11,491 | 11.49 | 10.46 | 527.07 |
| | July | 1158 | 2 | 158 | 11,317 | 11.32 | 10.00 | 525.25 |
| | August | 497 | 794 | 144 | 11,389 | 11.39 | 9.95 | 521.96 |
| | September | 252 | 1274 | 187 | 10,374 | 10.37 | 8.66 | 513.68 |
| | October | 1878 | 7 | 320 | 38,938 | 38.94 | 36.73 | 517.71 |
| | November | 1267 | 728 | 445 | 56,805 | 56.81 | 54.37 | 508.61 |
| | December | 0.6 | 2187 | 536 | 72,975 | 72.98 | 70.25 | 487.25 |
| | TOTAL | 15038 | 6168 | 4280 | 487,247 | 487.25 | 461.76 | |
| | | | | | 12 Month Permit Limit (MMscf) = | | | 870 |

| | | |
|---|---|---|
| 2013 Non Metered Boiler Pool Capacity: | **287.8** | MMBTU/hr[f] |

| | | |
|---|---|---|
| Estimated Gas-Use per MMBtu rating Jan-June: | 0.94 | MMscf/MMBtu/hr |
| Estimated Gas-Use per MMBtu rating July-Dec: | 0.66 | MMscf/MMBtu/hr |
| Estimated Gas-Use per MMBtu - Annual | 1.60 | MMscf/MMBtu/hr |
| Estimated Gas-Use per MMBtu - Fiscal Year | 1.70 | MMscf/MMBtu/hr |

| Gas Use Non-Metered[g] (MMSCF) | | | | |
|---|---|---|---|---|
| **NMED ID:** | 11 | 12 | 53 &134 | Insignificant Units[h] |
| **Location:** | TA-53-365 | TA-53-365 | TA-16-1484 | Lab Wide |
| **Equipment ID:** | BHW-1 | BHW-2 | Plant 5 | Various |
| **Database ID:** | B-0042 | B-0043 | B-0093/0092 | |
| **Design Rate[i] (MMBTU/hr)** | **7.115** | **7.115** | **12.700** | **261** |
| Calculated Gas Use-Jan-June | 6.719 | 6.719 | 11.994 | 246.367 |
| Calculated Gas Use-July-Dec | 4.696 | 4.696 | 8.383 | 172.189 |
| Calculated Gas Use-Annual | 11.415 | 11.415 | 20.377 | 418.555 |

Reviewed By / Date: _____

Definitions:

MMSCF= Million Standard Cubic Feet

MSCF = Thousand Standard Cubic Feet

| Emission Factors (lb/MMscf) | | | | |
|---|---|---|---|---|
| **Criteria Pollutant** | **Small Uncontrolled Boilers[1]** | **TA-16 Low NOx Boilers[4]** | **TA-55-6 Boilers[3]** | **RLUOB Boilers** |
| **NOx** | 100 | 37.08 | 138 | 29.9 |
| **SOx** | 0.6 | 0.6 | 0.6 | 0.6 |
| **PM[2]** | 7.6 | 7.6 | 14.2 | 4.9 |
| **PM-10[2]** | 7.6 | 7.6 | 14.2 | 4.9 |
| **PM-2.5[2]** | 7.6 | 7.6 | 14.2 | 4.9 |
| **CO** | 84 | 37.08 | 38.2 | 38.1 |
| **VOC** | 5.5 | 5.5 | 5.98 | 25.8 |

| **HAPs[5]** | |
|---|---|
| **Arsenic** | 0.0002 |
| **Benzene** | 0.0021 |
| **BE** | 0.000012 |
| **Cadmium** | 0.0011 |
| **Chromium** | 0.0014 |
| **Cobalt** | 0.000084 |
| **Dichlorobenzene** | 0.0012 |
| **Formaldehyde** | 0.075 |
| **Hexane** | 1.8 |
| **Lead** | 0.0005 |
| **Mangenese** | 0.00038 |
| **Mercury** | 0.00026 |
| **Napthalene** | 0.00061 |
| **Nickel** | 0.0021 |
| **POM** | 0.000088 |
| **Selenium** | 0.000024 |
| **Toluene** | 0.0034 |

| **References for Emission Factors** |
|---|
| (1) AP-42, 7/98, Section 1.4, Natural Gas Combustion, Small Boilers. |
| (2) Emission factors for natural gas of PM-10 and PM-2.5 are roughly equal to those of PM, Natural Gas Combustion, Table 1.4-2. |
| (3) AP-42, 7/98, Section 1.4, Natural Gas Combustion, Small Boilers for SOx. Stack test on 3/00 for NOx. Otherwise, Emission factors from Sellers Engineering Co. |
| (4) AP-42, 7/98, Section 1.4, Natural Gas Combustion, Small Boilers; Emission factors for NOx and CO from Sellers Engineering Co (low-NOx boilers). |
| (5) All HAP emission factors from AP-42 7/98, Section 1.4, Natural Gas Combustion, Tables 1.4-3, 1.4-4. |

## CMRR Boiler Fuel Oil Use (2013):

| **Date \ Boiler** | **BHW-1 (gal.)** | **BHW-2 (gal.)** | **BHW-3 (gal.)** | |
|---|---|---|---|---|
| 1/8/2013 | 15.6 | 19.5 | 29.4 | Reading provided by Randy Johnson |
| 1/9/2013 | 23.4 | 7.5 | 48.7 | Reading provided by Randy Johnson |
| 1/10/2013 | 4.1 | 46 | 7.6 | Reading provided by Randy Johnson |
| | | | | |
| No additional fuel oil burned in these units since January 10, 2013 | | | | as of July 1, 2013, per Randy Johnson |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# 2013 Small Boilers Emission Summary

## Total Emissions (tons)

| Pollutant<br><br>Criteria | Annual* Emissions (Includes Insignificant Sources) | Jan-June* (Includes Insignificant Sources) | July-Dec* (Includes Insignificant Sources) | Jan-June CMRR-RLUOB Boilers | July-Dec CMRR-RLUOB Boilers |
|---|---|---|---|---|---|
| NOx | 23.974 | 14.020 | 9.954 | 0.037 | 0.027 |
| SOx | 0.146 | 0.086 | 0.061 | 0.001 | 0.001 |
| PM | 1.916 | 1.118 | 0.798 | 0.006 | 0.004 |
| PM-10 | 1.916 | 1.118 | 0.798 | 0.006 | 0.004 |
| PM-2.5 | 1.916 | 1.118 | 0.798 | 0.006 | 0.004 |
| CO | 19.403 | 11.395 | 8.008 | 0.047 | 0.034 |
| VOC | 1.388 | 0.813 | 0.575 | 0.032 | 0.023 |
| HAPs | | | | | |
| Arsenic | 4.87E-05 | 2.85E-05 | 2.02E-05 | 2.49E-07 | 1.79E-07 |
| Benzene | 5.12E-04 | 3.00E-04 | 2.12E-04 | 2.61E-06 | 1.88E-06 |
| BE | 2.92E-06 | 1.71E-06 | 1.21E-06 | 1.49E-08 | 1.07E-08 |
| Cadmium | 2.68E-04 | 1.57E-04 | 1.11E-04 | 1.37E-06 | 9.85E-07 |
| Chromium | 3.41E-04 | 2.00E-04 | 1.41E-04 | 1.74E-06 | 1.25E-06 |
| Cobalt | 2.05E-05 | 1.20E-05 | 8.48E-06 | 1.05E-07 | 7.52E-08 |
| Dichlorobenzene | 2.92E-04 | 1.71E-04 | 1.21E-04 | 1.49E-06 | 1.07E-06 |
| Formaldehyde | 1.83E-02 | 1.07E-02 | 7.57E-03 | 9.34E-05 | 6.71E-05 |
| Hexane | 4.39E-01 | 2.57E-01 | 1.82E-01 | 2.24E-03 | 1.61E-03 |
| Lead | 1.22E-04 | 7.14E-05 | 5.04E-05 | 6.23E-07 | 4.48E-07 |
| Mangenese | 9.26E-05 | 5.42E-05 | 3.83E-05 | 4.73E-07 | 3.40E-07 |
| Mercury | 6.33E-05 | 3.71E-05 | 2.62E-05 | 3.24E-07 | 2.33E-07 |
| Napthalene | 1.49E-04 | 8.71E-05 | 6.15E-05 | 7.59E-07 | 5.46E-07 |
| Nickel | 5.12E-04 | 3.00E-04 | 2.12E-04 | 2.61E-06 | 1.88E-06 |
| POM | 2.14E-05 | 1.26E-05 | 8.88E-06 | 1.10E-07 | 7.88E-08 |
| Selenium | 5.85E-06 | 3.43E-06 | 2.42E-06 | 2.99E-08 | 2.15E-08 |
| Toluene | 8.28E-04 | 4.85E-04 | 3.43E-04 | 4.23E-06 | 3.04E-06 |
| TOTAL HAPS | 0.460 | 0.270 | 0.191 | 0.002 | 0.002 |

* The totals include exempt, non-exempt, metered, and non-metered boilers (all boilers except Power Plant boilers).

| REFERENCES |
| --- |
| (a) Information on non-metered boilers is provided in the facility wide gas use report by Utilities and Infrastructure and contains all gas use at LANL minus those non-LANL sources which feed from the LANL main line and LANL sources that are individiually metered. Total Gas use does not include the TA-3 Power Plant. All other sources are included in this total. |
| (b) TA-16 Boilers include 2 boilers in plant 5. Gas use was difficult to obtain, so, the boilers were included in the "boiler pool" to determine gas use. Plant 6 has been taken off line and is not expected to be reused or boilers relocated. The removal of these boilers will be requested in the next operating permit revision. |
| (c) TA-55 has two boilers with separate AIRs numbers. Each boiler has a gas meter. The gas use information is provided monthly by the Utility and Infrastruction personnel and is included in the facility wide gas report. |
| (d) The TA-50-RLWTF, TA-48-1 BS-1, and TA-59-1 BHW-2 boilers were removed from service in 2011. These units will be removed from the operating permit. The boilers were removed from these emission calculations for FY 2012. Replacement boilers for TA-48 and TA-59 are small comfort heat boilers and are exempt sources. |
| (e) The 12-month rolling average includes all gas use from all boilers listed in this spreadsheet. Boilers not included in this report due to their large size or design are powerplant boilers at TA-3. A gas use limit of 870 MMscf/yr, 12-month rolling average is a permit limit in Section 2.4 of the LANL operating permit. |
| (f) The non-metered boiler pool capacity is the sum of all active non-metered boilers design ratings (derated value, called design rating in boiler data base) in MMBTU. This number is used to estimate the gas use rate (total non-metered gas use divided by the non-metered boiler pool capacity number). This value is taken from the boilers database (Access) on the database drive on the cleanair server within ENV-ES. |
| (g) The non-metered boilers gas use section provides estimates of gas use for each boiler. This is calculated using the non-metered gas rate, as discussed in reference (f). The individual boiler design rating is mutiplied by the gas use rate to provide the estimated gas used per reporting period (in MMSCF). Boilers previously included at TA-48 and TA-59 were replaced with smaller exempt boilers an removed from these calcs on 10-15-12. |
| (h) NMED List of Insignificant Activities (9/95), Item (3.) exempts fuel burning equipment which uses gaseous fuel, has a design rate less than or equal to 5 MMBTU/hr, and is used for heating buildings for personal comfort or for producing hot water for personal use. This value contains natural gas fired HVAC units as well as some NG heating units. |
| (i) The design rate for boilers includes a correction for elevation. LANL is at approximately 7,500 feet above sea level. Corrections are made for atmospheric boilers using 4% reduction (derated) for each 1,000 feet above sea level (4% x 7.5 = 30%). For forced draft and power burner boilers, the reduction is half that of atmospheric at 15%. The correction is made using the boiler plate input rating minus the appropriate percentage. |

# 2013 Non-Exempt Boiler Emissions for Annual EI Reporting (Tons)

| Pollutant | AIRS 018 TA-53-365 BHW-1 | AIRS 019 TA-53-365 BHW-2 | AIRS 024 TA-16 BS-1 | AIRS 024 TA-16 BS-2 | AIRS 037 TA-55-6 BHW-1B | AIRS 038 TA-55-6 BHW-2B | AIRS New TA-55-440 B-1 | AIRS New TA-55-440 B-2 | AIRS New TA-55-440 B-3 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 0.571 | 0.571 | 0.189 | 0.189 | 1.038 | 0.426 | 0.021 | 0.021 | 0.021 | 3.046 |
| **SOx** | 0.003 | 0.003 | 0.003 | 0.003 | 0.005 | 0.002 | 0.0004 | 0.0004 | 0.0004 | 0.021 |
| **PM** | 0.043 | 0.043 | 0.039 | 0.039 | 0.107 | 0.044 | 0.004 | 0.004 | 0.004 | 0.325 |
| **PM-10** | 0.043 | 0.043 | 0.039 | 0.039 | 0.107 | 0.044 | 0.004 | 0.004 | 0.004 | 0.325 |
| **PM-2.5** | 0.043 | 0.043 | 0.039 | 0.039 | 0.107 | 0.044 | 0.004 | 0.004 | 0.004 | 0.325 |
| **CO** | 0.479 | 0.479 | 0.189 | 0.189 | 0.287 | 0.118 | 0.027 | 0.027 | 0.027 | 1.823 |
| **VOC** | 0.031 | 0.031 | 0.028 | 0.028 | 0.045 | 0.018 | 0.018 | 0.018 | 0.018 | 0.237 |
| **HAPs** | | | | | | | | | | |
| **Arsenic** | 1.14E-06 | 1.14E-06 | 1.02E-06 | 1.02E-06 | 1.50E-06 | 6.17E-07 | 1.43E-07 | 1.43E-07 | 1.43E-07 | 6.87E-06 |
| **Benzene** | 1.20E-05 | 1.20E-05 | 1.07E-05 | 1.07E-05 | 1.58E-05 | 6.48E-06 | 1.50E-06 | 1.50E-06 | 1.50E-06 | 7.21E-05 |
| **BE** | 6.85E-08 | 6.85E-08 | 6.11E-08 | 6.11E-08 | 9.02E-08 | 3.70E-08 | 8.56E-09 | 8.56E-09 | 8.56E-09 | 4.12E-07 |
| **Cadmium** | 6.28E-06 | 6.28E-06 | 5.60E-06 | 5.60E-06 | 8.27E-06 | 3.39E-06 | 7.85E-07 | 7.85E-07 | 7.85E-07 | 3.78E-05 |
| **Chromium** | 7.99E-06 | 7.99E-06 | 7.13E-06 | 7.13E-06 | 1.05E-05 | 4.32E-06 | 9.99E-07 | 9.99E-07 | 9.99E-07 | 4.81E-05 |
| **Cobalt** | 4.79E-07 | 4.79E-07 | 4.28E-07 | 4.28E-07 | 6.32E-07 | 2.59E-07 | 5.99E-08 | 5.99E-08 | 5.99E-08 | 2.89E-06 |
| **Dichlorobenzene** | 6.85E-06 | 6.85E-06 | 6.11E-06 | 6.11E-06 | 9.02E-06 | 3.70E-06 | 8.56E-07 | 8.56E-07 | 8.56E-07 | 4.12E-05 |
| **Formaldehyde** | 4.28E-04 | 4.28E-04 | 3.82E-04 | 3.82E-04 | 5.64E-04 | 2.31E-04 | 5.35E-05 | 5.35E-05 | 5.35E-05 | 2.58E-03 |
| **Hexane** | 1.03E-02 | 1.03E-02 | 9.17E-03 | 9.17E-03 | 1.35E-02 | 5.55E-03 | 1.28E-03 | 1.28E-03 | 1.28E-03 | 6.18E-02 |
| **Lead** | 2.85E-06 | 2.85E-06 | 2.55E-06 | 2.55E-06 | 3.76E-06 | 1.54E-06 | 3.57E-07 | 3.57E-07 | 3.57E-07 | 1.72E-05 |
| **Mangenese** | 2.17E-06 | 2.17E-06 | 1.94E-06 | 1.94E-06 | 2.86E-06 | 1.17E-06 | 2.71E-07 | 2.71E-07 | 2.71E-07 | 1.31E-05 |
| **Mercury** | 1.48E-06 | 1.48E-06 | 1.32E-06 | 1.32E-06 | 1.95E-06 | 8.02E-07 | 1.85E-07 | 1.85E-07 | 1.85E-07 | 8.93E-06 |
| **Napthalene** | 3.48E-06 | 3.48E-06 | 3.11E-06 | 3.11E-06 | 4.59E-06 | 1.88E-06 | 4.35E-07 | 4.35E-07 | 4.35E-07 | 2.10E-05 |
| **Nickel** | 1.20E-05 | 1.20E-05 | 1.07E-05 | 1.07E-05 | 1.58E-05 | 6.48E-06 | 1.50E-06 | 1.50E-06 | 1.50E-06 | 7.21E-05 |
| **POM** | 5.02E-07 | 5.02E-07 | 4.48E-07 | 4.48E-07 | 6.62E-07 | 2.71E-07 | 6.28E-08 | 6.28E-08 | 6.28E-08 | 3.02E-06 |
| **Selenium** | 1.37E-07 | 1.37E-07 | 1.22E-07 | 1.22E-07 | 1.80E-07 | 7.40E-08 | 1.71E-08 | 1.71E-08 | 1.71E-08 | 8.24E-07 |
| **Toluene** | 1.94E-05 | 1.94E-05 | 1.73E-05 | 1.73E-05 | 2.56E-05 | 1.05E-05 | 2.43E-06 | 2.43E-06 | 2.43E-06 | 1.17E-04 |
| **TOTAL HAPS** | 1.08E-02 | 1.08E-02 | 9.62E-03 | 9.62E-03 | 1.42E-02 | 5.82E-03 | 1.35E-03 | 1.35E-03 | 1.35E-03 | 0.06 |

| EPCRA 313 Chemical[a] | Emissions from all Small Boilers[b] | |
|---|---|---|
| | Emission Factor (lbs/MMscf) | Emission (lbs) |
| **Lead**[c] | 5.0E-04 | 2.56E-01 |
| **Sulfuric Acid**[d] | 0.6 | 307.64 |
| **Mercury**[c] | 2.6E-04 | 1.33E-01 |
| **PACs**[e] | 8.69E-07 | 4.46E-04 |
| **Benzo(g,h,i) perylene**[c] | 1.20E-06 | 6.15E-04 |

**References**

**(a)** Amount of EPCRA chemical in fuel is considered "otherwise used" for EPCRA 313 threshold determination

**(b)** Combustion compounds emitted are considered "manufactured" for EPCRA 313 threshold deteminations. Lead and mercury are included with lead compounds and mercury compounds respectively.

**(c)** Emission Factors from AP-42, Section 1.4, Natural Gas Combustion, Tables 1.4-2, 1.4-3 and 1.4-4, July 1998

**(d)** Assume all SOx emissions are converted to sulfuric acid in the stack.

**(e)** EPCRA PAC Guidance Document, Table 2-3

## Greenhouse Gas Emissions

| Emission Factors | | | References |
|---|---|---|---|
| $CO_2$ [(a)] | 53.02 | kg/mmBtu | (a) From 40 CFR Part 98, Subpart C, Table C-1, "Default CO2 Emission Factors and High Heat Values for Various Types of Fuel." |
| $CH_4$ [(b)] | 0.001 | kg/mmBtu | (b) From 40 CFR Part 98, Subpart C, Table C-2, "Default CH4 and N2O Emission Factors for Various Types of Fuel." |
| $N_2O$ [(b)] | 0.0001 | kg/mmBtu | (c) The average high heat value (HHV) is shown. Initial HHV is provided in Btu/SCF. HHV is taken from the monthly "Totalizer Report". |
| LANL Natural Gas High Heat Value[(c)]: | | | (d) Boiler Pool Capacity and Design Ratings were determined using the EAQ boilers data base. |
| **1020.8** | mmBtu/mmSCF | | (e) Fiscal year begins on October 1st of the following year and ends on September 30th of the current year. |

Equation: Fuel Use MMscf/year * Nat. Gas MMBTU/MMscf * Emission Factor kg/MMBTU * metric ton/1000 kg

| Metered Boilers | | | Calender Year | | | | Fiscal Year [(e)] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Unit No. | NMED ID | CO2 (metric tons) | CH4 (metric tons) | N2O (metric tons) | Total CO2 Equivalents (metric tons) | CO2 (metric tons) | CH4 (metric tons) | N2O (metric tons) | Total CO2 Equivalents (metric tons) |
| TA-55-6 | BHW-1 | 29 | 813.91 | 0.015 | 0.002 | 814.8 | 868.38 | 0.016 | 0.002 | 869.3 |
| TA-55-6 | BHW-2 | 30 | 333.83 | 0.006 | 0.001 | 334.2 | 190.24 | 0.004 | 0.000 | 190.4 |
| TA-55-440 | B-1thru3 | | 231.66 | 0.004 | 0.0004 | 231.9 | 239.29 | 0.005 | 0.000 | 239.5 |
| | | **Metered Total** | 1379.39 | 0.026 | 0.003 | 1148.9 | 1297.9 | 0.024 | 0.002 | 1059.7 |

| Non-Metered Boilers | | | Calender Year | | | | Fiscal Year [(e)] | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Unit No. | NMED ID | CO2 (metric tons) | CH4 (metric tons) | N2O (metric tons) | Total CO2 Equivalents (metric tons) | CO2 (metric tons) | CH4 (metric tons) | N2O (metric tons) | Total CO2 Equivalents (metric tons) |
| TA-53-365 | BHW-1 | 11 | 617.83 | 0.012 | 0.001 | 618.5 | 655.21 | 0.012 | 0.001 | 655.9 |
| TA-53-365 | BHW-2 | 12 | 617.83 | 0.012 | 0.001 | 618.5 | 655.21 | 0.012 | 0.001 | 655.9 |
| TA-16-1484 | Plant 5 | 53 | 1102.88 | 0.021 | 0.002 | 1104.0 | 1169.62 | 0.022 | 0.002 | 1170.8 |
| Lab Wide | Various | None | 22654.32 | 0.427 | 0.043 | 22677.7 | 24025.10 | 0.453 | 0.045 | 24049.9 |
| | | **Non-Metered Total** | 24992.86 | 0.471 | 0.047 | 25018.7 | 26505.1 | 0.500 | 0.050 | 26532.5 |
| | | | | | **Total CO2 Equivalents (metric tons)** | 26167.6 | | | **Total CO2 Equivalents (metric tons)** | 27592.3 |

## CY2013 Daily Turbine Gas Use (Mscf), 12 Month Rolling Total Gas Use, & Hours of Operation

| Day | Jan | | Feb | | Mar | | Apr | | May | | Jun | | July | | Aug | | Sept | | Oct | | Nov | | Dec | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs | Gas Use | Hrs |
| 1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 3225 | 15.5 | 858 | 4.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 909 | 4.8 | 0 | 0.0 | 3524 | 16.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 3 | 2902 | 13.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 3005 | 16.2 | 0 | 0.0 | 0 | 0.0 | 829 | 4.2 | 0 | 0.0 | 0 | 0.0 |
| 4 | 2361 | 11.2 | 0 | 0.0 | 2 | 0.0 | 902 | 5.6 | 0 | 0.0 | 12 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1648 | 8.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 5 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1650 | 8.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 6 | 0 | 0.0 | 1527 | 7.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 252 | 1.7 | 0 | 0.0 | 0 | 0.0 | 1229 | 6.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 7 | 2531 | 10.8 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 23 | 0.0 | 0 | 0.0 | 72 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 871 | 4.1 | 0 | 0.0 |
| 8 | 2398 | 10.0 | 0 | 0.0 | 45 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 3399 | 16.2 | 171 | 1.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 9 | 2551 | 10.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1008 | 5.3 | 0 | 0.0 | 3116 | 16.2 | 244 | 1.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 10 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2765 | 14.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 11 | 18 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1012 | 5.4 | 1661 | 8.2 | 0 | 0.0 | 0 | 0.0 | 489 | 2.1 | 0 | 0.0 | 183 | 0.5 |
| 12 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 29 | 0.0 | 1659 | 8.2 | 4 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 742 | 4.3 |
| 13 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 996 | 5.3 | 0 | 0.0 | 151 | 0.0 | 751 | 3.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 14 | 0 | 0.0 | 772 | 4.2 | 0 | 0.0 | 14 | 0.0 | 0 | 0.0 | 0 | 0.0 | 262 | 0.0 | 4 | 0.0 | 0 | 0.0 | 0 | 0.0 | 891 | 4.1 | 0 | 0.0 |
| 15 | 1610 | 7.0 | 16 | 0.8 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 3300 | 16.3 | 72 | 0.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 16 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 882 | 4.7 | 0 | 0.0 | 3053 | 16.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 17 | 887 | 4.3 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 834 | 4.1 | 0 | 0.0 | 51 | 0.9 |
| 18 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1024 | 4.8 | 0 | 0.0 | 0 | 0.0 | 1735 | 8.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 19 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 900 | 5.1 | 0 | 0.0 | 1662 | 8.2 | 853 | 4.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 20 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1659 | 9.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 21 | 0 | 0.0 | 1034 | 5.4 | 998 | 5.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1673 | 8.1 | 0 | 0.0 | 0 | 0.0 | 873 | 4.2 | 0 | 0.0 |
| 22 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 3076 | 14.5 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 23 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 876 | 4.6 | 0 | 0.0 | 0 | 0.0 | 1669 | 8.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 24 | 14 | 0.3 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 25 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1047 | 5.3 | 0 | 0.0 | 0 | 0.0 | 1623 | 8.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 26 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 863 | 4.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 27 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 831 | 4.5 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 28 | 0 | 0.0 | 969 | 5.2 | 984 | 4.8 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 29 | 0 | 0.0 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 3333 | 17.0 | 0 | 0.0 | 860 | 4.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 30 | 0 | 0.0 | | | 0 | 0.0 | 0 | 0.0 | 932 | 4.9 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 31 | 13 | 0.3 | | | 0 | 0.0 | | | 0 | 0.0 | | | 0 | 0.0 | 0 | 0.0 | | | 888 | 4.2 | | | 0 | 0.0 |
| SUM | 15285 | 67.8 | 4318 | 23 | 2029 | 10.5 | 2987 | 15.7 | 4630 | 24.3 | 7365 | 39 | 32399 | 160 | 12103 | 59.2 | 6994 | 34 | 3040 | 14.6 | 2635 | 12.4 | 976 | 5.7 |
| 12 Mo. Rolling Gas | Mscf | 169,824 | | 125,626 | | 113,697 | | 102,428 | | 107,047 | | 114,354 | | 125,342 | | 131,792 | | 121,987 | | 93,798 | | 96,311 | | 94,761 | |
| 12 Mo. Rolling Hours | Hrs. | 808 | | 604 | | 548 | | 495 | | 519 | | 558 | | 611 | | 639 | | 587 | | 463 | | 473 | | 466 | |

**First Half Gas Use: 36,614 Mscf** | **Second Half Gas Use: 58,147 Mscf** | **Annual Gas Use: 94,761 Mscf**

**Permit Limit (12 mo rolling): 646 MMscf** or **646,000 Mscf** High Heat Value (HHV) for natural gas[k] = **1021** MMBtu/MMscf

**Total Annual Hours: 465.8 Hour**

Reviewed by/date: _____

# 2013 Combustion Turbine Emissions (Actual)

| Pollutant<br>Criteria | Emission Factors (lb/MMscf) | Unit Emissions (Tons) TA-3-2422 Combustion Turbine<br>Annual (tons) | Jan-June (tons) | July-Dec (tons) | Reference |
|---|---|---|---|---|---|
| NOx | 50.5 | 2.393 | 0.925 | 1.468 | a |
| SOx | 3.5 | 0.166 | 0.064 | 0.102 | b |
| PM | 6.8 | 0.322 | 0.124 | 0.198 | c |
| $PM_{10}$ | 6.8 | 0.322 | 0.124 | 0.198 | c |
| $PM_{2.5}$ | 6.8 | 0.322 | 0.124 | 0.198 | c |
| CO | 10.5 | 0.497 | 0.192 | 0.305 | a |
| VOC | 2.2 | 0.104 | 0.040 | 0.064 | d |
| **HAPs / TRI** | | | | | |
| Acetaldehyde | 4.12E-02 | 1.95E-03 | 7.54E-04 | 1.20E-03 | e, f, g |
| Acrolein | 6.59E-03 | 3.12E-04 | 1.21E-04 | 1.92E-04 | e, f, g |
| Benzene | 1.24E-02 | 5.86E-04 | 2.26E-04 | 3.59E-04 | e, f,g |
| Benzo (a) anthracene | 3.09E-03 | 1.46E-04 | 5.66E-05 | 8.98E-05 | f, h |
| 1,3-Butadiene | 4.43E-04 | 2.10E-05 | 8.11E-06 | 1.29E-05 | e, f, g |
| Cadmium | 7.11E-03 | 3.37E-04 | 1.30E-04 | 2.07E-04 | f, h |
| Chromium | 1.34E-02 | 6.34E-04 | 2.45E-04 | 3.89E-04 | f, h |
| Copper | 7.11E-02 | 3.37E-03 | 1.30E-03 | 2.07E-03 | f, h |
| Ethylbenzene | 3.30E-02 | 1.56E-03 | 6.03E-04 | 9.58E-04 | e, f, g |
| Fluoranthene | 1.24E-03 | 5.86E-05 | 2.26E-05 | 3.59E-05 | f, h |
| Formaldehyde | 7.31E-01 | 3.46E-02 | 1.34E-02 | 2.13E-02 | e, f, g |
| Manganese | 8.24E-02 | 3.90E-03 | 1.51E-03 | 2.40E-03 | f, h |
| Mercury | 6.80E-03 | 3.22E-04 | 1.24E-04 | 1.98E-04 | f, h |
| Napthalene | 1.34E-03 | 6.34E-05 | 2.45E-05 | 3.89E-05 | e, f, g |
| Nickel | 1.18E-01 | 5.61E-03 | 2.17E-03 | 3.44E-03 | f, h |
| PAH | 2.27E-03 | 1.07E-04 | 4.15E-05 | 6.59E-05 | e, f, g |
| Phenol | 1.34E-02 | 6.34E-04 | 2.45E-04 | 3.89E-04 | e, f, h |
| Propylene Oxide | 2.99E-02 | 1.42E-03 | 5.47E-04 | 8.68E-04 | e, f, g |
| Toluene | 1.34E-01 | 6.34E-03 | 2.45E-03 | 3.89E-03 | e, f, g |
| Xylenes (isomers) | 6.59E-02 | 3.12E-03 | 1.21E-03 | 1.92E-03 | e, f, g |
| **TOTAL HAPS** | | **6.52E-02** | **2.52E-02** | **4.00E-02** | |

| Greenhouse Gases | Emission Factors (kg/mmBtu) | Calender Yr (metric tons) | Fiscal Yr (metric tons) | Reference |
|---|---|---|---|---|
| $CO_2$ | 53.02 | 5128.9 | 6602.5 | i, l |
| $CH_4$ | 0.001 | 0.097 | 0.1 | j, l |
| $N_2O$ | 0.0001 | 0.010 | 0.0 | j, l |
| $CO_2$ Equivalent Emissions (metric tons): | | 5134.2 | 6609.4 | |

References:

**(a)** Values are from the initial compliance test (TRC - October 22, 2007). Test shows average NOx as 11.29 lbs/hr and CO as 2.35 lbs/hr. These were divided by the gas flow rate of 0.223620 MMscf/hr to get 50.48 lb/MMscf (rounded to 50.5) for NOx and 10.5 lb/MMscf for CO.The SCFH value (fuel flow rate) from the compliance test report (223620 SCFH or 223.6 MSCFH)

**(b)** The SOx emission factor was taken from AP-42 Table 3.1-2a. The default value is used when percent sulfur is unknown (0.0034 lb/mmbtu). This is equivilant to converting the 2 grains per 100 scf to percent. The 0.0034 lb/mmbtu was converted to lb/mmscf by multiplying by 1030 btu/scf (the heat value of natural gas), to provide 3.5 lb/mmscf.

**(c)** PM was calculated by taking the AP-42, Table 3.1-2a, EF of 6.6E-3 lb/MMBtu and multiplying it by 1030 BTU/scf to get 6.8 lb/MMscf. PM10 was calculated the same as PM, as most PM from natural gas combustion is less than 1 micrometer.

**(d)** The VOC emission factor was taken from AP-42 Table 3.1-2a. The factor, 2.1 E-03 lb/mmbtu, was converted to lb/mmscf by multiplying by 1030 giving 2.2 lbs/mmscf.

**(e)** These chemicals are HAPs

**(f)** These chemicals are EPCRA 313 listed chemicals.

**(g)** Emission factor from AP-42, table 3.1-3 (lb/mmbtu). This was multiplied by 1030 Btu/scf to provide the lb./mmscf factor.

**(h)** Emission factors from EPA FIRE database (SCC: 20300202 & 20200201). These values were also converted from lb/mmbtu to lb/mmscf. Retrieved 4-14-08.

**(i)** Emission Factor is from 40 CFR Part 98, Subpart C, Table C-1, "Default CO2 Emission Factors and High Heat Values for Various Types of Fuel." Units are kg/mmBtu.

**(j)** Emission Factor is from 40 CFR Part 98, Subpart C, Table C-2, "Default CH4 and N2O Emission Factors for Various Types of Fuel." Units are kg/mmBtu.

**(k)** Average high heat values for natural gas used at LANL were calculated each month. The average was taken from the monthly "TA-3 Power Plant Totalizer Report."

**(l)** Fiscal year begins on October 1st and ends on September 30th of the following year.

Reviewed by/date: _____

**Monthly Emission Calculation - 2013**
**Unit TA-3-22-CT-1 TA-3 - Combustion Turbine**
(Required by Condition A1307.A of Title V Permit P100-R1-M1)

## Monthly Average Hourly Emissions Rate (pph)

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 11.38 | 9.48 | 9.76 | 9.61 | 9.62 | 9.54 | 10.25 | 10.32 | 10.39 | 10.52 | 10.73 | 8.65 | 23.8 |
| **SOx** | 0.79 | 0.66 | 0.68 | 0.67 | 0.67 | 0.66 | 0.71 | 0.72 | 0.72 | 0.73 | 0.74 | 0.60 | 1.7 |
| **PM** | 1.53 | 1.28 | 1.31 | 1.29 | 1.30 | 1.28 | 1.38 | 1.39 | 1.40 | 1.42 | 1.45 | 1.16 | 1.9 |
| **PM-10** | 1.53 | 1.28 | 1.31 | 1.29 | 1.30 | 1.28 | 1.38 | 1.39 | 1.40 | 1.42 | 1.45 | 1.16 | 1.9 |
| **PM-2.5** | 1.53 | 1.28 | 1.31 | 1.29 | 1.30 | 1.28 | 1.38 | 1.39 | 1.40 | 1.42 | 1.45 | 1.16 | 1.9 |
| **CO** | 2.37 | 1.97 | 2.03 | 2.00 | 2.00 | 1.98 | 2.13 | 2.15 | 2.16 | 2.19 | 2.23 | 1.80 | 29 |
| **VOC** | 0.50 | 0.41 | 0.43 | 0.42 | 0.42 | 0.42 | 0.45 | 0.45 | 0.45 | 0.46 | 0.47 | 0.38 | 0.6 |

## 12-Month Rolling Emission Rate* (TPY)

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 4.288 | 3.172 | 2.871 | 2.586 | 2.703 | 2.887 | 3.165 | 3.328 | 3.080 | 2.368 | 2.432 | 2.393 | 59.4 |
| **SOx** | 0.297 | 0.220 | 0.199 | 0.179 | 0.187 | 0.200 | 0.219 | 0.231 | 0.213 | 0.164 | 0.169 | 0.166 | 4.2 |
| **PM** | 0.577 | 0.427 | 0.387 | 0.348 | 0.364 | 0.389 | 0.426 | 0.448 | 0.415 | 0.319 | 0.327 | 0.322 | 4.8 |
| **PM-10** | 0.577 | 0.427 | 0.387 | 0.348 | 0.364 | 0.389 | 0.426 | 0.448 | 0.415 | 0.319 | 0.327 | 0.322 | 4.8 |
| **PM-2.5** | 0.577 | 0.427 | 0.387 | 0.348 | 0.364 | 0.389 | 0.426 | 0.448 | 0.415 | 0.319 | 0.327 | 0.322 | 4.8 |
| **CO** | 0.892 | 0.660 | 0.597 | 0.538 | 0.562 | 0.600 | 0.658 | 0.692 | 0.640 | 0.492 | 0.506 | 0.497 | 72.3 |
| **VOC** | 0.187 | 0.138 | 0.125 | 0.113 | 0.118 | 0.126 | 0.138 | 0.145 | 0.134 | 0.103 | 0.106 | 0.104 | 1.5 |

* Using rolling fuel use

# TA-3 Power Plant Fuel Use Totals 2013 (Data Entry)

| | DATA ENTRY | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | TA-3-22 Power Plant[b] Boiler # 1 (Edgemoor Iron Works, 210 mmBtu/hr) | | TA-3-22 Power Plant[b] Boiler # 2 (Edgemoor Iron Works, 210 mmBtu/hr) | | TA-3-22 Power Plant[b] Boiler # 3 (Union Iron Works, 210 mmBtu/hr) | | Monthly Totals | |
| Month | Natural Gas (mscf)[a] | Fuel Oil (gallons)[a] | Natural Gas (mscf)[a] | Fuel Oil (gallons)[a] | Natural Gas (mscf)[a] | Fuel Oil (gallons)[a] | Natural Gas (mmscf)[a] | Fuel Oil (gallons)[a] |
| January | 58,093 | 1,517 | 28 | 0 | 2,062 | 2,485 | 60.183 | 4002 |
| February | 6,010 | 0 | 41,409 | 0 | 2,279 | 0 | 49.697 | 0 |
| March | 6 | 0 | 34,046 | 0 | 9,252 | 0 | 43.304 | 0 |
| April | 0 | 0 | 474 | 0 | 36,679 | 0 | 37.154 | 0 |
| May | 6,679 | 0 | 0 | 0 | 20,692 | 0 | 27.371 | 0 |
| June | 16,782 | 0 | 0 | 0 | 0 | 0 | 16.782 | 0 |
| July | 16,569 | 0 | 2 | 0 | 388 | 0 | 16.959 | 0 |
| August | 57 | 0 | 4 | 0 | 13,364 | 0 | 13.425 | 0 |
| September | 9,684 | 0 | 0 | 0 | 8,495 | 0 | 18.179 | 0 |
| October | 31,261 | 0 | 0 | 0 | 4,325 | 0 | 35.586 | 0 |
| November | 47,377 | 0 | 0 | 0 | 1,248 | 0 | 48.625 | 0 |
| December | 59,173 | 0 | 0 | 0 | 401 | 0 | 59.574 | 0 |
| Annual Totals: | 251,691 | 1,517 | 75,962 | 0 | 99,186 | 2,485 | 426.838 | 4002 |
| Jan. - June | 87,570 | 1,517 | 75,956 | 0 | 70,964 | 2,485 | 234.490 | 4002 |
| July - Dec. | 164,121 | 0 | 6 | 0 | 28,221 | 0 | 192.348 | 0 |

| Month | 12-Mo. Rolling Total Natural Gas (mmscf) | 12-Mo. Rolling Total Fuel Oil (gallons) | Hours of Operation Nat Gas Boiler 1 | Hours of Operation Nat Gas Boiler 2 | Hours of Operation Nat Gas Boiler 3 | Hours of Operation Fuel Oil Boiler 1 | Hours of Operation Fuel Oil Boiler 2 | Hours of Operation Fuel Oil Boiler 3 | *12-Month Rolling Total Hours (All Boilers) |
|---|---|---|---|---|---|---|---|---|---|
| January | 424.9 | 4,002 | 723.7 | 0.0 | 41.5 | 2.9 | 0.0 | 6.7 | 8717.6 |
| February | 418.9 | 4,002 | 85.9 | 572.5 | 34.5 | 0.0 | 0.0 | 0.0 | 8685.4 |
| March | 415.6 | 4,002 | 0.0 | 576.0 | 177.2 | 0.0 | 0.0 | 0.0 | 8688.9 |
| April | 417.0 | 4,002 | 0.0 | 11.4 | 717.7 | 0.0 | 0.0 | 0.0 | 8702.3 |
| May | 416.9 | 4,002 | 227.9 | 0.0 | 518.8 | 0.0 | 0.0 | 0.0 | 8705.0 |
| June | 415.5 | 4,002 | 719.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8705.2 |
| July | 414.6 | 4,002 | 728.9 | 0.0 | 14.7 | 0.0 | 0.0 | 0.0 | 8705.5 |
| August | 413.1 | 4,002 | 0.5 | 0.0 | 597.6 | 0.0 | 0.0 | 0.0 | 8704.9 |
| September | 411.4 | 4,002 | 354.8 | 0.0 | 364.6 | 0.0 | 0.0 | 0.0 | 8697.9 |
| October | 416.0 | 4,002 | 661.1 | 0.0 | 83.4 | 0.0 | 0.0 | 0.0 | 8697.8 |
| November | 423.3 | 4,002 | 703.4 | 0.0 | 19.2 | 0.0 | 0.0 | 0.0 | 8697.8 |
| December | 426.8 | 4,002 | 737.7 | 0.0 | 6.7 | 0.0 | 0.0 | 0.0 | 8689.0 |
| Permit Limits: | **1000 MMscf** | **500,000 gal** | | | | | | | |

* The requirement to calculate a 12 month rolling total of hours became effective on June 15, 2012.

**Data Reviewed By:** _____

For References, See "Emission Summary Sheet"

## 12 Month Rolling Fuel Totals For Each Individual Boiler - 2013

| Month | Boiler 1 | | Boiler 2 | | Boiler 3 | |
|---|---|---|---|---|---|---|
| | Natural Gas (mmscf) | Fuel Oil (gal.) | Natural Gas (mmscf) | Fuel Oil (gal.) | Natural Gas (mmscf) | Fuel Oil (gal.) |
| January | 279 | 1,517 | 111 | 0 | 34 | 2,485 |
| February | 231 | 1,517 | 153 | 0 | 35 | 2,485 |
| March | 214 | 1,517 | 161 | 0 | 41 | 2,485 |
| April | 214 | 1,517 | 126 | 0 | 77 | 2,485 |
| May | 221 | 1,517 | 98 | 0 | 98 | 2,485 |
| June | 237 | 1,517 | 80 | 0 | 98 | 2,485 |
| July | 254 | 1,517 | 76 | 0 | 84 | 2,485 |
| August | 243 | 1,517 | 76 | 0 | 94 | 2,485 |
| September | 233 | 1,517 | 76 | 0 | 102 | 2,485 |
| October | 233 | 1,517 | 76 | 0 | 107 | 2,485 |
| November | 248 | 1,517 | 76 | 0 | 99 | 2,485 |
| December | 252 | 1,517 | 76 | 0 | 99 | 2,485 |

# Emissions by Boiler 2013

| Pollutant Criteria | Emission Factor | | Unit Emissions | | | | Unit Emissions | | | | Unit Emissions | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Boiler #1, Stack 032 | | | | Boiler #2, Stack 033 | | | | Boiler #3, Stack 034 | | | |
| | Natural[a] Gas (lb/mmscf) | Fuel Oil[f] lbs/ 1000 gal | Annual Natl Gas (tons) | Annual Fuel Oil (tons) | Jan-June (gas&oil) (tons) | July-Dec (gas&oil) (tons) | Annual Natl Gas (tons) | Annual Fuel Oil (tons) | Jan-June (gas&oil) (tons) | July-Dec (gas&oil) (tons) | Annual Natl Gas (tons) | Annual Fuel Oil (tons) | Jan-June (gas&oil) (tons) | July-Dec (gas&oil) (tons) |
| NOx[c] | 58 | 8.64 | 7.299 | 0.007 | 2.546 | 4.759 | 2.203 | 0.000 | 2.203 | 0.000 | 2.876 | 0.011 | 2.069 | 0.818 |
| SOx[g] | 0.6 | 7.4 | 0.076 | 0.006 | 0.032 | 0.049 | 0.023 | 0.000 | 0.023 | 0.000 | 0.030 | 0.009 | 0.030 | 0.008 |
| PM[d] | 7.6 | 3.3 | 0.956 | 0.003 | 0.335 | 0.624 | 0.289 | 0.000 | 0.289 | 0.000 | 0.377 | 0.004 | 0.274 | 0.107 |
| PM-10[d] | 7.6 | 2.3 | 0.956 | 0.002 | 0.335 | 0.624 | 0.289 | 0.000 | 0.289 | 0.000 | 0.377 | 0.003 | 0.273 | 0.107 |
| PM-2.5[d] | 7.6 | 1.55 | 0.956 | 0.001 | 0.334 | 0.624 | 0.289 | 0.000 | 0.289 | 0.000 | 0.377 | 0.002 | 0.272 | 0.107 |
| CO[e] | 40 | 5.0 | 5.034 | 0.004 | 1.755 | 3.282 | 1.519 | 0.000 | 1.519 | 0.000 | 1.984 | 0.006 | 1.425 | 0.564 |
| VOC | 5.5 | 0.2 | 0.692 | 0.0002 | 0.241 | 0.451 | 0.209 | 0.0000 | 0.209 | 0.000 | 0.273 | 0.000 | 0.195 | 0.078 |
| HAPs[h] | | | | | | | | | | | | | | |
| Arsenic | 0.0002 | 0.00055 | 2.52E-05 | 4.16E-07 | 9.17E-06 | 1.64E-05 | 7.60E-06 | 0.00E+00 | 7.60E-06 | 5.90E-10 | 9.92E-06 | 6.81E-07 | 7.78E-06 | 2.82E-06 |
| Benzene | 0.0021 | - | 2.64E-04 | 0.0 | 9.19E-05 | 1.72E-04 | 7.98E-05 | 0.0 | 7.98E-05 | 6.20E-09 | 1.04E-04 | 0.0 | 7.45E-05 | 2.96E-05 |
| Beryllium | 0.000012 | 0.00041 | 1.51E-06 | 3.12E-07 | 8.37E-07 | 9.85E-07 | 4.56E-07 | 0.00E+00 | 4.56E-07 | 3.54E-11 | 5.95E-07 | 5.11E-07 | 9.36E-07 | 1.69E-07 |
| Cadmium | 0.0011 | 0.00041 | 1.38E-04 | 3.12E-07 | 4.85E-05 | 9.03E-05 | 4.18E-05 | 0.00E+00 | 4.18E-05 | 3.25E-09 | 5.46E-05 | 5.11E-07 | 3.95E-05 | 1.55E-05 |
| Chromium | 0.0014 | 0.00041 | 1.76E-04 | 3.12E-07 | 6.16E-05 | 1.15E-04 | 5.32E-05 | 0.00E+00 | 5.32E-05 | 4.13E-09 | 6.94E-05 | 5.11E-07 | 5.02E-05 | 1.98E-05 |
| Cobalt | 0.000084 | - | 1.06E-05 | 0.0 | 3.68E-06 | 6.89E-06 | 3.19E-06 | 0.0 | 3.19E-06 | 2.48E-10 | 4.17E-06 | 0.0 | 2.98E-06 | 1.19E-06 |
| Dichlorober | 0.0012 | - | 1.51E-04 | 0.0 | 5.25E-05 | 9.85E-05 | 4.56E-05 | 0.0 | 4.56E-05 | 3.54E-09 | 5.95E-05 | 0.0 | 4.26E-05 | 1.69E-05 |
| Formaldehy | 0.075 | 0.048 | 9.44E-03 | 3.64E-05 | 3.32E-03 | 6.15E-03 | 2.85E-03 | 0.00E+00 | 2.85E-03 | 2.21E-07 | 3.72E-03 | 5.96E-05 | 2.72E-03 | 1.06E-03 |
| Hexane | 1.8 | - | 2.27E-01 | 0.0 | 7.88E-02 | 1.48E-01 | 6.84E-02 | 0.0 | 6.84E-02 | 5.31E-06 | 8.93E-02 | 0.0 | 6.39E-02 | 2.54E-02 |
| Lead | 0.0005 | 0.00123 | 6.29E-05 | 9.35E-07 | 2.28E-05 | 4.10E-05 | 1.90E-05 | 0.00E+00 | 1.90E-05 | 1.48E-09 | 2.48E-05 | 1.53E-06 | 1.93E-05 | 7.06E-06 |
| Mangenese | 0.00038 | 0.00082 | 4.78E-05 | 6.24E-07 | 1.73E-05 | 3.12E-05 | 1.44E-05 | 0.00E+00 | 1.44E-05 | 1.12E-09 | 1.88E-05 | 1.02E-06 | 1.45E-05 | 5.36E-06 |
| Mercury[i] | 0.00026 | 0.00041 | 3.27E-05 | 3.12E-07 | 1.17E-05 | 2.13E-05 | 9.88E-06 | 0.00E+00 | 9.87E-06 | 7.67E-10 | 1.29E-05 | 5.11E-07 | 9.74E-06 | 3.67E-06 |
| Napthalene | 0.00061 | - | 7.68E-05 | 0.0 | 2.67E-05 | 5.01E-05 | 2.32E-05 | 0.0 | 2.32E-05 | 1.80E-09 | 3.03E-05 | 0.0 | 2.16E-05 | 8.61E-06 |
| Nickel | 0.0021 | 0.00041 | 2.64E-04 | 3.12E-07 | 9.23E-05 | 1.72E-04 | 7.98E-05 | 0.00E+00 | 7.98E-05 | 6.20E-09 | 1.04E-04 | 5.11E-07 | 7.50E-05 | 2.96E-05 |
| POM | 0.000088 | 0.0033 | 1.11E-05 | 2.50E-06 | 6.36E-06 | 7.22E-06 | 3.34E-06 | 0.00E+00 | 3.34E-06 | 2.60E-10 | 4.36E-06 | 4.10E-06 | 7.22E-06 | 1.24E-06 |
| Selenium | 0.000024 | 0.00206 | 3.02E-06 | 1.56E-06 | 2.61E-06 | 1.97E-06 | 9.12E-07 | 0.00E+00 | 9.11E-07 | 7.08E-11 | 1.19E-06 | 2.55E-06 | 3.40E-06 | 3.39E-07 |
| Toluene | 0.0034 | - | 4.28E-04 | 0.0 | 1.49E-04 | 2.79E-04 | 1.29E-04 | 0.0 | 1.29E-04 | 1.00E-08 | 1.69E-04 | 0.0 | 1.21E-04 | 4.80E-05 |
| TOTAL HAPS | | | 2.38E-01 | 4.40E-05 | 8.27E-02 | 1.55E-01 | 7.17E-02 | 0.00E+00 | 7.17E-02 | 5.57E-06 | 9.37E-02 | 7.21E-05 | 6.71E-02 | 2.66E-02 |

**Data Reviewed By:** _____

**For References, see Emission Summary.**

# 2013 Greenhouse Gas Emissions

## CALENDER YEAR

| | Natural Gas Emissions | | | Fuel Oil Emissions | | | Total Emissions | | |
|---|---|---|---|---|---|---|---|---|---|
| Emission Unit Number | CO2 metric tons | CH4 metric tons | N2O metric tons | CO2 metric tons | CH4 metric tons | N2O metric tons | CO2 metric tons | CH4 metric tons | N2O metric tons |
| TA-3-22-1 | 13622.8 | 0.257 | 0.026 | 15.49 | 0.001 | 0.000 | 13638.2 | 0.258 | 0.026 |
| TA-3-22-2 | 4111.4 | 0.078 | 0.008 | 0.00 | 0.000 | 0.000 | 4111.4 | 0.078 | 0.008 |
| TA-3-22-3 | 5368.4 | 0.101 | 0.010 | 25.36 | 0.001 | 0.000 | 5393.8 | 0.102 | 0.010 |
| Totals: | 23102.6 | 0.436 | 0.044 | 40.85 | 0.002 | 0.000 | | | |
| **Plant Totals (metric tons):** | | | | | | | **23143.5** | **0.437** | **0.044** |
| **$CO_2$ Equivalent Total Emissions (metric tons):** | | | | | | | **23167.5** | | |

## FISCAL YEAR [e]

| | Natural Gas Emissions | | | Fuel Oil Emissions | | | Total Emissions | | |
|---|---|---|---|---|---|---|---|---|---|
| Emission Unit Number | CO2 metric tons | CH4 metric tons | N2O metric tons | CO2 metric tons | CH4 metric tons | N2O metric tons | CO2 metric tons | CH4 metric tons | N2O metric tons |
| TA-3-22-1 | 12591.9 | 0.237 | 0.024 | 15.49 | 0.001 | 0.000 | 12607.4 | 0.238 | 0.024 |
| TA-3-22-2 | 4128.8 | 0.078 | 0.008 | 0.00 | 0.000 | 0.000 | 4128.8 | 0.078 | 0.008 |
| TA-3-22-3 | 5545.5 | 0.105 | 0.010 | 25.36 | 0.001 | 0.000 | 5570.8 | 0.106 | 0.011 |
| Totals: | 22266.2 | 0.420 | 0.042 | 40.85 | 0.002 | 0.000 | | | |
| **Plant Totals (metric tons):** | | | | | | | **22307.1** | **0.422** | **0.042** |
| **$CO_2$ Equivalent Total Emissions (metric tons):** | | | | | | | **22330.2** | | |

| | | |
|---|---|---|
| LANL Natural Gas High Heat Value[c]: | **1020.8** | mmBtu/mmscf |
| Fuel Oil Default High Heat Value[a]: | **0.138** | mmBtu/gallon |

**GHG Emission Factors**

| Pollutant | Natural Gas | | Fuel Oil | |
|---|---|---|---|---|
| $CO_2$ [a] | 53.02 | kg/mmBtu | 73.96 | kg/mmBtu |
| $CH_4$ [b] | 0.001 | kg/mmBtu | 0.003 | kg/mmBtu |
| $N_2O$ [b] | 0.0001 | kg/mmBtu | 0.0006 | kg/mmBtu |

**References**

(a) Emission Factor/High Heat Value is from 40 CFR Part 98, Subpart C, Table C-1, "Default $CO_2$ Emission Factors and High Heat Values for Various Types of Fuel."

(b) Emission Factor is from 40 CFR Part 98, Subpart C, Table C-2, "Default $CH_4$ and $N_2O$ Emission Factors for Various Types of Fuel."

(c) Natural gas was analyzed and averaged for each month. Average high heat value for the year was taken from the monthly "TA-3 Power Plant Totalizer Report" provided by Utilities and Infrastructure. Path: Envision:\AQC\Reports\Fuel Use\Avg Nat Gas BTU Values

(d) Fuel use values for natural gas and fuel oil are taken from the monthly "TA-3 Power Plant Totalizer Report".

(e) Fiscal year begins on October 1st and ends on September 30th of the following year.

# 12 Month Rolling Emissions 2013 (Tons)
# All Three Boilers Combined

| Pollutant | TSP | PM10 | NOx | CO | VOC | $SO_2$ |
|---|---|---|---|---|---|---|
| **Permit Limit (tons/yr)** **12-Month Rolling Total** | **8.4** | **8.2** | **60.2** | **41.3** | **5.6** | **7.9** |
| January | 1.621 | 1.619 | 12.338 | 8.507 | 1.169 | 0.142 |
| February | 1.598 | 1.596 | 12.165 | 8.388 | 1.152 | 0.140 |
| March | 1.586 | 1.584 | 12.070 | 8.322 | 1.143 | 0.139 |
| April | 1.591 | 1.589 | 12.110 | 8.350 | 1.147 | 0.140 |
| May | 1.591 | 1.589 | 12.107 | 8.348 | 1.147 | 0.140 |
| June | 1.585 | 1.583 | 12.066 | 8.319 | 1.143 | 0.139 |
| July | 1.582 | 1.580 | 12.041 | 8.302 | 1.141 | 0.139 |
| August | 1.577 | 1.575 | 11.998 | 8.273 | 1.137 | 0.139 |
| September | 1.570 | 1.568 | 11.947 | 8.238 | 1.132 | 0.138 |
| October | 1.587 | 1.585 | 12.080 | 8.329 | 1.144 | 0.140 |
| November | 1.615 | 1.613 | 12.293 | 8.476 | 1.164 | 0.142 |
| December | 1.629 | 1.627 | 12.396 | 8.547 | 1.174 | 0.143 |

Meets permit condition A1307.A, Monitoring Condition 2.

**Monthly Emission Totals (Tons)**

| Pollutant | TSP | PM10 | NOx | CO | VOC | $SO_2$ |
|---|---|---|---|---|---|---|
| January | 0.235 | 0.233 | 1.763 | 1.214 | 0.166 | 0.033 |
| February | 0.189 | 0.189 | 1.441 | 0.994 | 0.137 | 0.015 |
| March | 0.165 | 0.165 | 1.256 | 0.866 | 0.119 | 0.013 |
| April | 0.141 | 0.141 | 1.077 | 0.743 | 0.102 | 0.011 |
| May | 0.104 | 0.104 | 0.794 | 0.547 | 0.075 | 0.008 |
| June | 0.064 | 0.064 | 0.487 | 0.336 | 0.046 | 0.005 |
| July | 0.064 | 0.064 | 0.492 | 0.339 | 0.047 | 0.005 |
| August | 0.051 | 0.051 | 0.389 | 0.269 | 0.037 | 0.004 |
| September | 0.069 | 0.069 | 0.527 | 0.364 | 0.050 | 0.005 |
| October | 0.135 | 0.135 | 1.032 | 0.712 | 0.098 | 0.011 |
| November | 0.185 | 0.185 | 1.410 | 0.973 | 0.134 | 0.015 |
| December | 0.226 | 0.226 | 1.728 | 1.191 | 0.164 | 0.018 |
| Annual Totals | 1.629 | 1.627 | 12.396 | 8.547 | 1.174 | 0.143 |

**Data Reviewed By:** _____

## Monthly Emission Calculation (Natural Gas) 2013

Average Hourly Emissions Rates (pph) for each Emission Unit

(Meets condition A1307.A, monitoring condition 1, of Title V Permit P100-R1-M3)

### Unit TA-3-22-1 (Boiler 1) pph

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable Emissions[(a)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 4.66 | 4.06 | 0.00 | 0.00 | 1.70 | 1.35 | 1.32 | 6.58 | 1.58 | 2.74 | 3.91 | 4.65 | 10.2 |
| **SOx** | 0.05 | 0.04 | 0.00 | 0.00 | 0.02 | 0.01 | 0.01 | 0.07 | 0.02 | 0.03 | 0.04 | 0.05 | 1.1 |
| **PM** | 0.61 | 0.53 | 0.00 | 0.00 | 0.22 | 0.18 | 0.17 | 0.86 | 0.21 | 0.36 | 0.51 | 0.61 | 1.3 |
| **PM-10** | 0.61 | 0.53 | 0.00 | 0.00 | 0.22 | 0.18 | 0.17 | 0.86 | 0.21 | 0.36 | 0.51 | 0.61 | 1.3 |
| **PM-2.5** | 0.61 | 0.53 | 0.00 | 0.00 | 0.22 | 0.18 | 0.17 | 0.86 | 0.21 | 0.36 | 0.51 | 0.61 | 1.3 |
| **CO** | 3.21 | 2.80 | 0.00 | 0.00 | 1.17 | 0.93 | 0.91 | 4.54 | 1.09 | 1.89 | 2.69 | 3.21 | 7.0 |
| **VOC** | 0.44 | 0.38 | 0.00 | 0.00 | 0.16 | 0.13 | 0.13 | 0.62 | 0.15 | 0.26 | 0.37 | 0.44 | 1.0 |

### Unit TA-3-22-2 (Boiler 2) pph

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable Emissions[(a)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 0.00 | 4.20 | 3.43 | 2.41 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.2 |
| **SOx** | 0.00 | 0.04 | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.1 |
| **PM** | 0.00 | 0.55 | 0.45 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.3 |
| **PM-10** | 0.00 | 0.55 | 0.45 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.3 |
| **PM-2.5** | 0.00 | 0.55 | 0.45 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.3 |
| **CO** | 0.00 | 2.89 | 2.36 | 1.66 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 7.0 |
| **VOC** | 0.00 | 0.40 | 0.33 | 0.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.0 |

### Unit TA-3-22-3 (Boiler 3) pph

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable Emissions[(a)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 2.88 | 3.83 | 3.03 | 2.96 | 2.31 | 0.00 | 1.53 | 1.30 | 1.35 | 3.01 | 3.77 | 3.47 | 10.2 |
| **SOx** | 0.03 | 0.04 | 0.03 | 0.03 | 0.02 | 0.00 | 0.02 | 0.01 | 0.01 | 0.03 | 0.04 | 0.04 | 1.1 |
| **PM** | 0.38 | 0.50 | 0.40 | 0.39 | 0.30 | 0.00 | 0.20 | 0.17 | 0.18 | 0.39 | 0.49 | 0.45 | 1.3 |
| **PM-10** | 0.38 | 0.50 | 0.40 | 0.39 | 0.30 | 0.00 | 0.20 | 0.17 | 0.18 | 0.39 | 0.49 | 0.45 | 1.3 |
| **PM-2.5** | 0.38 | 0.50 | 0.40 | 0.39 | 0.30 | 0.00 | 0.20 | 0.17 | 0.18 | 0.39 | 0.49 | 0.45 | 1.3 |
| **CO** | 1.99 | 2.64 | 2.09 | 2.04 | 1.60 | 0.00 | 1.06 | 0.89 | 0.93 | 2.07 | 2.60 | 2.39 | 7.0 |
| **VOC** | 0.27 | 0.36 | 0.29 | 0.28 | 0.22 | 0.00 | 0.15 | 0.12 | 0.13 | 0.29 | 0.36 | 0.33 | 1.0 |

(a) Allowable Emissions are from table A1302A of permit P100-R1-M3

NOTE: Condition A1307.A, Monitoring Condition 3 is calculated using an emission factor for NOx of 58 lbs/MMscf, and an average Heat Value of 1,020 MMBtu/ MMscf (Reference 40 CFR Part 98, Subpart C, Table C-1). Therefore the NOx emission rate when burning natural gas is a constant of 0.057 lbs/MMBtu .

## Monthly Emission Calculation (Fuel Oil) 2013

Average Hourly Emissions Rates (pph) for each Emission Unit

(Meets condition A1307.A, monitoring condition 1, of Title V Permit P100-R1-M3)

### Unit TA-3-22-1 (Boiler 1)

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable Emissions[(a)] Oil |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 4.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.3 |
| **SOx** | 3.86 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.6 |
| **PM** | 1.73 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.3 |
| **PM-10** | 1.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.0 |
| **PM-2.5** | 0.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.0 |
| **CO** | 2.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.5 |
| **VOC** | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.3 |

### Unit TA-3-22-2 (Boiler 2)

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable Emissions[(a)] Oil |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.3 |
| **SOx** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.6 |
| **PM** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.3 |
| **PM-10** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.0 |
| **PM-2.5** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.0 |
| **CO** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.5 |
| **VOC** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.3 |

### Unit TA-3-22-3 (Boiler 3)

| | Jan. | Feb. | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Allowable Emissions[(a)] Oil |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOx** | 3.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.3 |
| **SOx** | 2.74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.6 |
| **PM** | 1.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.3 |
| **PM-10** | 0.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.0 |
| **PM-2.5** | 0.57 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.0 |
| **CO** | 1.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.5 |
| **VOC** | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.3 |

**Lb/Hr Emission Calculation = (Emission Factor (lb/1000 gal)) x (Amt Fuel Burned (gal)) / (1000) / (Hours Unit Operated) = lbs/hr**

(a) Allowable Emissions are from table A1302A of permit P100-R1-M3

NOTE: Condition A1307.A, Monitoring Condition 3 is calculated using an emission factor for NOx of 8.64 lb/1000 gallons, and an average Heat Value of 138,000 MMBtu/gal (Reference 40 CFR Part 98, Subpart C, Table C-1). Therefore the NOx emission rate when burning oil is a constant of 0.063 lbs/MMBtu .

# Emission Summary TA-3 Power Plant 2013

| Pollutant<br>Criteria | Emission Factor<br>Natural Gas (lb/MMscf) | Emission Factor<br>Fuel Oil[f] (lb/1000 gal.) | Annual Emissions (Natural Gas + Fuel Oil) (tons) | Jan-June Emissions (Natural Gas + Fuel Oil) (tons) | July-Dec Emissions (Natural Gas + Fuel Oil) (tons) | Reference<br>Gas | Reference<br>Oil |
|---|---|---|---|---|---|---|---|
| **NOx** | 58 | 8.64 | 12.396 | 6.818 | 5.578 | (c) | (c) |
| **SOx** | 0.6 | 7.4 | 0.143 | 0.085 | 0.058 | (a)(j) | (g)(j) |
| **PM** | 7.6 | 3.3 | 1.629 | 0.898 | 0.731 | (d) | (d) |
| **PM-10** | 7.6 | 2.3 | 1.627 | 0.896 | 0.731 | (d) | (d) |
| **PM-2.5** | 7.6 | 1.55 | 1.625 | 0.894 | 0.731 | (d) | (d) |
| **CO** | 40 | 5.0 | 8.547 | 4.700 | 3.847 | (b) | (g) |
| **VOC** | 5.5 | 0.2 | 1.174 | 0.645 | 0.529 | (b) | (i) |
| **HAPs[h]** | | | | | | | |
| **Arsenic** | 0.0002 | 0.00055 | 4.38E-05 | 2.45E-05 | 1.92E-05 | (a) | (k) |
| **Benzene** | 0.0021 | - | 4.48E-04 | 2.46E-04 | 2.02E-04 | (c) | |
| **Beryllium** | 0.000012 | 0.00041 | 3.38E-06 | 2.23E-06 | 1.15E-06 | (c) | (k) |
| **Cadmium** | 0.0011 | 0.00041 | 2.36E-04 | 1.30E-04 | 1.06E-04 | (c) | (k) |
| **Chromium** | 0.0014 | 0.00041 | 3.00E-04 | 1.65E-04 | 1.35E-04 | (c) | (k) |
| **Cobalt** | 0.000084 | - | 1.79E-05 | 9.85E-06 | 8.08E-06 | (c) | |
| **Dichlorobenzene** | 0.0012 | - | 2.56E-04 | 1.41E-04 | 1.15E-04 | (c) | |
| **Formaldehyde** | 0.075 | 0.048 | 1.61E-02 | 8.89E-03 | 7.21E-03 | (c) | (k) |
| **Hexane** | 1.8 | - | 3.84E-01 | 2.11E-01 | 1.73E-01 | (c) | |
| **Lead** | 0.0005 | 0.001233 | 1.09E-04 | 6.11E-05 | 4.81E-05 | (c) | (k) |
| **Manganese** | 0.00038 | 0.000822 | 8.27E-05 | 4.62E-05 | 3.65E-05 | (c) | (k) |
| **Mercury** | 0.00026 | 0.000411 | 5.63E-05 | 3.13E-05 | 2.50E-05 | (i)(c) | (i)(k) |
| **Napthalene** | 0.00061 | - | 1.30E-04 | 7.15E-05 | 5.87E-05 | (c) | |
| **Nickel** | 0.0021 | 0.000411 | 4.49E-04 | 2.47E-04 | 2.02E-04 | (c) | (k) |
| **POM** | 0.000088 | 0.0033 | 2.54E-05 | 1.69E-05 | 8.46E-06 | (c) | (k) |
| **Selenium** | 0.000024 | 0.002055 | 9.23E-06 | 6.93E-06 | 2.31E-06 | (c) | (k) |
| **Toluene** | 0.0034 | - | 7.26E-04 | 3.99E-04 | 3.27E-04 | (c) | |
| **TOTAL HAPS** | | | 4.03E-01 | 2.22E-01 | 1.82E-01 | | |
| **EPCRA 313** | | | | **lbs./year** | | | |
| **Lead** | 0.0005 | 0.00123 | 1.09E-04 | 0.218 | | (c) | (i)(k) |
| **Sulfuric Acid** | 0.60 | 0.285 | 1.29E-01 | 257.24 | | (e)(j) | (e)(h) |
| **Mercury** | 0.00026 | 0.00041 | 5.63E-05 | 0.113 | | (c) | (i)(k) |
| **PACs** | 8.69E-07 | 1.65E-05 | 2.18E-07 | 4.37E-04 | | (f)(l) | (f)(l) |
| **Benzo(g,h,i) perylene** | 1.20E-06 | 2.26E-06 | 2.61E-07 | 5.21E-04 | | (i)(k)(c) | (f) |
| **Zinc** | - | 0.00055 | 1.10E-06 | 2.19E-03 | | | (k) |

**Reference**

**(a)** AP-42, 7/98, Section. 1.4, *Natural Gas Combustion* , Tables 1.4-1, 1.4-2

**(b)** Fuel usage obtained from Jerry Gonzales (FWO-UI). Values are provided in a monthly data deliverable from KSL.

**(c)** Average of source tests conducted on all 3 boilers September 2002 burning natural gas after FGR installed. Assumed FGR resulted in similar Nox reduction for oil.

**(d)** All PM from natural gas is assumed <1µ, so PM-10, PM-2.5 and total PM have equal EFs, AP-42, Natural Gas Combustion, Table 1.4-2. The PM emission factor for fuel oil is the sum of filterable and condensable PM.

**(e)** AP-42, 1/95, Section. 1.4, Natural Gas Combustion, Table 1.4-2. Consistent with previous stack tests.

**(f)** AP-42, 9/98, Section. 1.3, *Fuel Oil Combustion* , Table 1.3-1 with Errata, Table 1.3-3, and Table 1.3-6.

(g) Boilers>100 MMBtu/hr: SOx Emission Factor ($SO_2$ {142S} + $SO_3$ {5.7S}) = 147.7 * S (from AP-42, Table 1.3-1 w/Errata) (S = weight % sulfur in oil)(Sulfur content per analysis on oil in tanks in August 01', no new oil delivered in 02'/03')

S(%)= 0.05

**(h)** HAP emission factors for natural gas from AP-42, Tables 1.4-3 an 1.4-4, for fuel oil from AP-42 Tables 1.3-8 and 1.3-10.

**(i)** AP-42, Table 1.4-2, 1.4-3, and 1.4-4, July 1998

**(j)** Assume all $SO_3$ is converted to sulfuric acid.

**(k)** AP-42, tables 1.3-9 and 1.3-10, September 1998.

**(l)** EPCRA PAC Guidance Document, Table 2-3.

**Reviewed By/Date:**

**ATTACHMENT B:**

***2013 Annual Emissions Inventory Submittal to NMED***

Los Alamos
NATIONAL LABORATORY
EST.1943

# memorandum

*Environmental Protection Division*

*To/MS:* 2013 Emissions Inventory File
*Thru/MS:* Alison M. Dorries, ENV-DO, K491
*From/MS:* Steven L. Story, ENV-CP, J978
*Phone/Fax:* 5-2169
*LAUR:* 14-21662
*Symbol:* ENV-DO-14-0068
*Date:* MAR 2 6 2014

**Subject: 2013 Emissions Inventory Electronic Submittal**

Los Alamos National Laboratory (LANL) submitted their 2013 Emissions Inventory Report to New Mexico Environmental Department (NMED) via online reporting tool, AEIR. This report is required by Title 20, Chapter 2, Part 73 of the New Mexico Administrative Code (20.2.73 NMAC), Notice of Intent and Emissions Inventory Requirements. The report was submitted on March 26, 2014, and meets New Mexico Environmental Department's deadline of April 1st.

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

AMD:SLS:WW/lm

Cy: Carl A. Beard, PADOPS, (E-File)
Hai Shen, NA-00-LA, (E-File)
Michael T. Brandt, ADESH, (E-File)
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ENV-CP Title V Emissions Report File
ENV-CP Correspondence File, K490
env-correspondence@lanl.gov (E-FILE)

# ENCLOSURE 1

2013 Emissions Inventory Report

ENV-DO-14-0068

LAUR-13-22031

Electronic Submittal

Date: MAR 2 6 2014

New Mexico Environment Department

Subject Item List

Home Admin Tools About AEIR Logout

## Facility Annual Emissions - Subject Item List

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

***Subject Item/Equipment***

| | Type | ID | Designation | Description | Complete |
|---|---|---|---|---|---|
| ○ | Federal Agency | 856 | 2195FR4 | Los Alamos National Laboratory | |
| ◉ | Asphalt Drum/Burner | 116 | TA-60-BDM | Asphalt Plant Dryer - Propane | ☑ |
| ○ | Beryllium Work | 2 | TA-35-213 | Be Target Fabrication Facility - Machining TA-35-213 | ☑ |
| ○ | Beryllium Work | 3 | TA-3-141 | Be Test Facility - Machining TA-3-141 | ☑ |
| ○ | Beryllium Work | 6 | TA-55-PF4 (a) | Plutonium Facility Beryllium machining, weld cutting / dressing and metallography | ☑ |
| ○ | Beryllium Work | 41 | TA-3-66 | Sigma Facility-electroplating/metallography | ☑ |
| ○ | Boiler | 11 | TA-53-365-BHW-1 | Boiler TA-53-365-BHW-1 | ☑ |
| ○ | Boiler | 12 | TA-53-365-BHW-2 | Boiler TA-53-365-BHW-2 | ☑ |
| ○ | Boiler | 24 | TA-3-22-1 | Power Plant Boiler (pph, Natural Gas) | ☑ |
| ○ | Boiler | 25 | TA-3-22-2 | Power Plant Boiler (pph, Natural Gas) | ☑ |
| ○ | Boiler | 26 | TA-3-22-3 | Power Plant Boiler (pph, Natural Gas) | ☑ |
| ○ | Boiler | 29 | TA-55-6-BHW-1 | Sellers Boiler TA-55-6-BHW-1 | ☑ |
| ○ | Boiler | 30 | TA-55-6-BHW-2 | Sellers Boiler TA-55-6-BHW-2 | ☑ |
| ○ | Boiler | 53 | TA-16-1484-BS-2 | Low NOx Boiler TA-16-1484-BS-2 | ☑ |
| ○ | Boiler | 90 | B-1 | Boiler-CMRR | ☑ |
| ○ | Boiler | 104 | B-2 | Boiler-CMRR | ☑ |
| ○ | Boiler | 105 | B-3 | Boiler-CMRR | ☑ |
| ○ | Boiler | 106 | B-4 | Boiler-CMRR | ☑ |
| ○ | Boiler | 107 | B-5 | Boiler-CMRR | ☑ |
| ○ | Boiler | 134 | TA-16-1484-BS-1 | Low NOx Boiler TA-16-1484-BS-1 | ☑ |
| ○ | Boiler | 137 | TA-3-22-2 | Power Plant Boiler (pph, No. 2 fuel oil) | ☑ |
| ○ | Boiler | 138 | TA-3-22-3 | Power Plant Boiler (pph, No. 2 fuel oil) | ☑ |
| ○ | Boiler | 141 | TA-3-22-1 | Power Plant Boiler (pph, No. 2 fuel oil) | ☑ |
| ○ | Boiler | 144 | All Boilers | Natural Gas and No. 2 Fuel Boilers (cap) | ☑ |
| ○ | Internal combustion engine | 56 | TA-33-G-1 | Kohler Diesel Generator TA-33-G-1 | ☑ |
| ○ | Internal combustion engine | 119 | TA-33-G-2 | Kohler Diesel Generator TA-33-G-2 (temp located to TA-39) | ☑ |
| ○ | Internal combustion engine | 120 | TA-33-G-3 | Kohler Diesel Generator TA-33-G-3 (temp located to TA-39) | ☑ |
| ○ | Internal combustion engine | 128 | 3 Generators | 3 Cummins Diesel Powered Generators, CMRR-GEN-1, CMRR-GEN-2, and CMRR-GEN-3 | ☑ |
| ○ | Internal combustion engine | 135 | TA-33-G-4 | Caterpillar Diesel Generator TA-33-G-4 | ☑ |
| ○ | Internal combustion engine | 146 | TA-33-G-1P | Cummins Portable Diesel Generator | ☑ |
| ○ | Parts Washer | 21 | TA-55-DG-1 | Degreaser - Ultrasonic Cold Batch TA-55-4 | ☑ |
| ○ | Research/Testing | 7 | LANL-FW-CHEM | R & D Activities - Labwide (031) | ☑ |

| | | | | | |
|---|---|---|---|---|---|
| ○ | Shredder | 89 | TA-52-11 | Data Disintegrator/industrial Shredder | ☑ |
| ○ | Turbine | 112 | TA-3-22-CT-1 | Combustion Turbine | ☑ |

Add an unpermitted source for EPA GHG calculations

Detail | Emissions | Print | Export | Total Emissions | Review for Submittal

***Submittal Comments***

2000 character maximum

Save Comments

***File Attachments***

Attach File to Submittal

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 116
**Designation:** TA-60-BDM
**Description:** Asphalt Plant Dryer - Propane
**Type:** Asphalt Drum/Burner
**SCC:** Industrial Processes, Mineral Products, Asphalt Concrete, Drum Mix Plant: Rotary Drum Dryer / Mixer, Natural Gas - Fired
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Propane | |
| **Input Materials Processed:** | Asphalt (INPUT) | |
| **Materials Consumed:** | 13569.0 | gal/y |
| **Fuel Heating Value:** | 91547.0 | BTU/gal |
| **Percent Sulfur of Fuel:** | 0.0 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 8 |
| **Operating Time in Days per Week:** | 5 |
| **Operating Time in Weeks per Year:** | 26 |
| **Operating Time in Hours per Year:** | 1040 |
| **Percent of Operation During Winter:** | 10 |
| **Percent of Operation During Spring:** | 30 |
| **Percent of Operation During Summer:** | 30 |
| **Percent of Operation During Fall:** | 30 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.533 | tons/y | EPA emission factors (e.g., AP-42) |
| **Lead:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.015 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.001 | tons/y | Manufacturer Specification |
| **Particulate Matter (2.5 microns or less):** | 0.001 | tons/y | Manufacturer Specification |
| **Particulate Matter (total suspended):** | 0.009 | tons/y | Manufacturer Specification |
| **Sulfur Dioxide:** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

---

**Facility ID:** 2
**Designation:** TA-35-213
**Description:** Be Target Fabrication Facility - Machining TA-35-213
**Type:** Beryllium Work
**SCC:** Industrial Processes, Fabricated Metal Products, Machining Operations, Specify Material**
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

**Input Materials Processed:** Metal (INPUT)

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 5 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 1820 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Beryllium:** | 0.0 | tons/y | Estimate |
| **Particulate Matter (total suspended):** | 0.0 | tons/y | Estimate |

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

---

**Facility ID:** 3
**Designation:** TA-3-141
**Description:** Be Test Facility - Machining TA-3-141
**Type:** Beryllium Work
**SCC:** Industrial Processes, Fabricated Metal Products, Machining Operations, Specify Material**
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

**Input Materials Processed:** Metal (INPUT)

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Beryllium:** | 0.0 | tons/y | Sample testing |
| **Particulate Matter (total suspended):** | 0.0 | tons/y | Sample testing |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

---

**Facility ID:** 6
**Designation:** TA-55-PF4 (a)
**Description:** Plutonium Facility Beryllium machining, weld cutting / dressing and metallography
**Type:** Beryllium Work
**SCC:** Industrial Processes, Fabricated Metal Products, Machining Operations, Specify Material**
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

**Input Materials Processed:** Metal (INPUT)

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 5 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 1820 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Beryllium:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

---

**Facility ID:** 41
**Designation:** TA-3-66
**Description:** Sigma Facility-electroplating/metallography
**Type:** Beryllium Work
**SCC:** Industrial Processes, Fabricated Metal Products, Abrasive Cleaning of Metal Parts, Polishing
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

**Input Materials Processed:** Metal (INPUT)

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 8 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Beryllium:** | 0.0 | tons/y | Design calculation |

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 11
**Designation:** TA-53-365-BHW-1
**Description:** Boiler TA-53-365-BHW-1
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers < 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 11.42 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 15 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 33 |
| **Operating Time in Hours per Year:** | 3465 |
| **Percent of Operation During Winter:** | 40 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 40 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.479 | tons/y | EPA emission factors (e.g., AP-42) |
| **Formaldehyde:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.01 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.571 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.043 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.043 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.043 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.003 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.031 | tons/y | EPA emission factors (e.g., AP-42) |

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

---

**Facility ID:** 12
**Designation:** TA-53-365-BHW-2
**Description:** Boiler TA-53-365-BHW-2
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers < 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 11.42 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 15 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 33 |
| **Operating Time in Hours per Year:** | 3465 |
| **Percent of Operation During Winter:** | 40 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 40 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.479 | tons/y | EPA emission factors (e.g., AP-42) |
| **Formaldehyde:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.01 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.571 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.043 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.043 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.043 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.003 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.031 | tons/y | EPA emission factors (e.g., AP-42) |

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

---

**Facility ID:** 24
**Designation:** TA-3-22-1
**Description:** Power Plant Boiler (pph, Natural Gas)
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers > 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 251.7 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 30 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 20 |
| **Percent of Operation During Fall:** | 30 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 5.03 | tons/y | EPA emission factors (e.g., AP-42) |
| **Formaldehyde:** | 0.01 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.02 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 7.3 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.96 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.96 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.96 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.08 | tons/y | EPA emission factors (e.g., AP-42) |

| | | | |
|---|---|---|---|
| **Toluene; (Methyl benzene):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.69 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

---

**Facility ID:** 25
**Designation:** TA-3-22-2
**Description:** Power Plant Boiler (pph, Natural Gas)
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers > 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 76.0 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 30 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 20 |
| **Percent of Operation During Fall:** | 30 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 1.52 | tons/y | EPA emission factors (e.g., AP-42) |
| **Formaldehyde:** | 0.003 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.07 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 2.2 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.29 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.29 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.29 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.02 | tons/y | EPA emission factors (e.g., AP-42) |

**Volatile Organic Compounds (VOC):** 0.21 tons/y EPA emission factors (e.g., AP-42)

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 26
**Designation:** TA-3-22-3
**Description:** Power Plant Boiler (pph, Natural Gas)
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers > 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 99.2 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 30 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 20 |
| **Percent of Operation During Fall:** | 30 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 1.98 | tons/y | EPA emission factors (e.g., AP-42) |
| **Formaldehyde:** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.09 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 2.88 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.38 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.38 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.38 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.03 | tons/y | EPA emission factors (e.g., AP-42) |

**Volatile Organic Compounds (VOC):** 0.27 tons/y EPA emission factors (e.g., AP-42)

***Subject Item Comments***

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Print Close

# Facility Annual Emissions - Subject Item Submittal Review

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 29
**Designation:** TA-55-6-BHW-1
**Description:** Sellers Boiler TA-55-6-BHW-1
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers < 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 15.038 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 15 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 33 |
| **Operating Time in Hours per Year:** | 3465 |
| **Percent of Operation During Winter:** | 35 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 10 |
| **Percent of Operation During Fall:** | 35 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.287 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.014 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 1.04 | tons/y | Actual stack test |
| **Particulate Matter (10 microns or less):** | 0.107 | tons/y | Manufacturer Specification |
| **Particulate Matter (2.5 microns or less):** | 0.107 | tons/y | Manufacturer Specification |
| **Particulate Matter (total suspended):** | 0.107 | tons/y | Manufacturer Specification |
| **Sulfur Dioxide:** | 0.005 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.045 | tons/y | Manufacturer Specification |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 30
**Designation:** TA-55-6-BHW-2
**Description:** Sellers Boiler TA-55-6-BHW-2
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers < 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 6.168 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 15 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 33 |
| **Operating Time in Hours per Year:** | 3465 |
| **Percent of Operation During Winter:** | 40 |
| **Percent of Operation During Spring:** | 10 |
| **Percent of Operation During Summer:** | 10 |
| **Percent of Operation During Fall:** | 40 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.118 | tons/y | Manufacturer Specification |
| **Formaldehyde:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.006 | tons/y | EPA emission factors (e.g., AP-42) |
| **Lead:** | 0.0 | tons/y | Manufacturer Specification |
| **Nitrogen Dioxide:** | 0.426 | tons/y | Actual stack test |
| **Particulate Matter (10 microns or less):** | 0.044 | tons/y | Manufacturer Specification |
| **Particulate Matter (2.5 microns or less):** | 0.044 | tons/y | Manufacturer Specification |
| **Particulate Matter (total suspended):** | 0.044 | tons/y | Manufacturer Specification |
| **Sulfur Dioxide:** | 0.002 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.018 | tons/y | Manufacturer Specification |

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 53
**Designation:** TA-16-1484-BS-2
**Description:** Low NOx Boiler TA-16-1484-BS-2
**Type:** Boiler
**SCC:** External Combustion Boilers, Commercial/Institutional, Natural Gas, < 10 Million Btu/hr
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 10.19 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Ash of Fuel:** | 0.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.189 | tons/y | Design calculation |
| **Lead:** | 0.0 | tons/y | Design calculation |
| **Nitrogen Dioxide:** | 0.189 | tons/y | Design calculation |
| **Particulate Matter (10 microns or less):** | 0.039 | tons/y | Design calculation |
| **Particulate Matter (2.5 microns or less):** | 0.039 | tons/y | Design calculation |
| **Particulate Matter (total suspended):** | 0.039 | tons/y | Design calculation |
| **Sulfur Dioxide:** | 0.003 | tons/y | Design calculation |
| **Volatile Organic Compounds (VOC):** | 0.028 | tons/y | Design calculation |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 90
**Designation:** B-1
**Description:** Boiler-CMRR
**Type:** Boiler
**SCC:** External Combustion Boilers, Commercial/Institutional, Natural Gas, < 10 Million Btu/hr
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 1.43 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.027 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.021 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.018 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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Print Close

## Facility Annual Emissions - Subject Item Submittal Review

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 104
**Designation:** B-2
**Description:** Boiler-CMRR
**Type:** Boiler
**SCC:** External Combustion Boilers, Commercial/Institutional, Natural Gas, < 10 Million Btu/hr
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 1.43 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.027 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.021 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.018 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 105
**Designation:** B-3
**Description:** Boiler-CMRR
**Type:** Boiler
**SCC:** External Combustion Boilers, Commercial/Institutional, Natural Gas, < 10 Million Btu/hr
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 1.43 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.027 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.021 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.018 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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Print Close

## Facility Annual Emissions - Subject Item Submittal Review

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 106
**Designation:** B-4
**Description:** Boiler-CMRR
**Type:** Boiler
**SCC:** External Combustion Boilers, Commercial/Institutional, Natural Gas, < 10 Million Btu/hr
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 0.0 | MM SCF/y |
| **Fuel Heating Value:** | 0.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.0 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 0.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 0 |
| **Operating Time in Days per Week:** | 0 |
| **Operating Time in Weeks per Year:** | 0 |
| **Operating Time in Hours per Year:** | 0 |
| **Percent of Operation During Winter:** | 0 |
| **Percent of Operation During Spring:** | 0 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 0 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

This unit has not been built.

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 107
**Designation:** B-5
**Description:** Boiler-CMRR
**Type:** Boiler
**SCC:** External Combustion Boilers, Commercial/Institutional, Natural Gas, < 10 Million Btu/hr
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 0.0 | MM SCF/y |
| **Fuel Heating Value:** | 0.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.0 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 0.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 0 |
| **Operating Time in Days per Week:** | 0 |
| **Operating Time in Weeks per Year:** | 0 |
| **Operating Time in Hours per Year:** | 0 |
| **Percent of Operation During Winter:** | 0 |
| **Percent of Operation During Spring:** | 0 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 0 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

This unit has not been built.

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 134
**Designation:** TA-16-1484-BS-1
**Description:** Low NOx Boiler TA-16-1484-BS-1
**Type:** Boiler
**SCC:** External Combustion Boilers, Commercial/Institutional, Natural Gas, < 10 Million Btu/hr
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 10.19 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.189 | tons/y | Design calculation |
| **Lead:** | 0.0 | tons/y | Design calculation |
| **Nitrogen Dioxide:** | 0.189 | tons/y | Design calculation |
| **Particulate Matter (10 microns or less):** | 0.039 | tons/y | Design calculation |
| **Particulate Matter (2.5 microns or less):** | 0.039 | tons/y | Design calculation |
| **Particulate Matter (total suspended):** | 0.039 | tons/y | Design calculation |
| **Sulfur Dioxide:** | 0.003 | tons/y | Design calculation |
| **Volatile Organic Compounds (VOC):** | 0.028 | tons/y | Design calculation |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 137
**Designation:** TA-3-22-2
**Description:** Power Plant Boiler (pph, No. 2 fuel oil)
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Distillate Oil, Grades 1 and 2 Oil
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Input Materials Processed:** | Diesel (INPUT) | |
| **Materials Consumed:** | 0.0 | g/yr |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.05 | percent |
| **Percent Ash of Fuel:** | 0.01 | percent |
| **Percent Carbon Content:** | 83.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 30 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 20 |
| **Percent of Operation During Fall:** | 30 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Formaldehyde:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 138
**Designation:** TA-3-22-3
**Description:** Power Plant Boiler (pph, No. 2 fuel oil)
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Distillate Oil, Grades 1 and 2 Oil
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Input Materials Processed:** | Diesel (INPUT) | |
| **Materials Consumed:** | 2485.0 | gal/y |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.05 | percent |
| **Percent Ash of Fuel:** | 0.01 | percent |
| **Percent Carbon Content:** | 83.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 30 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 20 |
| **Percent of Operation During Fall:** | 30 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.006 | tons/y | EPA emission factors (e.g., AP-42) |
| **Formaldehyde:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Hexane:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.011 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.003 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.002 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.009 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 141
**Designation:** TA-3-22-1
**Description:** Power Plant Boiler (pph, No. 2 fuel oil)
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers > 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Input Materials Processed:** | Diesel (INPUT) | |
| **Materials Consumed:** | 1517.0 | gal/y |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.05 | percent |
| **Percent Ash of Fuel:** | 0.01 | percent |
| **Percent Carbon Content:** | 83.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 30 |
| **Percent of Operation During Spring:** | 20 |
| **Percent of Operation During Summer:** | 20 |
| **Percent of Operation During Fall:** | 30 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.007 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.002 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.003 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.006 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 144
**Designation:** All Boilers
**Description:** Natural Gas and No. 2 Fuel Boilers (cap)
**Type:** Boiler
**SCC:** External Combustion Boilers, Electric Generation, Natural Gas, Boilers > 100 Million Btu/hr except Tangential
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 0.0 | MM SCF/y |
| **Fuel Heating Value:** | 0.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.0 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 0.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 0 |
| **Operating Time in Days per Week:** | 0 |
| **Operating Time in Weeks per Year:** | 0 |
| **Operating Time in Hours per Year:** | 0 |
| **Percent of Operation During Winter:** | 0 |
| **Percent of Operation During Spring:** | 0 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 0 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

This Facility ID represents the total from the power plant boilers for both natural gas and fuel oil. However, these emissions are already captured with Facility IDs 24, 25, and 26 for natural gas and Facility IDs 137, 138, and 141 for fuel oil. In order to avoid counting the emissions twice, NMED has asked us to enter zeros for this Facility ID.

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 56
**Designation:** TA-33-G-1
**Description:** Kohler Diesel Generator TA-33-G-1
**Type:** Internal combustion engine
**SCC:** Internal Combustion Engines, Electric Generation, Distillate Oil (Diesel), Reciprocating
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Input Materials Processed:** | Diesel (INPUT) | |
| **Materials Consumed:** | 2930.4 | gal/y |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.01 | percent |
| **Percent Carbon Content:** | 83.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 5 |
| **Operating Time in Days per Week:** | 4 |
| **Operating Time in Weeks per Year:** | 16 |
| **Operating Time in Hours per Year:** | 350 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.348 | tons/y | Design calculation |
| **Lead:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.428 | tons/y | Design calculation |
| **Particulate Matter (10 microns or less):** | 0.014 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.014 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.014 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.063 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.008 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 119
**Designation:** TA-33-G-2
**Description:** Kohler Diesel Generator TA-33-G-2 (temp located to TA-39)
**Type:** Internal combustion engine
**SCC:** Internal Combustion Engines, Electric Generation, Distillate Oil (Diesel), Reciprocating
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Input Materials Processed:** | Diesel (INPUT) | |
| **Materials Consumed:** | 41.7 | gal/y |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.01 | percent |
| **Percent Carbon Content:** | 83.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 2 |
| **Operating Time in Days per Week:** | 2 |
| **Operating Time in Weeks per Year:** | 10 |
| **Operating Time in Hours per Year:** | 25 |
| **Percent of Operation During Winter:** | 50 |
| **Percent of Operation During Spring:** | 0 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 50 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.002 | tons/y | Design calculation |
| **Nitrogen Dioxide:** | 0.01 | tons/y | Design calculation |
| **Particulate Matter (10 microns or less):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 120
**Designation:** TA-33-G-3
**Description:** Kohler Diesel Generator TA-33-G-3 (temp located to TA-39)
**Type:** Internal combustion engine
**SCC:** Internal Combustion Engines, Electric Generation, Distillate Oil (Diesel), Reciprocating
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Input Materials Processed:** | Diesel (INPUT) | |
| **Materials Consumed:** | 47.1 | gal/y |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.01 | percent |
| **Percent Carbon Content:** | 83.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 2 |
| **Operating Time in Days per Week:** | 2 |
| **Operating Time in Weeks per Year:** | 10 |
| **Operating Time in Hours per Year:** | 30 |
| **Percent of Operation During Winter:** | 50 |
| **Percent of Operation During Spring:** | 0 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 50 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.002 | tons/y | Design calculation |
| **Nitrogen Dioxide:** | 0.012 | tons/y | Design calculation |
| **Particulate Matter (10 microns or less):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.001 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Thursday, March 20, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 128
**Designation:** 3 Generators
**Description:** 3 Cummins Diesel Powered Generators, CMRR-GEN-1, CMRR-GEN-2, and CMRR-GEN-3
**Type:** Internal combustion engine
**SCC:** Internal Combustion Engines, Industrial, Distillate Oil (Diesel), Reciprocating: Cogeneration
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Materials Consumed:** | 9614.1 | gal |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.487 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 2.227 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.07 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.07 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.07 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.038 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.07 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 135
**Designation:** TA-33-G-4
**Description:** Caterpillar Diesel Generator TA-33-G-4
**Type:** Internal combustion engine
**SCC:** Internal Combustion Engines, Electric Generation, Distillate Oil (Diesel), Reciprocating
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Input Materials Processed:** | Diesel (INPUT) | |
| **Materials Consumed:** | 173.8 | gal/y |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.01 | percent |
| **Percent Carbon Content:** | 83.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 2 |
| **Operating Time in Days per Week:** | 2 |
| **Operating Time in Weeks per Year:** | 10 |
| **Operating Time in Hours per Year:** | 15 |
| **Percent of Operation During Winter:** | 50 |
| **Percent of Operation During Spring:** | 50 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 0 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.011 | tons/y | Design calculation |
| **Nitrogen Dioxide:** | 0.052 | tons/y | Design calculation |
| **Particulate Matter (10 microns or less):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.004 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 146
**Designation:** TA-33-G-1P
**Description:** Cummins Portable Diesel Generator
**Type:** Internal combustion engine
**SCC:** Internal Combustion Engines, Electric Generation, Distillate Oil (Diesel), Reciprocating
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Diesel | |
| **Materials Consumed:** | 0.0 | gal/y |
| **Fuel Heating Value:** | 138.0 | MM BTU/M gal |
| **Percent Sulfur of Fuel:** | 0.001 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 0 |
| **Operating Time in Days per Week:** | 0 |
| **Operating Time in Weeks per Year:** | 0 |
| **Operating Time in Hours per Year:** | 0 |
| **Percent of Operation During Winter:** | 0 |
| **Percent of Operation During Spring:** | 0 |
| **Percent of Operation During Summer:** | 0 |
| **Percent of Operation During Fall:** | 0 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

This generator was permitted to operate at this location in December 2013 and it did not operate in 2013.

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**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 21
**Designation:** TA-55-DG-1
**Description:** Degreaser - Ultrasonic Cold Batch TA-55-4
**Type:** Parts Washer
**SCC:** Petroleum and Solvent Evaporation, Organic Solvent Evaporation, Degreasing, Trichloroethylene: General Degreasing Units
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

**Input Materials Processed:** Solvent (INPUT)

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 4 |
| **Operating Time in Days per Week:** | 1 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 208 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **TCE; (Trichloroethylene); (Trichloroethene):** | 0.008 | tons/y | Material balance |

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**
Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 7
**Designation:** LANL-FW-CHEM
**Description:** R & D Activities - Labwide (031)
**Type:** Research/Testing
**SCC:** Industrial Processes, Photographic Equipment/Health Care/Laboratories, Laboratories, Bench Scale Reagents: Research
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 24 |
| **Operating Time in Days per Week:** | 7 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 8760 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Acetaldehyde; (Ethyl aldehyde):** | 0.0 | tons/y | Material balance |
| **Acetonitrile; (Methyl cyanide):** | 0.0 | tons/y | Material balance |
| **Acetophenone:** | 0.0 | tons/y | Material balance |
| **Acrylamide:** | 0.0 | tons/y | Material balance |
| **Acrylic acid:** | 0.0 | tons/y | Material balance |
| **Acrylonitrile:** | 0.0 | tons/y | Material balance |
| **Ammonia:** | 0.0 | tons/y | Material balance |
| **Aniline:** | 0.0 | tons/y | Material balance |
| **Antimony:** | 0.0 | tons/y | Material balance |
| **Antimony compounds:** | 0.0 | tons/y | Material balance |
| **Arsenic Compounds:** | 0.0 | tons/y | Material balance |
| **Benzene:** | 0.0 | tons/y | Material balance |
| **Benzyl Chloride:** | 0.0 | tons/y | Material balance |
| **Biphenyl:** | 0.0 | tons/y | Material balance |
| **Bromoform; (Tribromomethane):** | 0.0 | tons/y | Material balance |
| **Butadiene(1,3-):** | 0.0 | tons/y | Material balance |
| **Cadmium:** | 0.0 | tons/y | Material balance |
| **Cadmium compounds:** | 0.0 | tons/y | Material balance |
| **Carbon Disulfide:** | 0.0 | tons/y | Material balance |
| **Carbon tetrachloride; (Tetrachoromethane):** | 0.0 | tons/y | Material balance |
| **Carbonyl sulfide:** | 0.0 | tons/y | Material balance |

| | | | |
|---|---|---|---|
| **Catechol (Pyrocatechol):** | 0.0 | tons/y | Material balance |
| **Chlorine:** | 0.0 | tons/y | Material balance |
| **Chloroacetic Acid:** | 0.0 | tons/y | Material balance |
| **Chlorobenzene(Phenyl Chloride):** | 0.0 | tons/y | Material balance |
| **Chloroform; (Trichloromethane):** | 0.0 | tons/y | Material balance |
| **Chromium:** | 0.0 | tons/y | Material balance |
| **Cobalt Compounds:** | 0.0 | tons/y | Material balance |
| **Cresol(m-); (Methylphenol, 3-):** | 0.0 | tons/y | Material balance |
| **Cumene:** | 0.0 | tons/y | Material balance |
| **Cyanide compounds:** | 0.0 | tons/y | Material balance |
| **Dibutylphthalate; (Di-n-butyl phthalate):** | 0.0 | tons/y | Material balance |
| **Diethanolamine:** | 0.0 | tons/y | Material balance |
| **Dimethyl Sulfate:** | 0.0 | tons/y | Material balance |
| **Dimethyl formamide:** | 0.0 | tons/y | Material balance |
| **Dimethylhydrazine(1,1-):** | 0.0 | tons/y | Material balance |
| **Dioxane(1,4-) (1,4-Diethyleneoxide):** | 0.0 | tons/y | Material balance |
| **Epichlorohydrin; (1-Chloro-2,3-epoxypropane):** | 0.0 | tons/y | Material balance |
| **Epoxybutane(1,2-) (1,2-Butylene oxide):** | 0.0 | tons/y | Material balance |
| **Ethyl Acrylate:** | 0.0 | tons/y | Material balance |
| **Ethyl chloride; (Chloroethane):** | 0.0 | tons/y | Material balance |
| **Ethylene Glycol:** | 0.0 | tons/y | Material balance |
| **Ethylene dibromide; (EDB); (1.2-Dibromoethane):** | 0.0 | tons/y | Material balance |
| **Formaldehyde:** | 0.0 | tons/y | Material balance |
| **Glycol Ethers:** | 0.0 | tons/y | Material balance |
| **Hexachlorocyclopentadiene:** | 0.0 | tons/y | Material balance |
| **Hexamethylphosphoramide:** | 0.0 | tons/y | Material balance |
| **Hexane:** | 0.0 | tons/y | Material balance |
| **Hydrazine:** | 0.0 | tons/y | Material balance |
| **Hydrochloric acid (HCl):** | 0.83 | tons/y | Material balance |
| **Hydrofluoric Acid; (Hydrogen fluoride):** | 0.0 | tons/y | Material balance |
| **Hydroquinone:** | 0.0 | tons/y | Material balance |
| **Iodomethane (Methyl iodide):** | 0.0 | tons/y | Material balance |
| **Lead Compounds:** | 0.0 | tons/y | Material balance |
| **Manganese:** | 0.0 | tons/y | Material balance |
| **Manganese compounds:** | 0.0 | tons/y | Material balance |
| **Mercury compounds:** | 0.0 | tons/y | Material balance |
| **Methanol; (Methyl alcohol):** | 0.0 | tons/y | Material balance |
| **Methyl Ethyl Ketone; (MEK); (2-Butanone):** | 0.0 | tons/y | Material balance |
| **Methyl Methacrylate:** | 0.0 | tons/y | Material balance |
| **Methyl bromide; (Bromomethane):** | 0.0 | tons/y | Material balance |
| **Methyl chloride; (Chloromethane):** | 0.0 | tons/y | Material balance |
| **Methyl isobutyl ketone; (Hexone); (4-Methyl-2-pentanone):** | 0.0 | tons/y | Material balance |
| **Methyl tert butyl ether:** | 0.0 | tons/y | Material balance |
| **Methylene chloride; (Dichloromethane):** | 0.0 | tons/y | Material balance |
| **Methylenebiphenyl isocyanate; (MDI); (Diphenylmethane diisocyanate):** | 0.0 | tons/y | Material balance |
| **Naphthalene:** | 0.0 | tons/y | Material balance |
| **Nickel:** | 0.0 | tons/y | Material balance |
| **Nickel compounds:** | 0.0 | tons/y | Material balance |
| **Nitrobenzene; (nitro-Benzene):** | 0.0 | tons/y | Material balance |
| **Nitrophenol(4-); (p-Nitrophenol):** | 0.0 | tons/y | Material balance |
| **PCE; (Perchloroethylene); (Tetrachloroethylene); (Tetrachloroethene):** | 0.0 | tons/y | Material balance |

| | | | |
|---|---|---|---|
| **Phenol:** | 0.0 | tons/y | Material balance |
| **Phenylenediamine(p-); (Phenylenediamine):** | 0.0 | tons/y | Material balance |
| **Phosphine:** | 0.0 | tons/y | Material balance |
| **Phosphorus:** | 0.0 | tons/y | Material balance |
| **Phthalic anhydride:** | 0.0 | tons/y | Material balance |
| **Polycylic Organic Matter:** | 0.0 | tons/y | Material balance |
| **Propylene oxide:** | 0.0 | tons/y | Material balance |
| **Selenium:** | 0.0 | tons/y | Material balance |
| **Selenium compounds:** | 0.0 | tons/y | Material balance |
| **Styrene:** | 0.0 | tons/y | Material balance |
| **TCE; (Trichloroethylene); (Trichloroethene):** | 0.0 | tons/y | Material balance |
| **Tetrachloroethane(1,1,2,2-):** | 0.0 | tons/y | Material balance |
| **Titanium tetrachloride:** | 0.0 | tons/y | Material balance |
| **Toluene diisocyanate(2,4-):** | 0.0 | tons/y | Material balance |
| **Toluene; (Methyl benzene):** | 0.0 | tons/y | Material balance |
| **Total HAP:** | 3.49 | tons/y | Material balance |
| **Trichloroethane(1,1,1-) (Methyl Chloroform):** | 0.0 | tons/y | Material balance |
| **Trichloroethane(1,1,2-):** | 0.0 | tons/y | Material balance |
| **Triethylamine:** | 0.0 | tons/y | Material balance |
| **Trimethylpentane(2,2,4-):** | 0.0 | tons/y | Material balance |
| **Urethane; (Ethyl carbamate):** | 0.0 | tons/y | Material balance |
| **Vinyl acetate; (Vinyl acetate monomer):** | 0.0 | tons/y | Material balance |
| **Volatile Organic Compounds (VOC):** | 9.59 | tons/y | Material balance |
| **Xylene(o-); (1,2-Dimethylbenzene); (ortho-Xylene):** | 0.0 | tons/y | Material balance |
| **Xylenes (total); (Xylol):** | 0.0 | tons/y | Material balance |
| **bis(2-ethylhexyl) phthalate; (Di-2-ethylhexyl phthalate); (DEHP):** | 0.0 | tons/y | Material balance |

***Subject Item Comments***

Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 89
**Designation:** TA-52-11
**Description:** Data Disintegrator/industrial Shredder
**Type:** Shredder
**SCC:** Industrial Processes, Pulp and Paper and Wood Products, Miscellaneous Paper Products, Other Not Classified
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

**Input Materials Processed:** Paper (INPUT)

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 7 |
| **Operating Time in Days per Week:** | 5 |
| **Operating Time in Weeks per Year:** | 52 |
| **Operating Time in Hours per Year:** | 1820 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Particulate Matter (10 microns or less):** | 0.07 | tons/y | Manufacturer Specification |
| **Particulate Matter (2.5 microns or less):** | 0.04 | tons/y | Manufacturer Specification |
| **Particulate Matter (total suspended):** | 0.07 | tons/y | Manufacturer Specification |

***Subject Item Comments***

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Print Close

**Facility Annual Emissions - Subject Item Submittal Review**

Wednesday, March 19, 2014

**Agency ID:** 856
**Facility Name:** Los Alamos National Laboratory
**Organization Name:** U.S. Department of Energy National Nuclear Security Administration
**Submittal Status:** 2013 Submittal (In Process)

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**Facility ID:** 112
**Designation:** TA-3-22-CT-1
**Description:** Combustion Turbine
**Type:** Turbine
**SCC:** Internal Combustion Engines, Electric Generation, Natural Gas, Turbine
**GHG Reporting:** Reports GHG to EPA

***Supplemental Parameters***

| | Amount | Unit of Measure |
|---|---|---|
| **Fuel Type:** | Natural Gas | |
| **Input Materials Processed:** | Natural Gas (INPUT) | |
| **Materials Consumed:** | 94.8 | MM SCF/y |
| **Fuel Heating Value:** | 1021.0 | MM BTU/MM SCF |
| **Percent Sulfur of Fuel:** | 0.001 | percent |
| **Percent Ash of Fuel:** | 0.0 | percent |
| **Percent Carbon Content:** | 65.0 | percent |

***Operating Detail***

| | Value |
|---|---|
| **Operating Time in Hours per Day:** | 7 |
| **Operating Time in Days per Week:** | 4 |
| **Operating Time in Weeks per Year:** | 12 |
| **Operating Time in Hours per Year:** | 500 |
| **Percent of Operation During Winter:** | 25 |
| **Percent of Operation During Spring:** | 25 |
| **Percent of Operation During Summer:** | 25 |
| **Percent of Operation During Fall:** | 25 |

***Actual Pollutants***

| Pollutant | Amount | Unit of Measure | Calculation Method |
|---|---|---|---|
| **Carbon Monoxide:** | 0.5 | tons/y | EPA emission factors (e.g., AP-42) |
| **Lead:** | 0.0 | tons/y | EPA emission factors (e.g., AP-42) |
| **Nitrogen Dioxide:** | 2.39 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (10 microns or less):** | 0.32 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (2.5 microns or less):** | 0.32 | tons/y | EPA emission factors (e.g., AP-42) |
| **Particulate Matter (total suspended):** | 0.32 | tons/y | EPA emission factors (e.g., AP-42) |
| **Sulfur Dioxide:** | 0.17 | tons/y | EPA emission factors (e.g., AP-42) |
| **Volatile Organic Compounds (VOC):** | 0.1 | tons/y | EPA emission factors (e.g., AP-42) |

***Subject Item Comments***

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**ATTACHMENT C:**

***2013 Semi-annual Emissions Reports***

***Submitted Under Title V Operating Permit Requirements***

Los Alamos
NATIONAL LABORATORY

*Environment Safety & Health*
PO Box 1663, MS K491
Los Alamos, New Mexico 87545
(505)667-4218/Fax (505) 665-3811

*Date*: SEP 1 7 2013
*Symbol*: ADESH-13-046
*LAUR*: 13-26818

Compliance Reporting Manager
Compliance & Enforcement Section
New Mexico Environment Department
Air Quality Bureau
1301 Siler Road, Building B
Santa Fe, New Mexico 87507-3113

Dear Compliance Reporting Manager:

**SUBJECT: TITLE V SEMI-ANNUAL EMISSIONS REPORT FOR PERMIT P100-R1-M3 JANUARY 1, 2013 – JUNE 30, 2013 AI NO. 856 – LOS ALAMOS NATIONAL LABORATORY (LANL)**

Enclosed is Los Alamos National Laboratory's (LANL) Semi-Annual Emissions report for the period January 1, 2013 through June 30, 2013. This report is required by permit condition A109 B and is submitted within 90 days from the end of the reporting period as required by that condition.

The semi-annual emissions report includes actual emissions from permitted sources included in LANL's Operating Permit. Emissions are also reported from insignificant boiler and generator sources. These sources are included to demonstrate that LANL has not exceeded Prevention of Significant Deterioration (PSD) applicability thresholds. In this report, actual emissions are listed along with the emission limits for ease in comparing and verifying compliance. No annual emission limits were exceeded during this reporting period.

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

Sincerely,

Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety & Health

# Title V Semi-Annual Emission Report for Permit P100-R1-M3

**January 1, 2013 – June 30, 2013**

## Identifying Information

Source Name: Los Alamos National Laboratory County: Los Alamos

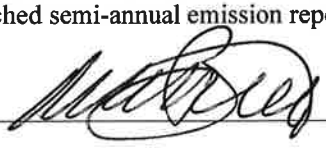
Source Address:
City: Los Alamos State: NM Zip Code: 87545

Responsible Official: Michael T. Brandt Ph No. (505) 667-4218 Fax No. (505) 665-3811
Technical Contact: Steven L. Story Ph No. (505) 665-2169 Fax No. (505) 665-8858
Principal Company Product or Business: National Security and Nuclear Weapons Research Primary SIC Code: 8733

Permit No. P100-R1-M3 {IDEA/Tempo ID No. 856} Permit Issued Date: April 26, 2013

## Certification of Truth, Accuracy, and Completeness

I, Michael T. Brandt certify that, based on information and belief formed after reasonable inquiry, the statements and information in the attached semi-annual emission report are true, accurate, and complete.

Signature  Date: 9/17/13

Title: Associate Director Environmental, Safety, and Health

# ENCLOSURE 1

Title V Semi-Annual Emissions Report for Permit
P100-R1-M3
January 1, 2013 – June 30, 2013

ADESH-13-046

LAUR-13-26818

Date: SEP 17 2013

# Title V Semi-Annual Emissions Report for Permit P100-R1-M3
# January 1, 2013 - June 30, 2013

## Emission Reporting Requirements

### A109 Facility: Reporting Schedules

A. A Semi-Annual Report of monitoring activities is due within 45 days following the end of every 6-month reporting period. The six month reporting periods start on January 1st and July 1st of each year.

B. A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

## A700 Beryllium Activities

A702 Emission Limits - Beryllium Activities

| Source | Beryllium Particulate Matter | Aluminum Particulate Matter |
|---|---|---|
| Sigma Facility TA-3-66 | 10 gm/24 hr | N/A |
| Beryllium Technology Facility TA-3-141 | 0.35 gm/24 hr 3.5 gm/yr | N/A |
| Target Fabrication Facility TA-35-213 | $1.8 \times 10^{-04}$ gm/hr 0.36 gm/yr | N/A |
| Plutonium Facility TA-55-PF-4 Machining Operation | 0.12 gm/24 hr 2.99 gm/yr | 0.12 gm/24 hr 2.99 gm/y |
| Plutonium Facility TA-55-PF-4 Foundry Operation | $3.49 \times 10^{-05}$ gm/24 hr $8.73 \times 10^{-04}$ gm/yr | $3.49 \times 10^{-05}$ gm/24 hr $8.73 \times 10^{-04}$ gm/y |

## Reporting Requirement

A707 D The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:** Continued on the next page

## A800 External Combustion

A802 Emission Limits - External Combustion

| Unit No. | [1]$NO_x$ tpy | CO tpy | VOC tpy | $SO_2$ tpy | TSP tpy | $PM_{10}$ tpy |
|---|---|---|---|---|---|---|
| Combined annual emissions for all units listed in Table 800.A [2] | 80.0 | 80.0 | 50.0 | 50.0 | 50.0 | 50.0 |

| Unit No. | [1]$NO_x$ pph | $NO_x$ tpy | CO pph | CO tpy | VOC pph | VOC tpy | $SO_2$ pph | $SO_2$ tpy | TSP pph | TSP tpy | $PM_{10}$ pph | $PM_{10}$ tpy | $PM_{2.5}$ pph | $PM_{2.5}$ tpy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CMRR-BHW-1 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | --[3] | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-1 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| CMRR-BHW-2 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | -- | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-2 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| CMRR-BHW-3 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | -- | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-3 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| CMRR-BHW-4 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | -- | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-4 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| All boilers On[4] | N/A | 2.9 | N/A | 0.9 | -- | -- | N/A | 10.4 | N/A | 0.5 | N/A | 0.3 | N/A | 0.3 |
| Combined Total[5] | | 14.5 | | 28.1 | | -- | | 11.6 | | 2.1 | | 1.9 | | 1.9 |

## Reporting Requirement

A807 B The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:** Continued on the next page

## A800 External Combustion - continued

| CMRR-BHW-4 (Gas) | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A802 B) (tons per year) |
|---|---|---|---|---|
| NOx | 0.000 | | | 2.9 |
| $SO_2$ | 0.000 | | | 0.3 |
| TSP | 0.000 | | | 0.4 |
| PM-10 | 0.000 | | | 0.4 |
| PM-2.5 | 0.000 | | | 0.4 |
| CO | 0.000 | | | 4.8 |
| VOCs | 0.000 | | | No Source Limit |
| HAPs | 0.000 | | | No Source Limit |

**Note:** The CMRR-BHW-4 boiler has not been installed.

| CMRR Boilers Totals (Oil) | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A802 B) (tons per year) |
|---|---|---|---|---|
| NOx | 0.002 | | | 2.9 |
| $SO_2$ | 0.001 | | | 10.4 |
| TSP | 0.000 | | | 0.5 |
| PM-10 | 0.000 | | | 0.3 |
| PM-2.5 | 0.000 | | | 0.3 |
| CO | 0.001 | | | 0.9 |
| VOCs | 0.001 | | | No Source Limit |
| HAPs | 0.000 | | | No Source Limit |

**Note:** The CMRR boilers operated on fuel oil for a total of 14 hours during the first 6 months of 2013.

| CMRR Boilers Totals (Gas and Oil) | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A802 B) (tons per year) |
|---|---|---|---|---|
| NOx | 0.039 | | | 14.5 |
| $SO_2$ | 0.002 | | | 11.6 |
| TSP | 0.006 | | | 2.1 |
| PM-10 | 0.006 | | | 1.9 |
| PM-2.5 | 0.006 | | | 1.9 |
| CO | 0.048 | | | 20.1 |
| VOCs | 0.033 | | | No Source Limit |
| HAPs | 0.002 | | | No Source Limit |

## A1000 Degreasers

A1002 Emission Limits - Degreasers

| Unit No. | VOC/HAPs tpy |
|---|---|
| TA-55-DG-1 | -- |

1 The VOC emissions from this source category are included in the facility-wide allowable emissions limit established in Table 106.B: 200 tpy VOC, 8.0 tpy per individual HAP, and 24.0 tpy of combined total HAPs. Any VHAPs that are also defined as a VOC shall be included in the VOC total.

## Reporting Requirement

A1007 A The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:**

| Degreaser TA-55-DG-1 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1002 A) (tons per year) |
|---|---|---|---|---|
| VOCs | 0.002 | | | Source limits refer to facility-wide limits. |
| HAPs | 0.002 | | | |

## A1100 Internal Combustion- continued

| Generator TA-33-G-3 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1102 A) (tons per year) |
|---|---|---|---|---|
| NOx | 0.000 | | | 0.21 |
| $SO_2$ | 0.000 | | | Not Required |
| TSP | 0.000 | | | Not Required |
| $PM_{10}$ | 0.000 | | | Not Required |
| CO | 0.000 | | | 0.1 |
| VOC | 0.000 | | | Not Required |
| HAPs | 0.00E+00 | | | No Source Limit |

**Note:** The TA-33-G-3 generator only operated for a 0.2 hours during the first 6 months of 2013.

| Generator TA-33-G-4 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1102 A) (tons per year) |
|---|---|---|---|---|
| NOx | 0.052 | | | 2.33 |
| $SO_2$ | 0.004 | | | 0.16 |
| TSP | 0.004 | | | Not Required |
| $PM_{10}$ | 0.004 | | | Not Required |
| CO | 0.011 | | | 1.4 |
| VOC | 0.004 | | | 0.2 |
| HAPs | 1.67E-05 | | | No Source Limit |

**Note:** The TA-33-G-4 generator only operated for 11 hours during the first 6 months of 2013.

| Stationary Standby Generators | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits |
|---|---|---|---|---|
| NOx | 1.51 | | | No Source Specific Emission Limits for Standby Generators |
| $SO_2$ | 0.07 | | | |
| TSP | 0.08 | | | |
| $PM_{10}$ | 0.08 | | | |
| CO | 0.34 | | | |
| VOC | 0.08 | | | |
| HAPs | 0.001 | | | |

**Note**: Standby Generators are insignificant sources.

| Generator CMRR-GEN-1 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits |
|---|---|---|---|---|
| NOx | 0.238 | | | No Source Specific Emission Limits for the CMRR Generators |
| $SO_2$ | 0.004 | | | |
| TSP | 0.007 | | | |
| $PM_{10}$ | 0.007 | | | |
| CO | 0.052 | | | |
| VOC | 0.007 | | | |
| HAPs | 4.32E-05 | | | |

Continued on the next page.

## A1200 Data Disintegrator

A1202 Emission Limits - Data Disintegrator

| Unit No. | TSP pph | TSP tpy | PM10 pph | PM10 tpy |
|---|---|---|---|---|
| TA-52-11 | 2.3 | 9.9 | 2.3 | 9.9 |

## Reporting Requirement

A1207 A The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:**

| Data Disintegrator TA-52-11 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1202 A) (tons per year) |
|---|---|---|---|---|
| TSP | 0.03 | | | 9.9 |
| PM10 | 0.03 | | | 9.9 |

**A1300 TA-3 Power Plant**

**Comments:**

| Combustion Turbine TA-3-22 CT-1 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limit (Condition A1302 A) (tons per year) |
|---|---|---|---|---|
| NOx | 0.93 | | | 59.4 |
| SOx | 0.06 | | | 4.2 |
| TSP | 0.12 | | | 4.8 |
| $PM_{10}$ | 0.12 | | | 4.8 |
| $PM_{2.5}$ | 0.12 | | | 4.8 |
| CO | 0.19 | | | 72.3 |
| VOC | 0.04 | | | 1.5 |
| HAPs | 0.03 | | | No Source Limit |

## A102 Facility Wide Emission Limits

**Table 102.A: Total Potential Criteria Pollutant Emissions from Entire Facility**

| Pollutant | Emissions (tons per year) |
|---|---|
| Nitrogen Oxides (NOx) | 245.0 |
| Carbon Monoxide (CO) | 225.0 |
| Volatile Organic Compounds (VOC) | 200.0 |
| Sulfur Dioxide ($SO_2$) | 150.0 |
| Total Particulate Matter (TSP) | 120.0 |
| Particulate Matter less than 10 microns ($PM_{10}$) | 120.0 |
| Particulate Matter less than 2.5 microns ($PM_{2.5}$) | 120.0 |

**Table 102.B: Total Potential HAPs that exceed 1.0 tons per year**

| Pollutant | Emissions (tons per year) |
|---|---|
| Individual HAP | 8.0 |
| Total HAPs | 24.0 |

### Reporting Requirement

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:**

| Pollutant | January - June Emissions (tons) | July - December Emissions (tons) | 2012 Annual Emissions (tons) | Facility Wide Permit Limits (Condition A102) (tons per year) |
|---|---|---|---|---|
| Nitrogen Oxides | 24.4 | | | 245 |
| Carbon Monoxide | 17.2 | | | 225 |
| Volatile Organic Carbons | 6.9 | | | 200 |
| Sulfur Dioxide | 0.3 | | | 150 |
| Total Particulate Matter | 2.3 | | | 120 |
| Particulate Matter less than 10 microns | 2.3 | | | 120 |
| Particulate Matter less than 2.5 microns | 1.0 | | | 120 |
| Hazardous Air Pollutants | 2.3 | | | 24 |

Los Alamos
NATIONAL LABORATORY

***Environment Safety & Health***
PO Box 1663, MS K491
Los Alamos, New Mexico 87545
(505)667-4218/Fax (505) 665-3811

*Date*: MAR 2 6 2014
*Symbol*: ADESH-14-017
*LAUR*: 14-21663

Compliance Reporting Manager
Compliance & Enforcement Section
New Mexico Environment Department
Air Quality Bureau
1301 Siler Road, Building B
Santa Fe, New Mexico 87507-3113

Dear Compliance Reporting Manager:

**Subject: Title V Semi-Annual Emissions Report for Permit P100-R1-M3, July 1, 2013 – December 31, 2013 AI No. 856 – Los Alamos National (LANL)**

Enclosed is Los Alamos National Laboratory's (LANL) Semi-Annual Emissions report for the period July 1, 2013 through December 31, 2013. This report is required by permit condition A109 B and is submitted within 90 days from the end of the reporting period as required by that condition.

The semi-annual emissions report includes actual emissions from permitted sources included in LANL's Operating Permit. Emissions are also reported from insignificant boiler and generator sources. These sources are included to demonstrate that LANL has not exceeded Prevention of Significant Deterioration (PSD) applicability thresholds. In this report, actual emissions are listed along with the emission limits for ease in comparing and verifying compliance. No annual emission limits were exceeded during this reporting period.

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

Sincerely,

Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety & Health

MTB:SLS:WW/lm

Enclosure: 1. Title V Semi-Annual Emissions Report for Permit P100-R1-M3
July 1, 2013 – December 31, 2013

Cy: Hai Shen, NA-00-LA, (E-File)
Carl A. Beard, PADOPS, (E-File)
Michael T. Brandt, ADESH, (E-File)
Alison M. Dorries, ENV-DO, (E-File)
Steve L. Story, ENV-CP, (E-File)
Walter Whetham, ENV-CP, (E-File)
Cynthia Blackwell, LC-LESH, (E-File)
LASOmailbox@nnsa.doe.gov, (E-File)
locatesteam@lanl.gov, (E-File)
ENV-CP Title V Emissions Report File
ENV-CP Correspondence File, K490

# Title V Semi-Annual Emission Report for Permit P100-R1-M3

**July 1, 2013 – December 31, 2013**

## Identifying Information

Source Name: Los Alamos National Laboratory County: Los Alamos

Source Address:
City: Los Alamos State: NM Zip Code: 87545

Responsible Official: Michael T. Brandt Ph No. (505) 667-4218 Fax No. (505) 665-3811
Technical Contact: Steven L. Story Ph No. (505) 665-2169 Fax No. (505) 665-8858
Principal Company Product or Business: National Security and Nuclear Weapons Research Primary SIC Code: 8733

Permit No. P100-R1-M3 {IDEA/Tempo ID No. 856} Permit Issued Date: April 26, 2013

## Certification of Truth, Accuracy, and Completeness

I, Michael T. Brandt certify that, based on information and belief formed after reasonable inquiry, the statements and information in the attached semi-annual emission report are true, accurate, and complete.

Signature Date: 3/26/14

Title: Associate Director Environmental, Safety, and Health

# ENCLOSURE 1

Title V Semi-Annual Emissions Report for Permit
P100-R1-M3
July 1, 2013 – December 31, 2013

ADESH-14-017

LAUR-14-21663

Date: MAR 2 6 2014

# Title V Semi-Annual Emissions Report for Permit P100-R1-M3
# July 1, 2013 - December 31, 2013

## Emission Reporting Requirements

### A109 Facility: Reporting Schedules

A. A Semi-Annual Report of monitoring activities is due within 45 days following the end of every 6-month reporting period. The six month reporting periods start on January 1st and July 1st of each year.

B. A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

## A700 Beryllium Activities

A702 Emission Limits - Beryllium Activities

| Source | Beryllium Particulate Matter | Aluminum Particulate Matter |
|---|---|---|
| Sigma Facility TA-3-66 | 10 gm/24 hr | N/A |
| Beryllium Technology Facility TA-3-141 | 0.35 gm/24 hr<br>3.5 gm/yr | N/A |
| Target Fabrication Facility TA-35-213 | $1.8 \times 10^{-04}$ gm/hr<br>0.46 gm/yr | N/A |
| Plutonium Facility TA-55 PF-4 Machining Operation | 0.12 gm/24 hr<br>2.99 gm/yr | 0.12 gm/24 hr<br>2.99 gm/y |
| Plutonium Facility TA-55 PF-4 Foundry Operation | $3.49 \times 10^{-03}$ gm/24 hr<br>$8.73 \times 10^{-04}$ gm/yr | $3.49 \times 10^{-03}$ gm/24 hr<br>$8.73 \times 10^{-04}$ gm/y |

## Reporting Requirement

A707 D The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:** Continued on the next page

## A800 External Combustion

A802 Emission Limits - External Combustion

| Unit No. | [1]$NO_x$ tpy | CO tpy | VOC tpy | $SO_2$ tpy | TSP tpy | $PM_{10}$ tpy |
|---|---|---|---|---|---|---|
| Combined annual emissions for all units listed in Table 800.A [2] | 80.0 | 80.0 | 50.0 | 50.0 | 50.0 | 50.0 |

| Unit No. | [1]$NO_x$ pph | $NO_x$ tpy | CO pph | CO tpy | VOC pph | VOC tpy | $SO_2$ pph | $SO_2$ tpy | TSP pph | TSP tpy | $PM_{10}$ pph | $PM_{10}$ tpy | $PM_{2.5}$ pph | $PM_{2.5}$ tpy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CMRR-BHW-1 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | --[2] | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-1 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| CMRR-BHW-2 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | -- | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-2 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| CMRR-BHW-3 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | -- | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-3 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| CMRR-BHW-4 (GAS) | 0.7 | 2.9 | 1.1 | 4.8 | -- | -- | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.4 | 0.1 | 0.4 |
| CMRR-BHW-4 (OIL) | 1.6 | | 0.5 | | -- | -- | 5.8 | | 0.3 | | 0.2 | | 0.2 | |
| All boilers Oil[3] | N/A | 2.9 | N/A | 0.9 | -- | -- | N/A | 10.4 | N/A | 0.5 | N/A | 0.3 | N/A | 0.3 |
| Combined Total | | 14.5 | | 20.1 | | -- | | 11.6 | | 2.1 | | 1.9 | | 1.9 |

## Reporting Requirement

A807 B The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:** Continued on the next page

## A800 External Combustion - continued

| CMRR-BHW-4 (Gas) | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A802 B) (tons per year) |
|---|---|---|---|---|
| NOx | 0.000 | 0.000 | 0.000 | 2.9 |
| $SO_2$ | 0.000 | 0.000 | 0.000 | 0.3 |
| TSP | 0.000 | 0.000 | 0.000 | 0.4 |
| PM-10 | 0.000 | 0.000 | 0.000 | 0.4 |
| PM-2.5 | 0.000 | 0.000 | 0.000 | 0.4 |
| CO | 0.000 | 0.000 | 0.000 | 4.8 |
| VOCs | 0.000 | 0.000 | 0.000 | No Source Limit |
| HAPs | 0.000 | 0.000 | 0.000 | No Source Limit |

**Note:** The CMRR-BHW-4 boiler has not been installed.

| CMRR Boilers Totals (Oil) | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A802 B) (tons per year) |
|---|---|---|---|---|
| NOx | 0.002 | 0.000 | 0.002 | 2.9 |
| $SO_2$ | 0.001 | 0.000 | 0.001 | 10.4 |
| TSP | 0.000 | 0.000 | 0.000 | 0.5 |
| PM-10 | 0.000 | 0.000 | 0.000 | 0.3 |
| PM-2.5 | 0.000 | 0.000 | 0.000 | 0.3 |
| CO | 0.001 | 0.000 | 0.001 | 0.9 |
| VOCs | 0.001 | 0.000 | 0.001 | No Source Limit |
| HAPs | 0.000 | 0.000 | 0.000 | No Source Limit |

**Note:** The CMRR boilers operated on fuel oil for a total of 14 hours during the first 6 months of 2013 and did not operate on fuel oil during the second 6 months of 2013.

| CMRR Boilers Totals (Gas and Oil) | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A802 B) (tons per year) |
|---|---|---|---|---|
| NOx | 0.039 | 0.027 | 0.066 | 14.5 |
| $SO_2$ | 0.002 | 0.001 | 0.003 | 11.6 |
| TSP | 0.006 | 0.004 | 0.010 | 2.1 |
| PM-10 | 0.006 | 0.004 | 0.010 | 1.9 |
| PM-2.5 | 0.006 | 0.004 | 0.010 | 1.9 |
| CO | 0.048 | 0.034 | 0.082 | 20.1 |
| VOCs | 0.033 | 0.023 | 0.056 | No Source Limit |
| HAPs | 0.002 | 0.002 | 0.004 | No Source Limit |

## A1000 Degreasers

A1002 Emission Limits - Degreasers

| Unit No. | VOC/HAPs tpy |
|---|---|
| TA-55-DG-1 | |

The VOC emissions from this source category are included in the facility-wide allowable emissions limit established in Table 106.B: 200 tpy VOC, 8.0 tpy per individual HAP, and 24.0 tpy of combined total HAPs. Any VHAPs that are also defined as a VOC shall be included in the VOC total

## Reporting Requirement

A1007 A The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:**

| Degreaser TA-55-DG-1 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1002 A) (tons per year) |
|---|---|---|---|---|
| VOCs | 0.002 | 0.006 | 0.008 | Source limits refer to facility-wide limits. |
| HAPs | 0.002 | 0.006 | 0.008 | |

## A1100 Internal Combustion- continued

| Generator TA-33-G-3 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1102 A) (tons per year) |
|---|---|---|---|---|
| NOx | 0.000 | 0.012 | 0.012 | 0.21 |
| $SO_2$ | 0.000 | 0.001 | 0.001 | Not Required |
| TSP | 0.000 | 0.001 | 0.001 | Not Required |
| $PM_{10}$ | 0.000 | 0.001 | 0.001 | Not Required |
| CO | 0.000 | 0.002 | 0.002 | 0.1 |
| VOC | 0.000 | 0.001 | 0.001 | Not Required |
| HAPs | 0.00E+00 | 3.72E-06 | 3.72E-06 | No Source Limit |

**Note:** The TA-33-G-3 generator did not operate during the first 6 months of 2013.

| Generator TA-33-G-4 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1102 A) (tons per year) |
|---|---|---|---|---|
| NOx | 0.052 | 0.000 | 0.052 | 2.33 |
| $SO_2$ | 0.004 | 0.000 | 0.004 | 0.16 |
| TSP | 0.004 | 0.000 | 0.004 | Not Required |
| $PM_{10}$ | 0.004 | 0.000 | 0.004 | Not Required |
| CO | 0.011 | 0.000 | 0.011 | 1.4 |
| VOC | 0.004 | 0.000 | 0.004 | 0.2 |
| HAPs | 1.67E-05 | 0.00E+00 | 1.75E-05 | No Source Limit |

**Note:** The TA-33-G-4 generator only operated for 0.2 hours during the second six months of 2013.

| Stationary Standby Generators | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits |
|---|---|---|---|---|
| NOx | 1.47 | 1.24 | 2.71 | No Source Specific Emission Limits for Standby Generators |
| $SO_2$ | 0.07 | 0.06 | 0.12 | |
| TSP | 0.08 | 0.07 | 0.14 | |
| $PM_{10}$ | 0.08 | 0.07 | 0.14 | |
| CO | 0.33 | 0.28 | 0.61 | |
| VOC | 0.08 | 0.07 | 0.14 | |
| HAPs | 0.001 | 0.000 | 0.001 | |

**Note:** Standby Generators are insignificant sources.

| Generator CMRR-GEN-1 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits |
|---|---|---|---|---|
| NOx | 0.238 | 0.334 | 0.572 | No Source Specific Emission Limits for the CMRR Generators |
| $SO_2$ | 0.004 | 0.006 | 0.010 | |
| TSP | 0.007 | 0.010 | 0.017 | |
| $PM_{10}$ | 0.007 | 0.010 | 0.017 | |
| CO | 0.052 | 0.073 | 0.125 | |
| VOC | 0.007 | 0.010 | 0.017 | |
| HAPs | 4.32E-05 | 6.07E-05 | 1.04E-04 | |

Continued on the next page.

## A1200 Data Disintegrator

A1202 Emission Limits - Data Disintegrator

| Unit No. | TSP pph | TSP tpy | PM10 pph | PM10 tpy |
|---|---|---|---|---|
| TA-52-11 | 2.3 | 9.9 | 2.3 | 9.9 |

## Reporting Requirement

A1207 A The permittee shall submit reports described in Section A109 and in accordance with B110.

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:**

| Data Disintegrator TA-52-11 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limits (Condition A1202 A) (tons per year) |
|---|---|---|---|---|
| TSP | 0.03 | 0.04 | 0.07 | 9.9 |
| PM10 | 0.03 | 0.04 | 0.07 | 9.9 |

**A1300 TA-3 Power Plant**

**Comments:**

| Combustion Turbine TA-3-22 CT-1 | January - June Emissions (tons) | July - December Emissions (tons) | Annual Emissions (tons) | Permit Limit (Condition A1302 A) (tons per year) |
|---|---|---|---|---|
| **NOx** | 0.93 | 1.47 | 2.40 | 59.4 |
| **SOx** | 0.06 | 0.10 | 0.16 | 4.2 |
| **TSP** | 0.12 | 0.20 | 0.32 | 4.8 |
| **$PM_{10}$** | 0.12 | 0.20 | 0.32 | 4.8 |
| **$PM_{2.5}$** | 0.12 | 0.20 | 0.32 | 4.8 |
| **CO** | 0.19 | 0.31 | 0.50 | 72.3 |
| **VOC** | 0.04 | 0.06 | 0.10 | 1.5 |
| **HAPs** | 0.03 | 0.04 | 0.07 | No Source Limit |

## A102 Facility Wide Emission Limits

**Table 102.A: Total Potential Criteria Pollutant Emissions from Entire Facility**

| Pollutant | Emissions (tons per year) |
|---|---|
| Nitrogen Oxides (NOx) | 245.0 |
| Carbon Monoxide (CO) | 225.0 |
| Volatile Organic Compounds (VOC) | 200.0 |
| Sulfur Dioxide ($SO_2$) | 150.0 |
| Total Particulate Matter (TSP) | 120.0 |
| Particulate Matter less than 10 microns ($PM_{10}$) | 120.0 |
| Particulate Matter less than 2.5 microns ($PM_{2.5}$) | 120.0 |

**Table 102.B: Total Potential HAPs that exceed 1.0 tons per year**

| Pollutant | Emissions (tons per year) |
|---|---|
| Individual HAP | 8.0 |
| Total HAPs | 24.0 |

### Reporting Requirement

A109 B A Semi-Annual Report of actual emissions from all permitted sources unless otherwise specified in this permit is due within 90 days following the end of every 6-month reporting period as defined at Condition A109.A. Emission estimates of criteria pollutants NOx, CO, SO2, VOC, TSP, PM10, and PM2.5 shall not include fugitive emissions. Emission estimates of HAPs shall include fugitive emissions. Emission estimates shall not include Insignificant or Trivial Activities, except that facility-wide emissions from all natural gas combustion sources shall be estimated. The reports shall include a comparison of actual emissions that occured during the reporting period with the facility-wide allowable emission limits at Table 106.B.

Has this reporting requirement been met during this reporting period with a separate reporting submittal? Answer Yes or No below.

☐ **Yes** **Date report submitted:** **Tracking Number:**

☒ **No** **Provide comments and identify any supporting documentation as an attachment.**

**Comments:**

| Pollutant | January - June Emissions (tons) | July - December Emissions (tons) | 2013 Annual Emissions (tons) | Facility Wide Permit Limits (Condition A102.) (tons per year) |
|---|---|---|---|---|
| Nitrogen Oxides | 24.3 | 19.9 | 44.2 | 245 |
| Carbon Monoxide | 17.2 | 13.2 | 30.4 | 225 |
| Volatile Organic Carbons | 6.9 | 5.6 | 12.5 | 200 |
| Sulfur Dioxide | 0.3 | 0.4 | 0.7 | 150 |
| Total Particulate Matter | 2.3 | 1.9 | 4.2 | 120 |
| Particulate Matter less than 10 microns | 2.3 | 1.9 | 4.2 | 120 |
| Particulate Matter less than 2.5 microns | 1.0 | 0.9 | 2.0 | 120 |
| Hazardous Air Pollutants | 2.3 | 2.1 | 4.4 | 24 |