SMAQMD BACT CLEARINGHOUSE

CATEGORY Type: **IC ENGINE COMPRESSION-STANDBY**

BACT Category: Minor source

| **BACT Determination Number:** 281 | **BACT Determination Date:** 6/4/2021 |
|---|---|

## Equipment Information

**Permit Number:** N/A -- Generic BACT Determination

**Equipment Description:** IC Engine, Standby, for major and minor sources

**Unit Size/Rating/Capacity:** Engine, Standby, Diesel-fueled ≥ 50 hp

**Equipment Location:**

**EXPIRED**

## BACT Determination Information

**District Contact:** Venk Reddy Phone No.: (279) 207-1146 email: vreddy@airquality.org

| | | |
|---|---|---|
| **ROCs** | **Standard:** | Applicable NMHC or NMHC + NOx emission standard |
| | **Technology Description:** | ≥ 1000 HP 0.14 g/hp-hr, < 1000 HP Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| | **Basis:** | Achieved in Practice |
| **NOx** | **Standard:** | Applicable NOx or NMHC + NOx emission standard |
| | **Technology Description:** | ≥ 1000 HP 0.5 g/hp-hr, < 1000 HP Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| | **Basis:** | Achieved in Practice |
| **SOx** | **Standard:** | CARB Diesel |
| | **Technology Description:** | Diesel fuel with a sulfur content no greater than 0.0015% by weight. |
| | **Basis:** | Achieved in Practice |
| **PM10** | **Standard:** | Applicable PM emission standard |
| | **Technology Description:** | ≥ 1000 HP 0.02 g/hp-hr, < 1000 HPApplicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| | **Basis:** | Achieved in Practice |
| **PM2.5** | **Standard:** | Applicable PM emission standard |
| | **Technology Description:** | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby |
| | **Basis:** | Achieved in Practice |
| **CO** | **Standard:** | Applicable CO emission standard |
| | **Technology Description:** | Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| | **Basis:** | Achieved in Practice |
| **LEAD** | **Standard:** | N/A |
| | **Technology Description:** | N/A |
| | **Basis:** | |

**Comments:** For emergency engines 50 ≤ bhp < 75, Tier 4 Interim certification is the requirement; for emergency engines 75 ≤ gbhp < 750, Tier 3 certification is the requirement; for emergency engines ≥ 750 bhp and < 1000 HP, Tier 2 certification is the requirement. ≥ 1000 HP Tier 4 emissions is the requirement.
T-BACT is equivalent to BACT except at major sources where a particulate filter is required.

Printed: 11/9/2021

777 12th Street, Third Floor

SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Sacramento, CA 95814

# BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

**EXPIRED**

**DETERMINATION NO.:** 281

**DATE:** December 14, 2020

**ENGINEER:** Venk Reddy

**Category/General Equip Description:** Internal Combustion (I.C.) Engine

**Equipment Specific Description:** I.C. Engine, Emergency Standby, Diesel-fueled

**Equipment Size/Rating:** Minor or Major Source BACT

**Previous BACT Det. No.:** No. 172

This BACT determination will update the following determinations:
#172 which was made on April 10, 2018 for diesel emergency standby I.C. engines BHP ≥ 50.

This BACT applies to I.C. engines BHP ≥ 50 which use diesel fuel to provide emergency electrical power, emergency water pumping for flood control or firefighting, emergency potable water pumping, or emergency sewage pumping. Engines permitted as emergency standby are used in two ways: 1) as part of a generator system or 2) as a direct drive pump. As part of a generator typical uses include providing power to life safety systems, building equipment, or computer equipment. As part of a direct drive pump typical uses are for fire suppression, potable water supply or sewage pumping the use of which is tied to an emergency event.

This BACT determination is being updated in accordance with District Policy to review BACT determinations once every two (2) years.

## BACT/T-BACT ANALYSIS

### A. ACHIEVED IN PRACTICE (Rule 202, §205.1a):

The following control technologies are currently employed as BACT/T-BACT for diesel-fueled emergency standby engines by the following agencies and air pollution control districts:

Note: Diesel PM is the primary driver for health risks associated with diesel engines. Diesel PM is emitted as PM10 and PM2.5, and the same control technologies that control PM10 and PM2.5 also control diesel PM.

**US EPA**

Projects entered in the EPA RACT/BACT LAER clearinghouse between the period of 1/1/2018 and 12/1/2020 were reviewed for this BACT determination. Seventy-one projects were identified and reviewed. A majority of them were found to be consistent with the SMAQMD current BACT guidelines or had emissions of criteria pollutants that were higher than the current SMAQMD standards. Projects found to be stricter than the SMAQMD current guidelines, or those that were not previously available for the size category, are discussed below.

**BACT**

Source: EPA RACT/BACT/LAER Clearinghouse

| For Emergency Standby Units with a Rating of 50 ≤ BHP < 175 | |
|---|---|
| VOC | No limit |
| NOx | 3.5 g/hp-hr |
| SOx | No limit |
| PM10 | 0.3 g/hp-hr |
| PM2.5 | 0.3 g/hp-hr |
| CO | 3.73 g/hp-hr |

**RBLC ID: KY-0110 – 61 HP Radio Tower Emergency Generator**

| For Emergency Standby Units with a Rating of 175 ≤ BHP < 750 | |
|---|---|
| VOC | 0.14 g/hp-hr |
| NOx | 0.3 g/hp-hr |
| SOx | Diesel fuel with a sulfur content no greater than 0.0015% by weight (A) |
| PM10 | 1.49E-2 g/hp-hr |
| PM2.5 | 1.49E-2 g/hp-hr |
| CO | 2.8 g/hp-hr |

(A) The referenced RBLC ID does not have a SOx requirement, however many other emergency standby engines in this category have this requirement.

**RBLC ID: TX-0846 -Toyota Motor 214 KW ( ~286 HP) – Tier 4 compliant.**

**US EPA**

| For Emergency Standby Units with a Rating of BHP ≥ 750 | |
|---|---|
| VOC | 6.4 g/KW-hr (4.8 g/hp-hr) NMHC + NOx; Emission Standards based on 40 CFR Part 60, Subpart IIII |
| NOx | 6.4 g/KW-hr (4.8 g/hp-hr) NMHC + NOx; Emission Standards based on 40 CFR Part 60, Subpart IIII |
| SOx | Diesel fuel with a sulfur content no greater than 0.0015% by weight |
| PM10 | 0.20 g/KW-hr (0.15 g/hp-hr) PM10 (filterable); Emission Standards based on 40 CFR Part 60, Subpart IIII |
| PM2.5 | 0.20 g/KW-hr (0.15 g/hp-hr) PM2.5 (filterable); Emission Standards based on 40 CFR Part 60, Subpart IIII |
| CO | 3.5 g/KW-hr (2.6 g/hp-hr) CO; Emission Standards based on 40 CFR Part 60, Subpart IIII |

In general, all the emergency standby engines in the size category have the above referenced emission standards. There is one group of engines to note. The RBLC ID MI-0433 group has two engines that state Tier 4 engines were installed but are held to the above referenced Tier 2 standards. Since the BACT emissions published in the clearinghouse are within the range of the above table, (Tier 2 standards) they are not each listed separately here.

**T-BACT**

There are no T-BACT standards published in the clearinghouse for this category, but the NESHAP standards (see 40 CFR, Part 63 standards below) represent Maximum Achievable Control Technology (MACT) or Generally Available Control Technology (GACT) for HAPs and can therefore be considered T-BACT.

**RULE REQUIREMENTS:**

40 CFR Part 60 Subpart IIII – Standards of Performance for Stationary Compression Internal Combustion Engines: This regulation applies to owners/operators of new stationary compression ignition engines that commenced construction after July 11, 2005. [40 CFR §60.4200]

40 CFR §60.4205(b)

Owners and operators of 2007 model year and later emergency stationary Compression Ignition Internal Combustion Engines (CI ICE) with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.

40 CFR §60.4205(c)

Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in Table 4 to this subpart, for all pollutants.

Note: The emission standards listed in Table 4 of Subpart IIII are the same as those listed in the Table below, except that fire pumps were given an additional three years to comply with those standards. As of the date of this determination, new emergency use fire pumps are subject to the same emission standards as emergency use non-fire pumps.

**US EPA**

40 CFR §60.4202(a)(2)
For engines with a maximum engine power greater than or equal to 37 KW (50 HP), the certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 (emission standards) and 40 CFR 89.113 (smoke standards) apply for all pollutants beginning in model year 2007.

| 40 CFR §89.112 Table 1: Emission Standards in g/kW-hr (g/hp-hr) | | | | | |
|---|---|---|---|---|---|
| Maximum engine power | Tier | Model year(s) | PM | NMHC + NOx | CO |
| 37≤kW<75 (50≤hp<100) | 3 | 2008+ | 0.40 (0.30) | 4.7 (3.5) | 5.0 (3.7) |
| 75≤kW<130 (100≤hp<175) | 3 | 2007+ | 0.30 (0.22) | 4.0 (3.0) | 5.0 (3.7) |
| 130≤kW<225 (175≤hp<300) | 3 | 2006+ | 0.20 (0.15) | 4.0 (3.0) | 3.5 (2.6) |
| 225≤kW<450 (300≤hp<600) | 3 | 2006+ | 0.20 (0.15) | 4.0 (3.0) | 3.5 (2.6) |
| 450≤kW<560 (600≤hp<750) | 3 | 2006+ | 0.20 (0.15) | 4.0 (3.0) | 3.5 (2.6) |
| kW>560 (hp>750) | 2 | 2006+ | 0.20 (0.15) | 6.4 (4.8) | 3.5 (2.6) |

40 CFR Part 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines: This regulation applies to new and existing stationary IC engines. New emergency engines that comply with 40 CFR 60 Subpart IIII already meet the requirements of this NESHAP, as noted below.

40 CFR §63.6590(c)
*Stationary RICE subject to Regulations under 40 CFR Part 60*. An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR Part 60 Subpart IIII, for compression ignition engines or 40 CFR Part 60 Subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this subpart.

**Air Resources Board (ARB)**

**BACT**

From 1/1/2018 to 12/14/2020 there has been one stationary emergency engine entered by SCAQMD on 2/1/2019 for application 504556. This application was for a 183 hp fire pump engine that falls within the parameters of the current SMAQMD BACT determination (BACT # 172). The ARB clearinghouse shows that SJVUAPCD has a new BACT policy as of 6/13/20; the details of this policy are described below. No other new district BACT guidelines or policies for stationary emergency engines during this time period were published in the ARB BACT clearinghouse.

Source: ARB BACT Clearinghouse

| I.C. Engines; Emergency; Compression Ignition | |
|---|---|
| VOC | Latest EPA Tier Certification level for applicable horsepower range (SJVUAPCD) |
| NOx | Latest EPA Tier Certification level for applicable horsepower range (SJVUAPCD) |
| SOx | Very low sulfur diesel fuel (15 ppmw sulfur or less) (SJVUAPCD) |
| PM10 | 0.15 g/bhp-hr or the latest EPA Tier Certification level for applicable horsepower range, whichever is more stringent (ATCM) (SJVUAPCD) |
| PM2.5 | No standard |
| CO | Latest EPA Tier Certification level for applicable horsepower range (SJVUAPCD) |

**T-BACT**

There are no T-BACT standards published in the clearinghouse for this category. However, the ATCM standards (see Rule Requirements Below) represent BACT for toxic air contaminants (TACs) and can therefore be considered T-BACT.

**RULE REQUIREMENTS:**

Title 17, Cal. Code Regs. Sections 93115 through 93115.15 – Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI) Engines: This regulation applies to owners/operators of new and existing stationary compression ignition engines greater than 50 bhp.

§93115.6(a): New Emergency Standby Diesel-Fueled CI Engine Emission Standards.

(1) At-School and Near-School Provisions. No owner or operator shall operate a new stationary emergency standby diesel-fueled CI engine for non-emergency use, including maintenance and testing, during the following periods:
  (A) whenever there is a school sponsored activity, if the engine is located on school grounds, and
  (B) between 7:30 a.m. and 3:30 p.m. on days when school is in session, if the engine is located within 500 feet of school grounds. Section 93115.6(a)(1) does not apply if the engine emits no more than 0.01 g/bhp-hr of diesel PM.

(3) New Engines: As of January 1, 2005, except as provided in section 93115.3, no person shall sell, offer for sale, purchase, or lease for use in California any new stationary emergency standby diesel-fueled CI engine that has a rated brake horsepower greater

**Air Resources Board (ARB)**

than 50 unless it meets the following applicable emission standards, and no person shall operate any new stationary emergency standby diesel-fueled CI engine that has a rated brake horsepower greater than 50, unless it meets all of the following applicable operating requirements and emission standards specified in 93115.6(a)(3).

(A) Emissions Standards and Hours of Operating Requirements.

1. New stationary emergency standby diesel-fueled engines (>50 bhp) shall:
   a. meet the applicable emission standards for all pollutants for the same model year and maximum horsepower rating as specified in Table 1: Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines, in effect on the date of acquisition or submittal, as defined in section 93115.4, and
   b. after December 31, 2008, be certified to the new nonroad compression-ignition (CI) engine emission standards for all pollutants for 2007 and later model year engines as specified in 40 CFR, Part 60, Subpart III-Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (2006);

Table 1: Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines – g/bhp-hr (g/kW-hr)

| Maximum Engine Power | Tier | Model year(s) | PM | NMHC + NOx | CO |
|---|---|---|---|---|---|
| 50≤HP<75 (37≤kW<56) | 2 | 2007 | 0.15 (0.20) | 5.6 (7.5) | 3.7 (5.0) |
| | 4i | 2008+ | | 3.5 (4.7) | |
| 75≤HP<100 (56≤kW<75) | 2 | 2007 | 0.15 (0.20) | 5.6 (7.5) | 3.7 (5.0) |
| | 3 | 2008+ | | 3.5 (4.7) | |
| 100≤HP<175 (130≤kW<225) | 3 | 2007 | 0.15 (0.20) | 3.0 (4.0) | 3.7 (5.0) |
| | | 2008+ | | | |
| 175≤HP<300 (130≤kW<225) | 3 | 2007 | 0.15 (0.20) | 3.0 (4.0) | 2.6 (3.5) |
| | | 2008+ | | | |
| 300≤HP<600 (225≤kW<450) | 3 | 2007 | 0.15 (0.20) | 3.0 (4.0) | 2.6 (3.5) |
| | | 2008+ | | | |
| 600≤HP<750 (450≤kW<560) | 3 | 2007 | 0.15 (0.20) | 3.0 (4.0) | 2.6 (3.5) |
| | | 2008+ | | | |
| HP>750 (kW>560) | 2 | 2007 | 0.15 (0.20) | 4.8 (6.4) | 2.6 (3.5) |
| | | 2008+ | | | |

(4) New Direct-Drive Emergency Standby Fire Pump Engines: Except as provided in section 93115.3, no person shall sell, offer for sale, purchase, or lease for use in California any new stationary emergency standby diesel-fueled direct-drive fire-pump CI engine that has a rated brake horsepower greater than 50 unless the fire-pump engine meets the applicable emission standards and certification requirements specified in section 93115.6(a)(4), and no person shall operate any new stationary emergency standby diesel-fueled direct-drive fire pump CI engine that has a rated brake horsepower greater than 50, unless it meets all of the applicable operating requirements and emission

**Air Resources Board (ARB)**

standards specified in 93115.6(a)(4).

(A) Standards and Hours of Operating Requirements.

1. New direct-drive emergency standby diesel-fueled fire-pump engines (>50 bhp) shall:
   a. meet the applicable emissions standards for all pollutants as specified in Table 2 Emissions Standards for New Stationary Emergency Standby Direct-Drive Fire Pump Engines for the model year and NFPA nameplate power rating; and
   b. meet the new fire pump engine certification requirements and emission standards required by 40 CFR § 60.4202(d.) Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (2006); and
   c. not operate more than the number of hours necessary to comply with the testing requirements of the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 2002 edition, which is incorporated herein by reference. This subsection does not limit engine operation for emergency use and for emission testing to show compliance with 93115.6(a)(4)

Table 2: Emission Standards for New Stationary Emergency Standby Direct-Drive Fire Pump Engines > 50 BHP – g/bhp-hr (g/kW-hr)

| Maximum Engine Power | Model year(s) | PM | NMHC + NOx | CO |
|---|---|---|---|---|
| 50≤HP<100 (37≤kW<75) | 2010 and earlier | 0.60 (0.80) | 7.8 (10.5) | 3.7 (5.0) |
| | 2011+ | 0.30 (0.40) | 3.5 (4.7) | |
| 100≤HP<175 (75≤kW<130) | 2009 and earlier | 0.60 (0.80) | 7.8 (10.5) | 3.7 (5.0) |
| | 2010+ | 0.22 (0.30) | 3.0 (4.0) | |
| 175≤HP<300 (130≤kW<225) | 2008 and earlier | 0.40 (0.54) | 7.8 (10.5) | 2.6 (3.5) |
| | 2009+ | 0.15 (0.20) | 3.0 (4.0) | |
| 300≤HP<600 (225≤kW<450) | 2008 and earlier | 0.40 (0.54) | 7.8 (10.5) | 2.6 (3.5) |
| | 2009+ | 0.15 (0.20) | 3.0 (4.0) | |
| 600≤HP<750 (450≤kW<560) | 2008 and earlier | 0.40 (0.54) | 7.8 (10.5) | 2.6 (3.5) |
| | 2009+ | 0.15 (0.20) | 3.0 (4.0) | |
| HP>750 (kW>560) | 2007 and earlier | 0.40 (0.54) | 7.8 (10.5) | 2.6 (3.5) |
| | 2008+ | 0.15 (0.20) | 4.8 (6.4) | |

**Sacramento Metropolitan AQMD**

**BACT**

Source: SMAQMD BACT Clearinghouse, BACT Determination Number 172

| For Emergency Standby Units With a Rating of ≥ 50 HP | |
|---|---|
| VOC | Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| NOx | Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| SOx | Diesel fuel with a sulfur content no greater than 0.0015% by weight. |
| PM10 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| PM2.5 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |
| CO | Applicable CO emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. |

**T-BACT**

| I.C. Engines, Emergency Standby, Diesel-Fueled | |
|---|---|
| Diesel PM | Applicable PM emission standard for horsepower range based on the ATCM for Stationary CI Engines |

**RULE REQUIREMENTS:**

Rule 412 Stationary Internal Combustion Engines Located at Major Stationary Sources of NOx (Adopted 06-01-1995) The emission limits of this rule are not applicable to emergency standby engines used for loss of electricity, water pumping for flood or fire control, or the emergency electrical power for emergency incident response. The engine is subject to equipment requirements of providing an hour meter or computerized tracking system.

**South Coast AQMD**

**BACT**

Source: SCAQMD BACT Guidelines for Non Major Polluting Facilities, from guidelines published February 5, 2021, IC Engine, Stationary, Emergency BACT Rev 6 (2-1-2019)

The BACT for emergency standby diesel-fired engines is to follow the requirements of Rule 1470 as described below. SOx is consistent with Rule 431.2 which requires sulfur content no greater than 0.0015% by weight.

Source: SCAQMD BACT Guidelines for Major Polluting Facilities

374 BHP, (12-10-15) Tier 3 with a particulate trap used for control of toxic emissions
755 BHP, (12-10-15) Tier 2 with a particulate trap used for control of toxic emissions
2,220 BHP, (12-10-15) Tier 2 with a particulate trap used for control of toxic emissions

Since the use of the particulate filter is used to control toxic emissions at major sources, its application will be considered T-BACT for major sources.

**RULE REQUIREMENTS:**

Reg XI, Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines (Amended November 1, 2019)

Per section (i)(1)(B) Emergency Standby Engines are exempt from the emission limitations of this rule.

Reg XIV, Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines (Amended May 4, 2012)

This rule regulates criteria pollutants as well as diesel PM from stationary diesel engines. The primary purpose of this regulation is for the controlling toxic pollutants around sensitive receptors. Therefore, it will be considered for purposes of establishing T-BACT control levels.

| SCAQMD Rule 1470 Emission Standards – g/kW-hr (g/bhp-hr)<br>Rule 1470 §(c)(2)(C)(vi) for PM<br>Rule 1470 §(c)(2)(C)(vii), Table 2 for NMHC + NOx, and CO | | | |
|---|---|---|---|
| Maximum Engine Power | NMHC + NOx | CO | PM |
| 50 < HP < 100<br>(37 < kW < 75) | 4.7 (3.5) | 5.0 (3.7) | (0.15) |
| 100 < HP < 175<br>(75 < kW < 130) | 4.0 (3.0) | 5.0 (3.7) | (0.15) |
| 175 < HP ≤ 750<br>(130 < kW ≤ 560) | 4.0 (3.0) | 3.5 (2.6) | (0.15) |
| HP > 750<br>(kW > 560) | 6.4 (4.8) | 3.5 (2.6) | (0.15) |

**South Coast AQMD**

For emergency standby diesel fueled direct drive fire pump engines, SCAQMD Rule 1470 requires the engine to meet the same emission standards as Table 2 of the Stationary Diesel ATCM (Title 17, Cal. Code Regs., §93116(a)(4)).

Rule 1470, §§(c)(2)(A), (c)(2)(C)(iv), and (c)(2)(C)(v) place additional restrictions on engines located on school grounds, within 100 meters of a school, within 500 feet of a school, and within 50 meters of a sensitive receptor. For engines located within 100 meters of a school or on school grounds, the engine must emit diesel PM at a rate less than or equal to 0.01 g/hp-hr, unless the owner/operator accepts restrictions on non-emergency operation (7:30 a.m. to 4:30 p.m. when school is in session or during school activities) in most cases. New engines located within 500 feet of as school must meet an emission standard of 0.15 g/hp-hr and not operate for non-emergency use between the hours of 7:30 a.m. and 3:30 p.m. when school is in session. Except for replacement engines, new stationary emergency engines located within 50 meters of a sensitive receptor are required to meet Tier 4 PM standards for nonroad engines.

**San Joaquin Valley Unified APCD**

**BACT**
Source: SJVUAPCD BACT Guideline 3.1.1 (Last Updated: 6/13/2019)

| Emergency Diesel IC Engine | |
|---|---|
| VOC | Latest EPA Tier Certification level for applicable horsepower range |
| NOx | Latest EPA Tier Certification level for applicable horsepower range |
| SOx | Very low sulfur diesel fuel (15 ppmw sulfur or less) |
| PM10 | 0.15 g/bhp-hr or the Latest EPA Tier Certification level for applicable horsepower range, whichever is more stringent. (ATCM) |
| PM2.5 | No standard |
| CO | Latest EPA Tier Certification level for applicable horsepower range |

**San Joaquin Valley Unified APCD**

**BACT**
Source: SJVUAPCD BACT Guideline 3.1.4 (Last Updated 3/2/2020)

| Emergency Diesel I.C. Engine Driving a Fire Pump | |
|---|---|
| VOC | Latest EPA Tier Certification level for applicable horsepower range |
| NOx | Latest EPA Tier Certification levels for applicable horsepower range |
| SOx | Low-sulfur diesel fuel (500 ppmw sulfur or less) or Very Low-sulfur diesel fuel (15 ppmw sulfur or less), where available. |
| PM10 | 0.1 grams/bhp-hr (if TBACT is triggered) (corrected 7/16/01) (A) (B)<br>0.15 grams/bhp-hr (if TBACT is not triggered) |
| PM2.5 | No standard |
| CO | Latest EPA Tier Certification level for applicable horsepower range |

(A) Any engine model included in the ARB or EPA diesel engine certification lists and identified as having a PM10 emission rate of 0.149 grams/bhp-hr or less, based on ISO 8178 test procedure, shall be deemed to meet the 0.1 grams/bhp-hr requirement.
(B) A site-specific Health Risk Analysis is used to determine if TBACT is triggered. (Clarification added 05/07/01)

**T-BACT**
Source: SJVUAPCD BACT Guideline 3.1.4

| Emergency Diesel I.C. Engine Driving a Fire Pump | |
|---|---|
| Diesel PM | 0.1 g/hp-hr, if T-BACT is triggered based on a site-specific health risk analysis |

There are no T-BACT standards published in the clearinghouse for non-fire pump emergency diesel I.C. engines.

SJVUAPCD justified the use of a lower tier engine as a backup power source, by stating that Tier 4 is not a technologically feasible option for critical loads (Project S-1203544, Facility S-9416, November 16, 2020). Since most emergency standby engine operations are critical loads, such as building lighting, data backup, fire pumps, water transmission, hospital operations, etc., the use of Tier 4 engines was removed as an achieved in practice category. The complete packet can be found on the SJVUAPCD website under this link: https://www.valleyair.org/notices/Docs/2020/11-18-20_(S-1203544)/Packet.pdf. Excerpts of this document can be found in Attachment A.

**RULE REQUIREMENTS:**

Rule 4701 – INTERNAL COMBUSTION ENGINES – PHASE I (AMENDED August 21, 2003)

Emergency Standby Engines are exempt from the emission limitations of this rule.

Rule 4702 – INTERNAL COMBUSTION ENGINES (Amended November 14, 2013)

Emergency Standby Engines are exempt from the emission limitations of this rule.

**San Diego County APCD**

**BACT**
Source: NSR Requirements for BACT (June 2011)
The engine BACT determinations listed in the SDAPCD Clearinghouse do not apply to emergency standby engines.

**T-BACT**
There are no T-BACT standards published in the clearinghouse for this category.

**RULE REQUIREMENTS:**
Regulation 4, Rule 69.4.1 – Stationary Reciprocating Internal Combustion Engines – (Rev. adopted & Effective July 8, 2020)
This rule applies to stationary I.C. Engines ≥ 50 BHP located at a stationary source

| New or Replacement Emergency Standby Engines Using Diesel | | | | |
|---|---|---|---|---|
| | Certified engines, 50 ≤ bhp<100 | Certified engines, 100 ≤ bhp<170 | Certified engines, 175≤ bhp<750 | Certified engines, ≥750 |
| VOC | No standard | No standard | No standard | No standard |
| NOx | 3.5 g/bhp-hr | 3.0 g/bhp-hr | 3.0 g/bhp-hr | 4.8 g/bhp-hr |
| SOx | California Diesel Fuel | California Diesel Fuel | California Diesel Fuel | California Diesel Fuel |
| PM10 | No standard | No standard | No standard | No standard |
| PM2.5 | No standard | No standard | No standard | No standard |
| CO | 3.7 g/bhp-hr | 3.7 g/bhp-hr | 2.6 g/bhp-hr | 2.6 g/bhp-hr |

## Bay Area AQMD

**BACT**
Source: BAAQMD BACT Guideline 96.1.3 (12/22/20)

| IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump rated ≥ 50 BHP and < 1000 BHP | |
|---|---|
| VOC | ARB ATCM standard for NMHC at applicable horsepower rating |
| NOx | ARB ATCM standard for NOx at applicable horsepower rating |
| SOx | Fuel sulfur content not to exceed 0.0015% (wt.) or 15 ppm (wt.) |
| PM10 | 0.15 g/bhp-hr |
| PM2.5 | No standard |
| CO | ARB ATCM standard for CO at applicable horsepower rating |

Source: BAAQMD BACT Guideline 96.1.5 (12/22/20)

| IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump ≥ 1000 BHP | |
|---|---|
| VOC | 0.14 g/bhp-hr |
| NOx | 0.5 g/bhp-hr |
| SOx | Fuel sulfur content not to exceed 0.0015% (wt.) or 15 ppm (wt.) |
| PM10 | 0.02 g/bhp-hr |
| PM2.5 | No standard |
| CO | 2.6 g/bhp-hr |

**T-BACT**
Source: BAAQMD BACT Guideline 96.1.3 (12/22/20)

| IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump ≥ 50 BHP and < 1000 BHP | |
|---|---|
| Diesel PM | 0.15 g/bhp-hr |

Source: BAAQMD BACT Guideline 96.1.5 (12/22/20)

| IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump ≥ 1000 BHP | |
|---|---|
| Diesel PM | 0.02 g/bhp-hr |

| **Bay Area AQMD** |
| --- |
| **RULE REQUIREMENTS:**<br>Reg 9, Rule 8 – Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines (Revised 10/15/2019)<br><br>Emergency Standby Engines are exempt from the emission limitations of this rule. |

The following control technologies have been identified and are ranked based on stringency, 1 being most stringent:

| SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES For Engines >50 BHP and <1000 BHP | |
|---|---|
| **VOC** | 1. Applicable NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, SMAQMD, EPA, BAAQMD, SJVAPCD]<br>2. No Standard [SDAPCD] |
| **NOx** | 1. Applicable NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, EPA, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD] |
| **SOx** | 1. Diesel fuel with a sulfur content no greater than 0.0015% by weight [EPA, ARB, SMAQMD, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD] |
| **PM10** | 1. Applicable PM emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, EPA SMAQMD, BAAQMD, SJVAPCD]<br>2. No Standard [SDAPCD] |
| **PM2.5** | 1. Applicable PM emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [SMAQMD]<br>2. Applicable PM emission standard for horsepower range based on 40 CFR 60 Subpart IIII or 40 CFR 63 Subpart ZZZZ, whichever is more stringent [EPA]<br>3. No Standard [ARB, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD] |
| **CO** | 1. Applicable CO emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD, EPA, SDAPCD] |
| **Diesel PM (T-BACT)** | 1. Use of a particulate filter [SCAQMD]<br>2. Compliance with SCAQMD Rule 1470(C) [SCAQMD]<br>3. 0.1 g/hp-hr if T-BACT is triggered for a direct-drive fire pump [SJVUAPCD]<br>4. Applicable PM emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, BAAQMD, SJVUAPCD, SMAQMD]<br>5. Applicable PM emission standard for horsepower range based on 40 CFR 60 subpart IIII, 40 CFR 63 Subpart ZZZZ. [EPA] |

(A) For non-direct drive fire pump emergency engines 50 ≤ bhp < 75, Tier 4 Interim certification is the requirement; for emergency engines 75 ≥ bhp < 750, Tier 3 certification is the requirement; for emergency engines ≥ 750 bhp, Tier 2 certification is the requirement.

(B) For direct-drive fire pump emergency engines, the applicable standards are those listed in Table 2 of the Stationary Diesel ATCM (Title 17, Cal. Code Regs., §93116(a)(4))

(C) SCAQMD Rule 1470 requires new engines (as of January 1, 2013) located within 50 meters of a sensitive receptor that are not replacement engines to meet Tier 4 emission standards for PM.

Contacting engine manufactures as part of this update and a review of current proposed engines within SMAQMD, the general sentiment of the lack of availability of Tier 4 engines from the manufacturers and the requirement to install aftermarket controls was still expressed. There is limited availability of Tier 4 engines and in order to meet the demand if Tier 4 final engines were required, the engines would need to purchase aftermarket SCR and DPF controls.

Additionally, Caterpillar submitted documentation to show that Tier 4 engines are not suited for emergency standby engine applications. This information is found in Attachment B.

Based on the information presented by Caterpillar and SJVUAPCD, Tier 4 engines (including the use of SCR and DPF) are not considered achieved in practice at this time for engines rated less than 1000 HP or over 1000 HP in an agricultural or direct drive fire pump application. The BAAQMD has shown that Tier 4 engines have been achieved in practice for engines greater than or equal to 1000 HP based on their BACT guidance.

| **SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES For Engines >=1000 BHP** | |
|---|---|
| **VOC** | 1. 0.14 g/bhp-hr [BAAQMD]<br>2. Applicable NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, EPA, SMAQMD, SJVAPCD]<br>3. No Standard [SDAPCD] |
| **NOx** | 1. 0.5 g/bhp-hr [BAAQMD]<br>2. Applicable NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, EPA, SMAQMD, SCAQMD, SDAPCD, BAAQMD, SJVAPCD] |
| **SOx** | 1. Diesel fuel with a sulfur content no greater than 0.0015% by weight [EPA, ARB, SMAQMD, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD] |
| **PM10** | 1. 0.02 g/bhp-hr [BAAQMD]<br>2. Applicable PM emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, EPA, SMAQMD, BAAQMD, SJVAPCD]<br>3. No Standard [SDAPCD] |
| **PM2.5** | 1. Applicable PM emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [SMAQMD]<br>2. Applicable PM emission standard for horsepower range based on 40 CFR 60 Subpart IIII or 40 CFR 63 Subpart ZZZZ, whichever is more stringent [EPA]<br>3. No Standard [ARB, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD] |
| **CO** | 1. Applicable CO emission standard for horsepower range,(A) based on the ATCM for Stationary CI Engines. (2.6 g/bhp-hr) [ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD, EPA, SDAPCD] |
| **Diesel PM (T-BACT)** | 1. 0.02 g/bhp-hr [BAAQMD]<br>2. Compliance with SCAQMD Rule 1470(B) [SCAQMD]<br>3. 0.149 g/hp-hr if T-BACT is triggered for a direct-drive fire pump [SJVUAPCD]<br>4. Applicable PM emission standard for horsepower range (A) based on the ATCM for Stationary CI Engines. [ARB, BAAQMD, SJVUAPCD, SMAQMD]<br>5. Applicable PM emission standard for horsepower range based on 40 CFR 60 subpart IIII, 40 CFR 63 Subpart ZZZZ. [EPA] |

(A) SCAQMD Rule 1470 requires new engines (as of January 1, 2013) located within 50 meters of a sensitive receptor that are not replacement engines to meet Tier 4 emission standards for PM.

The following control technologies have been identified as the most stringent, achieved in practice control technologies:

| BEST CONTROL TECHNOLOGIES ACHIEVED IN PRACTICE For Engines >50 BHP and <1000 BHP | | |
|---|---|---|
| **Pollutant** | **Standard** | **Source** |
| VOC | Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | ARB, SMAQMD, SCAQMD, BAAQMD |
| NOx | Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |
| SOx | Diesel fuel with a sulfur content no greater than 0.0015% by weight. | EPA, ARB, SMAQMD, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD |
| PM10 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |
| PM2.5 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | SMAQMD; EPA |
| CO | Applicable CO emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |
| Diesel PM (T-BACT) | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | EPA, ARB, SMAQMD, SCAQMD (A), SJVUAPCD, SDAPCD, BAAQMD |

(A) SCAQMD Rule 1470 requires a more stringent PM emission standard for engines greater or equal to 175 HP if the engine is going to be located within 50 meters from a sensitive receptor. The rule analysis states that cancer risk from emergency diesel engines could be as high as 11 per million for receptors within 50 meters of the release point. This is greater than the 10 in a million significance level for the SCAQMD. Therefore, SCAQMD justified the requirement that most new emergency-use diesel engines meet more stringent standards for PM when installed within 50 meters of a sensitive receptor. Rule

1470 is not considered achieved in practice for SMAQMD for the following reasons:

i. It requires more stringent PM standards for engines ≥ 175 HP when installed within 50 meters from sensitive receptors because the cancer risk may exceed 10 in one million. SMAQMD does not allow a cancer risk in excess of 10 in one million.
ii. It allows operation of the engine for emergency purposes if the electrical operating reserves fall below 5% (Stage II). SMAQMD allows emergency operation only during unforeseeable power outages.
iii. It allows the use of the engine in Demand Response Programs (DRP). SMAQMD allows emergency operation only during power outages.

| BEST CONTROL TECHNOLOGIES ACHIEVED IN PRACTICE<br>For Engines ≥1000 BHP | | |
|---|---|---|
| **Pollutant** | **Standard** | **Source** |
| VOC | 0.14 g/bhp-hr | BAAQMD |
| NOx | 0.5 g/bhp-hr | BAAQMD |
| SOx | Diesel fuel with a sulfur content no greater than 0.0015% by weight. | EPA, ARB, SMAQMD, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD |
| PM10 | 0.2 g/bhp-hr | BAAQMD |
| PM2.5 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | SMAQMD; EPA |
| CO | Applicable CO emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. (2.6 g/bhp-hr) | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |
| Diesel PM (T-BACT) | 0.02 g/bhp-hr | BAAQMD |

## B. TECHNOLOGICALLY FEASIBLE AND COST EFFECTIVE (Rule 202, §205.1.b.):

**Discussion:**

During the most recent rulemaking for updates to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines (Title 17, Cal. Code. Regs., §93115 to §93115.15), ARB conducted a cost effectiveness analysis to determine if selective catalytic reduction (SCR) and/or diesel particulate filters (DPF) were technologically feasible and cost effective for emergency use applications (Initial Statement of Reasons for Proposed Rulemaking: Proposed Amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines, Appendix B, September 2010).

The analysis concluded that DPFs were technologically feasible with some additional operational and monitoring conditions. These conditions would include either operating the engine for additional hours to allow the filter to regenerate (Passive DPF) or regenerating the filter during scheduled down-time (Active DPF), and monitoring for backpressure, cold starts, and 30-minute

idle sessions.

The analysis also concluded that SCR was technologically feasible, but had some additional challenges. Because emergency standby engines routinely operate only for scheduled maintenance and testing, the engines do not operate more than 15-30 minutes, and do operate at no or low load. Because of this the exhaust would not likely reach the temperature (260 °C to 540 °C) required for the catalyst to function properly. To circumvent this problem, the engine would need to be operated with higher loads and in many cases for longer periods of time. This could be a challenge for most emergency standby applications as most businesses do not have load banks in house and would have to create a larger load on the engine to get the catalyst up to operational temperature.

Urea handling and maintenance is also an important consideration. Urea crystallization in the lines can cause damage to the SCR system and to the engine itself. Crystallization in the lines is more likely in emergency standby engines due to their periodic and low hours of usage. Urea also has a shelf life of approximately two years. This could increase the cost of operating a SCR for emergency standby engines since the low number of annual hours of operation experienced by most emergency standby engines could lead to urea expiration. The urea would then have to be drained and replaced, creating an extra maintenance step and an increased cost to the end user.

ARB staff determined that while SCR systems may be technically feasible, there are significant operational hurdles to overcome before routine use of SCR on emergency standby engines is practical. This is because the majority of operating hours for emergency standby engines occur during short 15 to 30 minute maintenance and testing checks are at low engine loads. In most cases, the temperature needed for the SCR catalyst to function will not be reached during this operation and the SCR will not provide the expected NOx reductions.

ARB staff also reviewed the feasibility of requiring Tier 4 final engines in lieu of aftermarket treatment. ARB concluded that Tier 4 engines that rely on after-treatment technology for emergency standby applications will not be available from the original equipment manufacturers. Representatives from the Engine Manufacturer's Association (EMA) have indicated that it will not be economically viable for engine manufacturers to develop and maintain a Tier 4 emergency standby engine platform for California. At the time, ARB staff concluded that Tier 4 engines for emergency standby applications will not be available "off-the-shelf." Rather, each owner or operator will need to purchase a new Tier 2 or Tier 3 engine and then work with suppliers to retrofit the engine with a DPF and/or SCR to meet the Tier 4 emission standards for all pollutants. Subsequent to this, "off-the-shelf" Tier 4 final engines have become available for emergency purposes, and the District determined that Tier 4 final engines are technologically feasible. The District reviewed some engine list prices and determined that these prices were generally in line with the prices listed in Appendix B.

**Technologically Feasible Alternatives:**

Any alternative basic equipment, fuel, process, emission control device or technique, singly or in combination, determined to be technologically feasible by the Air Pollution Control Officer.

The table below shows the technologically feasible alternatives identified as capable of reducing emissions beyond the levels determined to be "Achieved in Practice" as per Rule 202, §205.1.a.

| Pollutant | Technologically Feasible Alternatives |
|---|---|
| **VOC** | Tier 4 standard |
| **NOx** | Selective Catalytic Reduction (SCR)<br>Tier 4 standard |
| **SOx** | No other technologically feasible option identified |
| **PM10** | Diesel Particulate Filter (DPF)<br>Tier 4 standard |
| **PM2.5** | Diesel Particulate Filter (DPF)<br>Tier 4 standard |
| **CO** | Tier 4 standard |

**Cost Effective Determination:**

After identifying the technologically feasible control options, a cost analysis is performed to take into consideration economic impacts for all technologically feasible controls identified.

The District reviewed cost information from the September 2010 amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines and adjusted the assumptions to reflect permitted emissions for maintenance and testing (50 hr/year). The District concluded that conducting the cost analysis using 200 hours per year for total operation (maintenance, testing, and emergency use) was not representative of actual engine operation, since emergency use is not predictable or routine. Cost effectiveness for PM reductions from a Tier 4 interim or Tier 4 final are not presented below, since the cost increases of these higher tier engines were consistently higher than those for retrofitting. The results are presented in the below tables.

| Cost-Effectiveness Associated with the Application of DPF and SCR on Emergency Standby Engines (50 hours/year) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Regulatory Scenario | | | HP Range | | | | |
| | | | 50-174 | 175-749 | 750-1,206 | 1,207-1,999 | >2,000 |
| | Average Horsepower: | | 112 | 462 | 978 | 1604 | 2630 |
| Scenario 1: DPF Retrofit of Tier 2/3 engine | Cost Increase Due to Controls (A) | PM | $4,300 | $17,600 | $37,200 | $60,900 | $99,900 |
| | | NOx | N/A | N/A | N/A | N/A | N/A |
| | Emission Reductions (lb) (B) | PM | 13 | 53 | 113 | 186 | 305 |
| | | NOx | N/A | N/A | N/A | N/A | N/A |
| | Cost Effectiveness ($/lb) | PM | $333 | $331 | $329 | $328 | $328 |
| | | NOx | N/A | N/A | N/A | N/A | N/A |
| Scenario 2: DPF/SCR Retrofit of Tier 2/3 engine | Cost Increase Due to Controls (A) | PM | $4,400 | $18,200 | $38,500 | $63,100 | $103,400 |
| | | NOx | $8,800 | $36,300 | $76,900 | $126,100 | $206,900 |
| | Emission Reductions (lb) (B) | PM | 13 | 53 | 113 | 186 | 305 |
| | | NOx | 161 | 666 | 2240 (C) | 3677 | 6032 |
| | Cost Effectiveness ($/lb) | PM | $341 | $342 | $341 | $340 | $339 |
| | | NOx | $55 | $54 | $34 | $34 | $34 |

(A) Cost increases due to controls are from Table B-7 of the Initial Statement of Reasons for Proposed Rulemaking: Proposed Amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines, Appendix B, September 2010.
(B) Emission reductions have been adjusted from 31 hours/year of operation to 50 hours/year of operation.
(C) The referenced table shows the emission of NOx to be based on 0.3 g/hp-hr. The proposed value is based on 0.5 g/hp-hr

| Cost-Effectiveness Associated with Installing Tier 4 Final Emergency Standby Engines (50 hours/year) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Regulatory Scenario | | | HP Range | | | | |
| | | | 50-174 | 175-749 | 750-1,206 | 1207-1,999 | >2,000 |
| | Average Horsepower: | | 112 | 462 | 978 | 1604 | 2630 |
| Tier 4 Final Engine | Cost Increase (A) | NOx | $28,000 | $85,008 | $156,480 | $248,465 | $328,750 |
| | Emission Reductions (lb) (B) | NOx | 161 | 666 | 2,240 | 3,677 | 6,032 |
| | Cost Effectiveness ($/lb) | NOx | $170 | $130 | $70 | $70 | $50 |

(A) Cost increases due to controls are from Table B-7 of the Initial Statement of Reasons for Proposed Rulemaking: Proposed Amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines, Appendix B, September 2010.
(B) Emission reductions have been adjusted from 31 hours/year of operation to 50 hours/year of operation.

The above cost effectiveness numbers were converted from cost per pound to cost per ton for comparison to the District's cost effectiveness thresholds.

| Cost-Effectiveness Associated with the Application of DPF and SCR on Emergency Standby Engines (50 hours/year) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Regulatory Scenario | | | HP Range | | | | |
| | | | 50-174 | 175-749 | 750-1,206 | 1,207-1,999 | >2,000 |
| | Average Horsepower: | | 112 | 462 | 978 | 1604 | 2630 |
| Scenario 1: DPF Retrofit of Tier 2/3 engine | Cost Effectiveness ($/ton) | PM | $660,000 | $662,000 | $658,000 | $656,000 | $656,000 |
| | | NOx | N/A | N/A | N/A | N/A | N/A |
| Scenario 2: DPF/SCR Retrofit of Tier 2/3 engine | Cost Effectiveness ($/ton) | PM | $682,000 | $684,000 | $682,000 | $680,000 | $678,000 |
| | | NOx | $110,000 | $108,000 | $68,000 | $68,000 | $68,000 |
| Scenario 3: Tier 4 Final engine | Cost Effectiveness ($/ton) | NOx | $340,000 | $260,000 | $140,000 | $140,000 | $100,000 |

As stated in the referenced CARB document, emissions are calculated based on a load factor of 30% and a control factor of 85%. The operational time of the SCR is 20 hrs of the initial 31 hrs/year of operation. Cost effectiveness is calculated based on an equipment life of 25 years of service. Additional information from CARB can be found on in the referenced document. SMAQMD cost effective methodology takes into account other factors such as interest rate, labor, insurance, maintenance, energy usage, lower equipment life, ect. that would increase the costs above. As demonstrated above, SCR and DPF after treatment equipment costs alone is not considered cost effective since both the cost effectiveness for reducing the pollutants exceeds the District's threshold of $24,500/ton for NOx and $11,400/ton for PM10. Adding in additional operating costs would drive the cost effectiveness above the thresholds.

## C. SELECTION OF BACT:

Based on the above analysis, BACT for VOC, NOx, SOx, PM10, and CO will remain at what is currently achieved in practice and BACT for PM2.5 will be set to be the same as for PM10.

| BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED for Engines ≥ 1000 BHP | | |
|---|---|---|
| **Pollutant** | **Standard** | **Source** |
| VOC | 0.14 g/bhp-hr (A) | BAAQMD |
| NOx | 0.5 g/bhp-hr (A) | BAAQMD |
| SOx | Diesel fuel with a sulfur content no greater than 0.0015% by weight. | EPA, ARB, SMAQMD, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD |
| PM10 | 0.02 g/hp-hr (A) | BAAQMD |
| PM2.5 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | SMAQMD; EPA |
| CO | Applicable CO emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |

(A) Applicable for IC Engine non-agricultural, non direct drive fire pumps rated ≥ 1000 BHP.

| BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED for Engines >50 BHP and <1000 BHP | | |
|---|---|---|
| **Pollutant** | **Standard** | **Source** |
| VOC | Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. (A) | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |
| NOx | Applicable NMHC + NOx emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. (A) | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |
| SOx | Diesel fuel with a sulfur content no greater than 0.0015% by weight. | EPA, ARB, SMAQMD, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD |
| PM10 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. (A) | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |
| PM2.5 | Applicable PM emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | SMAQMD; EPA |
| CO | Applicable CO emission standard for horsepower range based on Table 1: New Emergency Standby Diesel-Fueled CI Engines and Table 2: New Emergency Standby Direct-Drive Fire Pump Engines of the ATCM for Stationary CI Engines. | ARB, SMAQMD, SCAQMD, SJVUAPCD, BAAQMD |

(A) Applicable for IC Engines rated ≥ 50 BHP and < 1000 BHP, and all agricultural and direct drive fire pumps.

| T-BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED | | |
|---|---|---|
| **Pollutant** | **Standard** | **Source** |
| Diesel PM | 0.02 g/bhp-hr (A) | BAAQMD |
| | Particulate filter (B) | SCAQMD |
| | Applicable PM emission standard for horsepower range based on the ATCM for Stationary CI Engines (C) | EPA, ARB, SMAQMD, SCAQMD, SJVUAPCD, SDAPCD, BAAQMD |

(A) Applicable for IC Engine rated ≥ 1000 BHP.
(B) Applicable to major source.
(C) Applicable for IC Engines rated ≥ 50 BHP and < 1000 BHP

**APPROVED BY:** Amy L. Roberts **DATE:** 6/4/2021

# Attachment A

## San Juaquin Unified APCD Justification for non Tier 4 Engines

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

November 16, 2020

Michael Madruga
G.L. Bruno Associates
855 M St., Ste. 1010
Fresno, CA 93721

**Re: Notice of Preliminary Decision - Authority to Construct**
**Facility Number: S-9416**
**Project Number: S-1203544**

Dear Mr. Madruga:

Enclosed for your review and comment is the District's analysis of G.L. Bruno Associates's application for an Authority to Construct for the installation of a 500 kw Kohler/John Deere Tier 2 emergency standby diesel IC engine generator, at 4400 Kirkcaldy Dr, Bakersfield.

The notice of preliminary decision for this project has been posted on the District's website (www.valleyair.org). After addressing all comments made during the 30-day public notice period, the District intends to issue the Authority to Construct. Please submit your written comments on this project within the 30-day public comment period, as specified in the enclosed public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Ms. Silvana Procopio of Permit Services at (661) 392-5606.

Sincerely,

Arnaud Marjollet
Director of Permit Services

AM:SP

Enclosures

cc: Courtney Graham, CARB (w/ enclosure) via email

**Samir Sheikh**
Executive Director/Air Pollution Control Officer

**Northern Region**
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

**Southern Region**
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: (661) 392-5500 FAX: (661) 392-5585

www.valleyair.org www.healthyairliving.com

# Appendix D:
BACT Guideline and BACT Analysis

# San Joaquin Valley
# Unified Air Pollution Control District

**Best Available Control Technology (BACT) Guideline 3.1.1**
**Last Update: 6/13/2019**
**Emergency Diesel IC Engine**

| Pollutant | Achieved in Practice or in the SIP | Technologically Feasible | Alternate Basic Equipment |
|---|---|---|---|
| CO | Latest EPA Tier Certification level for applicable horsepower range | | |
| NOX | Latest EPA Tier Certification level for applicable horsepower range | | |
| PM10 | 0.15 g/bhp-hr or the Latest EPA Tier Certification level for applicable horsepower range, whichever is more stringent. (ATCM) | | |
| SOX | Very low sulfur diesel fuel (15 ppmw sulfur or less) | | |
| VOC | Latest EPA Tier Certification level for applicable horsepower range | | |

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

# Top-Down BACT Analysis for the Emergency IC Engine

BACT Guideline 3.1.1 (June 13, 2019) applies to emergency diesel IC engines. In accordance with the District BACT policy, information from that guideline will be utilized without further analysis.

## 1. BACT Analysis for $NO_X$ and VOC Emissions:

### a. Step 1 - Identify all control technologies

BACT Guideline 3.1.1 identifies only the following option:

- *Latest EPA Tier Certification level for applicable horsepower range*

  *Please note that the latest EPA Tier Certification for the applicable horsepower range (755 hp) may be Tier 2 or Tier 4 depending on the service of the IC engine*

### b. Step 2 - Eliminate technologically infeasible options

Definitions of Engine types:

The first step in eliminating technologically infeasible options is to understand useful engine definitions.

> Prime IC engines/generator sets (gensets) provide ongoing power and can accommodate varying loads on an unlimited basis throughout the year. However, the average load factor cannot exceed 70 percent of the prime rating. Prime power IC engine/gensets are best used in situations where a limited amount of power load fluctuation occurs.
>
> Emergency Standby IC engines/gensets provide a short-term power when there is an unexpected loss of utility power. These IC engines/gensets are generally intended to operate at a maximum of 200 hours per year and with a low load. Additionally, the average power output should not exceed 70 percent in any 24-hour period.

There is a significant difference in standby vs. prime IC engine/gensets. Standby IC engine/gensets are intended to provide emergency power on a short-term basis, while prime IC engine/gensets can provide year round power. Typically, new emergency IC engine/gensets powering generators are limited to 50 hours per year for non-emergency use.

Since the proposed engine will be operated at a health care facility serving essential functions, such as providing power to life-saving equipment, it is critical that the engine is fully reliable and operating within the conditions under which it has been certified. EPA certifies IC engines operating under "prime" conditions, i.e. continuous use. The latest EPA Tier certification for a 755 bhp IC engine/genset is Tier 4F. However, in this case, the proposed engine will be operated as an emergency standby unit.

Technology Used to Achieve Tier 4F Standards:

The second step in eliminating technologically infeasible options is to understand what controls engines need to meet Tier 4F certification emissions level.

To achieve Tier 4F NOx and $PM_{10}$ standards, manufacturers install diesel particulate filters (DPF), diesel oxidation catalysts (DOC), and selective catalytic reduction (SCR).

A DPF is a large, honeycombed, ceramic filter, coated with precious metal catalysts that trap PM in the exhaust stream. In normal DPF operating conditions, the exhaust temps are hot enough to incinerate most of the trapped $PM_{10}$. But idling, cold starts and light load factors can accelerate PM accumulation. When a DPF becomes full enough to affect backpressure, the engine's ECM injects a stream of diesel fuel into the DPF, raising temperatures and burning off the accumulated PM. This is called regeneration. Eventually ash, which won't burn off, collects in the DPF, requiring it to be cleaned or exchanged. Diesel PM Burns in the DPF when exhaust temperature reaches 600 C (1112 F).

Diesel oxidation catalysts are filters with a catalytic coating on the filter media. The catalyst on a DOC chemically changes carbon monoxide, hydrocarbons, diesel particulates and other pollutants to carbon dioxide and water. Catalyst activity is temperature dependent with a minimum exhaust temperature of 200 C (392 F) with maximum efficiency occurring at about 400 C (752 F).

Selective Catalytic Reduction (SCR) is used to lower NOx levels after the exhaust passes through a DPF or DPF/DOC combination. Urea/water solution, commonly referred to as diesel exhaust fluid (DEF), is injected into the exhaust stream. The exhaust and DEF in the presence of the catalyst turns the NOx into mostly water and nitrogen.

SCR is also temperature dependent with the optimum temperatures between 250 C to 427 C (480 F to 800 F).

Tier 4F Engines installed within the District:

A survey of existing/operating Tier 4F emergency IC engine/gensets operating within the District was performed. The proposed engine in this project is rated at 755 bhp. Listed below are all the Tier 4F emergency engines between 700 and 1000 bhp:

- C-2344-25-0 (825 BHP VOLVO PENTA MODEL TWD1672 GE TIER 4F) – stationary unit at a resort

- S-5290-4-0 (919 BHP VOLVO PENTA MODEL TWD1673 GE TIER 4F) – stationary unit at a distribution center

Technologically Feasible Determination:

Per the discussion above:

> The control equipment needed to achieve the Tier 4F standard is temperature dependent (SCR Operation) and must reach temperatures exceeding 400 C for maximum efficiency. To reach these temperatures IC engines must be operated under load and for prolonged periods. With the minimum permitted operating time associated with emergency engines, the required temperatures may not be obtained long enough to ensure proper operation resulting in minimal control effectiveness and possible failure. Therefore, the District considers that Tier 4F is not a not a technologically feasible option when evaluated under this specific criteria for use at a health care facility where reliability is absolutely critical.

Therefore, a Tier 4F engine is NOT a technologically feasible option.

**c. Step 3 - Rank remaining options by control effectiveness**

No ranking needs to be done because there is only one control option:

- Certified Tier 2 engine

**d. Step 4 - Cost Effectiveness Analysis**

The applicant has proposed the only control option remaining under consideration (Tier 2 engine). Therefore, a cost effectiveness analysis is not required.

**e. Step 5 - Select BACT**

BACT for NOx and VOC for an emergency IC engine/genset at a health care facility will be the use of an EPA Tier 2 certified IC engine. The applicant is proposing such a unit. Therefore, BACT has been satisfied.

# Attachment B

## Caterpillar Justification Submitted for Consideration of Tier 4 Engine Use as Emergency Standby Applications

**Caterpillar Inc.**

Emissions, Regulations & Conformance
PO Box 600, MOS 11
Mossville, IL 61552

**Subject:** Stationary Emergency Use Only Engine BACT Standards Should Align with US EPA Standards for Compression Ignition and Spark Ignition Engines

To Whom It May Concern:

Please find attached a white paper outlining recommendations for effective regulation of emissions from stationary engines in emergency power applications. This paper addresses the necessary exemption of Tier 4 Final product in standby emergency applications from Federal, California (CA) and other applicable local regulations. It recommends application of Tier 2 and Tier 3 standards in alignment with US EPA and CARB requirements. The paper is intended to explain why replication of prime power regulations is neither effective nor appropriate for emergency power applications and provide specific guidance for regulating those applications to achieve better air quality outcomes.

There is an immediate need for implementation of these recommendations as local air quality boards seek to achieve real improvements in air quality within their jurisdictions and may not fully understand the real-world implications of their policy decisions.

I am available for questions.

Kind Regards,

T.J. Tarabulski
Emissions Regulatory Affairs
Caterpillar Inc.
Tarabulski_TJ@cat.com
309 578-6587

# Recommendations for Effective Regulation of Emissions for Stationary Engines in Emergency Power Applications

T.J. Tarabulski, Caterpillar Inc.
July 2020

## INTRODUCTION

This paper is intended to inform the actions of regulatory bodies so that regulations are aligned with the intended air quality improvement objectives. This paper provides specific recommendations on how to regulate engines used in emergency power applications to achieve better air quality outcomes than what is realized by simple replication of prime power regulations.

Stationary engines used for emergency power should be regulated differently than stationary engines used for prime power. Emergency engines operate very few hours per year and have distinct operating profiles that result in a much different environmental impact than prime power engines.

## RECOMMENDATION AND BASIS

1. Best Available Control Technology (BACT) Standards for emergency diesel engines should remain at Tier 2 (emergency) above 560 bkW and at Tier 3 (emergency) at or below 560 bkW as Tier 4 (non-emergency) emissions levels will not be achieved in practice in significant portions of emergency engine operations; this request for ***emergency engine*** applications should not be misinterpreted to imply that Tier 4 engines are not effective in ***non-emergency engine*** applications that operate high hours per year where startup and shutdown are a small fraction of operating time.
2. Emergency gas engine levels should be set at 1.5 g/bhp-hr NOx and 2.0 g/bhp-hr CO for all horsepower ranges; VOC should be set at 1.5 g/bhp-hr for less than 130 hp, and 1.0 g/bhp-hr for greater than or equal to 130 hp. Such levels are achievable with a certified gas engine that is exempt from source test requirements under EPA's NSPS regulations.
3. It is important to note the above approaches would also minimize greenhouse gas (GHG) emissions from emergency applications.
4. Air permitting authorities, as an alternative to cost ineffective solutions, should limit emergency hours of operation (200 hours typical) with force majeure permit provisions for emergency engines in extraordinary grid-power outages to more accurately represent emergency engine impacts on an airshed.

## BACKGROUND

U.S. EPA determined[1] that the use of aftertreatment devices such as Selective Catalytic Reduction (SCR) and Diesel Particulate Filters (DPF) were not justified based on cost effectiveness ($/ton reduced) for emergency diesel engines in both the NSPS regulations for new engines (40 CFR Part 60 Subpart IIII) and in the regulation of hazardous air pollutants from new and existing engines (NESHAP, 40 CFR 63 Subpart ZZZZ). These regulations require the engines to meet 2007 emissions standards (Tier 3 for 75 HP to 750 HP, and Tier 2 for engines > 750 HP).

In 2011, California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) agreed with EPA's reasoning and aligned with EPA regulations to also allow this stationary emergency engine exemption, excepting CARB adopted a 0.15 g/bhp-hr PM for engines < 175 hp.

More stringent particulate matter (PM) emissions levels are required in California, such as the area under jurisdiction of South Coast Air Quality Management District (SCAQMD), to meet area-specific requirements ("sensitive receptor") or for major sources including Federal Title V facilities. None of these regional requirements mandates the use of Tier 4 certified engines.

SCAQMD limits emergency engines to 200 hours total /year which minimizes the modeled and realistic potential emissions in the airshed as an alternative to adding costly controls to engines that run on average < 50 hrs./year. Limiting testing and maintenance to non-ozone forming hours of the day will also mitigate emissions impact notwithstanding facility constraints that may apply.

Appendix A shows the steady state NOx concentration (ppm) for testing and maintenance conditions and full engine power output operation of a diesel engine. The EPA Tier 4 standard is reported in grams/bkW-hr based on a weighted average of 5 operating points and some of the

[1] US EPA June 2006 - Regulatory Impact Analysis of the Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (PDF), page 61

operating conditions may be above the absolute value of the Tier 4 standard. The test cycle does not include the no load (note: zero bkW drives g/bkW-hr to infinity) high idle operating condition typical of testing and maintenance. Therefore, emissions are not at Tier 4 g/kW-hr levels for the no load testing and maintenance condition, but operation is the lowest mass flow rate possible for engine operation and the mass flow is small when compared to full load exhaust mass flow rates. At zero engine load operation, the required engine temperature for the SCR system to operate will not be achieved. Engines with lower ratings than the example shown would typically have lower engine operating temperatures, especially at less than full load, and thus the time needed to reach the operating temperature of the SCR will be longer. Emergency engines typically run between 0% and 60% load when tested and less than 60% load during emergencies. In other words, even a Tier 4 engine will not achieve Tier 4 in practice in an emergency application.

Several considerations exist when investigating the use of Tier 4 certified technology in stationary emergency diesel engine applications:

1. Certified Tier 4 engines must have safeguards (inducements) to prevent the operation of the engine with certain emissions related faults. For example, certified Tier 4 engines will derate and eventually shut off without diesel exhaust fluid (DEF). The engine can also shut down with high exhaust backpressure. These unexpected shutdowns subordinate the mission of an emergency engine to provide power during an emergency. The EPA does allow the SCR induced engine shutdown to be overridden during an emergency, but only up to 120 hours of operation after which the engine will shut down without a factory override reset. This 120-hour shutdown could occur during an extended emergency and thus could risk human life, public health and safety or critical services. The DPF cannot be bypassed by the operator so DPF backpressure risk cannot be eliminated.
2. SCR systems require high operating temperatures. Achieving optimum operating temperature profiles typically requires at least 20 to 30 minutes at typical emergency engine loads. Emergency standby engines typically have short operation sessions resulting in exhaust temperatures that are too cool for NOx reduction to occur. This limitation of SCR makes them ineffective during typical testing and maintenance operations. The result is Tier 4 emissions levels are not achieved in practice for these short duration events.
3. NOx reductions using SCR are also dependent upon demand load. A lightly loaded engine that is typically operated for short periods of time would not achieve the full NOx reduction potential of the SCR system (see attached). Most operating hours for emergency standby engines occur when performing maintenance and testing checks at low engine loads. Artificially increasing these testing and maintenance loads to elevate temperatures increases GHG emissions at a minimum.
4. SCR requires the use of DEF, a urea-based solution, for the catalytic reaction. This required fluid requires separate storage from the diesel tank. DEF has a limited shelf life and will also degrade over long periods of time. With low hour usage on emergency engines, unused fluids that degrade over time could require additional system maintenance. Additionally, these urea systems could increase the maintenance test frequency.
5. DPFs on emergency engines will also pose their own issues. DPFs typically require engines to operate at higher loads for longer periods or add heat to properly regenerate (burn carbon). This increases fuel consumption resulting in larger required tanks to satisfy minimum run time. This will also increase GHG emissions ($CO_2$). Some customers may request a bypass to assure the systems never interfere with normal operation. If misused, such bypasses may further reduce control effectiveness and may be considered a defeat device and or tampering if used as part of an EPA certified system.
6. Additional operating and maintenance time under loaded conditions will be required in order to assure proper functioning of the DPFs or to activate SCR dosing. With the already low limits on emergency engine operation (generally less than 200 hours per year total and often less than 50 hours per year including maintenance and repair) added time for maintenance will further limit the possible run time for actual emergencies.
7. Tier 4 engines with aftertreatment systems require more building space and floor loading considerations for engine, urea tank and control systems. Additional structural supports, plumbing, electrical and exhaust ducts may also be required. Load banks or supplemental exhaust heat may also be needed to ensure proper engine loading to prevent DPF plugging. This will increase fuel consumption and GHG emissions ($CO_2$).

8. Costs for Tier 4 diesel engine generators, installation of necessary additional design requirements, and increased maintenance requirements will run as much as 60% to over 100% more than the standard emergency Tier 2 above 560 bkW and Tier 3 at or below 560 bkW. These costs, for engines that typically operate far below stringent State or Federal hour limits, will far exceed cost-effectiveness ($/ton) basis for engine emission regulation to Tier 4 levels.

**ADDITIONAL CONSIDERATIONS FOR SPARK IGNITION ENGINES**

This analysis is also applicable to Spark-ignited engines, consistent with EPA NSPS standards. EPA NSPS is clear on source test requirements for a noncertified engine on initial installation and every 3 years thereafter. Certified engines do not require source testing per NSPS. There is no other state or local air district applicable regulation—it is a federally mandated minimum requirement. Manufacturers are only certifying to the emergency and prime gas engine NSPS standards of 2.0 g/bhp-hr NOx and 1.0 g/bhp-hr NOx respectively. Thus, by setting emergency gas engine BACT at 0.5 g/bhp-hr the air district has automatically imposed an expensive source test ($5K - $10K per engine) on initial installation and every 3 years thereafter on the end user.

EPA regulations place the “performance test” requirement on the end user, not on the manufacturer due to this being a site specific NSPS requirement. In most cases, the very low NOx engine will also require the installation of an oxidation catalyst to reduce the CO and VOC to the BACT levels set by authorities. Such regulations should allow manufacturers to voluntarily **certify** emergency gas engines so that end users are not forced into an expensive, on-going source testing requirement and additional oxidation catalysts for engines that are intended to operate infrequently and for limited hours. Removal of certified OEM engine emissions components/aftertreatment on certified engines to meet a different BACT standard than the US EPA NSPS requirements would be counterproductive for certified products and reintroduce the source test requirement.

**CONCLUSION**

For all of the foregoing reasons, BACT for emergency diesel engines should be aligned with EPA and CARB regulations which require Tier 2 above 560 bkW and Tier 3 below 560 bkW, as Tier 4 emissions levels will not be achieved in practice, are not cost effective and may compromise safety for stationary emergency diesel applications. Therefore, Tier 4 engine systems would be misapplied for emergency installations, notwithstanding Tier 4 systems are installed in facilities despite the recognition that Tier 4 levels are not achieved in practice in significant portions of **emergency** engine operations.

Emergency gas engine BACT should be maintained in alignment or revised to allow certified gas engines requirements to align with EPA NSPS’ exemption to eliminate costly initial and on-going source testing. Emergency gas engine BACT must allow for certified engines to be used without modification.

In short, to achieve optimum air quality outcomes beyond what is realized by simple application of prime power regulations to emergency engines, stationary engines used for emergency power should be regulated differently than stationary engines used for prime power and aligned with existing EPA and CARB emergency engine regulations.

# Appendix A

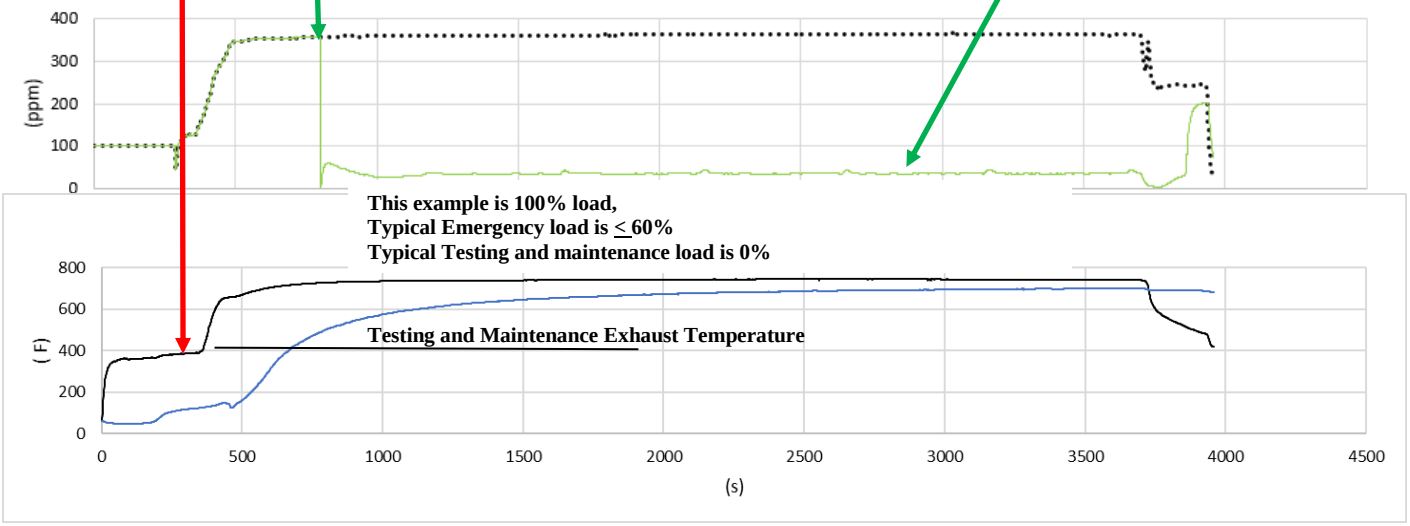
## Emergency Engine Operation of a Caterpillar C-175 3 MW Non-Emergency Engine (Tier 4)

This example is representative of typical aftertreatment equipped engines above and below 560 kW at 100% load with extended high idle at startup that represents typical testing and maintenance.

**Typical Testing and Maintenance interval**. NOx sensor is not operating initially, and emissions are represented by the black line for the duration. SCR does not activate during entire test. Mass flow is very low due to no electrical power output. Tier 4 not achieved in practice due to low catalyst inlet temperature over the duration (400 F). Engine operates at high idle (1800 rpm). ***Test periods range from 5-60 minutes.***

**Typical Emergency Interval**. Load is typically 60% max load making interval longer in practice. Startup is significant portion of operating interval. Reducing warmup interval increases GHG emissions. Tier 4 not achieved in practice over this entire operating cycle as catalyst temp remains low for a significant portion of the emergency

**Typical Tier 4 Non-Emergency Operation**. Startup emissions are negligible; SCR activates at higher loads and temperatures. Tier 4 achieved in practice



# Attachment C
## BACT Comments and Responses

Truck & Engine Manufacturers Association®
Bringing Clean Power to the World™

333 West Wacker Drive, Suite 810
Chicago, Illinois, 60606
Tel/Fax: (312) 929-1970
www.truckandenginemanufacturers.org

April 29, 2021

**VIA E-MAIL (aroberts@airquality.org)**

Amy Roberts
Manager, Stationary Sources Division
Sacramento Metropolitan Air Quality Management District
777 12th Street, Suite 300
Sacramento, California 95814

**Re: Proposed Revised BACT Determination (SMAQMD Rule 202, §205.1) for Emergency Diesel IC Engines: BACT #281**

Dear Ms. Roberts:

I am writing on behalf of the Truck and Engine Manufacturers Association ("EMA") regarding the notice that the Sacramento Metropolitan Air Quality Management District (SMAQMD) issued proposing to change the BACT determination (BACT #281) for emergency diesel IC engines ("Emergency Diesel Engines"). Specifically, the SMAQMD is proposing to determine that BACT for Emergency Diesel Engines rated at above 1,000 horsepower will be EPA's Tier 4 aftertreatment-forcing emission standards – standards that require the use of selective catalyst reduction (SCR) systems to reduce $NO_x$ emissions, and diesel particulate filters (DPFs) to control PM emissions.

By way of background, EMA is the trade association that represents the world's leading manufacturers of internal combustion engines used in all applications other than passenger cars and aircraft. Included among the wide array of engine products manufactured by EMA members are all power ranges of stationary engines, including Emergency Diesel Engines. EMA regularly represents its members in developing and commenting on federal, state and local regulations relating to engine-emissions standards, and, as a result, EMA has a direct and significant interest in this matter. In that regard, an Emergency Diesel Engine frequently is just a small component of a larger construction project and, consequently, the end-users of Emergency Diesel Engines may not be aware of the full ramifications of a proposed revised BACT determination until after the fact when a construction project is underway. Engine manufacturers are better suited and positioned to appreciate how revised BACT requirements could impact the broad range of applications for Emergency Diesel Engines, the primary purpose of which is to support and maintain life and safety when emergencies arise. EMA members manufacture and sell both Tier 4 and emergency-use only engines. EMA's goal in submitting these comments is to try to ensure that end-users retain the ability to specify and select the right engine for the right application with the appropriate emissions controls.

The premise for the SMAQMD's revised BACT proposal is that Tier 4 technologies have been deployed for Emergency Diesel Engines at a handful of sites in the U.S., and thus, Tier 4

standards have been "achieved in practice." But that is not actually the case. The fact that SCR and DPF systems have been installed on one or two Emergency Diesel Engines in the field does not mean that those engines actually and consistently achieve Tier 4 emission limits when in operation. To the contrary, the limited operating times, loads and exhaust temperatures that are inherent to how Emergency Diesel Engines typically operate – e.g., during very brief start-up and maintenance tests – necessarily means that the exhaust streams from those engines likely will not reach the high $NO_x$-conversion and light-off temperatures required to achieve emissions performance reflective of actual Tier 4 emission limits. Consequently, it has **not** been established that Tier 4 emission limits – as opposed to the installation of Tier 4 aftertreatment systems – have been "achieved in practice."

SMAQMD Rule 202 (at Section 205.1) establishes the relevant criteria for determining BACT, and includes two alternatives: (a) BACT reflects the most effective emission reduction devices and limits "demonstrated to be achievable in practice;" or (b) an alternative emission-control device or technique "determined to be technologically feasible and cost-effective." In this case, the first of the alternative definition of BACT has not been met because, as noted, the AQMD has not established (and cannot demonstrate) that Emergency Diesel Engines consistently meet Tier 4 standards during their expected patterns of operation. Accordingly, the SMAQMD should not be relying on the first alternative definition of BACT under Rule 202. That said, the second alternative definition of BACT is equally problematic, since there is no basis for assuming that a BACT requirement for Tier 4 aftertreatment-equipped Emergency Diesel Engines — engines which operate, on average, less than 40 hours per year — could ever meet the BACT cost-effectiveness thresholds.

It is our understanding that the SMAQMD's proposal to revise BACT #281 is based on one or two specific BACT determinations made by the South Coast AQMD and by the Bay Area AQMD. Those referenced BACT determinations, however, are not appropriate benchmarks, since it has not been established that the relevant emissions from those particular installations of Emergency Diesel Engines actually achieved and maintained Tier 4 emission levels. In fact, as noted above, operating loads and temperatures generally are not sufficient to achieve the targeted $NO_x$ conversion rates and catalyst regenerations required to reduce emissions to Tier 4 levels. The net result is that even if the emergency engines at those referenced locations were equipped with SCR and DPF systems, those engines likely did not actually achieve Tier 4 emission levels "in practice." Indeed, we are not aware of any consistent site testing of emergency engines that establishes that the Tier 4 emission limits are met during all testing and other short-term operation of emergency engines.

This is a significant fact, since EPA Region IX has stated that "the successful operation of a new control technology [i.e., operation in a manner that successfully meets the targeted BACT emission standards] **for six months** constitutes achieved in practice." (See CAPCOA BACT Clearinghouse Manual, Section B.) (Emphasis added.) No such "achieved in practice" determination has been or can be made for Emergency Diesel Engines.

Significant as well, the cited example from the Bay Area AQMD is not a typical Emergency Diesel Engine installation, but rather represents a unique siting problem that triggered "fenceline" air toxics concerns – not criteria pollutant issues – and that was resolved, presumably in agreement with the impacted community, through the installation of Tier 4

aftertreatment systems. Accordingly, that installation does not establish that it is appropriate to require that all Emergency Diesel Engines utilize Tier 4 aftertreatment technologies without regard to cost-effectiveness or whether the applicable Tier 4 emission limits are actually achieved in practice by emergency engines that operate for such limited amounts of time.

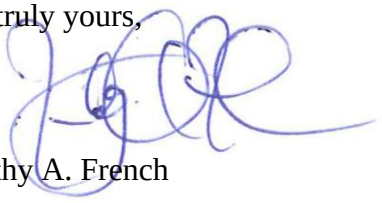
Because of the foregoing issues, EPA's New Source Performance Standards (NSPS) expressly provide that the Agency's Tier 2 standards apply to emergency IC engines above 750 hp, and that the Tier 3 standards apply to emergency IC engines rated at 75-750 hp. Similarly, CARB's stationary engine ATCM, as well as various other District stationary engine rules, specifically exempt Emergency Diesel Engines from having to meet EPA's Tier 4 standards, provided that the emergency engines are used exclusively to preserve or protect property, human life, or public health during an emergency power outage, and further provided that the emergency engines operate no more than 50 hours per year in non-emergency situations, such as during required periodic engine testing. BACT #281 should be revised to conform with the relevant NSPS, and State and local regulations pertaining to Emergency Diesel Engines.

There are multiple compelling reasons for not requiring that Emergency Diesel Engines meet EPA's final Tier 4 emission standards. As noted, those standards require the use of expensive diesel particulate filters (DPF) to control PM, and selective catalytic reduction (SCR) systems to reduce $NO_x$ emissions. That is a significant concern in the context of emergency engines, however, since there is the potential that the SCR systems can cause those engines to derate or even shutdown in the event of a system malfunction or a lack of DEF fluid, which could raise a number of concerns, particularly during an actual emergency. Additionally, the inherently limited use of emergency engines, which usually only operate for just minutes at a time during routine readiness testing, means (again) that those engines typically will not achieve the exhaust and catalyst temperatures required for the effective operation of SCR systems. In that regard, a significant load on an SCR-equipped engine is necessary to get the $NO_x$ catalyst up to a high enough temperature to begin controlling $NO_x$ in an effective and efficient manner. But emergency engines generally are only run during periodic maintenance tests, and even then only for 15 – 30 minutes at very light loads, which means that the SCR temperatures will be too low for effective $NO_x$ control. A white paper prepared by Caterpillar explains these technical points in additional detail, and is attached hereto. Of note, that same white paper is included as Attachment B to the SMAQMD's BACT proposal.

Since Emergency Diesel Engines do not and cannot actually and consistently achieve Tier 4 emission limits in practice, the second alternative definition of BACT comes into play, which raises the question of whether Tier 4 aftertreatment systems are technologically feasible and cost-effective for across-the-board application to Emergency Diesel Engines. They are not. There is a very significant cost-premium for Tier 4 engine configurations, which can cost anywhere from 35% - 60% more compared to the non-Tier-4 emergency engines required under EPA's NSPS and CARB's stationary engine ATCM. That purchase-price cost-premium does not include the extra costs for increased engine-room size, added maintenance, DEF tank systems and fluid, plumbing, electrical alarms, and other aftertreatment-related expenses, all of which would need to be included in a BACT cost-effectiveness analysis. Consequently, given emergency engines' inherently limited potential to emit (i.e., typically only during maintenance and start-up readiness tests), the significant cost differential for a Tier-4-compliamt precludes a determination that the Tier 4 standards should be BACT for all Emergency Diesel Engines.

Accordingly, and for all the foregoing reasons, EMA respectfully requests that the District revise BACT #281 to clarify that Emergency Diesel Engines rated at or above 1000 hp should meet EPA's Tier 2 standards, not EPA's Tier 4 standards.

Very truly yours,



Timothy A. French

cc: Venk Reddy (vreddy@airquality.org)
bactdeterminations@airquality.org
EMA Stationary Engine Committee

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

June 11, 2021

Mr. Timothy A. French
333 West Wacker Drive, Suite 810
Chicago, IL 60606

Subject: Proposed BACT Determination for Emergency Diesel Standby Engines (BACT 281)

Dear Mr. French:

Thank you for submitting comments on the Sacramento Metropolitan Air Quality Management District's (District) proposed Best Available Control Technology (BACT) determination for emergency standby diesel engines (BACT 281). We have reviewed your comment letter and would like to respond and provide information on the District's rationale for proceeding with the standards as outlined in the draft BACT determination.

**Achieved in Practice**

In your letter, you indicated Tier 4 technology is not achieved in practice for various reasons. We disagree. In developing BACT 281, we followed our District rule requirements and standard evaluation practices to make this determination. To elaborate, District Rule 202 (Section 205.1 (a)) states BACT is "… the most effective emission control device, emission limit, or technique, singly or in combination, which has been required or used for the type of equipment comprising such an emissions unit…." This requirement is what is commonly referred to as "achieved in practice" and is the first criterion that must be assessed in any BACT determination process. If the achieved in practice criteria has been met, the District must require that technology for similar applications. The District evaluates several factors when determining if a particular technology has been achieved in practice.

First, we evaluate whether the control technology has been required or used on equipment with the rating, capacity, and intended use or application, in this specific case, Tier 4 engine standards for emergency diesel standby engines at 1,000 hp or above. We do so by reviewing federal, state and local air district BACT determinations and rule requirements. We found many instances where Tier 4 technology has been installed.

- The California Air Resources Board (CARB) identified nationally over 150 installations of emergency engines at or above 1,000 hp that were either Certified Tier 4 or had necessary control technology to achieve equivalent Tier 4 standards (see enclosed documents).
- The Bay Area Air Quality Management District (BAAQMD) identified three installations in their District and a fourth installation in Washington for multiple engines that met this same technology criteria.
- District staff identified at least one other installation of multiple Tier 4 engines in Nevada.

These installations were all emergency diesel standby engines and were used at a variety of different industries (e.g., data centers, wastewater treatment plants, pumping stations, manufacturing, etc.). Therefore, the “achieved in practice” criterion has been met.

Second, the District must determine whether the emission unit is commercially available. EPA certified engines are manufactured and made available by large companies like Caterpillar and Cummins. There is no reasonable case to be made that Tier 4 engines for stationary and emergency applications are not commercially available and therefore this criterion is also met. For engines that must be retrofitted to meet Tier 4 equivalent standards, add-on aftertreatment controls are also commercially available and have already been installed on other standby engines as noted above.

Third, the control technology must have been installed and operated reliably for at least 180 days at one commercial facility. The Tier 4 final standard for new manufactured engines was phased-in over the period of 2008 - 2015. CARB has identified emergency standby engine installations dating as far back as 2012 (see enclosed documents). The installations in the Bay Area were from as far back as 2016. The engines in Washington were installed in 2015 and permitted in 2017 and the engines installed in Nevada were installed in 2017 and 2018. The BAAQMD have stated that the engines referenced in their BACT determination have been operating reliably and there is no other information to suggest Tier 4 technology being used in emergency engine applications has not performed reliably.

Lastly, the control technology must: (1) be verified to perform effectively over the range of operation expected for that class and category of source and (2) that verification will be based on a performance test or tests, when possible, or other performance data. We’ll speak to the first part of this element and address your stated concern that Tier 4 technology is not appropriate for emergency standby applications because these engines operate at low load, start-up conditions in which certified emission standards will not be realized. As you are aware, the Tier 4 standards are based on the weighted average of a multi-mode operational test. It is not expected that an engine will meet the Tier 4 NOx standard during any and all operation as it relies on catalytic reactions that require sufficient temperature, but rather that it will do so under specific load conditions as part of the compliance certification test. The higher NOx emissions prior to full catalyst activation is not new information. It is well established that the behavior is inherent in all applications of catalytic control of combustion emissions including on-road vehicles and the reason CARB and EPA are in pursuit of more stringent NOx standards based on updated compliance test duty cycles. Notwithstanding the higher, but short-lived NOx emissions prior to SCR catalyst activation, large NOx emission reductions will nonetheless be achieved when the engine reaches proper temperatures during longer maintenance runs. Importantly, Tier 4 controls will yield significantly lower NOx emissions during emergency operation, which can be substantial in length. Another aspect of a Tier 4 engine is the much lower particulate matter emissions. Since the control of carcinogenic particulate matter emission relies on diesel particle filtration, a Tier 4 engine is expected to have fully functioning DPF control over all operational conditions, even during the cold start, low-load conditions. Regarding the basis of the verification in the second part of this requirement, for any certified engine that is installed, the District relies on the certification testing performed for the particular engine family. For Tier 4 equivalent engines, these would be required to pass an emissions test to satisfy the verification element referenced above. The engine installation in Washington referenced by the BAAQMD BACT determination was tested utilizing the D2 cycle and met the Tier 4 emission requirement.

In summary, the District has determined that there have been many installed and operational emergency standby engines equipped with Tier 4 certified or equivalent technology, and at least one of

these has met *all* criteria used by the District to determine a technology is achieved in practice. The fact that emergency standby engines using Tier 4 technology have been installed, tested and used at facilities in and outside of California is the decisive factor in requiring Tier 4 engines in our BACT determination.

**Technologically Feasible & Cost Effectiveness**

The District acknowledges Tier 4 engines are more costly in comparison to lower Tier engines. However, cost analysis is not considered during the BACT determination process if technology has been demonstrated to be achieved in practice. The District is only required to evaluate and confirm technological feasibility and cost effectiveness for a given technology if the District is requiring technology that is going above and beyond what is currently achieved in practice (i.e., more stringent technology). Since the District determined Tier 4 certified or Tier 4 equivalent engines are achieved in practice in accordance with District procedures, cost effectiveness thresholds are not required to be considered.

**Federal & State Requirements**

The current EPA and CARB standards for emergency standby engines were promulgated several years ago and presumably considered cost among other factors in setting those standards. However, BACT is justifiably and often more stringent than state and federal regulations. BACT is the legal mechanism by which incremental air quality improvement is made over time. By design, it allows newer and cleaner technology to be required irrespective of regulatory mandates in place at federal, state and local levels. In this case, the emission reductions achieved by using Tier 4 engines, especially during longer emergency operations, are significant. BACT ensures that as technology becomes available or is at a reasonable cost point, that it be required to be used and allow for continual air quality improvements. Though a BACT determination is required by a District rule, a BACT determination is not a rule and as such is governed by the definition of BACT along with the District's implementation procedures regarding this definition. In this case, Tier 4 certified or Tier 4 equivalent engines in accordance with the District's achieved in practice criteria outlined above has been met.

We appreciate the time EMA has taken to comment on our BACT determination. We understand Tier 4 technology is yet to become ubiquitous in the emergency standby engine sector. However, given it has been demonstrated in numerous locations and industry applications, it is clear that our Tier 4 requirement is the only sensible outcome. Therefore, our District will proceed with the BACT standards detailed in the originally released determination (BACT 281). Please feel free to contact me should you have further questions at aroberts@airquality.org or (916) 825-6840.

Sincerely,

*Amy L. Roberts*

Amy Roberts
Division Manager

cc: Eric Guerra, Council Member, City of Sacramento and Chair, SMAQMD
Patrick Kennedy, Supervisor, Sacramento County and Vice-chair, SMAQMD
Alberto Ayala, Executive Director and Air Pollution Control Officer, SMAQMD
Kathy Pittard, Legal Counsel, SMAQMD
Brian Krebs, Program Manager, SMAQMD

Enclosures (2): California Air Resources Board Comments – Sequoia Data Center
California Air Resources Board Comments – Tier 4 BACT Comment Letter_CARB to SMAQMD 20210528

CALIFORNIA ASSOCIATION of SANITATION AGENCIES
1225 8th Street, Suite 595• Sacramento, CA 95814 • TEL: (916) 446-0388 •
www.casaweb.org

April 30, 2021

Venk Reddy
Sacramento Metropolitan Air Quality Management District
777 12th Street, 3rd Floor
Sacramento, CA 95814

Transmitted online email:
bactdeterminations@airquality.org

Re: California Association of Sanitation Agencies Comments on the Sacramento Metropolitan Air Quality Management District's New Best Available Control Technology Determination for Diesel-Fueled Emergency Standby Internal Combustion Engines Greater Than or Equal to 1,000 bhp (#281)

To Whom it May Concern:

The California Association of Sanitation Agencies (CASA) appreciates this opportunity to comment on the proposed New Best Available Control Technology (BACT) determination for diesel-fueled emergency standby internal combustion engines ≥1,000 bhp. CASA is an association of local agencies providing essential public services and engaged in advancing the recycling of wastewater into usable water, as well as the generation and use of renewable energy, biosolids, and other valuable resources. Through these efforts we help create a clean and sustainable environment for Californians.

Our members are also focused on helping the State achieve its 2030 mandates and goals for greenhouse gas emissions reductions, which include:

- Reducing short-lived climate pollutant (SLCP) emissions
- Effectively diverting organic waste from landfills
- Providing 60 percent of the State's energy needs from renewable sources
- Reducing carbon intensity of transportation fuel used in the State
- Increasing soil carbon and carbon sequestration under the Healthy Soils Initiative, Forest Carbon Plan, and Natural and Working Lands Climate Change Implementation Plan

As fellow dedicated environmental stewards and essential public service providers, CASA members provide reliable wastewater treatment to protect public health and the environment, as well as strive to exceed air district requirements. We recognize and support the need to manage criteria air pollutants and toxic air contaminants while maintaining essential public services.

The following text provides CASA's comments specific to the draft determination.

***Basis for the New BACT Determination is Unclear.***
The SMAQMD originally determined Tier 4 engines not to be achieved in practice based on two installations within the District. Yet, a determination of Tier 4 engines as BACT was made based on the Bay Area Air Quality Management District's (BAAQMD's) recent determination. Unfortunately, BAAQMD used different criteria than would be used by SMAQMD and their determination is based solely on installations and not the actual engine operation representative of an emergency event.

In addition to SMAQMD's original finding (that Tier 4 engines are not achieved in practice), two other air districts have made similar findings:

1. The San Joaquin Valley Air Pollution Control District (SJVUAPCD) justified the use of a lower tier engine as a backup power source, stating that Tier 4 is not yet a technologically feasible option for critical loads (Project S-1203544, Facility S-9416, November 16, 2020) provided by facilities serving essential functions (e.g., health care facilities, building lighting, data backup, fire pumps, water transmission, hospital operations, sewage pumping).
2. We understand the South Coast Air Quality Management District (SCAQMD) has permitted a Tier 4 emergency diesel generator at a hospital and permitting staff agreed that merely installing such a device did not prove it was "achieved-in-practice." The SCAQMD required the generator to be run for an extended duration to verify the unit would function as intended. It has been several years and, to our knowledge, SCAQMD has not yet determined it as achieved-in-practice.

CASA strongly recommends:

- Essential public services, including wastewater collection and treatment, be exempt from implementing the new BACT determination until proof of operational reliability of Tier 4 engines in a prolonged emergency event is available and documented.
- The Air District collect and provide operational proof that the BACT determination for diesel back-up engines greater than or equal to 1,000 bhp ensures operational reliability of Tier 4 engines during actual prolonged (i.e., greater than 200 hours) emergency situations (to be deemed "achieved-in-practice"). Additionally, SMAQMD should coordinate with BAAQMD, SJVAPCD, SCAQMD, and other air districts to determine whether this technology has truly been "achieved-in-practice" for the unique nature of POTWs and other essential public services that must function reliably in any emergency.

***Essential Public Services (such as Hospitals, Water and Wastewater Systems) Must be Supported by Reliable Backup Power.***

We have learned that the advanced technology used in certified Tier 4 emergency diesel engines is prone to failure during an extended emergency – for example, when the engine senses the urea level being depleted it triggers an automatic shutdown, which is an anticipated condition during Public Safety Power Shutoff events for the prevention of wildfire or other emergency situations where the grid power is unavailable for days at a time (as was the case in February of 2021 during the polar vortex across the US). Accordingly, we do not have confidence in the new BACT determination being "achieved-in-practice" without the data supporting the determination.

CASA recommends that stationary engines used for emergency power for essential public services be regulated differently than stationary engines used for prime power and aligned with existing EPA and CARB emergency engine regulations to ensure reliable service during emergency events. Specifically, CASA recommends that essential public services be exempt from implementing the new BACT determination until proof of operational reliability of Tier 4 engines in a prolonged emergency event is available and documented. We also recommend that air districts consider creating an essential public service subcategory for BACT determinations, where reliability of the technology could be considered to ensure public health and safety is not impaired (e.g., emergency power for hospitals and wastewater treatment facilities).

We want to thank SMAQMD for engaging the public early in the process and we greatly appreciate the opportunity to comment on the new BACT determination for diesel-fueled emergency standby internal combustion engines ≥1,000 bhp. Please contact me at sdeslauriers@carollo.com if you have any questions.

Sincerely,

Sarah A. Deslauriers, P.E., ENV SP
Climate Change Program Manager, CASA

cc: Adam Link, CASA Executive Director
Greg Kester, CASA Director of Renewable Resources
Debbie Webster, CVCWA Executive Director

SACRAMENTO METROPOLITAN

AIR QUALITY
MANAGEMENT DISTRICT

June 11, 2021

Ms. Sarah Deslauriers
Climate Change Program Manager
1225 8th St., Suite 595
Sacramento, CA 95814

Subject: Proposed BACT Determination for Emergency Diesel Standby Engines (BACT 281)

Dear Ms. Deslauriers:

Thank you for submitting comments on the Sacramento Metropolitan Air Quality Management District's (District) proposed Best Available Control Technology (BACT) determination for emergency standby diesel engines (BACT 281). We have reviewed your comment letter and would like to respond and provide information on the District's rationale for proceeding with the standards as outlined in the draft BACT determination.

**Achieved in Practice**

In your letter, you indicated that the basis for this BACT determination is unclear and that the achieved in practice determination of the Bay Area was different. In developing BACT 281, we followed our District rule requirements and standard evaluation practices to make this determination. To elaborate, District Rule 202 (Section 205.1 (a)) states BACT is "… the most effective emission control device, emission limit, or technique, singly or in combination, which has been required or used for the type of equipment comprising such an emissions unit…." This requirement is what is commonly referred to as "achieved in practice" and is the first criterion that must be assessed in any BACT determination process. If the achieved in practice criteria has been met, the District must require that technology for similar applications. The District evaluates several factors when determining if a particular technology has been achieved in practice.

First, we evaluate whether the control technology has been required or used on equipment with the rating, capacity, and intended use or application, in this specific case, Tier 4 engine standards for emergency diesel standby engines at 1,000 hp or above. We do so by reviewing federal, state and local air district BACT determinations and rule requirements. We found many instances where Tier 4 technology has been installed:

- The California Air Resources Board (CARB) identified nationally over 150 installations of emergency engines at or above 1,000 hp that were either Certified Tier 4 or had necessary control technology to achieve equivalent Tier 4 standards (see enclosed documents).
- The Bay Area Air Quality Management District (BAAQMD) identified three installations in their District and a fourth installation in Washington for multiple engines that met this same technology criteria.
- District staff identified at least one other installation of multiple Tier 4 engines in Nevada.

These installations were all emergency diesel standby engines and were used at a variety of different industries (e.g., data centers, wastewater treatment plants, pumping stations, manufacturing, etc.). Therefore, the "achieved in practice" criterion has been met.

Second, the District must determine whether the emission unit is commercially available. EPA certified engines are manufactured and made available by large companies like Caterpillar and Cummins. There is no reasonable case to be made that Tier 4 engines for stationary and emergency applications are not commercially available and therefore this criterion is also met. For engines that must be retrofitted to meet Tier 4 equivalent standards, add-on aftertreatment controls are also commercially available and have already been installed on other standby engines as noted above.

Third, the control technology must have been installed and operated reliably for at least 180 days at one commercial facility. The Tier 4 final standard for new manufactured engines was phased-in over the period of 2008 - 2015. CARB has identified emergency standby engine installations dating as far back as 2012 (see Attachment 1). The installations in the Bay Area were from as far back as 2016. The engines in Washington were installed in 2015 and permitted in 2017 and the engines installed in Nevada were installed in 2017 and 2018. The BAAQMD have stated that the engines referenced in their BACT determination have been operating reliably and there is no other information to suggest Tier 4 technology being used in emergency engine applications has not performed reliably.

Lastly, the control technology must: (1) be verified to perform effectively over the range of operation expected for that class and category of source and (2) that verification will be based on a performance test or tests, when possible, or other performance data. We'll speak to the first part of this element and address your stated concern that Tier 4 technology is not proven reliable for emergency standby applications. As mentioned above, Tier 4 engines have been installed and operated in emergency standby service since at least 2012. They have been installed in a variety of industries including essential public services such as wastewater treatment plants, water transmission, and hospitals. In addition, though not stationary, Tier 4 emission control have been implemented in California for every new diesel on-road heavy-duty engine since 2010 and every off-road engine since 2015. Regarding the basis of the verification in the second part of this requirement, for any certified engine that is installed, the District relies on the certification testing performed for the particular engine family. For Tier 4 equivalent engines, these would be required to pass an emissions test to satisfy the verification element referenced above. The engine installation in Washington referenced by the BAAQMD BACT determination was tested utilizing the D2 cycle and met the Tier 4 emission requirement.

In summary, the District has determined that there have been many installed and operational emergency standby engines equipped with Tier 4 certified or equivalent technology, and at least one of these has met *all* criteria used by the District to determine a technology is achieved in practice. The fact that emergency standby engines using Tier 4 technology have been installed, tested and used at facilities in and outside of California is the decisive factor in requiring Tier 4 engines in our BACT determination.

**Exempt Essential Public Services**

As discussed above, Tier 4 certified or equivalent engines have been installed and have operated reliably in many industry sectors. The Bay Area AQMD has identified four Tier 4 certified engines that are installed at the San Jose-Santa Clara Regional Wastewater facility since 2016. The list of other identified engines include installations at other Essential Public Service (EPS) facilities. Therefore, Tier 4 technology

has been shown to be achieved in practice at EPS facilities and the BACT determination is applicable to this sector as well.

We appreciate the time the California Association of Sanitation Agencies has taken to comment on our BACT determination. We understand Tier 4 technology is yet to become ubiquitous in the emergency standby engine sector. However, given it has been demonstrated in numerous locations and industry applications, the Tier 4 requirement is the only sensible outcome. Therefore, our District will proceed with the BACT standards detailed in the originally released determination (BACT 281). Please feel free to contact me should you have further questions at aroberts@airquality.org or (916) 825-6840.

Sincerely,

*Amy L. Roberts*

Amy Roberts
Division Manager

cc: Eric Guerra, Council Member, City of Sacramento and Chair, SMAQMD
Patrick Kennedy, Supervisor, Sacramento County and Vice-chair, SMAQMD
Alberto Ayala, Executive Director and Air Pollution Control Officer, SMAQMD
Kathy Pittard, Legal Counsel, SMAQMD
Brian Krebs, Program Manager, SMAQMD

Enclosures (2): California Air Resources Board Comments – Sequoia Data Center
California Air Resources Board Comments – Tier 4 BACT Comment Letter_CARB to SMAQMD 20210528

City of SACRAMENTO
Department of Utilities

April 30, 2021

Sacramento Metropolitan Air Quality Control Management District
777 12th Street, 3rd Floor
Sacramento, CA 95814
ATTN: Venk Reddy

via email: bactdeterminations@airquality.org

**Subject: Comment Letter – Proposed BACT determination: BACT #281 – I.C. Engine, Emergency Standby, Diesel Fueled**

To Whom It May Concern,

Thank you for the opportunity to comment on the proposed BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled, released on March 31, 2021. The City of Sacramento Department of Utilities (City) appreciates the efforts that the Sacramento Metropolitan Air Quality Management District (SMAQMD) is making toward cleaner air resources for our region. The City recognizes that there are regional improvements to me made, however, the City has some concerns to relay.

This letter will address the following areas of concern:

- The need for clear definitions.
- The for a phased implementation approach.
- Significant cost of compliance.
- Unjustifiable benefit/cost.

**The City is committed to ensuring public health and safety, but clarity is needed.** The City works to ensure that our systems comply with all existing laws and regulations. When new regulations are made, or existing regulations are updated, they must be clear and concise. In the proposed BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled, released on March 31, 2021, there is mention of "sensitive aeras", but there is no definition of what qualifies as a "sensitive area." Depending on the definition, this could impose significant, unplanned costs for compliance. Therefore, the City requests that SMAQMD develop a clear definition be written into the regulation.

**The City recommends a phased approach to allow for appropriate financial planning as well as cost effective design and engineering of compliant units.** The City and our regional partners understand that change is inevitable. As we work toward combating climate change and environmental justice issues in our region, we understand that the only constant is change. However, as a public agency, we are required to be the best possible stewards of our financial resources amongst many other things. Because of this, we find that there should be a phased in approach, rather than all changes happening at once. By utilizing a phased in approach, it will allow for public agencies to budget for these costly changes, but also allow for the design and manufacturing sector who operates in the generator space to design and value engineer units that are able to meet the new requirements at the most reasonable costs. The City finds that grace periods such as those offered by new requirements imposed by the California Air Resources Board (CARB) are beneficial for public agencies to appropriately plan for the upcoming changes.

A brief example of this could be that the new regulation would state that *"…starting January 1, 2025, all new emergency standby diesel fueled generators greater than 1,000HP will meet Tier 4 emission regulations…"* By not having a phased in approach with a reasonable lead time not only allows for the previously mentioned design updates from industry, but also allows public agencies to avoid significant additional costs to projects that are just getting under way or have already been budgeted. Public agencies will also be able to appropriately plan additional costs into their Capital Improvement Plans and determine if rate adjustments are necessary; a process that can take multiple years.

**The BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled carries significant additional costs.** There are serious cost and design implications associated with Tier 4 engines with aftertreatment systems. These units require more building space, which may not be available due to space constraints at the site. There are floor loading considerations to take into account for the engine, urea tank, and control systems. If existing floors are inadequate to accommodate a new unit, demolition, design, and construction of new facilities adds considerable costs. These added costs can be further exasperated by the potential need for increased structural supports, plumbing, electrical and exhaust ducts if they are required. Lastly, load banks or supplemental exhaust heat may be needed to ensure proper engine loading to prevent Diesel Particulate Filter (DPF) plugging. This not only increases fuel consumption, but also contributes to increased greenhouse gas emissions. Costs for Tier 4 diesel engine generators, installation of necessary additional design requirements, and increased maintenance will run as much as 60% to over 100% more than the standard emergency Tier 2 and Tier 3. Furthermore, there is a requirement to conduct D2 Cycle testing, which carries significant expense, to ensure the generator in fact meets all new Tier 4 requirements. These cumulative costs, for engines that typically operate far below stringent State or Federal hour limits, will far exceed cost-effectiveness ($/ton reduced) for engine emission regulation to Tier 4 levels.

**The BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled carries unjustifiable benefit/cost to public agencies.** The U.S. EPA has determined that the use of aftertreatment devices such as Selective Catalytic Reduction (SCR) and DPF's are not justified based on cost effectiveness ($/ton reduced) for emergency diesel engines in both the New Source Performance Standards (NSPS) regulations for new engines[1] and in the regulation of hazardous air pollutants from new and existing engines[2]. These regulations require the engines to meet 2007 emissions standards (Tier 3 for 75 HP to 750 HP, and Tier 2 for engines greater than 750 HP). Furthermore, in 2011, California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) agreed with EPA's reasoning and aligned with EPA regulations to also allow this stationary emergency engine exemption, excepting CARB adopted a 0.15 g/bhp-hr particulate matter (PM) for engines less than 175 HP. The City

[1] United States Environmental Protection Agency, 'New Source Performance Standards for Stationary Compression Ignition Internal Combustion Engines', *United States Environmental Protection Agency*, 40 CFR Part 60 Subpart IIII, https://www.epa.gov/stationary-engines/new-source-performance-standards-stationary-compression-ignition-internal-0

[2] United States Environmental Protection Agency, 'National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines', *United States Environmental Protection Agency*, NESHAP, 40 CFR 63 Subpart ZZZZ, https://www.epa.gov/stationary-engines/national-emission-standards-hazardous-air-pollutants-reciprocating-internal-0

finds these measures to be acceptable for emergency generators and asks the SMAQMD to maintain these existing standards.

The City recommends that the SMAQMD align with other regional air quality management districts in California that limit emergency engines to 200 hours total /year which minimizes the modeled and realistic potential emissions in the airshed as an alternative to adding costly controls to engines that run on average less than 50 hrs./year. Limiting testing and maintenance to non-ozone forming hours of the day will also mitigate emissions impact notwithstanding facility constraints that may apply. The City also recommends that the SMAQMD align their BACT for emergency diesel engines with the U.S. EPA and CARB regulations requiring Tier 2 above 560 bkW and Tier 3 below 560 bkW, as Tier 4 emissions levels will not be achieved in practice, are not cost effective and may compromise safety for stationary emergency diesel applications. Stationary engines used for emergency power should be regulated differently than stationary engines used for prime power and aligned with existing EPA and CARB emergency engine regulations.

As way of background, the City delivers about 37 billion gallons of potable water per year. Our one-half million customers are in a 100 square-mile service area in Sacramento, and we are located at the confluence of two major rivers, the American and the Sacramento. Our water system includes two water treatment plants, many storage reservoirs, groundwater wells, and approximately 1,700 miles of pipeline. The City is one large pressure zone operating at 45 psi., with the exception of one small secondary pressure zone (about 1% of our geographic area) that is equipped with an inline booster pump to bring water from the remainder of the system. Additionally, the City manages the conveyance of all wastewater in our service are to the Regional San Sacramento Regional Wastewater Treatment Plant near Elk Grove as well as stormwater management.

The City of Sacramento Department of Utilities thanks you for considering our comments for the proposed BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled. We look forward to continuing to working with the Sacramento Metropolitan Air Quality Management District towards practical and mutually beneficial regulation.

Sincerely,

William Busath
William Busath (Apr 27, 2021 09:14 PDT)

William O. Busath
Director of Utilities
City of Sacramento
(916) 808-1434 | bbusath@cityofsacramento.org

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

June 11, 2021

Mr. William Busath
City of Sacramento Department of Utilities
1395 35th Avenue
Sacramento, CA 95822

Subject: Proposed BACT Determination for Emergency Diesel Standby Engines (BACT 281)

Dear Mr. Busath:

Thank you for submitting comments on the Sacramento Metropolitan Air Quality Management District's (District) proposed Best Available Control Technology (BACT) determination for emergency standby diesel engines (BACT 281). We have reviewed your comment letter and would like to respond and provide information on the District's rationale for proceeding with the standards as outlined in the draft BACT determination.

**Need Sensitive Areas Definition Clarified**

The BACT determination does not use the term *Sensitive Areas*. However, it does reference *Sensitive Receptors* when summarizing the requirements of South Coast Air Quality Management District Rule 1470. Though the requirements of this rule are discussed as potential applicable requirements, no emission standards or requirements of this BACT determination were made because of Rule 1470. Therefore, no changes will be made to the BACT determination.

**Phased-in Approach of the BACT Determination**

A phased approach is sometimes utilized in prohibitory rules to allow time for existing sources and businesses to come into compliance with new air quality standards. This is not the case when making BACT determinations. By rule, the District must apply BACT to new equipment installations or modifications that will result in an emissions increase. The equipment must meet the cleanest standards determined to be achieved in practice, or even more stringent requirements that have been identified as technologically feasible and cost effective. There is no latitude for the District to consider a phased-in BACT determination as this is not allowed under the legal requirements of the BACT process.

**Added Cost for Tier 4 Technology & Cost Effectiveness**

In developing BACT 281, we followed our District rule requirements and standard evaluation practices to make this determination. To elaborate, District Rule 202 (Section 205.1 (a)) states BACT is "… the most effective emission control device, emission limit, or technique, singly or in combination, which has been required or used for the type of equipment comprising such an emissions unit…." This requirement is what is commonly referred to as "achieved in practice" and is the first criterion that must be assessed in any BACT determination process. If the achieved in practice criteria has been met, the District must require that technology for similar applications. The District evaluates several factors when determining if a particular technology has been achieved in practice.

First, we evaluate whether the control technology has been required or used on equipment with the rating, capacity, and intended use or application, in this specific case, Tier 4 engine standards for emergency diesel standby engines at 1,000 hp or above. We do so by reviewing federal, state and local air district BACT determinations and rule requirements. We found many instances where Tier 4 technology has been installed:

- The California Air Resources Board (CARB) identified nationally over 150 installations of emergency engines at or above 1,000 hp that were either Certified Tier 4 or had necessary control technology to achieve equivalent Tier 4 standards (see enclosed documents).
- The Bay Area Air Quality Management District (BAAQMD) identified three installations in their District and a fourth installation in Washington for multiple engines that met this same technology criteria.
- District staff identified at least one other installation of multiple Tier 4 engines in Nevada.

These installations were all emergency diesel standby engines and were used at a variety of different industries (e.g. data centers, wastewater treatment plants, pumping stations, manufacturing, etc.). Therefore, the “achieved in practice” criterion has been met.

Second, the District must determine whether the emission unit is commercially available. EPA certified engines are manufactured and made available by large companies like Caterpillar and Cummins. There is no reasonable case to be made that Tier 4 engines for stationary and emergency applications are not commercially available and therefore this criterion is also met. For engines that must be retrofitted to meet Tier 4 equivalent standards, add-on aftertreatment controls are also commercially available and have already been installed on other standby engines as noted above.

Third, the control technology must have been installed and operated reliably for at least 180 days at one commercial facility. The Tier 4 final standard for new manufactured engines was phased-in over the period of 2008 - 2015. CARB has identified emergency standby engine installations dating as far back as 2012 (see Attachment 1). The installations in the Bay Area were from as far back as 2016. The engines in Washington were installed in 2015 and permitted in 2017 and the engines installed in Nevada were installed in 2017 and 2018. The BAAQMD have stated that the engines referenced in their BACT determination have been operating reliably and there is no other information to suggest Tier 4 technology being used in emergency engine applications has not performed reliably.

Lastly, the control technology must: (1) be verified to perform effectively over the range of operation expected for that class and category of source and (2) that verification will be based on a performance test or tests, when possible, or other performance data. We’ll speak to the first part of this element. As mentioned above, Tier 4 engines have been installed and operated in emergency standby service since at least 2012. They have been installed in a variety of industries including essential public services such as wastewater treatment plants, water transmission, and hospitals. In addition, though not stationary, Tier 4 emission control technologies have been implemented in California for every new diesel on-road heavy-duty engine since 2010 and every off-road engine since 2015. Regarding the basis of the verification in the second part of this requirement, for any certified engine that is installed, the District relies on the certification testing performed for the particular engine family. For Tier 4 equivalent engines, these would be required to pass an emissions test to satisfy the verification element referenced above. The engine installation in Washington referenced by the BAAQMD BACT determination was tested utilizing the D2 cycle and met the Tier 4 emission requirement.

The District acknowledges Tier 4 engines are more costly in comparison to lower Tier engines. However, cost analysis is not considered during the BACT determination process if technology has been demonstrated to be achieved in practice. The District is only required to evaluate and confirm technological feasibility and cost effectiveness for a given technology if the District is requiring technology that is going above and beyond what is currently achieved in practice (i.e., more stringent technology). Since the District determined Tier 4 certified or Tier 4 equivalent engines are achieved in practice in accordance with District procedures, cost effectiveness thresholds are not required to be considered.

In summary, the District has determined that there have been many installed and operational emergency standby engines equipped with Tier 4 certified or equivalent technology, and at least one of these has met *all* criteria used by the District to determine a technology is achieved in practice. The fact that emergency standby engines using Tier 4 technology have been installed, tested and used at facilities in and outside of California is the decisive factor in requiring Tier 4 engines in our BACT determination.

**Federal & State Requirements**

The current EPA and CARB standards for emergency standby engines were promulgated several years ago and presumably considered cost among other factors in setting those standards. However, BACT is justifiably and often more stringent than state and federal regulations. BACT is the legal mechanism by which incremental air quality improvement is made over time. By design, it allows newer and cleaner technology to be required irrespective of regulatory mandates in place at federal, state and local levels. In this case, the emission reductions achieved by using Tier 4 engines, especially during longer emergency operations, are significant. BACT ensures that as technology becomes available or is at a reasonable cost point, that it be required to be used and allow for continual air quality improvements. Though a BACT determination is required by a District rule, a BACT determination is not a rule and as such is governed by the definition of BACT along with the District's implementation procedures regarding this definition. In this case, Tier 4 certified or Tier 4 equivalent engines in accordance with the District's achieved in practice criteria outlined above has been met.

We appreciate the time the City of Sacramento has taken to comment on our BACT determination. We understand Tier 4 technology is yet to become ubiquitous in the emergency standby engine sector. However, given it has been demonstrated in numerous locations and industry applications, the Tier 4 requirement is the only sensible outcome. Therefore, our District will proceed with the BACT standards detailed in the originally released determination (BACT 281). Please feel free to contact me should you have further questions at aroberts@airquality.org or (916) 825-6840.

Sincerely,

*Amy L. Roberts*

Amy Roberts
Division Manager

cc: Eric Guerra, Council Member, City of Sacramento and Chair, SMAQMD
Patrick Kennedy, Supervisor, Sacramento County and Vice-chair, SMAQMD
Howard Chan, City Manager, City of Sacramento

Hector Barron, Assistant City Manager – Public Works, Utilities, City of Sacramento
Alberto Ayala, Executive Director and Air Pollution Control Officer, SMAQMD
Kathy Pittard, Legal Counsel, SMAQMD
Brian Krebs, Program Manager, SMAQMD

Enclosures (2): California Air Resources Board Comments – Sequoia Data Center
California Air Resources Board Comments – Tier 4 BACT Comment Letter_CARB to SMAQMD 20210528

**Regional Water Authority**
*Building Alliances in Northern California*

5620 Birdcage Street
Suite 180
Citrus Heights, CA 95610

Tel: (916) 967-7692
Fax: (916) 967-7322
*www.rwah2o.org*



April 28, 2021

Mr. Venk Reddy
Sacramento Metropolitan Air Quality Control Management District
777 12th Street, 3rd Floor
Sacramento, CA 95814

via email: bactdeterminations@airquality.org

**Subject: Comment Letter – Proposed BACT determination: BACT #281 – I.C. Engine, Emergency Standby, Diesel Fueled**

Dear Mr. Reddy,

Thank you for the opportunity to comment on the proposed BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled, released on March 31, 2021. The Regional Water Authority (RWA) appreciates the efforts that the Sacramento Metropolitan Air Quality Management District (SMAQMD) is making toward cleaner air resources for our region. The RWA is a joint powers agency representing 20 public water suppliers in Sacramento, Placer, El Dorado, Yolo, and Sutter Counties. RWA's mission is to "serve, represent and align the interests of regional water providers and stakeholders for the purpose of improving water supply reliability, availability, quality and affordability." Collectively, our members provide water to nearly two million residents.

The RWA recognizes that there are regional improvements to me made, however, the RWA has some concerns to relay.

This letter will address the following areas of concern:

- The need for clear definitions.
- The for a phased implementation approach.
- Significant cost of compliance.
- Unjustifiable benefit/cost.

**The RWA is committed to ensuring public health and safety, but clarity is needed.**
Our members work to ensure that their systems comply with all existing laws and regulations. When new regulations are made, or existing regulations are updated, they must be clear and concise. In the proposed BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled, released on March 31, 2021, there is mention of "sensitive aeras", but there is no definition of what qualifies as a "sensitive area." Depending on the definition, this could impose significant, unplanned costs for compliance. Therefore, the RWA requests that SMAQMD develop a clear definition be written into the regulation.

**The RWA recommends a phased approach to allow for appropriate financial planning as well as cost effective design and engineering of compliant units.** The RWA's members understand that change is inevitable. As we work toward combating climate change and environmental justice issues in our region, we understand that the only constant is change. However, as a public agency, our members are required to be the best possible stewards of our financial resources amongst many other things. Because of this, we find that there should be a phased in approach, rather than all changes happening at once. By utilizing a phased in approach, it will allow for public agencies to budget for these costly changes, but also allow for the design and manufacturing sector who operates in the generator space to design and value engineer units that are able to meet the new requirements at the most reasonable costs. The RWA strongly recommends that grace periods such as those offered by new requirements imposed by the California Air Resources Board (CARB) that will allow for public agencies to appropriately plan for the upcoming changes.

A brief example of this could be that the new regulation would state that *"…starting January 1, 2025, all new emergency standby diesel fueled generators greater than 1,000HP will meet Tier 4 emission regulations…*" By not having a phased in approach with a reasonable lead time not only allows for the previously mentioned design updates from industry, but also allows public agencies to avoid significant additional costs to projects that are just getting under way or have already been budgeted. Public agencies will also be able to appropriately plan additional costs into their Capital Improvement Plans and determine if rate adjustments are necessary; a process that can take multiple years.

**The BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled carries significant additional costs.** There are serious cost and design implications associated with Tier 4 engines with aftertreatment systems. These units require more building space, which may not be available due to space constraints at the site. There are floor loading considerations to take into account for the engine, urea tank, and control systems. If existing floors are inadequate to accommodate a new unit, demolition, design, and construction of new facilities adds considerable costs. These added costs can be further exasperated by the potential need for increased structural supports, plumbing, electrical and exhaust ducts if they are required. Lastly, load banks or supplemental exhaust heat may be needed to ensure proper engine loading to prevent Diesel Particulate Filter (DPF) plugging. This not only increases fuel consumption, but also contributes to increased greenhouse gas emissions. Costs for Tier 4 diesel engine generators, installation of necessary additional design requirements, and increased maintenance will run as much as 60% to over 100% more than the standard emergency Tier 2 and Tier 3. Furthermore, there is a requirement to conduct D2 Cycle testing, which carries significant expense, to ensure the generator in fact meets all new Tier 4 requirements. These cumulative costs, for engines that

typically operate far below stringent State or Federal hour limits, will far exceed cost-effectiveness ($/ton reduced) for engine emission regulation to Tier 4 levels.

**The BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled carries unjustifiable benefit/cost to public agencies.** The U.S. EPA has determined that the use of aftertreatment devices such as Selective Catalytic Reduction (SCR) and DPF's are not justified based on cost effectiveness ($/ton reduced) for emergency diesel engines in both the New Source Performance Standards (NSPS) regulations for new engines[1] and in the regulation of hazardous air pollutants from new and existing engines[2]. These regulations require the engines to meet 2007 emissions standards (Tier 3 for 75 HP to 750 HP, and Tier 2 for engines greater than 750 HP). Furthermore, in 2011, California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) agreed with EPA's reasoning and aligned with EPA regulations to also allow this stationary emergency engine exemption, excepting CARB adopted a 0.15 g/bhp-hr particulate matter (PM) for engines less than 175 HP. The RWA finds these measures to be acceptable for emergency generators and asks the SMAQMD to maintain these existing standards.

The RWA recommends that the SMAQMD align with other regional air quality management districts in California that limit emergency engines to 200 hours total /year which minimizes the modeled and realistic potential emissions in the airshed as an alternative to adding costly controls to engines that run on average less than 50 hrs./year. Limiting testing and maintenance to non-ozone forming hours of the day will also mitigate emissions impact notwithstanding facility constraints that may apply. The RWA also recommends that the SMAQMD align their BACT for emergency diesel engines with the U.S. EPA and CARB regulations requiring Tier 2 above 560 bkW and Tier 3 below 560 bkW, as Tier 4 emissions levels will not be achieved in practice, are not cost effective and may compromise safety for stationary emergency diesel applications. Stationary engines used for emergency power should be regulated differently than stationary engines used for prime power and aligned with existing EPA and CARB emergency engine regulations.

[1] United States Environmental Protection Agency, 'New Source Performance Standards for Stationary Compression Ignition Internal Combustion Engines', *United States Environmental Protection Agency*, 40 CFR Part 60 Subpart IIII, https://www.epa.gov/stationary-engines/new-source-performance-standards-stationary-compression-ignition-internal-0

[2] United States Environmental Protection Agency, 'National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines', *United States Environmental Protection Agency*, NESHAP, 40 CFR 63 Subpart ZZZZ, https://www.epa.gov/stationary-engines/national-emission-standards-hazardous-air-pollutants-reciprocating-internal-0

The RWA thanks you for considering our comments for the proposed BACT determination: BACT # 281 – I.C. Engine, Emergency Standby, Diesel Fueled. Please call me at (916) 847-7589 if you have any questions.

Sincerely,

James Peifer
Executive Director

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

June 11, 2021

Mr. James Peifer
Regional Water Authority
6520 Birdcage Street, Ste. 180
Citrus Heights, CA 95610

Subject: Proposed BACT Determination for Emergency Diesel Standby Engines (BACT 281)

Dear Mr. Peifer:

Thank you for submitting comments on the Sacramento Metropolitan Air Quality Management District's (District) proposed Best Available Control Technology (BACT) determination for emergency standby diesel engines (BACT 281). We have reviewed your comment letter and would like to respond and provide information on the District's rationale for proceeding with the standards as outlined in the draft BACT determination.

**Need Sensitive Areas Definition Clarified**

The BACT determination does not use the term *Sensitive Areas*. However, it does reference *Sensitive Receptors* when summarizing the requirements of South Coast Air Quality Management District Rule 1470. Though the requirements of this rule are discussed as potential applicable requirements, no emission standards or requirements of this BACT determination were made because of Rule 1470. Therefore, no changes will be made to the BACT determination.

**Phased-in Approach of the BACT Determination**

A phased approach is sometimes utilized in prohibitory rules to allow time for existing sources and businesses to come into compliance with new air quality standards. This is not the case when making BACT determinations. By rule, the District must apply BACT to new equipment installations or modifications that will result in an emissions increase. The equipment must meet the cleanest standards determined to be achieved in practice, or even more stringent requirements that have been identified as technologically feasible and cost effective. There is no latitude for the District to consider a phased-in BACT determination as this is not allowed under the legal requirements of the BACT process.

**Added Cost for Tier 4 Technology & Cost Effectiveness**

In developing BACT 281, we followed our District rule requirements and standard evaluation practices to make this determination. To elaborate, District Rule 202 (Section 205.1 (a)) states BACT is "… the most effective emission control device, emission limit, or technique, singly or in combination, which has been required or used for the type of equipment comprising such an emissions unit…." This requirement is what is commonly referred to as "achieved in practice" and is the first criterion that must be assessed in any BACT determination process. If the achieved in practice criteria has been met, the District must require that technology for similar applications. The District evaluates several factors when determining if a particular technology has been achieved in practice.

First, we evaluate whether the control technology has been required or used on equipment with the rating, capacity, and intended use or application, in this specific case, Tier 4 engine standards for emergency diesel standby engines at 1,000 hp or above. We do so by reviewing federal, state and local air district BACT determinations and rule requirements. We found many instances where Tier 4 technology has been installed:

- The California Air Resources Board (CARB) identified nationally over 150 installations of emergency engines at or above 1,000 hp that were either Certified Tier 4 or had necessary control technology to achieve equivalent Tier 4 standards (see enclosed documents).
- The Bay Area Air Quality Management District (BAAQMD) identified three installations in their District and a fourth installation in Washington for multiple engines that met this same technology criteria.
- District staff identified at least one other installation of multiple Tier 4 engines in Nevada.

These installations were all emergency diesel standby engines and were used at a variety of different industries (e.g. data centers, wastewater treatment plants, pumping stations, manufacturing, etc.). Therefore, the "achieved in practice" criterion has been met.

Second, the District must determine whether the emission unit is commercially available. EPA certified engines are manufactured and made available by large companies like Caterpillar and Cummins. There is no reasonable case to be made that Tier 4 engines for stationary and emergency applications are not commercially available and therefore this criterion is also met. For engines that must be retrofitted to meet Tier 4 equivalent standards, add-on aftertreatment controls are also commercially available and have already been installed on other standby engines as noted above.

Third, the control technology must have been installed and operated reliably for at least 180 days at one commercial facility. The Tier 4 final standard for new manufactured engines was phased-in over the period of 2008 - 2015. CARB has identified emergency standby engine installations dating as far back as 2012 (see Attachment 1). The installations in the Bay Area were from as far back as 2016. The engines in Washington were installed in 2015 and permitted in 2017 and the engines installed in Nevada were installed in 2017 and 2018. The BAAQMD have stated that the engines referenced in their BACT determination have been operating reliably and there is no other information to suggest Tier 4 technology being used in emergency engine applications has not performed reliably.

Lastly, the control technology must: (1) be verified to perform effectively over the range of operation expected for that class and category of source and (2) that verification will be based on a performance test or tests, when possible, or other performance data. We'll speak to the first part of this element. As mentioned above, Tier 4 engines have been installed and operated in emergency standby service since at least 2012. They have been installed in a variety of industries including essential public services such as wastewater treatment plants, water transmission, and hospitals. In addition, though not stationary, Tier 4 emission control technologies have been implemented in California for every new diesel on-road heavy-duty engine since 2010 and every off-road engine since 2015. Regarding the basis of the verification in the second part of this requirement, for any certified engine that is installed, the District relies on the certification testing performed for the particular engine family. For Tier 4 equivalent engines, these would be required to pass an emissions test to satisfy the verification element referenced above. The engine installation in Washington referenced by the BAAQMD BACT determination was tested utilizing the D2 cycle and met the Tier 4 emission requirement.

The District acknowledges Tier 4 engines are more costly in comparison to lower Tier engines. However, cost analysis is not considered during the BACT determination process if technology has been demonstrated to be achieved in practice. The District is only required to evaluate and confirm technological feasibility and cost effectiveness for a given technology if the District is requiring technology that is going above and beyond what is currently achieved in practice (i.e., more stringent technology). Since the District determined Tier 4 certified or Tier 4 equivalent engines are achieved in practice in accordance with District procedures, cost effectiveness thresholds are not required to be considered.

In summary, the District has determined that there have been many installed and operational emergency standby engines equipped with Tier 4 certified or equivalent technology, and at least one of these has met *all* criteria used by the District to determine a technology is achieved in practice. The fact that emergency standby engines using Tier 4 technology have been installed, tested and used at facilities in and outside of California is the decisive factor in requiring Tier 4 engines in our BACT determination.

**Federal & State Requirements**

The current EPA and CARB standards for emergency standby engines were promulgated several years ago and presumably considered cost among other factors in setting those standards. However, BACT is justifiably and often more stringent than state and federal regulations. BACT is the legal mechanism by which incremental air quality improvement is made over time. By design, it allows newer and cleaner technology to be required irrespective of regulatory mandates in place at federal, state and local levels. In this case, the emission reductions achieved by using Tier 4 engines, especially during longer emergency operations, are significant. BACT ensures that as technology becomes available or is at a reasonable cost point, that it be required to be used and allow for continual air quality improvements. Though a BACT determination is required by a District rule, a BACT determination is not a rule and as such is governed by the definition of BACT along with the District's implementation procedures regarding this definition. In this case, Tier 4 certified or Tier 4 equivalent engines in accordance with the District's achieved in practice criteria outlined above has been met.

We appreciate the time the Regional Water Authority has taken to comment on our BACT determination. We understand Tier 4 technology is yet to become ubiquitous in the emergency standby engine sector. However, given it has been demonstrated in numerous locations and industry applications, the Tier 4 requirement is the only sensible outcome. Therefore, our District will proceed with the BACT standards detailed in the originally released determination (BACT 281). Please feel free to contact me should you have further questions at aroberts@airquality.org or (916) 825-6840.

Sincerely,

*Amy L. Roberts*

Amy Roberts
Division Manager

cc: Eric Guerra, Council Member, City of Sacramento and Chair, SMAQMD
Patrick Kennedy, Supervisor, Sacramento County and Vice-chair, SMAQMD
Alberto Ayala, Executive Director and Air Pollution Control Officer, SMAQMD

Kathy Pittard, Legal Counsel, SMAQMD
Brian Krebs, Program Manager, SMAQMD

Enclosures (2): California Air Resources Board Comments – Sequoia Data Center
California Air Resources Board Comments – Tier 4 BACT Comment Letter_CARB to SMAQMD 20210528

**Comments by the California Air Resources Board on the California Energy Commission's Proposed Decision for the Proposed Sequoia Data Center Project (19-SPPE-03)**

The California Air Resources Board (CARB) greatly appreciates the California Energy Commission (CEC, or "the Commission") providing the opportunity to provide the following written comments on the proposed Sequoia Data Center (or "proposed project"). At the last hearing on the Data Center, consistent with requests from presiding Commissioner Douglas, the Commission voted unanimously to pause proceedings and asked CARB to file additional information by October 15, 2020, relating to the air quality analysis. These comments provide the requested information.

The Sequoia Data Center is one of an increasing number of such projects before the Commission; cumulatively, the CEC has approximately 650 MW of generation capacity before it. Each of these projects proposes to use diesel generators, and the substantial majority of the projects propose to use "Tier 2" diesel generators, which are dirtier than modern "Tier 4" generators. Many of these projects are in, or near, communities experiencing elevated levels of environmental risk per CalEnviroScreen.

Consistent with its general oversight role,[1] CARB is committed to working with CEC and with the Bay Air Quality Management District (BAAQMD) to consider options to address data center air quality issues. Indeed, CARB is meeting regularly with BAAQMD and CEC Staff on general analytic issues, and intends to continue to do so.

For instance, in response to the increasing number of such projects, BAAQMD Staff contacted CARB in March 2020 to request assistance with the District's efforts to find and develop advanced technology that can be used as backup power for data centers. This extensive collaboration has resulted in the development of a new tool to identify emergency backup power technology options for commercial operations.[2] CARB is also in ongoing conversations with CEC on these general issues. CARB is committed to continuing to support the air district and CEC in their efforts to identify and require the use of best available control technology (BACT) or alternative technologies for the proposed data center projects. CARB would be supportive of technical workshops

[1] *See* Heath & Safety Code § 39600 *et seq.*
[2] *See* https://ww2.arb.ca.gov/our-work/programs/public-safety-power-shutoff-psps-events/emergency-backup-power-options-commercial.

and conferences on data centers generally, as well as continued scrutiny of this particular project.

With regard to this project, and with regard to the Commission's request for more information, CARB has reviewed air quality information for the proposed project. There are several issues on which more analysis is warranted. Most importantly, the project, as proposed, appears to cause violations of the state 1-hour $NO_2$ standard and may violate the federal standard as well. Elevated levels of $NO_2$ can cause lung irritation and exacerbate asthma, among other concerns—which, are, of course, of special concern during the current pandemic. We also highlight concerns regarding how ambient air quality impacts are evaluated, analysis of "emergency" operations, environmental review significance thresholds, evaluation of project alternatives, and BACT. We have also included a data appendix providing more information.

CARB's concerns here are applicable to most, if not all, proposed data center projects undergoing review. Thus, while the comments here are made in the context of the Sequoia Data Center proposal, they also represent air quality issues with current data center review more broadly, which CARB Staff is collaboratively addressing with CEC Staff and BAAQMD Staff. CARB looks forward to continuing that collaboration.

1. Relevant Legal Standards

Our comments are intended to provide information, consistent with the Commission's order, to inform review of this project under the Public Resources Code. We briefly recap the law at the outset to situate our comments, and provide a guide for members of the public who may review these materials after submission.

Public Resources Code section 25500 vests "exclusive power" in CEC to certify power plant sites and related facilities; construction cannot be commenced without first securing CEC certification, and CEC certification is "in lieu of any" and supersedes requirements by any other state, local, or regional agency. However, CEC may exempt "thermal power plants with a generating capacity of up to 100 megawatts" (MW) or modifications that add up to not more than 100 MW "if the commission finds that no substantial adverse impact on the environment or energy resources will result from the construction or operation of the proposed facility or from the modifications."[3] For such exempted facilities, the "exclusive power" grant does not go into effect, and so these facilities are subject to all other applicable agency requirements and permitting.[4] CEC developed a framework by which it would review

[3] Pub. Res. Code, § 25541.
[4] Pub. Res. Code, § 25542.

applications for exemption by power plants of 100 MW or less, referred to as a small power plant exemption (SPPE).[5]

Relevant here, SPPE applications must also include a discussion of environmental and energy resources impacts that "may result from the construction or operation of the power plant"; a "discussion of proposed alternatives to the power plant, including the alternative of no power plant, and any mitigation measures proposed to reduce environmental impact"; and a "discussion of that portion of the gross energy output which will be used for the site and related facility."[6] SPPE review "shall follow the requirements of the California Environmental Quality Act . . . and the state CEQA Guidelines."[7] If an SPPE is granted, the project moves on to local authorities (here, BAAQMD) for permitting; if not, CEC conducts permitting.

2. Ambient Air Quality Impact Evaluation

The Commission requested CARB's views on air quality impacts. Both CARB and the U.S. Environmental Protection Agency set ambient air quality standards, which provide science-based criteria for air quality.[8] Relevant here, the standards for $NO_2$ are 188 micrograms per cubic meter ($\mu g/m^3$) (1-hr National Ambient Air Quality Standard) and 339 $\mu g/m^3$ (1-hr California Ambient Air Quality Standard). The state standard is a "not to exceed" standard, while the federal standard allows some averaging. Accordingly, the state standard can be more rigorous in practice; we therefore focus on the state standard, but both standards may be exceeded by this project's emissions. The City of San Jose conducted an "Initial Study/Mitigated Negative Declaration" (IS/MND) for the project, which, though otherwise outdated given subsequent project modifications, contains information on these standards that demonstrates this point.[9]

$NO_2$ exposure over short periods can aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms. Longer exposures to elevated concentrations of $NO_2$ may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well as children and the elderly, are generally at greater risk for the health effects of $NO_2$. Projects whose emissions violate these standards cause adverse environmental impacts.

---

[5] Cal. Code Regs., tit. 20, §§ 1934–1947.
[6] *Id.* App'x F(e), (f), (j).
[7] *Id.* § 1936(c).
[8] *See, e.g.*, 42 U.S.C. § 7408-7410; Health & Safety Code §§ 39606 *et seq.*
[9] Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, January 23, 2020 (TN# 231651).

NOx emissions (including $NO_2$) are emitted into the air by the combustion of fuels by a variety of sources including cars, trucks, buses, refineries, and power plants. For the proposed project, the primary source of NOx emissions is the operation of the diesel backup generator engines. As part of the IS/MND for the proposed project, CEC Staff calculated the NOx emissions for the diesel backup generator engines and performed a modeling analysis to determine the ambient air quality impacts due to the operation of these engines. According to the IS/MND, the modeled 1-hour average $NO_2$ impacts are at 98% and 99% of the allowable state and federal ambient air quality standards, respectively, as a result of maintenance and testing operation of the backup generator engines.[10] Thus, any increase in modeled $NO_2$ ambient impacts for the proposed project would be a concern given the small compliance margin remaining before a 1-hour average ambient $NO_2$ standard is exceeded.

The operation of *one* generator likely violates the standards if the modeling uses more appropriate model inputs. CARB believes modelling inputs need to be adjusted to reflect best modelling practices. Appropriate modeling assumptions—including the assumed partial load NOx emission rate, exhaust $NO_2$/NOx ratio, modeling receptor spacing, type of ozone limiting method used, hourly meteorological missing data procedures used, and fenceline modeling receptor locations—result in higher impacts and potential $NO_2$ standard exceedances from only one backup diesel generator operating.

For a more concrete example of how modeling assumptions can result in the proposed project exceeding a 1-hour average $NO_2$ ambient air quality standard even just for one backup diesel generator operating, consider the background ambient dataset selected for the analysis. According to the IS/MND for the proposed project, the background ambient 1-hour average $NO_2$ levels used for purposes of modeling compliance with the 1-hr California Ambient Air Quality Standard were based on the use of an applicant-prepared dataset containing seasonal hour-of-day background $NO_2$ levels.[11] The seasonal hour-of-day background $NO_2$ levels were calculated by the applicant using a five-year average of third-highest value for the season and hour-of-day for data collected at the 158 Jackson Street monitor in San Jose, California, from January 2013 to December 2017.[12]

---

[10] Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, Table 5.3-8, 19-SPPE-03, January 23, 2020 (TN# 231651).
[11] Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, Table 5.3-8 (note a), 19-SPPE-03, January 23, 2020 (TN# 231651).
[12] Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, page 5.3-21, 19-SPPE-03, January 23, 2020 (TN# 231651).

Because the 1-hr California Ambient Air Quality Standard is a simple not-to-exceed 1-hour average standard[13] and not a multi-year averaged standard (like the 1-hr National Ambient Air Quality Standard), a multi-year average of the background 1-hour $NO_2$ levels for modeling compliance with the state standard does not provide complete information. For purposes of modeling compliance with the state 1-hour $NO_2$ standard, the maximum modeled 1-hour $NO_2$ impact for the proposed project should be added to the maximum 1-hour $NO_2$ background level for the project area. Such an analysis would likely show that the proposed project exceeds the 1-hour $NO_2$ state ambient air quality standard of 339 $\mu g/m^3$, given that the proposed project's maximum modeled 1-hour $NO_2$ impact is approximately 310 $\mu g/m^3$ for operation of a single diesel engine generator[14] and the maximum background level for the project area is approximately 162 $\mu g/m^3$,[15] resulting in a maximum combined project impact of approximately 472 $\mu g/m^3$. Again, the state standard is a "not-to-exceed" standard, making this analysis straightforward. Federal standard violations are also likely, though averaging requirements mean modeling is somewhat more complex, but important to review.

Moreover, note that the applicant-prepared background $NO_2$ monitoring dataset ends in 2017 and therefore does not represent the most current data available. The SPPE application for the proposed project was submitted in August 2019, and 2018 background data was readily available at that time. Given that the maximum background 1-hour $NO_2$ level for the dataset ending in 2017 is approximately 128 $\mu g/m^3$,[16] while the maximum level for the dataset ending in 2018 is approximately 162 $\mu g/m^3$, including the 2018 data results in a significant increase of approximately 34 $\mu g/m^3$ in the combined 1-hour $NO_2$ impacts for the proposed project.

As there are fifty-four generators in this project, exceedance concerns become even more acute. Because one generator appears to cause violations, operating multiple generators almost certainly would lead to further exceedances. We discuss this further below, regarding "emergency" operations.

Furthermore, it would be appropriate to consider ambient air quality impacts of multiple data centers—not just multiple generators—because the CEC is currently considering several projects in the same area. The impacts from the operation of the

---

[13] *See* Cal. Code Regs., tit. 17, § 70200 ($NO_2$ standard is violated "when concentrations exceed those set forth in the body of the regulation").

[14] CEC Staff Data Requests Set 3 for Sequoia Data Center, background information for Data Request Number 118, 19-SPPE-03, December 12, 2019 (TN# 231014).

[15] Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, Table 5.3-3, 2018 1-hr $NO_2$ of 86 ppb,19-SPPE-03, January 23, 2020 ((TN# 231651).

[16] Application for Small Power Plant Exemption, Sequoia Backup Generating Facility, Table 4.3-3 (68 ppb), August 14, 2019 (TN# 229419-1).

backup generators at these other constructed and/or proposed data centers located in the general project area should be included in the ambient air quality analysis for the proposed project to determine the cumulative impacts. Including these other data centers in the analysis is important given that it is unlikely the impacts from these other projects are properly accounted for in the background ambient data.

This suggests there are significant adverse environmental impacts from this proposed project that require additional mitigation measures or a full environmental impact report—or even that the SPPE is not appropriate for this project.

CARB Staff are prepared to assist CEC Staff on any further analysis. CARB also recommends as a best practice for all data center projects going forward under CEC's purview that CEC Staff perform a complete independent criteria pollutant ambient air quality modeling analysis and toxic air contaminate evaluation, and avoid using only applicant-prepared modeling input data/files.

3. Emergency Operation

The scope of the project's adverse environmental impacts—which already appear significant based on the foregoing—is likely more substantial if other generators operate, as may well occur. The proposed project, like all data centers, is seeking to install diesel engine backup generators for events in which it loses connection to the grid, so that it may continue to operate and provide its services reliably to its customers. Though the timing or occurrence of such events may not always be known, power loses do happen—and data centers are designed and built specifically because such events are foreseeable. Indeed, data centers *have* generators and sell themselves as reliable operators specifically because they intend to operate during such events, which have been occurring with increasing regularity. But this commercial proposition comes with analysis, disclosure, and mitigation obligations. Community members living near the data centers reasonably deserve to know—and want to know—what the air quality impacts will be when the centers operate. These impacts are likely to extend far beyond those of a single generator.

These obligations and operational realities mean forecasting a reasonable range of uses during power outages is appropriate. Such use is reasonably foreseeable. Although we recognize continuing work to limit reliability events and power shutoffs, data centers are constructed on the reasonable premise that such outages do occur, and that we must manage the continuing risks of a warming climate.

As Californians have experienced, the State is becoming increasingly prone to heat storm events, and these events occur precisely when air quality impacts are already likely to be severe, even before data centers operate their backup generators. During

a heat storm, other power plants are already likely to be running at capacity—including California's remaining fleet of relatively polluting gas peaker plants. These generators add air pollution to that caused by smoke and hot weather (hot weather generally tends to drive smog events). Moreover, peak power demand often occurs during the evening—a time when smog can be at its peak. Thus, the conditions under which data centers may operate may already include poor air quality, meaning the incremental contribution of data centers to this pollution may also be cumulatively significant, even for relatively small amounts of pollution.

Capturing these concerns is important—which requires developing reasonable assumptions as to when centers will operate at greater capacity. In our conversations with Staff, one question was whether modeling such operations is in fact unduly speculative. In CARB's view, data center emergency operations are not speculative, and an evaluation of their operations during loss of power—for which the centers are being specifically designed, and for which they are marketed to customers—is also not speculative. CEQA requires an appropriate evaluation even of foreseeable impacts otherwise imprecise in scope or contingent in occurrence.[17]

CEQA case law supports such modeling. For instance, in *Laurel Heights Improvement Association v. Regents of University of California*, the California Supreme Court held:

> an EIR must include an analysis of the environmental effects of future expansion or other action if: (1) it is a reasonably foreseeable consequence of the initial project; and (2) the future expansion or action will be significant in that it will likely change the scope or nature of the initial project or its environmental effects.[18]

Similarly, in *Whitman v. Board of Supervisors*, an oil company applied for a conditional use permit for an exploratory well, and the permit was granted despite the EIR not discussing the environmental impacts of a contemplated pipeline should the well prove lucrative. In part, the county planning department defended this omission by claiming the pipeline did not require a permit and was not subject to CEQA.[19] The court disagreed, stating:

---

[17] "The fact that precision may not be possible, however, does not mean that no analysis is required." *Laurel Heights Improvement Association v. Regents of University of California* (1998) 47 Cal.3d 376, 396.

[18] *Ibid*. And though the proposed project does not currently contain an EIR, the principle of not ignoring impacts from reasonably foreseeable operations still holds—even more so, perhaps, give, CEC Staff's more EIR-level review for its IS/MND.

[19] (2d Dist. 1979) 88 Cal.App.3d 397, 414–15.

> The record before us reflects that the construction of the pipeline was, from the very beginning, within the contemplation of [the oil company] should its well prove productive. Although admittedly contingent on the happening of certain occurrences, the pipeline was, nevertheless, part of [the oil company's] overall plan for the project and could have been discussed in the EIR in at least general terms.[20]

These legal principles reflect many CEQA cases which reach the same conclusion that reasonably forecasting events is critical to full analysis. CEC can rely on this law as it models operations. Though the precise parameters of simultaneous backup generator operation (or even if these backup generators will actually operate at all) cannot now be known, that does not per se render them speculative to the degree of no evaluation. As noted, at least some simultaneous operation of backup generators during power outages is reasonably foreseeable, and will only continue to become more so as the climate continues to warm. The only purpose for the installation of the backup diesel generators for this proposed project is to operate and provide power to the data center due to a disruption in utility power. Modeling at least some impact from simultaneous operation of the backup generators is no more speculative than assuming no hours of simultaneous operation or even in modeling the permitted 50 hours annually of operation for maintenance, which requires a similar degree of CEC making reasonable assumptions.

Because some emergency operation is foreseeable and anticipated and because reasonable assumptions can be made similarly to model various scenarios of emergency operation, at least some meaningful analysis of emergency operation emissions impacts can be conducted. Such analysis becomes even more important when one considers, as discussed above, how close to the $NO_2$ standards the proposed project is with just one backup generator running for maintenance purposes—and thus the likelihood of significant short-term ambient air quality impacts associated with the simultaneous operation of multiple backup diesel generators.

---

[20] *Ibid*. Likewise, in *City of Antioch v. City Council*, a proposed road and sewer construction project received a negative declaration, which the court found violated CEQA because it did not evaluate impacts of any resulting development. The City argued that an EIR was not required because it was not known what kind of development would occur, and any proposals for future development would be subject to further environmental review. (*City of Antioch v. City Council* (1986) 187 Cal.App.3d 1325, 1333.) The court held that "[c]onstruction of the roadway and utilities cannot be considered in isolation from the development it presages. Although the environmental impacts of future development cannot be presently predicted, it is very likely these impacts will be substantial"—and therefore required an EIR considering the "most probable development patterns." (*Id.* at pp. 1336, 1337.) The cases we have cited are representative; CEC will have ample legal support if it proceeds with modelling.

Consequently, CARB recommends that the short-term criteria pollutant and toxic air contaminant ambient air quality impacts due to the emergency operation of the backup generators for the proposed project be evaluated. For this analysis, CARB recommends that several operating scenarios be analyzed, including a scenario with multiple backup generators operating at high load and providing the full power required by the data center and a scenario based on the recent operation of data center backup generator systems due to the heat storm in California. It is CARB's understanding that the CEC and BAAQMD Staffs are in the process of collecting this information. In addition, CARB, CEC, and BAAQMD Staffs are in the process of determining other backup diesel generator operating scenarios that should be included in this type of ambient impact analysis. Were the Commission to direct a general evaluation of these issues, CARB is happy to assist.

4. CEQA Significance Thresholds

We have also discussed appropriate significance thresholds for these projects. CARB is of the view that multiple thresholds are appropriate for evaluation here. A range of thresholds could be used, including the 1-hour state and federal ambient air quality standards, federal ambient significance impact levels (SILs), hourly pounds-per-hour NSR trigger levels, and short-term acute toxic air contaminant thresholds. CARB also notes that evaluation of emergency operations would likely use the same significance thresholds as CEC uses for evaluation of generator maintenance impacts; CARB is not aware of any reason to rely on separate significance thresholds for air quality impacts from maintenance operation as opposed to power outage operation.

We further note that a fuller analysis of the project's significance may be masked by the use of offsets. An important component of the CEQA review process is the evaluation of a proposed project's impacts compared to significance thresholds. An example of this type of analysis is shown in the following evaluation from the IS/MND for the proposed project[21]:

> Table 5.3-6 provides the annual criteria pollutant emission estimates for project readiness testing and maintenance using the emissions source assumptions noted above. Table 5.3-6 shows that with NOx emissions from the readiness testing and maintenance of the standby generators fully offset through the permitting process with the BAAQMD, the project would not exceed any of the BAAQMD emissions significance thresholds. The BAAQMD CEQA Guidelines state that if the project's daily average or annual emissions of operational-related criteria air pollutants or precursors do not exceed any applicable Threshold of Significance listed in Table 5.3-

[21] Sequoia Data Center Initial Study and Proposed Mitigated Negative Declaration, page 5.3-19, 19-SPPE-03, January 23, 2020 (TN# 231651).

**4**, the proposed project would not result in a cumulatively significant impact (BAAQMD 2017b). The BAAQMD significance thresholds for daily emissions are daily average values that scale to equal the annual thresholds. Therefore, a separate comparison of the project's average daily emissions versus the BAAQMD average daily significance thresholds is unnecessary.

TABLE 5.3-6 ANNUAL CRITERIA POLLUTANT EMISSIONS FROM PROJECT TESTING AND MAINTENANCE

| | Annual Emissions (type) | | | | | |
|---|---|---|---|---|---|---|
| Source Type | ROG | CO | NOx | $SO_2$ | PM10 | PM2.5 |
| Mobile Sources | 0.14 | 1.8 | 0.63 | 0.003 | 0.58 | 0.16 |
| Facility Upkeep (Area and Energy Sources) | 3.2 | 0.76 | 0.9 | 0.01 | 0.07 | 0.07 |
| Standby Generators (Testing Only) | 0.54 | 6.4 | 35.96 | 0.03 | 0.16 | 0.16 |
| Proposed Offsets at 1:15 to 1 | -- | -- | (-41.35) | -- | -- | -- |
| Net Project Emissions | 3.9 | 8.9 | - 5.39 | 0.04 | 0.81 | 0.39 |
| BAAQMD Annual Significance Thresholds | 10 | -- | 10 | -- | 15 | 10 |
| Mitigated Emissions Exceed BAAQMD Threshold? (Y/N) | No | N/A | No | N/A | No | No |

While there is some question as to whether the NOx emission offsets shown above are being used as a CEQA mitigation measure,[22] it is clear that the NOx emission offsets are being treated as negative emissions and used to reduce the proposed project's emissions below CEQA significance levels. But the community will not experience simultaneous benefits from these offsets during operations—which is the key issue here. Emission offsets are based on emission reductions that have occurred many years prior to the review/permitting of a new project in question. Therefore, the emission reductions associated with emission offsets are not concurrent with the emission increases for the project under review.

In addition to this obvious timing issue, emission offsets are not re-evaluated at the time of use to ensure that they continue to represent real surplus emission reductions for the area in question (i.e., emission reductions beyond those required by current air quality regulations). Furthermore, emission offsets oftentimes are based on emission reductions that have occurred at facilities located far from where a new project is being proposed. Given these shortcomings, it is inappropriate to use NOx emission offsets as a concurrent emission reduction to keep the proposed project's emissions below CEQA significance levels, at least without more analysis to be able to conclude

[22] For instance, Table 5.3-6 refers to "[m]itigated emissions," while, two paragraphs later on the same page, the IS/MND states there are no required mitigation measures for readiness testing and maintenance.

based on substantial evidence that the proposed project's NOx emissions will not have substantial adverse impacts on the nearby communities.

CARB recommends that the CEC Staff do not treat emission offsets as negative emissions when comparing the proposed project's emissions to CEQA significance thresholds, and to include more analysis on the NOx offsets themselves. CARB and BAAQMD should be able to assist here.

5. Alternatives

For the reasons discussed above, a full analysis of the proposed project's impacts would lead to the conclusion that it has significant adverse environmental impacts, and hence prompt a thorough review of alternatives. Alternatives analysis is also a part of the SPPE process, even if significant adverse environmental impacts are not present.

In order to aid in its required finding of no significant adverse environmental impact, the CEC's regulations require SPPE applications to include a discussion of project alternatives. Accordingly, the proposed project's application includes an alternatives section of possible alternatives to the use of diesel backup generator engines. However, the discussion is cursory and lacks any meaningful evaluation of the alternatives listed.

At least two alternatives should reasonably be considered in more detail: the use of gas-fired engines and the use of Tier 4 diesel generators. Going forward, evaluating zero- or lower-emission alternatives even than these will be important – and a matter which CARB suggests CEC may wish to consider in a broader technical conference.

With regard to gas-fired engines the application materials provide only[23]:

[23] Application for Small Power Plant Exemption, Sequoia Backup Generating Facility, Section 5.3, page 5-2, August 14, 2019 (TN# 229419-1).

*Gas-Fired Engines*

> C1 considered using natural gas-fired engines instead of diesel generators to supply backup power for the SDC. This technology option was rejected because it is not technically feasible. The UPS systems described in Section 2.2 require backup generation that starts very quickly, and natural gas engines are too slow to start. Loss of natural gas delivery, such as broken pipe or loss of supply, would render the natural gas engines inoperable and unable to reliably provide backup electrical power in an emergency. Further, emergency conditions resulting in loss of power from SVP may also result in temporary loss of gas utility service. Therefore, natural gas engines are not considered reliable enough to meet the industry standard or needs of the SDC. Storage of enough natural gas on site to maintain emergency electricity to the SDC during an outage would not be tenable given the volume of natural gas that would be required. Finally, natural gas-fired engines are not considered industry standard for data centers.

But more analysis would be helpful. The above alternative discussion lacks supporting calculations, data, and references to actually conclude that natural-gas-fired engines start up too slowly, that the natural gas supply system is not reliable enough, or that there is insufficient room for onsite storage of natural gas. CEC's regulations, which require applicants to describe any studies or research undertaken or relied upon to provide any information in the application and to include or reference all studies and literature relied upon, can further support such analyses.[24]

Based on recent discussions with a manufacturer of rich-burn natural-gas-fired backup/emergency generator engines, these units are comparable to diesel-fired generating units with regards to startup time, transient load following, reliability, and space requirements. Enclosed as Attachment 1 is a list of a number of rich-burn natural-gas-fired backup/emergency generator engine installations. As shown by this list, these types of engines have been installed at a variety of facility types including hospitals, schools, warehouses, water supply utilities, and manufacturer operations. Because these types of engines are fired with natural gas and can be equipped with three-way catalyst systems, there would be no toxic diesel particulate emissions associated with the operation of the engines and the NOx emissions would be a small fraction the emissions associated with diesel engines.

In addition, the conclusion that the natural gas supply system may fail when there is a failure of the utility power grid is not supported by any evaluation of actual dual system failure analysis. Finally, there is no calculation of the extra room needed to

---

[24] Cal. Code Regs., tit. 20, §§ 1704 subd. (a)(3), 1940.

store natural gas onsite as a backup fuel supply, nor any discussion of why accommodating such extra room would be infeasible or inappropriate. CARB recommends that the Commission require the project applicant to provide the data, studies, research, or literature relied upon in concluding the project alternatives are not feasible, or, more preferably, to significantly expand the alternatives analysis.

As to Tier 4 diesel engines, because Tier 4 diesel backup generator engines are equipped with selective catalytic reduction (SCR) systems to control NOx emissions, the NOx emissions for these units are approximately 93% lower[25] than the emissions for Tier 2 diesel engines, including those equipped with diesel particulate filters. Based on discussions with two major manufacturers, Tier 4 diesel backup generator engines are essentially identical to Tier 2 units in terms of startup times, ramp rates, transient load following, and reliability (provided that manufacturer suggested maintenance is performed). For instance, CARB is aware of several EPA Tier 4 certified/Tier 4 compliant diesel backup/emergency generator sets that have been installed over the past few years. A list of these Tier 4 certified/Tier 4 compliant diesel backup/emergency generator installations are enclosed as Attachment 2. Also included in Attachment 2 are copies of some of the air quality permits for these listed units. CARB is in the process of collecting additional information on these installations and will be sharing this data with the CEC and BAAQMD Staffs as soon as it is available.

CARB notes that should the Commission ultimately require an EIR for this project, such EIR would necessarily include a more detailed review of these alternatives. Ideally, the following additional evaluations would be included in the expanded alternatives analysis:

- A detailed analysis (including calculations, vendor data, studies, etc.) of the startup times/ramp rates for simple-cycle natural-gas-fired gas turbine generators versus diesel backup generator engines;

- A detailed analysis (including calculations, vendor data, studies, etc.) of the startup times/ramp rates for natural-gas-fired rich-burn I/C engine generators versus diesel backup generator engines;

- Detailed studies examining the simultaneous dual failure of the utility power and natural gas supply systems;

[25] Base on EPA Nonroad Compression-Ignition Engine Exhaust Emission Standards, engines > 560 kw, 9.2 g/kw-hr (Tier 2) vs. 0.67 g/kw-hr (Tier 4) NOx emission standard.

- Detailed calculations of the space requirement for onsite liquid propane or liquid natural gas versus onsite storage of diesel fuel on a total stored energy basis;

- Manufacturer-supplied information regarding the availability of EPA Tier 4 certified/compliant diesel backup generator engines;

- Detailed calculations of the energy density of current generation large scale backup battery systems, available site space, battery packaging/layout options (including stacking of battery containers), and corresponding available power levels/duration for this system; and

- Further evaluation on the feasibility of using natural-gas-fired fuel cells, with the assumption that the fuel cells are constantly operating and feeding the grid with the ability to switch to facility-only power when needed for an emergency. To help with the CEC review of the feasibility of fuel cells, enclosed as Attachment 3 is a list of a number of large-scale fuel cells installations powered by natural gas.

CARB is prepared to work with CEC and BAAQMD to acquire the necessary information for such alternatives analysis. Such alternatives, if feasible, would properly be required as a condition for a SPPE, or could inform the CEC's considerations if an EIR becomes necessary.

6. <u>BACT</u>

New major sources of air pollution are required to reduce emissions consistent with the application of the BACT under both state and federal law.[26] In considering an SPPE application, CEC Staff considers whether BACT is being applied as part of its environmental evaluation, although the BACT determination will ultimately be made by local air districts if an SPPE is granted. If an SPPE is not granted, CEC must ultimately seek BACT determinations from the air district and impose those requirements itself through its certification process. Although BACT is legally distinct from CEQA alternatives analysis, the availability of cleaner technologies for backup generation also informs the BACT analysis.

In the SPPE application for the proposed project, the project developer concludes that the proposed diesel backup/emergency generator engines trigger BAAQMD New Source Review (NSR) BACT requirements for carbon monoxide (CO) and NOx, and that the use of EPA-certified Tier 2 diesel engines complies with these BACT

[26] Note that California BACT is generally more stringent than federal BACT. Thus, as CEC considers this matter, it should ensure that *both* legal standards are satisfied.

requirements.[27] While this conclusion is consistent with the BAAQMD BACT guideline for emergency diesel generators,[28] it is important to note that this guideline has not been updated for nearly ten years. Moreover, BACT guidelines are to be updated in particular circumstances, and thus do not preordain a Tier 2 outcome.[29]
Instead, BACT is more akin to a moving target, requiring reevaluation over time. After all, the "best" available technology invariably changes over time, and has been improving. In particular, BAAQMD NSR regulations define BACT as an emission limitation, control device, or control technique applied at a source that is the most stringent of:

> 202.1 The most effective emission control device or technique that has been successfully utilized for the type of equipment comprising such a source; or
>
> 202.2 The most stringent emission limitation achieved by an emission control device or technique for the type of equipment comprising such a source; or
>
> 202.3 The most effective control device or technique or most stringent emission limitation that the APCO has determined to be technologically feasible for a source, taking into consideration cost-effectiveness, any ancillary health and environmental impacts, and energy requirements; or
>
> 202.4 The most effective emission control limitation for the type of equipment comprising such a source that is contained in an approved implementation plan of any state, unless the applicant demonstrates to the satisfaction of the APCO that such limitation is not achievable.
>
> Under no circumstances shall BACT be less stringent than any emission control required by any applicable provision of federal, state or District laws, rules or regulations.[30]

---

[27] Application for Small Power Plant Exemption, Sequoia Backup Generating Facility, page 4.3-16, August 14, 2019 (TN# 229419-1).
[28] BAY AREA AIR QUALITY MANAGEMENT DISTRICT, Best Available Control Technology (BACT) Guideline, IC Engine-Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump > 50 bhp, 12/22/2010.
[29] That BAAQMD's BACT guideline uses a CARB air toxic control measure is also not material here: air districts are authorized to have more stringent controls or limitations than those otherwise required by CARB. This will especially hold true with standards like BACT, which are purposely designed to ratchet up pollution controls over time as technology advances.
[30] BAAQMD Regulation 2, Rule 2, Section 2-2-202, December 6, 2017.

Importantly for this project (and all data center projects), the above definition for BACT clearly indicates that BACT requires the use of either the most effective emission control device or technique that has been used or the most stringent emission limitation that has been achieved for the type of equipment being reviewed/permitted (generally referred to as achieved in practice).[31] The BACT definition is broad in nature and requires exploration of currently available emission control technologies and emission limits and selecting the most stringent one that has been installed on the type of equipment being reviewed/permitted. To CARB's knowledge, this has not occurred to date for the proposed project.

Since BAAQMD issued its BACT guideline ten years ago, the EPA certification standards for non-road diesel engines have become more stringent with Tier 4 requirements for engines with output greater than 560 kw manufactured since 2011. In addition, the major diesel engine generator manufacturers, including Cummins and Caterpillar, offer EPA Tier 4 final certified/EPA Tier 4 final compliant backup/emergency diesel generator sets in the size range identified for the proposed project (i.e., continuous generating ratings between approximately 1.5 MW to 3 MW). As discussed above, CARB is aware of several EPA Tier 4 certified/Tier 4 compliant diesel backup/emergency generator sets that have been installed over the past few years and has included a list of these installations as Attachment 2. Also included in Attachment 2 are copies of some of the air permits for these units. CARB is in the process of collecting information on these installations and will be sharing this data with the CEC and BAAQMD Staffs as soon as it is available.

In the meantime, CARB recommends that the BACT discussion in the IS/MND for the proposed project be revised to clearly indicate that BACT determinations are made on a case-by-case basis using the most current information available. This revised discussion should also make it clear that a case-by-case analysis may determine that BACT for the backup diesel generators identified for this proposed project is something other than the use of Tier 2 diesel engines.

## Conclusion

CARB recognizes the importance of reliable data center operation and will be happy to continue to provide air quality information to CEC. As data center applications multiply, it is critical that air and energy agencies collaborate to ensure that the internet is powered by the cleanest energy possible. Doing so is especially important because many data centers are in or near communities already suffering from air pollution burdens. The Commission has an opportunity to ensure that this project,

[31] The APCO has not made a technologically feasible BACT determination for these diesel backup generators, and even if they had, it would not be more stringent than what is achieved in practice.

and all projects before it, reflect modern pollution control standards. CARB looks forward to working with CEC and BAAQMD to ensure that such standards are required.

# ATTACHMENT 1

NATURAL GAS FIRED RICH BURN EMERGENCY GENERATOR ENGINES

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77346 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77532 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77506 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77523 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77581 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77505 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77571 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77565 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78209 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77339 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77041 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78220 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78582 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77521 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77469 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77429 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77406 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 76574 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 79706 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78621 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 76028 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78247 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78232 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78596 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 79764 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77571 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78201 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77065 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77449 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 76502 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77373 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77042 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77379 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77979 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77059 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78202 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78212 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77057 | Non-Certified Engine (DG) | Health Care and Social Assistance |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 75088 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77546 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77375 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78216 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78232 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78247 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78213 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77380 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77379 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 77382 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78251 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78228 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78230 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78221 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78223 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 76710 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78573 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78572 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78539 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | Construction | TX | 78213 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 77901 | Non-Certified Engine (DG) | Health Care and Social Assistance |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 78578 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 77406 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 75119 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 78220 | Non-Certified Engine (DG) | Manufacturing |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 78250 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 78224 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 78217 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 78227 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 78244 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 77096 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2020 | TX | 76107 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78223 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78230 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78258 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78227 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78204 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78408 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77087 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78253 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 78251 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77382 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77494 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 75206 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77531 | Non-Certified Engine (DG) | Manufacturing |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77095 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77449 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77068 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77449 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77375 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77025 | Non-Certified Engine (DG) | Health Care and Social Assistance |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77041 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 76087 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77380 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 75189 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77085 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 75454 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 77090 | Non-Certified Engine (DG) | Water Infrastructure |
| Enchanted Rock | G4.5 | 448 | 2019 | TX | 76711 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 75165 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77008 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 79605 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 76522 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77503 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 75075 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78382 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 76502 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78045 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78045 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77505 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77005 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77084 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78374 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78660 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 76542 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77075 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78664 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77087 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77401 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 75236 | Non-Certified Engine (DG) | Manufacturing |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 75220 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78043 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77479 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77581 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 76542 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78041 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 76548 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77049 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77807 | Non-Certified Engine (DG) | Educational Services |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77027 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77055 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77521 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77071 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78664 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78589 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78363 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78332 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78660 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78717 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77088 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77379 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 76502 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78577 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78539 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78501 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77901 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77433 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77345 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78501 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77093 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77523 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77494 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77494 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77429 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78596 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77054 | Non-Certified Engine (DG) | Health Care and Social Assistance |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77441 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78411 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77901 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77469 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77566 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78550 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 78550 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2018 | TX | 77546 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 78415 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77346 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 78412 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 78413 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 78413 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77488 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77044 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77077 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77521 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77407 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 78418 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77388 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77388 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 75160 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77422 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77084 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77354 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 76901 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77459 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77379 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77478 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77083 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77459 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77573 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77521 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77494 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77584 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77573 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77484 | Non-Certified Engine (DG) | Retail Trade |

| Table A-1: Rich Burn Natural Gas I/C Backup Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77070 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77429 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77450 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77591 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77493 | Non-Certified Engine (DG) | Manufacturing |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77073 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77386 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77057 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77072 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77375 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77433 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2017 | TX | 77066 | Non-Certified Engine (DG) | Retail Trade |
| Enchanted Rock | G4.5 | 448 | 2016 | TX | 77414 | Non-Certified Engine (DG) | Retail Trade |

# ATTACHMENT 2

TIER 4 DIESEL EMERGENCY GENERATOR ENGINES

| Table A-2: Tier 4 Backup Diesel Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Cummins | 2750DQLF | 2750 | 2019 | WI | 53711 | Tier 4 Compliant & Certified | Utilities |
| Cummins | 2250DQKAM | 2250 | 2020 | FL | 33442 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 2250DQKAC | | | TX | | | Data Center |
| Cummins | 2250DQKAC | | | VA | 23150 | | Data Center |
| Cummins | 2500DQLF | | | MD | | | Emergency Backup |
| Cummins | 1750DQKAD | | | AZ | | | Data Center |
| Cummins | 1500DQGAF | | | PA | | | Data Center |
| Cummins | 2250DQKAF | | | CA | | | Data Center |
| Cummins | 2250DQKAF | | | CA | | | Data Center |
| Cummins | 2250DQKAF | | | CA | | | Data Center |
| Cummins | 2250DQKAF | | | CA | | | Data Center |
| Cummins | 1750DQKAD | | | PA | | | Data Center |
| Cummins | 2000DQKAB | | | VA | | | Data Center |
| Cummins | 1500DQGAF | | | PA | | | Data Center |
| Cummins | 1250DQGAE | | | PA | | | Data Center |
| Cummins | 1250DQGAR | | | PA | | | Data Center |
| Cummins | 750DQFAA | | | VA | | | Emergency Backup |
| Cummins | 2750DQLF | 2750 | 2019 | AR | 72758 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 750DQFAA | 750 | 2019 | CA | 94105 | Tier 4 Compliant | Accommodation and Food Services |
| Cummins | 800DQFAB | 800 | 2018 | CA | 90230 | Tier 4 Compliant | Pump Station |
| Cummins | 1500DQGAS | 1500 | 2018 | MN | 55448 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 1000DQFAH | 1000 | 2020 | SD | 57030 | Tier 4 Compliant & Certified | Data Center |
| Cummins | 1500DQGAS | 1500 | 2018 | CA | 90292 | Tier 4 Compliant | General Backup |
| Cummins | 750DQFAA | 750 | 2018 | CA | 90292 | Tier 4 Compliant | Pump Station |
| Cummins | 1500DQGAS | 1500 | 2018 | MN | 55021 | Tier 4 Compliant | General Backup |
| Cummins | 1500DQGAF | 1500 | 2018 | CA | 94158 | Tier 4 Compliant | General Backup |
| Cummins | 2250DQKAM | 2250 | 2019 | CA | 92145 | Tier 4 Compliant & Certified | Utilities |
| Cummins | 800DQFAB | 800 | 2018 | CA | 90731 | Tier 4 Compliant | Pump Station |

| Table A-2: Tier 4 Backup Diesel Generator Installations | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Industry Use of Installation:** |
| Cummins | 1500DQGAS | 1500 | 2017 | WI | 53562 | Tier 4 Compliant & Certified | Data Center |
| Cummins | 1000DQFAH | 1000 | 2018 | FL | 32940 | Tier 4 Compliant & Certified | Water Infrastructure |
| Cummins | 2250DQKAM | 2250 | 1900 | NC | 28273 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 1500DQGAS | 1500 | 2018 | VA | 23297 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 1500DQGAS | 1500 | 2017 | MT | 59028 | Tier 4 Compliant & Certified | Continuous Base Load |
| Cummins | 1000DQFAH | 1000 | 1900 | TX | 77541 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 1500DQGAF | 1500 | 2014 | CA | 90045 | Tier 4 Compliant | General Backup |
| Cummins | 2500DQLH | 2500 | 2015 | NY | 10979 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 750DQFAA | 750 | 2015 | CA | 90744 | Tier 4 Compliant | Pump Station |
| Cummins | 1000DQFAH | 1000 | 2014 | MN | 56352 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 2000DQKAL | 2000 | 2014 | PR | 771 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 900DQFAH | 900 | 2013 | NC | 28308 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 900DQFAH | 900 | 2013 | HI | 96707 | Tier 4 Compliant & Certified | Manufacturing |
| Cummins | 2000DQKAL | 2000 | 2015 | VA | 22079 | Tier 4 Compliant & Certified | Water Infrastructure |
| Cummins | 1250DQGAR | 1250 | 2014 | NC | 27932 | Tier 4 Compliant & Certified | General Backup |
| Cummins | 1250DQGAR | 1250 | 2012 | NC | 27932 | Tier 4 Compliant & Certified | Water Infrastructure |
| Cummins | 1500DQGAF | 1500 | 2014 | CA | 92835 | Tier 4 Compliant | General Backup |
| Caterpillar | 3516CHD | 1920[1] | 2020 | CA | | Tier 4 Compliant & Certified | Utility |
| Caterpillar | 3516CHD | 2000[1] | 2019 | ND | | Tier 4 Compliant & Certified | Utility |
| Caterpillar | C18 | 500[1] | 2020 | CA | | Tier 4 Compliant & Certified | University |
| Caterpillar | C175 | 3000[1] | 2020 | AZ | | Tier 4 Compliant & Certified | Mining |
| Caterpillar | 3516CHD | 2500[1] | 2013 | NJ | | Tier 4 Compliant & Certified | Data Center |
| Caterpillar | 3516CHD | 2000[1] | | CA | | Tier 4 Compliant & Certified | Transportation |

[1] Per unit rated capacity (kW) provided by Caterpillar

**ATTACHMENT 2-1**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES LOCATED AT THE SAN MANUEL CASINO FACILITY

# United States Environmental Protection Agency
# Synthetic Minor Permit for San Manuel Casino

**Tribal NSR Permit:**
T-0003-CA-R2

**Permittee:**
San Manuel Entertainment Authority
777 San Manuel Blvd.,
Highland, CA 92346

**Facility:**
San Manuel Casino

**Location:**
777 San Manuel Blvd.,
Highland, CA 92346

Pursuant to the provisions of the Clean Air Act (CAA) and the Code of Federal Regulations (CFR) Title 40, Sections 49.151-165, the United States Environmental Protection Agency Region 9 (EPA) is issuing a synthetic minor source permit in Indian Country to San Manuel Entertainment Authority dba as San Manuel Casino (San Manuel). This permit applies to the operation of equipment at San Manuel that consists of two natural gas cogeneration units, five emergency diesel generators, five temporary replacement generators, three natural gas boilers, 13 water heaters, two fire pumps, and six cooling towers.

San Manuel is authorized to operate equipment at the facility as described herein, in accordance with the permit application, the regulations pertaining to the Federal Minor New Source Review Program in Indian Country at 40 CFR 49.151-165, and other terms and conditions set forth in this permit. Failure to comply with any condition or term set forth in this permit may result in enforcement action pursuant to section 113 of the CAA. This permit does not relieve San Manuel from the responsibility to comply with any other applicable provisions of the CAA (including applicable implementing regulations in 40 CFR parts 51, 52, 60, 61, 63, and 72 through 75), or other federal, tribal, and local requirements.

Per 40 CFR 49.159(a) this permit becomes effective 30 days after service of notice of this final permit decision unless review is requested on the permit pursuant to 40 CFR 49.159(d), in which case the permit will be stayed and construction is not authorized until agency review procedures under this section are exhausted and the EPA subsequently issues a final permit decision authorizing construction.

Elizabeth J. Adams
Director, Air and Radiation Division

February 27, 2020
Date

## Information about this Permit:

*Applicability*
Pursuant to the provisions of the Clean Air Act (CAA), Subchapter I, part D and 40 CFR part 49, subpart C, this permit authorizes the operation of the equipment described in Section 1 of this permit.

*Termination*
Section 7 of this permit addresses EPA's ability to revise, revoke and reissue, or terminate this permit.

*Definitions*
The terms used herein shall have the meaning as defined in 40 CFR 49.152, unless otherwise defined in Attachment B of this permit. If a term is not defined, it shall be interpreted in accordance with normal business use.

## Section 1: Location, Equipment and Activity Description

*Permittee Name and Address:*

San Manuel Entertainment Authority
777 San Manuel Blvd.
Highland, CA 92346

*Facility Contact:*

Director of Facilities
777 San Manuel Blvd.
Highland, CA 92346

*Physical Location:*

777 San Manuel Blvd.
Highland, CA 92346

Table 1. Equipment Description

| Emission Unit I.D. No. | Unit Description |
|---|---|
| Cogen-1, Cogen-2 | INNIO Jenbacher Cogeneration Unit, Model No. JMS 616 GS-J02, Natural Gas, 2,654 kW. Equipped with SCR/Oxidation Catalyst Systems. |
| CT-7, CT-8, CT-9, CT-10, CT-11, CT-12 | BAC Cooling Towers, Model No. S3E-1424-14W/V, 4,400 gallons per minute per cell (26,400 gallons per minute for all six cells), equipped with wave form Drift Eliminators |
| EG-7 | CAT Emergency Generator, Model No. C18, Diesel, 500 ekW, equipped with SCR and complying with Tier 4 Final standard. |
| EG-8, EG-9, EG-10, EG-11 | CAT Emergency Generator, Model No. 3516C, Diesel, 2,000 ekW, equipped with SCR and complying with Tier 4 Final standard. |
| TEMP-1, TEMP-2, TEMP-5 | Caterpillar, Tier 2, Diesel, 2029.8 kw, EPA Engine Family Name: ACPXL78.1T2X |
| TEMP-3, TEMP-4 | Caterpillar, Tier 2, Diesel, 2029.8 kw, EPA Engine Family Name: 8CPXL78.1T2E |
| FP-1 | John Deere Model PE4045D, Fire Pump, Diesel, 45 kW |
| FP-2 | Clarke, UFAD88, Fire Pump, Diesel, 177 kW |
| WH-1 | Lochnivar Model CWN1436PM, Water Heater, Natural Gas, 1.4 MMBtu/hr |
| WH-2 | Lochnivar Model CWN1436PM, Water Heater, Natural Gas, 1.4 MMBtu/hr |
| WH-3, WH-4, WH-5, WH-6, WH-7, WH-8 | Lochinvar ARMOR X2 Water Heater, Model No. AWN1300PM, natural gas, 1.3 MMBtu/hr. Equipped with ultralow $NO_x$ burner, and SCAQMD certified to comply with 20 ppm $NO_x$ @ 3% $O_2$. |
| WH-9, WH-10, WH-11 | Lochinvar ARMOR Water Heater, Model No. AWN400PM, Natural Gas, 0.4 MMBtu/hr. Equipped with ultra-low $NO_x$ burner, and SCAQMD certified to comply with 20 ppm $NO_x$ @ 3% $O_2$. |
| WH-12, WH-13 | Lochinvar POWER-PIN Water Heater, Model No. PFN2001PM, Natural Gas, 2 MMBtu/hr. Equipped with ultra-low NOx burner, and SCAQMD certified to comply with 20 ppm $NO_x$ @ 3% $O_2$. |
| BO-1 | Unilux Model ZF1600W Boiler, Natural Gas, 15 MMBtu/hr, Equipped with Ultra Low $NO_x$ Burners |
| BO-2 | Unilux Model ZF1600W Boiler, Natural Gas, 15 MMBtu/hr, Equipped with Ultra Low $NO_x$ Burners |
| BO-3 | Unilux Model ZF1600W Boiler, Natural Gas, 15 MMBtu/hr, Equipped with Ultra Low $NO_x$ Burners |

## Section 2 – General Provisions

1. *Permit Notification Requirements*
   The Permittee shall notify EPA by letter (postmarked by the timelines below) or by email, at AEO_R9@epa.gov and R9AirPermits@epa.gov, of:
   a. The date upon which performance tests will commence, in accordance with the provisions in Condition 12 and not less than 30 days prior to such date. Notification may be provided with the submittal of the performance test protocol(s) required pursuant to Condition 12.

2. *Source Operation*
   At all times, including periods of startup, shutdown, shakedown, and malfunction, the Permittee shall, to the extent practicable, maintain and operate the facility that is subject to this permit (Source), including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be on information available to EPA which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the Source.

3. *Malfunction Report*
   a. The Permittee shall notify EPA at AEO_R9@epa.gov and R9AirPermits@epa.gov within two (2) working days following the discovery of any failure of equipment listed in this permit (see Equipment List above), or failure of a process listed in this permit to operate in a normal manner, which results in an increase in emissions above any allowable emission limit stated in Section 3 of this permit.
   b. The Permittee shall provide an additional notification to EPA in writing or email within 15 days of any such failure described in under Condition 3a. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial malfunction, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed in Section 3 and the methods utilized to mitigate emissions and restore normal operations.
   c. Compliance with the malfunction notification requirements in Condition 3 shall not excuse or otherwise constitute a defense to any violation of this permit or any law or regulation such malfunction may cause.

4. *Inspection and Entry*
   The EPA Regional Administrator, and/or an authorized representative, upon presentation of proper credentials, shall be permitted to:
   a. Enter upon the premises where the Source is located or emissions-related activity is conducted; or where records are required to be kept under the terms and conditions of this permit;
   b. Have access to and copy, at reasonable times, any records that are required to be kept under the conditions of the permit;
   c. Inspect, during normal business hours or while the Source is in operation, any facilities, equipment (including monitoring and air pollution control equipment), method, practices or operations regulated or required under the permit;
   d. Sample or monitor substances or parameters subject to the requirements in this permit; and
   e. Record any inspection by use of written, electronic, magnetic and photographic media.

5. *Transfer of Ownership*
   In the event of any changes in the Permittee listed on this permit, the Permittee must submit a written or electronic notice to EPA within 30 days after the change in Permittee is effective. In the notice, the succeeding Permittee must provide a written agreement containing a specific date for transfer of the Permittee, and an effective date on which the new Permittee assumes partial and/ or full coverage and liability under this permit. The submittal must identify the previous owner, and update the name, street address, mailing address, contact information, and any other information about the Source if it would change as a result of the change of ownership. The Permittee shall ensure that the Source remains in compliance with this permit during any such transfer of ownership.

6. *Severability*
   The provisions of this permit are severable. If any portion of this permit is held invalid, the remaining terms and conditions of this permit shall remain valid and in force.

7. *Adherence to Application and Compliance with other Environmental Laws*
   The Permittee shall construct and operate equipment and activities and any associated air pollution control equipment listed in this permit (see Equipment and Activities List in Section 1) in compliance with this permit, the application on which this permit is based, and all other applicable federal, state, and local air quality regulations. This permit does not release the Permittee from any liability for compliance with other applicable federal, state, and local environmental laws and regulations, including the Clean Air Act.

8. *Compliance*
   The Permittee must comply with all provisions of this permit, including emission limitations that apply to the affected emissions units at the permitted Source. Noncompliance with any permit provision is a violation of the permit and may constitute a violation of the CAA; is grounds for an enforcement action; and is grounds for the EPA to revoke and terminate the permit.

9. *Unavailable Defense*
   In an enforcement action it shall not be a defense for the Permittee that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the provisions of this permit.

10. *Property Rights*
    The permit does not convey any property rights of any sort or any exclusive privilege.

11. *Credible Evidence*
    For the purpose of establishing whether the Permittee violated or is in violation of any requirement of this permit, nothing shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements if the Permittee had performed the appropriate performance or compliance test or procedure.

12. *Performance Tests*
    *a.* The Permittee shall submit a test report to EPA within 60 days after the completion of any required performance test. At a minimum, the test report shall include:
        1. A description of the Emissions Unit and sampling location(s);
        2. The time and date of each test;
        3. A summary of test results, reported in units consistent with the applicable standard;
        4. A description of the test methods and quality assurance procedures used;

5. A summary of any deviations from the proposed test plan and justification for why the deviation(s) was necessary;
6. The amount of fuel burned, raw material consumed, and/or product produced during each test run;
7. Operating parameters of the Source and control equipment during each test run;
8. Sample calculations of equations used to determine test results in the appropriate units; and
9. The name of the company or entity performing the analysis.

b. For each performance test required by this permit, the Permittee shall submit a performance test protocol to EPA no later than 30 days prior to the test to allow review of the test plan and to arrange for an observer to be present at the test. The test protocol shall include records to allow the Administrator to determine representative conditions upon which performance tests shall be conducted. The performance test shall be conducted in accordance with the submitted protocol, and any changes required by EPA.
c. Performance tests shall be conducted in accordance with the test methods set forth as specified in this permit. In lieu of the specified test methods, equivalent methods may be used with prior written approval from EPA.
d. Upon written request and adequate justification from the Permittee, EPA may waive a specific periodic test.
e. For performance test purposes, sampling ports, platforms, and access shall be provided on the Emissions Unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).

13. *Recordkeeping and Reporting*

In addition to the recordkeeping, notification, reporting requirements specified in Section 5 and 6, the Permittee shall:

a. Maintain a file of all records, data, measurements, reports, and documents related to operation of the Source. All records shall be in a permanent form suitable for inspection.
b. The Permittee shall maintain records and submit a written report of all excess emissions and any other noncompliance with permit conditions to EPA for each six-month reporting period from January 1 to June 30 and from July 1 to December 31, except when more frequent reporting is required by an applicable subpart, or EPA, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the Source. Each report shall be postmarked by the 45$^{th}$ day following the end of each six-month reporting period and shall include the following:
    1. Time intervals, data, and magnitude of the excess emissions;
    2. Nature and cause of the excess emissions (if known);
    3. Corrective actions taken and preventive measures adopted;
    4. If applicable, a statement in the report specifying that no excess emissions occurred or that the monitoring equipment has not been inoperative, repaired, or adjusted;
    5. Any failure to conduct any required source testing, monitoring, or other compliance activities; and
    6. Any violation of limitations on operation, including but not limited to restrictions on hours of operation.
c. Excess emissions shall be defined as any period in which an Emissions Unit (listed in the Equipment List above) exceeds any emissions limits set forth in this permit in Sections 3.
d. Excess emissions indicated by performance testing or compliance monitoring shall be considered violations of the applicable emission limit for the purposes of this permit.
e. All records required by this permit shall be retained for not less than five years following the date of such measurements, maintenance reports, and/or records.

14. *Notification of Closure*
    The Permittee must submit a report of any permanent or indefinite closure to EPA in writing within 90 days after the cessation of any operations at the permitted Source. It is not necessary to submit a report of closure for regular, seasonal closures.

15. *Signature Verifying Truth, Accuracy, and Completeness*
    All reports required by this permit shall be signed by a responsible official as to the truth, accuracy, and completeness of the information. The report must state that, based on information and belief formed after reasonable inquiry, the statements and information are true, accurate, and complete. If the Permittee discovers that any reports or notification submitted to the reviewing authority contain false, inaccurate, or incomplete information, the Permittee shall notify the reviewing authority immediately and correct or amend the report as soon as is practicable.

16. *Agency Notifications*

    The Permittee shall send all required notifications, reports and test plans to EPA at the addresses listed below. Reports and notifications sent by mail shall be postmarked by the applicable due date identified in this permit. With prior written notification, the EPA may waive the requirement to submit a hardcopy by mail or may update the mail or emailing addresses specified below.

    US Mail
    EPA Region 9
    Director, Enforcement Division
    Attn: Air & TRI, ENF-2-1
    75 Hawthorne Street
    San Francisco, CA 94105-3901

    Electronic Mail
    AEO_R9@epa.gov
    R9AirPermits@epa.gov

17. *Good Air Pollution Control Practices*
    The Permittee shall maintain and operate each affected emissions unit, including any associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions of New Source Review-regulated pollutants and considering the manufacturer's recommended operating procedures at all times, including periods of startup, shutdown, maintenance and malfunction. The EPA will determine whether the Permittee is using acceptable operating and maintenance procedures based on information available to the EPA which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the permitted Source.

18. *Liability*
    This permit does not release the Permittee from any liability for compliance with other applicable federal and tribal environmental laws and regulations, including the CAA.

19. *National Ambient Air Quality Standards (NAAQS)/Prevention of Significant Deterioration (PSD) Protection*

The permitted Source must not cause or contribute to a NAAQS violation or, in an attainment area, must not cause or contribute to a PSD increment violation.

20. *Information Requests*
    You, as the Permittee, shall furnish to the EPA, within a reasonable time, any information that the EPA may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit or to determine compliance with the permit. For any such information claimed to be confidential, the Permittee must submit a claim of confidentiality in accordance with 40 CFR part 2 subpart B.

21. *Posting of Permit*
    This permit must be posted prominently at the facility, and each affected emissions unit, activity and any associated air pollution control technology must be labeled with the identification number listed in Section 1.

22. *Permit Becomes Invalid*
    As provided in 40 CFR 49.155(b), unless the EPA grants an extension, this permit shall become invalid if construction is not commenced (as defined in 40 CFR 49.152(d)) within 18 months after the approval takes effect, is discontinued for a period of 18 months or more, or is not completed within a reasonable time. The EPA may extend the 18-month period upon a satisfactory showing that an extension is justified.

## Section 3: Emission Limitations and Standards

*Facility-wide Emission and Fuel Usage Limits*

23. Total facility emissions, including during periods of startup, shutdown, and malfunction, shall not exceed the following annual emissions limit (on a 12-month rolling basis):

    9.87 tons per year of Nitrogen Oxides ($NO_x$)
    5.50 tons per year of Volatile Organic Compounds (VOC)
    10.74 tons per year of Carbon Monoxide (CO)

    Compliance with Condition 23 shall be demonstrated pursuant to the procedures specified in Condition 47.

24. Throughput of natural gas and diesel fuel shall not exceed the following amounts, based on a 12-month rolling basis:

    a. BO-1, BO-2, BO-3, WH-1, WH-2: 59,242,546 standard cubic feet per year of natural gas combined.
    b. WH-3, WH-4, WH-5, WH-6, WH-7, WH-8, WH-9, WH-10, WH-11, WH-12, WH-13 : 47,450,000 standard cubic feet per year of natural gas combined.
    c. Diesel-Fuel Fire Pump, FP-1: 460 gallons per year of diesel fuel.
    d. TEMP-1, TEMP-2, and TEMP-5: 31,252 gallons per year of diesel fuel.
    e. TEMP-3, TEMP-4: 27,780 gallons per year of diesel fuel.

Compliance with Condition 24 shall be demonstrated pursuant to the procedures specified in Condition 47.

*Fuel Burning Operations* (EG-7, EG-8, EG-9, EG-10, EG-11, FP-1, FP-2, BO-1, BO-2, BO-3, Cogen-1, Cogen-2, WH-1 through WH-13)

25. Fuel combustion shall be limited to the following fuels:

    a. Natural gas and propane in the natural gas-fired boilers, water heaters WH-1 through WH-13, and Cogen generators (Cogen-1 and Cogen-2)
    b. Diesel or biodiesel containing no more than 15 parts per million (ppm) (0.0015 percent) sulfur.

*Requirements for Boilers* (BO-1, BO-2, BO-3)

26. Emissions of $NO_x$ from BO-1, BO-2, and BO-3 may not exceed 0.031 lb/mmBtu. Compliance with this limit shall be demonstrated pursuant to Conditions 12, 27-29.

27. Initial Performance Testing

    Within 180 days after permit issuance date, the Permittee shall perform initial performance tests in accordance with Conditions 12 and 29.

28. Periodic Performance Testing

    Permittee shall conduct periodic performance testing in accordance with Conditions 12 and 29 every 8,760 operational hours or 3 calendar years, whichever comes first.

29. Test Methods

    Compliance with the $NO_X$ emissions limit specified in Condition 26 shall be determined by one of the following test methods:

    i. EPA Method 3A of 40 CFR Part 60, App. A-2 - Determination of Oxygen and Carbon Dioxide and Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure) and EPA Method 7E of 40 CFR Part 60, App. A-2 - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)
    ii. ASTM D6522-00(2005) Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers

*Requirements for Emergency Generators (EG-7, EG-8, EG-9, EG-10, EG-11)*

30. EG-7 through EG-11 shall be operated only for testing and maintenance of the emission units, required regulatory purposes, and during emergency situations (as defined in Attachment B).

31. EG-7 through EG-11 shall be certified to the applicable Tier standards based on model year and maximum engine power, as provided in Table 1.

32. Operation of EG-7 through EG-11 for maintenance, testing, required regulatory purposes, shall not exceed 40 hours per calendar year per generator, including during periods of startup and shutdown.

33. Emergency Generators EG-7 through EG-11 must comply with the requirements of the New Source Performance Standards for Stationary Compression Ignition Internal Combustion Engines, codified at 40 CFR Part 60, Subpart IIII:

    a. Install and operate a non-resettable hour meter.
    b. Minimize the engine's time spent at idle during startup and minimize the engine's startup time to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes.
    c. Meet applicable Tier standards in 40 CFR 89.112, for all pollutants, for the same model year and maximum engine power. [*40 CFR 60.4211 (a)(3)*]
    d. Meet the following applicable requirements of 40 CFR Part 60.4211 [*40 CFR 60.4211 (a)(1-2)*]:
        i. Operate and maintain the stationary CI internal combustion engine and control device according to the manufacturer's emission-related written instructions; and
        ii. Change only those emission-related settings that are permitted by the manufacturer.

34. EG-7 through EG-11 shall be equipped with an SCR system. The SCR system shall operate at all times while fuel is flowing through a unit, excluding periods of startup. SCR ammonia or urea injection shall begin when the engine exhaust temperature reaches 575 degrees Fahrenheit (˚F) and do so continuously until the engine stop signal is triggered.

*Requirements for Fire Pumps (FP-1, FP-2)*

35. FP-1 and FP-2 shall each be equipped with a non-resettable hour meter.

*Requirements for Cogeneration Units (Cogen-1, Cogen-2)*

36. Cogen-1 and Cogen-2 shall be equipped with an SCR/oxidation catalyst system. The SCR/oxidation catalyst system shall operate at all times while fuel is flowing through a unit, excluding periods of startup. SCR ammonia or urea injection shall begin no later than when the engine exhaust temperature reaches 641 degrees Fahrenheit (˚F) and do so continuously until the engine stop signal is triggered.

37. The total hours of startup and shutdown shall not exceed 18 hours per calendar year and the total duration of non downtime-usage shall be a maximum of 8720 hours per calendar year, for each unit Cogen-1 and Cogen-2. Startup shall be defined as setting in operation the emission unit for any purpose. For each unit Cogen-1 and Cogen-2, the Permittee shall minimize the emission unit's time spent at idle during startup and minimize the unit's startup time to a period needed for appropriate and safe loading. Startup begins when fuel is first combusted in the engine and ends after the engine exhaust temperature reaches 641˚F or more; the duration of startup shall not exceed 65 minutes. Shutdown shall be defined as the period of time from the initial lowering of the engine load until the point at which the combustion process has stopped; the duration of shutdown shall not exceed 5 minutes.

38. Except during periods of startup and shutdown, emissions from Cogen-1 and Cogen-2 shall not exceed the following standards for each unit averaged over a period of one hour, as verified by monitoring and testing results demonstrated pursuant to Conditions 40 and 48:

VOC: 0.10 lb/MW-hr
$NO_x$: 0.07 lb/MW-hr
CO: 0.20 lb/MW-hr

39. Cogen-1 and Cogen-2 must comply with the requirements of the Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, codified at 40 CFR Part 60, Subpart JJJJ:

    a. The Permittee must install, operate, and maintain the emissions unit and control device according to the manufacturer's emission-related written instructions *[40 CFR 60.4243(a) and (h)(1)].*
    b. Propane may be used for a maximum of 100 hours per year as an alternative fuel solely during emergency operations, but records of such use must be kept. If propane is used for more than 100 hours per year in an engine that is not certified to the emission standards when using propane, the Permittee must conduct a performance test to demonstrate compliance with the emission standards of 40 CFR 60.4233 *[40 CFR 60.4243(e)]*.

40. Performance Tests

    a. The Permittee shall conduct performance tests according to the requirements in 40 CFR 60.8 and under the specific conditions specified by Table 2 to Subpart JJJJ of Part 60. Performance tests shall be performed as followed:
        i. While the Source is operating within 10% of its maximum operating rate; *[40 CFR 60.4244(a)]*
        ii. Using test methods from 40 CFR part 60, appendix A unless alternative methods are approved by the EPA in writing in advance of the test. For Cogen-1 and Cogen-2, measurements of $NO_X$ and CO may be taken using portable analyzers according to ASTM D6522(2005);
        iii. Demonstrating compliance with each limit by averaging the results of at least three test runs of at least one-hour duration each, unless the Permittee can demonstrate to the satisfaction of the EPA that the result of one of the test runs should be discarded. The test results the Permittee submits must contain at least two test runs. *[40 CFR 60.4244]*
        iv. Simultaneously for CO and $NO_X$ whenever either pollutant is being tested.
    b. The Permittee may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in §60.8(c). If the engine is non-operational, the Permittee does not need to startup the engine solely to conduct a performance test; however, the Permittee must conduct the performance test immediately upon startup of the engine. *[40 CFR 60.4244(b)]*
    c. Within 60 days after achieving the maximum production rate at which the Source will be operated, but not later than 180 days after initial startup of the Source, the Permittee shall conduct initial performance tests according to Condition 40.a to demonstrate compliance with Condition 38.
    d. The Permittee shall conduct subsequent performance tests to demonstrate compliance with Condition 38 whenever requested by the EPA and at least every 3 years (within 45 days before or after the previous performance test anniversary) after the initial performance test.
    e. For performance test purposes, sampling ports, platforms, and access shall be provided on the emission unit exhaust system in accordance with the requirements of 40 CFR 60.8(e).
    f. The Permittee shall furnish the EPA with a written report of the results of performance tests within 60 days of completion, and in accordance with Condition 12.
    g. In limited circumstances, upon written request and with adequate justification from the Permittee, the EPA may waive a specific performance test and/or allow for testing to be done under different operating conditions. Such justification must demonstrate to the EPA's satisfaction that it would be impractical to conduct the required test at the specified interval or to operate as specified during testing, as

applicable. Any waiver or allowance granted by the EPA shall be approved in writing and the Permittee shall adhere to any specifications or requirements concerning such waiver or allowance that the EPA imposes therein.

*Requirements for cooling towers (CT-7 through CT-12)*

41. The cooling towers shall be equipped with drift eliminators designed to limit circulating water drift loss to 0.0005 percent or less.

*Requirements for water heaters (WH-3, WH-4, WH-5, WH-6, WH-7, WH-8, WH-9, WH-10, WH-11, WH-12, WH-13)*

42. The water heaters shall be equipped with an ultra-low $NO_x$ burner.

43. The water heaters shall be SCAQMD certified not to exceed a concentration of 20 ppm $NO_x$ @ 3% $O_2$.

*Requirements during period of construction and installation of new equipment*

44. EG-7 will not commence operation until at least one of the four Tier 1 generators (EG-3 to EG-6) at the existing casino utility plant is taken offline.

45. The temporary replacement generators, TEMP-1 through TEMP-5, shall each not commence operation until the generator it is replacing (EG-1 through EG-6) at the casino utility plant permanently ceases operation and is taken offline.

46. Cogen-1, Cogen-2, and EG-8 through EG-11 shall not commence operation until TEMP-1 through TEMP-5 at the casino utility plant permanently cease operation and are taken offline.

## Section 4: Monitoring Requirements

47. Twelve-Month Rolling Limits

    a. Compliance with the twelve-month rolling limits in Conditions 23 and 24 shall be demonstrated by calculating or determining emissions and fuel usage from all emissions units, including during periods of startup, shutdown, and malfunction, and during the period of transition to new equipment described in Conditions 44-46.
    b. Natural gas usage shall be obtained from local utility bills and shall include usage of all natural gas-consuming units and equipment at the facility.
    c. Records of diesel usage for FP-1 shall be obtained from product transfer documents from the diesel fuel vendor.
    d. Month One of the emissions or fuel usage totals shall be added to the aggregate sum of the previous eleven months' emissions or fuel usage totals to determine each month's 12-month rolling total.
    e. The first 12-month rolling total shall be determined after Month Twelve of operation, and every subsequent month thereafter.
    f. Compliance with the 12-month rolling emissions limits specified in Conditions 23 and 24 shall be determined as follows:

i. Condition 23 VOC and CO limits and Condition 24.b limits: beginning from the effective date of the revised permit T-0003-CA-R1.
ii. Condition 23 $NO_x$ limit and Conditions 24.a and 24.c: including monthly totals from operations prior to the effective date of the revised permit T-0003-CA-R1.

48. *Monitoring Requirements for Cogen-1 and Cogen-2*

a. For each unit Cogen-1 and Cogen-2, the Permittee shall monitor and record the following monthly:
   i. Engine load (bhp);
   ii. Ammonia or urea injection rate to the SCR system;
   iii. Pressure drop across the oxidation catalyst;
   iv. Temperature at the inlet of the oxidation catalyst; and
   v. Temperatures at the outlet of the SCR catalyst.
b. Periodic monitoring for Cogen-1 and Cogen-2 shall be conducted using a portable analyzer on a quarterly basis as follows:
   i. The Permittee shall monitor and record the stack concentration of $NO_x$ (as $NO_2$), CO, and $O_2$ using one of the following options:
      1. EPA Method 3A - Determination of Oxygen and Carbon Dioxide and Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure) and EPA Method 7E - Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)
      2. ASTM D6522-00(2005) Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers
   ii. If the $NO_x$ or CO concentration, as measured by the portable analyzer, exceeds the emissions standards in Condition 38, the Permittee shall take corrective action to return the emissions to below this concentration as soon as possible, but no longer than one hour of operation after detection. If emissions continue to exceed the emissions standards in Condition 38 after one hour of operation after detection, the Permittee shall shut down the emission unit and not operate it again until the problem has been corrected. The Permittee shall report this as a deviation in accordance with Condition 63.

## Section 5: Recordkeeping Requirements

49. The Permittee shall keep records required for compliance with each condition of this permit for at least five years from the date of origin, unless otherwise stated, either onsite or at a convenient location, such that they can be delivered to the EPA within 24 hours of a request.

50. The permit application and all documentation supporting that application shall be maintained by the Permittee for the duration of time the affected emissions unit(s) is covered under this permit.

51. *Records for Emergency Generators and Fire Pump*

The Permittee shall maintain records related to EG-7 through EG-11 (emergency generators) and FP-1 (fire pump) as follows:
a. Monthly hours of operation, and current calendar year total hours of operation of emergency generators;

b. Monthly hours used for emergency purposes and monthly hours used for non-emergency purposes of emergency generators; and
c. For each fuel delivery for the fire pump, product transfer documents demonstrating the amount of diesel fuel purchased.

52. *Records for Continuous Natural Gas Generators*

    a. The Permittee shall maintain records and calculate $NO_x$, VOC, and CO emissions for Cogen-1 and Cogen-2 on a monthly basis. The 12-month rolling total must be calculated each month by adding the current month's calculated emissions to the previous 11 months of calculated emissions.
    b. The Permittee shall use the emission factors of the most recent performance test for Cogen-1 and Cogen-2 emissions calculations except during startup and shutdown.
    c. The Permittee shall maintain records and calculate the total hours of startup and shutdown for all emission units on a monthly basis. The 12-month rolling total must be calculated each month by adding the current month's calculated emissions to the previous 11 months of calculated emissions.

53. *Records for Cooling Towers*

    The Permittee shall maintain records showing that the cooling towers CT-7 through CT-12 are equipped with drift eliminators meeting the design standards specified in Condition 41.

54. The types and quantities of fuel combusted in each affected emissions unit, including engines and generators, shall be recorded each month.

55. The results of each performance test conducted pursuant to Conditions 12, 27, 28, and 40 shall be recorded. At a minimum, the Permittee shall maintain records of:

    a. The date of each test;
    b. Each test plan;
    c. Any documentation required to approve an alternate test method;
    d. Test conditions and operational parameters;
    e. The results of each test; and
    f. The name of the company or entity conducting the analysis.

56. A log of all maintenance activities conducted on each engine, excluding nonroad mobile engines, shall be recorded.

57. The Permittee shall maintain a log of continuous and annual operational hours for the equipment listed in Table 1.

58. The Permittee shall maintain a log describing the maintenance and repair activities for the equipment listed in Table 1 including the following information:

    a. Date of activity;
    b. Description of activity;
    c. For scheduled maintenance, the elapsed time, hours of operation, or other applicable measure since the activity was last performed;

d. For scheduled maintenance, the elapsed time, hours of operation, or other applicable measure until the activity should next be performed.

## Section 6: Notification and Reporting Requirements

59. *Notification of construction or modification, and operations*
The Permittee shall submit a written or electronic notice to the EPA within 30 days from when the Permittee begins actual construction of an emissions unit, or when the Permittee begins operations or resumes operation after a modification of an emissions unit.

60. *Notification of Change in Ownership*
If the permitted Source changes ownership, then the Permittee must submit a written or electronic notice to the EPA within 90 days after the change in ownership is effective. In the report, the Permittee must provide the EPA a written agreement containing a specific date for transfer of ownership, and an effective date on which the new owner assumes partial and/or full coverage and liability under this permit. The submittal must identify the previous owner, and update the name, street address, mailing address, contact information, and any other information about the permitted Source if it would change as a result of the change of ownership. The Permittee shall ensure that the permitted Source remains in compliance with the permit during any such transfer of ownership.

61. *Notification of Closure*
The Permittee must submit a report of any permanent or indefinite closure to the EPA in writing within 90 days after the cessation of all operations at the permitted Source. The notification must identify the owner, the current location, and the last operating location of the permitted Source. It is not necessary to submit a report of closure for regular, seasonal closures.

62. *Annual Reports*
The Permittee shall submit an annual report on or before March 15 of each year to the EPA. The annual report shall cover the period from January 1 to December 31 of the previous year and shall include:
    a. A compliance certification form indicating whether or not compliance is being met with each term or condition in Sections 2, 3, 4, 5, and 6 of the permit;
    b. The compliance certification form required under Condition 62.a shall contain a description of all emissions estimating methods used, including emission factors and their sources, a summary of materials usage, assumptions made and production data.

63. *Deviation Reports*
The Permittee shall promptly report to the EPA any deviations from permit requirements including deviations attributable to upset conditions. Deviation reports shall include:
    a. The identity of affected emissions unit where the deviation occurred.
    b. The nature of the deviation;
    c. The length of time of the deviation;
    d. The probable cause of the deviation; and
    e. Any corrective actions or preventive measures taken as a result of the deviation to minimize emissions from the deviation and to prevent future deviations.
    f. For the purposes of this permit, *promptly* shall be defined to mean:
        i. Within 72 hours of discovery for deviations from any emission limit in Conditions 23 through 26, and and 38; or

ii. Within 30 days after the end of the month in which the Permittee discovered the deviation, for all other deviations.

g. Notwithstanding the definition of "deviation" in Attachment B, for a deviation from a 12-month rolling permit limit in Condition 23 or Condition 24, once the deviation has been promptly reported, no additional deviation report will be required for such deviation unless and until the deviation continues into the following month's 12-month rolling totals.

64. *Performance Test Reports*
The Permittee shall submit a test report to the EPA within 60 days after the completion of any required performance test. At a minimum, the test report shall include:
a. A description of the affected emissions unit and sampling location(s);
b. The time and date of each test;
c. A summary of test results, reported in units consistent with the applicable standard;
d. A description of the test methods and quality assurance procedures used;
e. A summary of any deviations from the proposed test plan and justification for why the deviation(s) was necessary;
f. The amount of fuel burned, raw material consumed, and product produced during each test run;
g. Operating parameters of the affected emissions units and control equipment during each test run; and
h. Sample calculations of equations used to determine test results in the appropriate units.
i. The name of the company or entity performing the analysis.

65. *Reporting and Notification Address*
The Permittee shall send all required reports to the EPA at the mailing address(es) specified in Section 2.

66. *Signature Verifying Truth, Accuracy, and Completeness*
All reports required by this permit shall be signed by a responsible official as to the truth, accuracy, and completeness of the information. The report must state that, based on information and belief formed after reasonable inquiry, the statements and information are true, accurate, and complete. If the Permittee discovers that any reports or notification submitted to the EPA contain false, inaccurate, or incomplete information, the Permittee shall notify the EPA immediately and correct or amend the report as soon as practicable.

## Section 7: Changes to this Permit

67. *Revising, Reopening, Revoking and Reissuing, or Terminating for Cause*
The permit may be revised, reopened, revoked and reissued, or terminated for cause. The filing of a request by you, the Permittee, for a permit revision, revocation and re-issuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition. This provision also applies to the documents incorporated by reference.

68. *Change in ownership*
If the permitted Source changes ownership, the EPA may change the Permittee name and contact information in Section 1 to reflect the new ownership in accordance with the administrative amendment provisions in 40 CFR 49.159(f).

## Attachment A: Abbreviations and Acronyms

| | |
|---|---|
| ASTM | American Society for Testing and Materials |
| Btu | British thermal units |
| CAA or the Act | Federal Clean Air Act |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| ekW | electrical power (electrical kw) |
| EPA | United States Environmental Protection Agency |
| EU | Emission Unit |
| hr | Hour |
| kW | Kilowatt |
| lbs | Pounds |
| MMBTU | Million British thermal units |
| NAAQS | National Ambient Air Quality Standards |
| NESHAP | National Emission Standards for Hazardous Air Pollutants |
| $NO_x$ | Oxides of Nitrogen except $N_2O$ |
| NSR | New Source Review |
| $O_2$ | Oxygen |
| PM | Total Particulate Matter |
| PM2.5 | Particulate Matter less than 2.5 micrometers (µm) in diameter |
| PM10 | Particulate Matter less than 10 micrometers (µm) in diameter |
| ppm | Parts per Million |
| ppmvd | Parts per Million by volume, dry basis |
| PSD | Prevention of Significant Deterioration |
| RICE | Reciprocating Internal Combustion Engine |
| San Manuel | San Manuel Entertainment Authority, dba San Manuel Casino |
| SCAQMD | South Coast Air Quality Management District |
| SCR | Selective catalytic reduction |
| Source | San Manuel Casino |
| $SO_2$ | Sulfur Dioxide |
| tpy | Tons Per Year |
| µm | Micrometer |
| VOC | Volatile Organic Compounds |

## Attachment B: Definitions

### For the purposes of this permit:

*Cause* means with respect to the EPA's ability to terminate a permitted source's coverage under a permit that:

1. The Permittee is not in compliance with the provisions of this permit;
2. The EPA determines that the emissions resulting from the construction or modification of the permitted Source significantly contribute to National Ambient Air Quality Standard (NAAQS) violations, which are not adequately addressed by the requirements in this permit;
3. The EPA has reasonable cause to believe that the Permittee obtained approval of permit by fraud or misrepresentation; or
4. The Permittee failed to disclose a material fact required by the regulations applicable to the permitted Source of which the applicant had or should have had knowledge at the time the Permittee submitted the application.

*Construction* means any physical change or change in the method of operation including fabrication, erection, installation, demolition, or modification of an affected emissions unit that would result in a change of emissions.

*Deviation* means any situation in which an emissions unit fails to meet a permit term or condition. A deviation is not always a violation. A deviation can be determined by observation or through review of data obtained from any testing, monitoring, or recordkeeping established in accordance with the requirements of this permit. For a situation lasting more than 24 hours which constitutes a deviation, each 24-hour period is considered a separate deviation. Included in the meaning of deviation are any of the following:

1. A situation where emissions exceed an emission limitation or standard;
2. A situation where process or emissions control device parameter values indicate that an emission limitation or standard has not been met; and
3. A situation in which observations or data collected demonstrates noncompliance with an emission limitation or standard or any work practice or operating condition required by the permit.

*Emergency situation* includes producing power for critical networks or equipment (including power supplied to portions of a facility) during power outages (such as when electric power from the local utility, or the normal power source, is interrupted), or if an engine is used to pump water in the case of fire, flood, or other similar event.

*Permittee* means San Manuel Entertainment Authority (dba San Manuel Casino).

*Responsible official* means one of the following:

1. For a corporation: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is directly responsible for the overall operation of the permitted Source.
2. For a partnership or sole proprietorship: a general partner or the proprietor, respectively.
3. For a public agency: Either a principal executive officer or ranking elected official, such as a chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

*Standard cubic foot* means a measure of the quantity of a gas equal to a cubic foot of volume at a temperature of 68 °F and a pressure of 29.92 in. Hg.

# United States Environmental Protection Agency
# Pacific Southwest – Region 9

www.epa.gov/caa-permitting/tribal-minor-new-source-review-permitting-region-9

## Technical Support Document

**Tribal Minor New Source Review Permit**
**February 20, 2020**

| | |
|---|---|
| **Permittee:** | San Manuel Entertainment Authority<br>dba San Manuel Casino<br>777 San Manuel Blvd.<br>Highland, CA 92346 |
| **Source:** | San Manuel Casino |
| **Location:** | 777 San Manuel Boulevard<br>Highland, California 92346 |
| **Source Contact:** | Clifford Batten, Environmental Manager<br>(909) 425-3590 x 104311<br>cbatten@sanmanuel-nsn.gov |
| **Source ID #:** | 34 |
| **Application #:** | 2019-014-AA |
| **Docket:** | EPA-R09-OAR-2019-0719 |

Pursuant to the provisions of Clean Air Act (CAA) sections 110(a) and 301(d) and the Code of Federal Regulations (CFR) title 40, sections 49.151-161, the United States Environmental Protection Agency Region 9 (EPA) is issuing an administrative permit revision of a synthetic minor New Source Review (NSR) permit in Indian Country to the San Manuel Entertainment Authority ("Permittee") for the San Manuel Casino ("Source"), located near Highland, CA. This administrative permit revision amends a preconstruction permit (permit no. TA-0003-CA-R1) that the EPA recently issued for the Source, which authorized construction of 22 new and replacement emissions units as part of a planned expansion of the existing facility. In this action, we are revising conditions applicable to five temporary replacement generators, two replacement emergency generators, one fire pump, and six cooling towers, to accommodate changes in design since the previous permit was issued. Consistent with the requirements at 40 CFR 49.159(f), this action will not cause an increase in allowable emissions above the minor NSR threshold of any regulated NSR pollutant.

This Technical Support Document (TSD) provides the EPA's analysis of the application and describes the equipment that is addressed in this action, and the permit conditions that will be revised.

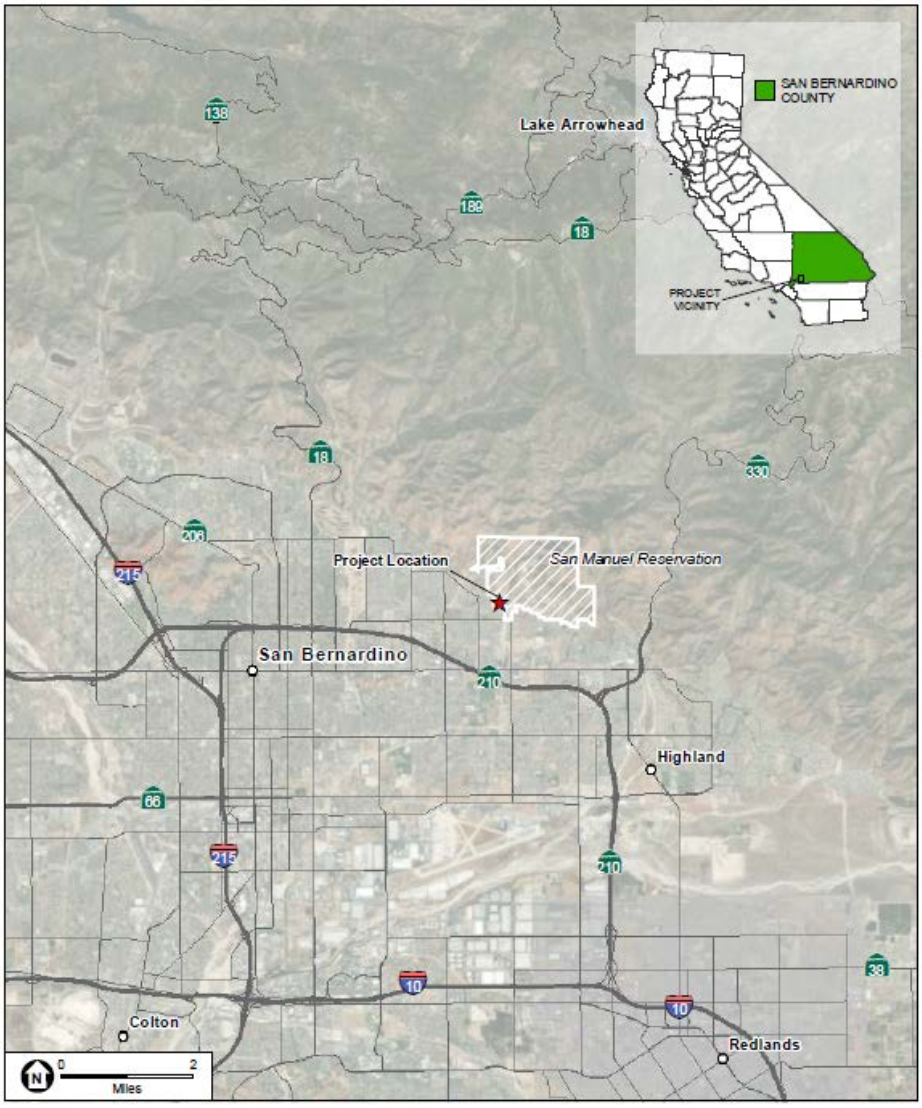
# Table of Contents

# 1. Source and Permit Information

## 1.1. Source Description

San Manuel Casino is a gaming facility owned and operated by the San Manuel Entertainment Authority, an instrumentality of the federally recognized Indian tribe the San Manuel Band of Mission Indians. Construction of the Source began in 2003, and gaming operations there began in 2005. The Source is located on the southwest portion of the San Manuel Reservation, adjacent to the City of Highland, in San Bernardino County, California, and within the South Coast Air Basin (SCAB). Non-tribal lands in the urban areas of the San Bernardino County fall under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Figure 1 below shows the general facility location.

**Figure 1: Source location**



Under a 1999 EPA policy memo[1] in place at the time of the Source's construction, sources in Indian country whose potential to emit (PTE) exceeded title V major source thresholds would be treated as nonmajor sources if their actual emissions were at or below 50 percent of the major source threshold. Following the EPA's promulgation of the CAA Tribal NSR Rule, 76 FR 38747 (July 1, 2011), to avoid regulation as a major source, these sources must now obtain synthetic minor limits under the Tribal Minor NSR Program (40 CFR 49.151-165). Consistent with these requirements, the Permittee applied for an initial synthetic minor permit pursuant to 40 CFR 49.158 on August 27, 2012. The EPA issued the Source a synthetic minor NSR permit on September 25, 2017 (Permit No. TA-0003-CA) and a revised synthetic minor NSR permit on August 6, 2019 (Permit No. TA-0003-CA-R1).

As permitted under Permit No. TA-0003-CA-R1, San Manuel Casino is currently authorized to construct 22 new and replacement emissions units: two new generators for a new 5-megawatt (MW) combined heat and power cogeneration system, six new cooling towers, a new emergency garage generator, 11 new water heaters, and two replacement Tier 4 emergency engines.

The SCAB is currently designated as extreme nonattainment for the 2015 and 2008 8-hour ozone national ambient air quality standards (NAAQS), moderate nonattainment for the 2012 and 1997 24-hour particulate matter less than 2.5 µm in diameter ($PM_{2.5}$) NAAQS, and serious nonattainment for the 2006 24-hr $PM_{2.5}$ NAAQS. *See* 40 CFR 81.305. As an extreme ozone nonattainment area, the SCAB is subject to a lower major source threshold for volatile organic compounds (VOC) and nitrogen oxides ($NO_x$) of 10 tons per year (tpy). In the existing permit for the Source, the Permittee elected to accept federally enforceable limits to stay below the major source threshold for $NO_x$, CO, and VOC. Thus, under the existing permit, the Source is considered a synthetic minor source of $NO_x$, CO, and VOC.

### 1.2. Permit Action

On December 27, 2019, the EPA received an application from the Permittee for an administrative permit revision (Facility ID #34; Application #2019-014-AA) under the CAA Tribal Minor NSR Program to add some new equipment, remove existing permit limits, and replace some existing and previously permitted, but not yet installed equipments due to project redesign.

The EPA determined that not all of the proposed changes can be processed as an administrative permit revision. After discussions with the Permittee, the EPA is proceeding with those portions of the proposed changes that qualify for permitting as an administrative permit revision under 40 CFR 49.159(f): five temporary replacement Tier 2 generators,[2] two Tier 4 replacement emergency generators, one new fire pump, and six new cooling towers. The proposed administrative permit revision will also remove conditions applicable to the previously permitted cooling towers and two

[1] Memorandum dated March 7, 1999, from John Seitz, Office of Air Quality Planning and Standards Director and Eric V. Schaeffer, Office of Regulatory Enforcement Director, Subject: "Potential to Emit (PTE) Transition Policy for Part 71 Implementation in Indian Country."

[2] These temporary replacement generators are designed as portable engines. However, portable engines that replace existing stationary engines at the same location on a temporary basis and that are intended to perform the same or similar functions are considered stationary engines. See 76 FR 37953, 37959 (June 28, 2011). Therefore, emissions from these units are included in the facility PTE calculations.

existing Tier 1 and 2 emergency engines. We expect to the make the other permit revisions in a separate forthcoming permit action.

In addition, because the proposed changes represent a reworking of the overall project that has not completed construction, we are applying the tribal NSR requirements based on the changes in emissions relative to the source as it existed prior to the issuance of TA-0003-CA-R1. We are using the allowable emissions from the initial permit, T-0003-CA, as the starting point for evaluating emissions increases in Section 4.2. That is, we are treating these permit revisions as part of the same project.

This permit action will update the Source's equipment description table and will add some new emissions units by an amount below the Tribal Minor NSR permitting thresholds and replace some emissions units that does not cause in increase in the emissions units' allowable emissions.

## 1.3. Permit History

**Table 1. Permit Revision History**

| Application No. | Issue Date | Description/Category | Revised Permit Conditions |
|---|---|---|---|
| 2012-003-SM | 9/25/2017 | Synthetic Minor Permit | Docket #EPA-R09-OAR-2017-0269<br>• Initial permit |
| 2018-010-SM | 8/6/2019 | Synthetic Minor Permit/Modification | Docket #EPA-R09-OAR-2019-0150<br>• Revised cover page and made minor administrative edits throughout<br>• Updated Table 1<br>o Removed EG-3 to EG-6<br>o Added two new generators for a new 5-MW combined heat and power cogeneration system<br>o Added six new cooling towers<br>o Added a new emergency garage generator<br>o Added 11 new water heaters<br>o Added two replacement Tier 4 emergency engines<br>• Added Condition 22 – Permit Becomes Invalid<br>• Added synthetic minor limits for VOC and CO<br>• Added monitoring, recordkeeping, and reporting requirements for the new and replacement emissions units<br>• Removed monitoring, recordkeeping, and reporting requirements for removed emissions unit |
| 2019-014-AA | TBD | Administrative Permit Revision | Docket #EPA-R09-OAR-2019-0719<br>• Revises cover page and makes minor administrative edits throughout<br>• Updates Table 1<br>o Remove CT-1 through CT-6, EG-1, and EG-2<br>o Add six new cooling towers, CT-7 through CT-12<br>o Add two replacement Tier 4 emergency engines, EG-10, EG-11<br>o Add five temporary replacement engines, TEMP-1 through TEMP-5<br>o Add one new fire pump, FP-2<br>• Add fuel limits for TEMP-1 through TEMP-5 under Condition 24<br>• Added monitoring, recordkeeping, and reporting requirements for the new and replacement emissions units<br>• Removed monitoring, recordkeeping, and reporting requirements for removed emissions unit |

## 2. Public Participation

Because this action consists of administrative permit revisions under 40 CFR 49.159(f), it is not subject to the public participation or administrative and judicial review requirements of the Tribal Minor NSR Program.[3] The final permit and other key documents relevant to the revised permit are available at www.regulations.gov under docket ID number EPA-R09-OAR-2019-0719.

## 3. Tribal Minor NSR Program Requirements

The Tribal Minor NSR Program is potentially applicable to owners and operators of sources located, or planning to locate, on Indian reservations, and in other areas of Indian country where no EPA-approved tribal air permit program is in place and where an Indian tribe or the EPA has demonstrated that the tribe has jurisdiction. Because the Source is located on tribal land of the San Manuel Band of Mission Indians, where no EPA-approved tribal air permit program is in place, the Source is subject to the requirements of the Tribal Minor NSR Program.

The Tribal Minor NSR Program requires owners and operators of certain new and modified sources of air pollution in Indian country to obtain a minor NSR permit prior to constructing or modifying a source. This preconstruction permitting program is triggered for new or modified sources based on potential increases in air pollutants according to the applicability criteria in 40 CFR 49.153. Under 49.153(a)(2), if a physical or operational change would increase an emissions unit's allowable emissions of a regulated NSR pollutant above its existing annual allowable emissions limit, the Source must obtain a permit revision to reflect the increase in the limit. For a physical or operational change that is not otherwise subject to review under major or minor NSR, such increase in the annual allowable emissions limit may be accomplished through an administrative permit revision as provided in 49.159(f). Under 40 CFR 49.159(f)(2), an administrative permit revision is not subject to the permit application, issuance, public participation or administrative and judicial review requirements of the Tribal Minor NSR Program.

As discussed in detail below, the changes made to the permit in this action qualify as administrative permit revisions under 49.159(f).

Because this action consists of administrative permit revisions under 49.159(f)(1), the action is not subject to the permit application, issuance, public participation or administrative and judicial review requirements of the Minor NSR program per 40 CFR 49.159(f)(2).

## 4. Administrative Permit Revision

### 4.1. New and Replacement Units

**Existing Generators (EG-1 through EG-6), Temporary Replacement Generators (TEMP-1 through TEMP-5), and Tier 4 Replacement Generators (EG-8 through EG-11)**

[3] 40 CFR 49.159(f)(2).

The six existing Caterpillar generators (EG-1 through EG-6, with EG-4 already removed) are used for emergency power during periods when electrical power from the local utilities is not available. In the previous permitting action for permit TA-0003-CA-R1, the plan was to remove EG-3, EG-4, EG-5 and EG-6, and replace EG-3 and EG-4 with Tier 4 generators (EG-8 and EG-9). In addition, EG-1 and EG-2 were converted from stand-by generators to emergency generators.

In this application 2019-014-AA, the Permittee proposes to replace existing Tier 1 and Tier 2 emergency generators, EG-1 and EG-2, with two new Tier 4 emergency generators EG-10 and EG-11. EG-10 and EG-11 are the same model generators as EG-8 and EG-9, and all will provide emergency backup power. The Permittee also confirmed that to continuously fulfill the necessary backup power needs of 9MW for the existing Source and 13.5 MW for the Project (5 MW Cogen and 8.5 MW backup generators), temporary generators will be used to provide emergency power until the Cogen (Cogen-1 and Cogen-2) and Tier 4 emergency generators (EG-8 through EG-11) are fully operational.

**Cooling Towers (CT-7 through CT-12)**

Instead of the permitted CT-1 through CT-6, the Permittee is proposing to cancel those units and put in CT-7 through CT-12. CT-1 through CT-6 have not yet been procured or installed, and the Source requests this replacement due to the projected need for a slight increase (2%) in cooling capacity and equipment operators' recommendation to change to a similar model that they are familiar with for ease of operation and maintenance. These new cooling towers are high performance units and will be equipped with cellular type drift eliminators to reduce particulate matter (PM) emissions, and are assumed to operate 24 hours per day, year-round.

**Fire Pump (FP-2)**

The Source has determined that an additional fire pump is needed, and therefore proposes to install a new emergency standby direct-drive fire pump engine (FP-2). FP-2 will be located outside the new San Manuel Casino podium building next to the parking lot, and will be certified to EPA Tier 3 emission standards.

### 4.2. Changes to Emissions

Attachment 1 includes detailed emissions calculations and emissions factors used in the emissions calculations. The permit limits for the existing permit are summarized in Table 2 below, alongside the application thresholds for minor NSR and title V and for major NSR.

**Table 2. Allowable Emissions (tpy) for the 2018 San Manuel Casino Permit TA-0003-CA-R1**

| | VOC | $NO_x$ | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | Total HAPs[4] |
|---|---|---|---|---|---|---|---|
| Existing Allowable Emissions | 5.50 | 9.87 | 10.74 | 0.15 | 2.66 | 2.66 | 1.46 |
| Title V Threshold[5] | 10 | 10 | 100 | 70 | 100 | 70 | 25 |
| NSR Major Source Threshold[6] | 10 | 10 | 250 | 70 | 250 | 70 | 25 |
| Tribal Minor NSR Threshold[7] | 2 | 5 | 10 | 10 | 5 | 0.6 | NA |

Table 3 shows the emissions increase resulting from this action. As explained below, because this action does not modify the existing synthetic minor limits or cause an increase in emissions above the minor NSR threshold it qualifies as an administrative amendment under 40 CFR 49.153(a)(2) and 40 CFR 49.159(f)(1)(v).

The increase from FP-2 and CT-7 through CT-12 are based on the potential to emit of each unit, such that the allowable increase is the same as the units' PTE with no operational limits. These units are not a part of the existing synthetic minor limits for the Source.

TEMP-1 through TEMP-5 will take on similar operational limits to the units they are replacing, EG-1 through EG-6, which have existing synthetic minor limits and will not cause an increase in allowable emissions. Each temporary replacement generator will only be installed when the unit it is replacing has been removed. When the temporary replacement generators are removed, the new and previously permitted Tier 4 engines (EG-8 through EG-11) will be installed. Emissions from EG-8 through EG-11 are calculated as emergency generators using 200 hours/year for the PTE.

[4] Maximum emissions from any one HAP for the existing source are < 0.07 tpy, which is lower than the major source threshold of any one HAP of 10 tpy.
[5] Major source thresholds for the title V operating permit program are described at 40 CFR 71.2 and sources subject to title V permitting requirements are described at 40 CFR 71.3(a).
[6] Major source thresholds for attainment/unclassifiable areas (PSD) are described at 40 CFR 52.21(b)(1); major source thresholds for nonattainment areas (nonattainment NSR) are listed at 40 CFR part 51, Appendix S, Section II.A.4.
[7] Minor source thresholds are listed at 40 CFR 49.153, Table 1.

**Table 3. 2018-014-AA Emissions Increase by Emissions Unit (tpy)**

| Proposed New Emissions Unit Increases/PTE | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source Description** | **VOC** | **$NO_x$** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **HAP** |
| FP-2 | 0.06 | 0.15 | 0.05 | 0.05 | 0.01 | 0.01 | 0.00 |
| CT-7 | | | | | 0.06 | 0.06 | |
| CT-8 | | | | | 0.06 | 0.06 | |
| CT-9 | | | | | 0.06 | 0.06 | |
| CT-10 | | | | | 0.06 | 0.06 | |
| CT-11 | | | | | 0.06 | 0.06 | |
| CT-12 | | | | | 0.06 | 0.06 | |
| **Temporary Replacement Generator Increases** | | | | | | | |
| **Source Description** | **VOC** | **$NO_x$** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **HAP** |
| EG-1 Replacement (TEMP-1 – EG-1 Allowable) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EG-2 Replacement (TEMp-2 – EG-2 Allowable) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EG-3 Replacement (TEMP-3 – EG-3 Allowable) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EG-4 Replacement (TEMP-4 – EG-4 Allowable) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EG-6 Replacement (TEMP-5 – EG-6 Allowable) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Final Replacement Modification Increases** | | | | | | | |
| **Source Description** | **VOC** | **$NO_x$** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **HAP** |
| EG-8 Replacement (EG-8 PTE - TEMP-3) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EG-9 Replacement (EG-9 PTE – TEMP-4) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EG-10 Replacement (EG-10 PTE – TEMP-1) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EG-11 Replacement (EG-11 PTE – TEMP-2) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Total Emissions Increase | 0.06 | 0.15 | 0.05 | 0.06 | 0.38 | 0.38 | 0.00 |
| Tribal Minor NSR Threshold | 2.00 | 5.00 | 10.00 | 10.00 | 5.00 | 0.60 | NA |
| Exceed minor NSR source threshold? | No | No | No | No | No | No | No |

## 4.3. Changes to Permit

We are revising the Source's Tribal Minor NSR permit to incorporate language that reflects the addition of the new cooling towers, fire pump, temporary replacement generators, and Tier 4 emergency generators. Specific changes include: adding fuel limits for temporary replacement generators under Condition 24; applying existing permit requirements to new and replacement emissions units under Conditions 25, 30 through 35, 41, 51, and 53; adding Condition 35 to require the fire pumps to be equipped with non-resettable hour meters; deleting requirements for the removed emissions units; and revising Conditions 45 and 46 to incorporate the updated implementation schedule, including temporary units. We are also making minor administrative updates to the first page of the permit and updating the equipment description in Table 1 to reflect the changes to the permitted equipment.

A red-line version of the revised permit showing all edits is included in the docket.

## 5. Control Technology Review for Proposed Modifications to Emission-Generating Units

Because this action consists of administrative permit revisions, the action is not subject to the requirement at 40 CFR 49.154(c) to conduct a control technology review. The EPA conducted a control technology review as part of our recent permitting action for TA-0003-CA-R1.

## 6. Air Quality Impact Analysis

For projects that trigger minor NSR review, the reviewing authority may require an air quality impact analysis (AQIA) if there is reason to believe that construction or modification will cause or contribute to a NAAQS or Prevention of Significant Deterioration (PSD) increment violation. *See* 40 CFR 49.154(d). Because this action consists of administrative permit revisions, under 40 CFR 49.159(f)(2), it is not subject to the permit application or issuance requirements of the Tribal Minor NSR Program. Because of the very low emissions increase from the fire pump and cooling towers, their construction and operation is consistent with the AQIA conducted for the EPA's issuance of Permit TA-0003-CA-R1, demonstrating that the permitted project would not cause or contribute to a NAAQS or PSD increment violation.

## 7. Listed Species-Related Requirements

Pursuant to section 7 of the Endangered Species Act (ESA), 16 U.S.C. 1536, and its implementing regulations at 50 CFR part 402, the EPA is required to ensure that any action authorized, funded, or carried out by the EPA is not likely to jeopardize the continued existence of any federally endangered or federally threatened species listed under the ESA, or result in the destruction or adverse modification of such species' designated critical habitat. This project will not involve any new ground disturbances and will not directly impact federally listed species or modify natural habitat that could support federally listed species. Because the recent permit action for Permit TA-0003-CA-R1 addressed potential effects within the construction area based on recent information about species presence (including considerations related to the ESA, Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (Eagle Act)), we are determining that this permit action is covered by the previous analysis and the EPA does not anticipate any species-related concerns under the ESA, MBTA, or Eagle Act. The EPA therefore finds that issuance of this permit will have no effect on listed species or critical habitats and has determined that no further formal consultation or action is required. See Section 9 of our TSD for Permit TA-0003-CA-R1, which provides additional information.

## 8. Historic Properties-Related Requirements

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires federal agencies, including the EPA, to take into account the effects of an undertaking on historic properties. The implementing regulations of the NHPA can be found at 36 CFR part 800. An "undertaking," as defined at 36 CFR 800.16(y), includes projects requiring a federal permit. This project will not involve any new ground disturbances and will be completely constructed within the existing casino building. Thus, the EPA is determining that the project will have no potential to cause effects to historic properties. See Section 10 of our TSD for Permit TA-0003-CA-R1, which provides additional information. Pursuant to 36

CFR 800.3(a)(1), the EPA has no further obligations under NHPA Section 106 or 36 CFR part 800.

## 9. Environmental Justice Analysis

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," calls on each federal agency to make environmental justice a part of its mission by "identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations."

The EPA defines "environmental justice" (EJ) to include the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and polices. The EPA's goal is to provide an opportunity for overburdened populations or communities to participate in the permitting process. "Overburdened" is used to describe the minority, low-income, tribal and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards.

The EPA considered EJ issues associated with changes to the Source as part of our recent permitting action for Permit TA-0003-CA-R1, and determined that our analysis of EJ considerations Permit TA-0003-CA-R1 remains valid. This permit continues to serve as an enforceable mechanism to protect air quality in the surrounding community. Issuance of this administrative permit revision will continue to require the Source to meet certain emissions rates, performance standards, recordkeeping and reporting requirements to control emissions of NOx, VOC, and CO to be lower than title V thresholds.

## 10. Authority

The CAA provides the EPA with broad authority to protect air resources throughout the nation, including air resources in Indian country. Unlike states, Indian tribes are not required to develop CAA NSR permitting programs. *See*, *e.g.*, Indian Tribes: Air Quality Planning and Management, 63 FR 7253 (Feb. 12, 1998) (also known as the Tribal Authority Rule). In the absence of an adequately implemented EPA-approved NSR program on the tribal lands of the San Manuel Band of Mission Indians, the EPA has the authority to implement a federal implementation plan (FIP) in order to protect tribal air resources from impacts due to the construction of new or modified stationary sources of air pollutants. In 2011, the EPA established the Tribal Minor NSR Program under the CAA as part of a FIP for Indian country, through the Tribal NSR Rule. 76 FR 38748 (July 1, 2011) (codified at 40 CFR part 49). The EPA has followed the Tribal Minor NSR Program in this permit action.

**ATTACHMENT 2-2**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES
LOCATED AT THE BANK OF AMERICA NATIONAL ASSOCIATION

# COMMONWEALTH of VIRGINIA

*DEPARTMENT OF ENVIRONMENTAL QUALITY*
PIEDMONT REGIONAL OFFICE
4949A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K. Paylor
Director

Jeffery Steers
Regional Director


August 1, 2017

Mr. Terry R. Myatt,
Integrated Facility Manager
CBRE / Bank of America Account
6050 White Oak Creek Drive
Sandston, Virginia 23150

Location: Henrico County
Registration No.: 52403

Dear Mr. Myatt,

Attached is a significant amendment to your new source review permit dated October 12, 2016 to construct and operate a banking and data center in accordance with the provisions of the Virginia Regulations for the Control and Abatement of Air Pollution. This permit supersedes your permit dated October 12, 2016.

In the course of evaluating the application and arriving at a final decision to approve the project, the Department of Environmental Quality (DEQ) deemed the application complete on July 27, 2017.

This permit contains legally enforceable conditions. Failure to comply may result in a Notice of Violation and/or civil charges. Please read all permit conditions carefully.

This permit approval to construct and operate shall not relieve Bank of America National Association of the responsibility to comply with all other local, state, and federal permit regulations.

The generators (Ref. Nos. 1-5, 12, 14 and 15) are subject to 40 CFR 63, Maximum Achievable Control Technology, (MACT) Subpart ZZZZ and 40 CFR 60, New Source Performance Standard (NSPS), Subpart IIII. Virginia has not accepted delegation of these rules. In summary, the units are required to comply with certain federal emission standards and operating limitations. DEQ advises you to review the referenced MACT and NSPS to ensure compliance with applicable

emission and operational limitations. As the owner/operator you are also responsible for any monitoring, notification, reporting and recordkeeping requirements of the MACT and NSPS. Notifications shall be sent to EPA, Region III.

To review any federal rules referenced in the above paragraph or in the attached permit, the US Government Publishing Office maintains the text of these rules at **www.ecfr.gov**, Title 40, Parts 60 and 63.

The Board's Regulations as contained in Title 9 of the Virginia Administrative Code 5-170-200 provide that you may request a formal hearing from this case decision by filing a petition with the Board within 30 days after this case decision notice was mailed or delivered to you. Please consult the relevant regulations for additional requirements for such requests.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date you actually received this permit or the date on which it was mailed to you, whichever occurred first, within which to initiate an appeal of this decision by filing a Notice of Appeal with:

David K. Paylor, Director
Department of Environmental Quality
P. O. Box 1105
Richmond, VA 23218

If this permit was delivered to you by mail, three days are added to the thirty-day period in which to file an appeal. Please refer to Part Two A of the Rules of the Supreme Court of Virginia for information on the required content of the Notice of Appeal and for additional requirements governing appeals from decisions of administrative agencies.

If you have any questions concerning this permit, please contact the regional office at 804-527-5020.

Sincerely,

James E. Kyle, P.E.
Air Permit Manager

JEK/JH/52403-5 NSR

Attachments: Permit

cc: Manager, Data Analysis (electronic file submission)
Manager/Inspector, Air Compliance

# *COMMONWEALTH of VIRGINIA*

*DEPARTMENT OF ENVIRONMENTAL QUALITY*
PIEDMONT REGIONAL OFFICE
4949A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

Molly Joseph Ward
Secretary of Natural Resources

David K Paylor
Director

Jeffery Steers
Regional Director


## STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE

This permit supersedes your permits dated October 12, 2016.

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution,

Bank of America National Association
6050 White Oak Creek Drive
Sandston, Virginia 23150
Registration No.: 52403

is authorized to construct and operate

a banking and data center

located at

6050 White Oak Creek Drive
Sandston, Virginia 23150

in accordance with the Conditions of this permit.

Approved on August 1, 2017.

James E. Kyle, P.E.
Air Permit Manager

Permit consists of 9 pages.
Permit Conditions 1 to 24.

## INTRODUCTION

This permit approval is based on the permit application dated December 2, 2011, July 20, 2012, August 30, 2016 and June 6, 2017, including amendment information dated January 9, 2012, April 2, 2012, April 13, 2012, August 13, 2012, September 11, 2012, and October 10, 2016 and supplemental information dated July 6 and 27, 2017. Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. In addition, this facility may be subject to additional applicable requirements not listed in this permit.

Words or terms used in this permit shall have meanings as provided in 9 VAC 5-10-10 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ or the Board for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

**Equipment List** - Equipment at this facility consists of the following:

| **Equipment included in the project:** | | | |
|---|---|---|---|
| **Reference No.** | **Equipment Description** | **Rated Capacity** | **Federal Delegated Requirements** |
| 1 | Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2 | 2,446 kW/3280 hp (engine rating) | None |
| 2 | Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2 | 2,446 kW/3280 hp (engine rating) | None |
| 3 | Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2 | 2,446 kW/3280 hp (engine rating) | None |

| Equipment included in the project: | | | |
|---|---|---|---|
| **Reference No.** | **Equipment Description** | **Rated Capacity** | **Federal Delegated Requirements** |
| 4 | Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2 | 2,446 kW/3280 hp (engine rating) | None |
| 5 | Cummins Model DQKAC diesel generator, engine model QSK60-G14 NR2 | 2,446 kW/3280 hp (engine rating) | None |

| Equipment permitted prior to the date of this permit: | | | |
|---|---|---|---|
| **Reference No.** | **Equipment Description** | **Rated Capacity** | **Federal Delegated Requirements** |
| 14 | Caterpillar diesel emergency generator, engine Model 3512C | 1,645 kW/2206 hp (engine rating) | None |
| 15 | Caterpillar diesel emergency generator, engine Model 3512C | 1,645 kW/2206 hp (engine rating) | None |

| Equipment Exempt from Permitting | | | |
|---|---|---|---|
| **Reference No.** | **Equipment Description** | **Rated Capacity** | **Exemption Citation 9 VAC 5-80-** |
| 6 | Lochinvar Crest FBN3000 natural gas boiler | 3.0 MMBtu/hr | 1105 B.1 |
| 7 | Lochinvar Crest FBN3000 natural gas boiler | 3.0 MMBtu/hr | 1105 B.1 |
| 8 | Pressure storage tank (diesel) | 33,000 gal | 1105 B.8.e |
| 9 | Pressure storage tank (diesel) | 33,000 gal | 1105 B.8.e |
| 10 | Pressure storage tank (diesel) | 15,000 gal | 1105 B.8.e |
| 11 | Pressure storage tank (urea) | 15,000 gal | 1105 |
| 12 | Cummins diesel emergency generator | 250 kW | 1105 B.2.b |
| 13 | Pressure storage tank (diesel) | 300 gal | 1105 B.8.e |
| 16 | Storage tank (diesel) | 5,900 gal | 1105 B.8.e |
| 17 | Storage tank (diesel) | 5,900 gal | 1105 B.8.e |

Specifications included in the above tables are for informational purposes only and do not form enforceable terms or conditions of the permit.

## PROCESS REQUIREMENTS

1. **Storage** - The permittee is authorized to store only the petroleum product specified in the equipment list for each respective storage tank. A change in the materials stored may require a permit to modify and operate.
(9 VAC 5-80-1180)

2. **Emissions Controls** – Emissions shall be controlled by proper operation and maintenance of combustion equipment. The permittee shall develop, maintain, and have available to all operators good written operating procedures and a maintenance schedule for the engine-generator sets (Ref. Nos. 1-5, 14 and 15). These procedures shall be based on the manufacturer's recommendations, at minimum.
(9 VAC 5-80-1180)

3. **Emission Controls** – Nitrogen oxides ($NO_X$) emissions from the engine-generator sets (Ref. Nos. 14 & 15) shall be controlled by the following: electronic fuel injection, turbocharged engine, and an aftercooler. The permittee shall maintain documentation that demonstrates the control devices have been installed on the engine-generator sets.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

4. **Monitoring Devices** – The engine-generator sets (Ref. Nos. 1-5, 14 and 15) shall be equipped with non-resettable hour meters. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the generators are operating.
(9 VAC 5-80-1180)

## OPERATING LIMITATIONS

5. **Operating Hours** – Each engine-generator set (Ref. Nos. 1-5), shall not operate more than 1000 hours per year, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

6. **Operating Hours** – Each engine-generator set (Ref. Nos. 14 and 15), shall not operate more than 500 hours per year, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

7. **Fuel** - The approved fuel for the engine-generator sets (Ref. Nos. 1-5, 14 and 15) is distillate oil. A change in the fuel may require a permit to modify and operate.
(9 VAC 5-80-1180)

8. **Fuel** - The distillate oil shall meet the specifications below:

   DISTILLATE OIL which meets the ASTM D396 specification for numbers 1 or 2 fuel oil:

   Maximum sulfur content per shipment: **0.0015%**

   (9 VAC 5-80-1180)

9. **Fuel Certification** - The permittee shall obtain a certification from the fuel supplier with each shipment of distillate oil. Each fuel supplier certification shall include the following:

   a. The name of the fuel supplier;

   b. The date on which the distillate oil was received;

   c. The quantity of distillate oil delivered in the shipment;

   d. A statement that the distillate oil complies with the American Society for Testing and Materials specifications (ASTM D396) for numbers 1 or 2 fuel oil; and

   e. The sulfur content of the distillate oil.

   Fuel sampling and analysis, independent of that used for certification, as may be periodically required or conducted by DEQ may be used to determine compliance with the fuel specifications stipulated in Condition 8. Exceedance of these specifications may be considered credible evidence of the exceedance of emission limits.
   (9 VAC 5-80-1180)

## EMISSION LIMITS

10. **Process Emission Limits** - Emissions from the operation of the engine-generator sets (Ref. Nos. 1-5) shall not exceed the limits specified below:

| | | | | |
|---|---|---|---|---|
| Particulate Matter | 3.4 | lbs/hr | 1.7 | tons/yr |
| PM-10 | 3.4 | lbs/hr | 1.7 | tons/yr |
| Nitrogen Oxides (as $NO_2$) | 27.0 | lbs/hr | 13.5 | tons/yr |
| Carbon Monoxide | 94.4 | lbs/hr | 47.2 | tons/yr |
| Volatile Organic Compounds | 10.8 | lbs/hr | 5.4 | tons/yr |

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the

exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 5 and 8.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

11. **Process Emission Limits** - Emissions from the operation of the engine-generator sets (Ref. Nos. 14 and 15) shall not exceed the limits specified below:

| | | | | |
|---|---|---|---|---|
| Particulate Matter | 3.2 | lbs/hr | 0.8 | tons/yr |
| PM-10 | 3.2 | lbs/hr | 0.8 | tons/yr |
| Nitrogen Oxides (as $NO_2$) | 6.0 | *g/hp-hr** | 25.6 | tons/yr |
| Carbon Monoxide | 41.4 | lbs/hr | 10.3 | tons/yr |
| Volatile Organic Compounds | 3.2 | lbs/hr | 0.8 | tons/yr |

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 2, 3, 6, 7 and 8. *Grams/hp-hr limit is for each generator.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

12. **Visible Emission Limit** - Visible emissions from the engine-generator sets (Ref. Nos. 1-5, 14 and 15) each shall not exceed 10 percent opacity except during one six-minute period in any one hour in which visible emissions shall not exceed 20 percent opacity as determined by the EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during startup, shutdown, and malfunction.
(9 VAC 5-80-1180)

## RECORDS

13. **On Site Records** - The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the Director, Piedmont Region. These records shall include, but are not limited to:

    a. Annual hours of operation for each engine-generator set, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.

    b. All fuel supplier certifications.

    c. Scheduled and unscheduled maintenance and operator training.

d. Results of all stack tests, visible emission evaluations and performance evaluations.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.
(9 VAC 5-80-1180 and 9 VAC 5-50-50)

PROCESS REQUIREMENTS

14. **Emissions Testing** - The facility shall be constructed so as to allow for emissions testing upon reasonable notice at any time, using appropriate methods. Sampling ports shall be provided when requested at the appropriate locations and safe sampling platforms and access shall be provided.
(9 VAC 5-50-30 F and 9 VAC 5-80-1180)

NOTIFICATIONS

15. **Initial Notifications** - The permittee shall furnish written notification to the Piedmont Regional Office of the actual start-up date of the engine-generator sets (Ref. Nos. 14 and 15) within 15 days after such date.
(9 VAC 5-50-50 and 9 VAC 5-80-1180)

GENERAL CONDITIONS

16. **Permit Invalidation** – This permit to construct the engine-generator sets (Ref. Nos. 14 and 15) shall become invalid, unless an extension is granted by the DEQ, if:

a. A program of continuous construction or modification is not commenced within 9 months from the date of this permit.

b. A program of construction or modification is discontinued for a period of 18 months or more, or is not completed within a reasonable time, except for a DEQ approved period between phases of the phased construction of a new stationary source or project.

(9 VAC 5-80-1210)

17. **Permit Suspension/Revocation** - This permit may be suspended or revoked if the permittee:

a. Knowingly makes material misstatements in the permit application or any amendments to it;

b. Fails to comply with the conditions of this permit;

c. Fails to comply with any emission standards applicable to a permitted emissions unit, ;

d. Causes emissions from the stationary source which result in violations of, or interfere with the attainment and maintenance of, any ambient air quality standard; or

e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emission limitations, in the State Implementation Plan in effect at the time an application for this permit is submitted.

(9 VAC 5-80-1210 F)

18. **Right of Entry** - The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;

b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations; and

d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.
(9 VAC 5-170-130 and 9 VAC 5-80-1180)

19. **Maintenance/Operating Procedures** – At all times, including periods of start-up, shutdown, and malfunction, the permittee shall, to the extent practicable, maintain and operate the affected source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

The permittee shall take the following measures in order to minimize the duration and frequency of excess emissions, with respect to air pollution control equipment and process equipment which affect such emissions:

a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.

b. Maintain an inventory of spare parts.

c. Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.

d. Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures, prior to their first operation of such equipment. The permittee shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training.

Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.
(9 VAC 5-50-20 E and 9 VAC 5-80-1180 D)

20. **Record of Malfunctions** – The permittee shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.
(9VAC 5-20-180 J and 9 VAC 5-80-1180 D)

21. **Notification for Facility or Control Equipment Malfunction** - The permittee shall furnish notification to the Director, Piedmont Region of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour, by facsimile transmission, telephone or telegraph. Such notification shall be made as soon as practicable but no later than four daytime business hours after the malfunction is discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within two weeks of discovery of the malfunction. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the Director, Piedmont Region.
(9 VAC 5-20-180 C and 9 VAC 5-80-1180)

22. **Violation of Ambient Air Quality Standard** - The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9 VAC 5-20-180 I and 9 VAC 5-80-1180)

23. **Change of Ownership** - In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current permit issued to the previous owner. The new owner shall notify the Director, Piedmont Region of the change of ownership within 30 days of the transfer.
(9 VAC 5-80-1240)

24. **Permit Copy** - The permittee shall keep a copy of this permit on the premises of the facility to which it applies.
(9 VAC 5-80-1180)

# ENGINEERING ANALYSIS- Minor NSR Permit

Source Name **Bank of America National Association** Registration No **52403-5**

Source Location: **Sandston, Virginia**

Date **July 12, 2017** Permit Writer Initials **JH**

---

## I. Introduction and Background

### A. Company Background

Bank of America National Association is a banking and data center located at 6050 Elko Tract Road in Sandston, Virginia. The facility is a synthetic minor source for NOx The facility is located in an attainment area for all criteria pollutants, and is in a VOC and $NO_x$ Emission Control Areas

The facility is located on a site that is suitable from an air pollution standpoint An air inspection has not been conducted at the facility to date Additionally, this facility is not a Greenfield site and the permit is not for a major modification, therefore the county Local Government Ordinance Form was not required. This permit action will supersede the permit dated October 12, 2016

### B. Proposed Project Summary

The Bank of America has requested a permit amendment to update the permit for generators Ref. Nos. 1-5 to reflect emission factors based on manufacturer data not to exceed emission rates.

**C. Process and Equipment Description-** No equipment will be constructed as a result of the proposed project.

### D. Project Schedule

Date permit application received in region: 6/14/17
Date application was deemed complete: 7/6/17
Proposed construction commencement date None provided
Proposed start-up date None provided

## II. Emissions Calculations- see attached spreadsheets which include the details on the basis of emissions.

## III. Regulatory Review

The proposed project is not applicable to Article 6 permitting because the emission increase is below project exemption levels This permit action is considered a significant amendment because it required a case-by-case determination of an emission limitation as described in 9 VAC 5-80-1290

The generators were manufactured after April 1, 2006, have a displacement less than 30 liters per cylinder and are compression ignition (CI) engines, thus are subject to NSPS Subpart IIII The letter from Cummins Power Generation dated January 24, 2012 that was submitted with the application indicates that the generators will meet EPA Tier 4 standards with the recommended not to exceed limits provided The generators are reciprocating internal combustion engine and

are being operated at an area source of HAP emissions therefore, the generators are subject to MACT Subpart ZZZZ Owner/operators may demonstrate compliance with the MACT by complying with NSPS Subpart IIII However, Virginia has not accepted delegation to enforce the NSPS or the MACT for area HAP sources

A Criteria Pollutants - No modeling is required because the proposed project is not subject to Article 6 permitting.

B Toxic Pollutants - The generators are an affected source under a MACT, therefore the source is specifically exempt per 9 VAC 5-60-300 C. 5 and 7, and 9 VAC 5-80-1105 F

C Control Technology- The emissions increases from the generators are below project exemption levels, therefore, they are not subject to BACT and do not require a review of control technology.

## IV. Initial Compliance Determination (including references)

A Stack Testing – None required

B VEEs – None required.

## V. Continuing Compliance Determination

A CEMS – CEMS are not required for this source type

B Recordkeeping- there have been no changes made to the permit.

C Further VEE testing may be required if there are any compliance issues with the facility.

## VI. Public Participation

No public comment period is required for a minor NSR permit action and no public interest in project has been indicated

## VII. Other Considerations

A File Consistency Review – The facility's files, including permit and compliance records, were reviewed for this permit action Because the initial notifications for actual construction and anticipated start-up have been received for generators 14 and 15 they have been removed from the permit

B PRO Policy Consistency Review – The permit conforms to the latest boilerplate format

C Confidentiality – The source did not request that any information be kept confidential

D. Permit History –

October 12, 2016 – NSR modification for the construction and operation of two generators (Ref. Nos 14 and 15) Supersedes September 25, 2012 and June 5, 2012 permits

September 25, 2012 – NSR modification for construction of generator, increase in operating hours and facility name change.

June 5, 2012 (superseded) – NSR permit issued to construct and operate 5 diesel generators

## VIII. Recommendations

Based on the information submitted, it is recommended that this permit be issued.

Regional Engineer. Jennifer Haffner Date July 12, 2017

Reviewing Engineer Date: 8/1/2017

| | | | |
|---|---|---|---|
| Company Name | Bank of America National Association | Date | 07/05/17 |
| Source Location | Sandston | Engineer | JH |
| Registration No | 52403 | Diesel Generators | |

Sulfur Content 0 0015 % (by weight)

| Unit Ref No | MRC (kW) | MRC (hp) | MRC (MMBtu/hr) | Hours of Oper (hrs/yr) | Emission Factors (lb/kW-hr) | | | | | | Hourly Emissions (lb/hr) | | | | | | Permitted Criteria Pollutant Emissions (tons/yr) | | | | | | New Uncontrolled Emissions (tons/yr) | | | | | | Current Uncontrolled Emissions (tons/yr) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ |
| 1 | 2,250 | 3,280 | 19 4 | 1000 | 0 0003 | 0 0003 | 0 000 | 0 0077 | 0 0009 | 0 002 | 0 62 | 0 62 | 0 03 | 17 36 | 1 98 | 4 96 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 2 | 2,250 | 3,280 | 19 4 | 1000 | 0 0003 | 0 0003 | 0 000 | 0 0077 | 0 0009 | 0 002 | 0 62 | 0 62 | 0 03 | 17 36 | 1 98 | 4 96 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 3 | 2,250 | 3,280 | 19 4 | 1000 | 0 0003 | 0 0003 | 0 000 | 0 0077 | 0 0009 | 0 002 | 0 62 | 0 62 | 0 03 | 17 36 | 1 98 | 4 96 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 4 | 2,250 | 3,280 | 19 4 | 1000 | 0 0003 | 0 0003 | 0 000 | 0 0077 | 0 0009 | 0 002 | 0 62 | 0 62 | 0 03 | 17 36 | 1 98 | 4 96 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 5 | 2,250 | 3,280 | 19 4 | 1000 | 0 0003 | 0 0003 | 0 000 | 0 0077 | 0 0009 | 0 002 | 0 62 | 0 62 | 0 03 | 17 36 | 1 98 | 4 96 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 31 | 0 31 | 0 01 | 8 68 | 0 99 | 2 48 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| | | | | Total | 3.10 | 3.10 | 0 14 | 86.81 | 9.92 | 24 80 | 1.55 | 1 55 | 0 07 | 43 40 | 4 96 | 12 40 | 1 6 | 1 6 | 0 1 | 43 4 | 5 0 | 12.4 | 1 2 | 1.2 | 0.1 | 87 | 5 0 | 16 6 | | | | | | |

References

(1) PM, PM-10, CO, VOC and NOx emission factors are from manufacturer specifications not to exceed emission rates dated January 24, 2012

| | |
|---|---|
| PM | 0 125 g/kW-hr |
| PM-10 | 0 125 g/kW-hr |
| CO | 3 5 g/kW-hr |
| VOC | 0 40 g/kW-hr |
| Nox | 1 g/kW-hr |

(2) Assume PM10 equals PM
(3) Sulfur emissions based on AP-42 Table 3 4-1 dated 10/96 Emission Factors for Large Stationary Diesel Engines
(4) conversion grams to pounds 453 60 g/lb

**March 19, 2013 Stack Test Results**

| | lb/hr* | lb/hr** |
|---|---|---|
| PM | 0 08 | 0 42 |
| CO | 0 68 | 3 40 |
| VOC | 0 11 | 0 53 |
| NOx | 2 44 | 12 2 |

* Emissions based on one generator
** Emissions based on 5 generators

## CURRENT UNCONTROLLED EMISSIONS

Emissions based on October 12, 2016 NSR permit

| Unit Ref No | MRC (kW) | MRC (hp) | MRC (MMBtu/hr) | Hours of Oper (hrs/yr) | Emission Factors (lb/kW-hr) | | | | | | Hourly Emissions (lb/hr) | | | | | | Current Uncontrolled Emissions (tons/yr) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ |
| 1 | 2,250 | 3,280 | 19 4 | 1000 | 0 0002 | 0 0002 | 0 000 | 0 0015 | 0 0009 | 0 003 | 0 50 | 0 50 | 0 03 | 3 47 | 1 98 | 6 65 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 2 | 2,250 | 3,280 | 19 4 | 1000 | 0 0002 | 0 0002 | 0 000 | 0 0015 | 0 0009 | 0 003 | 0 50 | 0 50 | 0 03 | 3 47 | 1 98 | 6 65 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 3 | 2,250 | 3,280 | 19 4 | 1000 | 0 0002 | 0 0002 | 0 000 | 0 0015 | 0 0009 | 0 003 | 0 50 | 0 50 | 0 03 | 3 47 | 1 98 | 6 65 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 4 | 2,250 | 3,280 | 19 4 | 1000 | 0 0002 | 0 0002 | 0 000 | 0 0015 | 0 0009 | 0 003 | 0 50 | 0 50 | 0 03 | 3 47 | 1 98 | 6 65 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| 5 | 2,250 | 3,280 | 19 4 | 1000 | 0 0002 | 0 0002 | 0 000 | 0 0015 | 0 0009 | 0 003 | 0 50 | 0 50 | 0 03 | 3 47 | 1 98 | 6 65 | 0 25 | 0 25 | 0 01 | 1 74 | 0 99 | 3 32 |
| | | | | Total | 2 48 | 2.48 | 0 14 | 17 36 | 9.92 | 33.23 | 1.24 | 1.24 | 0.07 | 8.68 | 4.96 | 16.62 | | | | | | |

References

(1) CO and NOx emission factors are from manufacturer specifications and include a 100% factor of safety
PM, PM-10 and VOC emission factors are based on NSPS

| | | |
|---|---|---|
| PM | 0 1 g/kW-hr | NSPS |
| PM-10 | 0 1 g/kW-hr | NSPS |
| CO | 0 7 g/kW-hr | |
| VOC | 0 40 g/kW-hr | NSPS |
| Nox | 1 34 g/kW-hr | |

(2) Assume PM10 equals PM
(3) PM, PM-10 and VOC manufacturer specifications were above the NSPS standard therefore, the standard was used as the emission factor
(4) Sulfur emissions based on AP-42 Table 3 4-1 dated 10/96 Emission Factors for Large Stationary Diesel Engines

Company Name Bank of America National Association Date 09/27/16
Source Location Sandston Engineer JH
Registration No 52403 Diesel Generators

Sulfur Content 0 0015 % (by weight)

| Unit Ref. No | MRC (kW) | MRC (hp) | MRC (MMBtu/hr) | Hours of Oper (hrs/yr) | Emission Factors (lb/hp-hr) | | | | | | Hourly Emissions (lb/hr) | | | | | | Uncontrolled Emissions (tons/yr) | | | | | | Annual Emissions (tons/yr) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ | PM | $PM_{10}$ | $SO_2$ | CO | VOC | $NO_X$ |
| 14 | 1 645 | 2,206 | | 500 | 0 0006 | 0 0006 | 0 000 | 0 0075 | 0 0007 | 0 019 | 1 58 | 1 58 | 0 03 | 20 67 | 1 56 | 51 19 | 0 32 | 0 32 | 0 01 | 4 13 | 0 39 | 10 24 | 0 40 | 0 40 | 0 01 | 5 17 | 0 39 | 12 80 |
| 15 | 1,645 | 2,206 | | 500 | 0 0006 | 0 0006 | 0 000 | 0 0075 | 0 0007 | 0 019 | 1 58 | 1 58 | 0 03 | 20 67 | 1 56 | 51 19 | 0 32 | 0 32 | 0 01 | 4 13 | 0 39 | 10 24 | 0 40 | 0 40 | 0 01 | 5 17 | 0 39 | 12 80 |
| | | | | | | | | | Total: | | 3.16 | 3.16 | 0 05 | 41.34 | 3.11 | 102.37 | 0 63 | 0 63 | 0.01 | 8.27 | 0 78 | 20 47 | 0 8 | 0.8 | 0 0 | 10.3 | 0.8 | 25.6 |

References

| Manufacturer nominal worse case emissions data | | | Nominal emission factor |
|---|---|---|---|
| PM | 0 001 lb/hp hr | PM | 1 26 lb/hr |
| CO | 0 01 lb/hp hr | CO | 16 54 lb/hr |
| NMHC + NOx | 0 01856 lb/hp hr | NMHC + NOx | 40 95 lb/hr |

(1) lb/hr PM, CO & Nox emissions based on manufacturer nominal worse case + 25% (per diesel engine procedures)
(2) SO2 & VOC emissions based on AP-42 Table 3 4-1 dated 10/96 Emission Factors for Large Stationary Diesel Engines
(3) Assume PM10 equals PM
(4) Uncontrolled PM, CO, & NOx emissions based on manufacturer nominal worse case load/pollutant (per diesel engine procedures)
(5) annual PM, CO & Nox emissions based on manufacturer nominal worse case + 25% (per diesel engine procedures)
(6) conversion grams to pounds 453 60 g/lb

| Tier 2 standards | | Converted (1kW = 1 341 hp) | |
|---|---|---|---|
| PM | 0 2 g/kW-hr | PM | 0 15 g/hp hr |
| CO | 3 5 g/kW-hr | CO | 2 61 g/hp hr |
| NMHC + NOx | 6 4 g/kW-hr | NMHC + NOx | 4 77 g/hp hr |

**Diesel Generators (1-5)** Input: 19.4 MMBtu/hr Hours of operation: 1000 hr/yr

| CO2 | | | | | | Methane | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Emission Factor | | | tons/yr | 5 units | | Emission Factor | | | tons/yr | 5 units | |
| 165 | lb/mmbtu | | 1600 5 | 8,003 | | 0.09 | lb/mmbtu | | 0.8730 | 4 3650 | |
| GWP factc | 1 | CO2e | 1,600.5 | 8,003 | | GWP factc | 21 | CO2e | 18.33 | 92 | |

| Total CO2e tpy | |
|---|---|
| Per Unit | Total Units |
| 1,619 | 8,094 |

Emission factors from AP-42 Table 3.41
No factor for N2O could be found for diesel generators
SF6, HFC and PFC are not typically emitted from fuel combustion
GWP factor see 40 CFR Part 98, Subpart A, Table A-1

**ATTACHMENT 2-3**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES
LOCATED AT THE MOUNTRAIL WILLIAMS ELECTRIC COOPERATIVE FACILITY

NORTH Dakota | Environmental Quality
Be Legendary.™

May 29, 2019

FILE

Mr. Dale Haugen
Mountrail Williams Electric Cooperative
P.O. Box 1346
Williston, ND 58802

Re: Peaking Units

Dear Mr. Haugen:

We have reviewed the information received May 28, 2019 for the installation/operation of two peaking units at the Mountrail Williams Electric Cooperative facility located at 218 - 58th Street SW in Williston, ND. Based upon the information submitted, the Department has determined that the facility is an air pollution source of minor significance and a Permit to Construct is not required per Subdivision 33-15-14-02.13.n of the North Dakota Air Pollution Control Rules. This determination is contingent upon the following conditions:

1. Construction/operation of the facility (with respect to sources of air pollution) shall be in accordance with information provided to the Department as well as any plans, specifications and supporting data submitted to the Department. The Department shall be notified ten days in advance of any significant deviations from the specifications furnished. This determination may be invalidated if the Department determines that a significant deviation from the plans and specifications furnished has been or is to be made.

2. Even though a permit is not required, emissions from your facility must still comply with the applicable requirements of the rules. This includes the applicable requirements of 40 CFR 60, Subpart IIII. The Department is the implementing/enforcement agency for the requirements of Subpart IIII and any required reports should be submitted to our Department at the address on this letter or by email at AirQuality@nd.gov.

Note that the above determination only pertains to air quality requirements. Other divisions (Water Quality, Waste Management and Municipal Facilities) within the Department may have additional requirements. Contact information for the various divisions is listed at the bottom of this letter.

If you should have any questions, feel free to contact me at 701-328-5198 or cthorstenson@nd.gov.

Sincerely,

Craig D. Thorstenson
Environmental Engineer
Division of Air Quality

CDT:csc

# PERMIT APPLICATION FOR AIR CONTAMINANT SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8516 (06-13)


## SECTION A - FACILITY INFORMATION

| | | |
|---|---|---|
| Name of Firm or Organization<br>Mountrail Williams Electric Cooperative | | |
| Contact Person for Air Pollution Matters<br>Dale Haugen | | |
| Title<br>General Manager | Telephone Number<br>(701) 770-0755 | E-mail Address<br>dhaugen@mwec.com |
| Applicant's Name<br>Dale Haugen | | |
| Title<br>General Manager | Telephone Number<br>(701) 770-0755 | E-mail Address<br>dhaugen@mwec.com |
| Mailing Address (Street & No.)<br>PO Box 1346 | | |
| City<br>Williston | State<br>ND | ZIP Code<br>58802 |
| Facility Address (Street & No.)<br>218 58th St W | | |
| City<br>Williston | State<br>ND | ZIP Code<br>58102 |

| | | |
|---|---|---|
| County<br>Williams | Latitude (Nearest Second)<br>48.147 N | Longitude (Nearest Second)<br>103.6180 W |

| | | |
|---|---|---|
| Legal Description of Facility Site<br>_____¼ _____¼,<br>_____ Section _____ Twp. _____ Range | Land Area at Facility Site<br>Acres (or)<br>20.4 Ac (campus) Sq. Ft. | MSL Elevation at Facility |

## SECTION B – GENERAL NATURE OF BUSINESS

| Describe Nature of Business | North American Industry Classification System Number | Standard Industrial Classification Number (SIC) |
|---|---|---|
| Headquarters Office | 551114 | |
| Electric Utility | | 4911 |
| | | |
| | | |

## SECTION C – GENERAL PERMIT INFORMATION

| | |
|---|---|
| Type of Permit? Permit to Construct (PTC) ☑ Permit to Operate (PTO) ☑ | |
| If application is for a Permit to Construct, please provide the following data: | |
| Planned Start Construction Date<br>2018 | Planned End Construction Date<br>10/1/2019 |

## SECTION D – SOURCE IDENTIFICATION AND CATEGORY OF EACH SOURCE INCLUDED ON THIS PERMIT APPLICATION

| | | Permit to Construct | | | | Minor Source Permit to Operate | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Your Source ID Number | Source or Unit (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.) | New Source | Existing Source Modification | Existing Source Expansion | Existing Source Change of Location | New Source | Existing Source Initial Application | Existing Source After Modification | Existing Source After Expansion | Existing Source After Change of Location | Existing Source After Change of Ownership | Other |
| 1 | Generator 1 | ☑ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2 | Generator 2 | ☑ | ☐ | ☐ | ☐ | ☑ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Add additional pages if necessary

## SECTION E – IDENTIFICATION OF AIR CONTAMINANTS

Check all which are emitted in measurable quantities into the atmosphere from any operation at facility

| | | | |
|---|---|---|---|
| ☐ Arsenic | ☐ Chlorine Compounds | ☑ Sulfur Compounds | ☐ Radioisotopes |
| ☐ Asbestos | ☐ Chromium Compounds | ☐ Hydrogen Sulfide | ☐ Visible Emissions |
| ☐ Beryllium | ☐ Fluoride Compounds | ☑ Odors | ☑ Particulates (specify) |
| ☐ Cadmium | ☐ Volatile Organic Compounds | ☑ Carbon Monoxide | ☐ Dust |
| ☐ Lead | ☑ Other Organic Compounds | ☑ Nitrogen Compounds | ☐ Silica |
| ☐ Mercury | ☑ Greenhouse Gases ($CO_2e$) | ☐ Pesticides | ☐ Other (specify) |

List Specific Compounds
Agglomerated Carbon

| Has Source Testing Been Done at the Facility? | Last Date when a Testing Program was Completed | If Program is Continuous, Give Approximate Testing Frequency |
|---|---|---|
| ☐ Yes ☑ No | | |

## SECTION F1 – ADDITIONAL FORMS

Indicate which of the following forms are attached and made part of the application

| | |
|---|---|
| ☐ Air Pollution Control Equipment (SFN 8532) | ☐ Fuel Burning Equipment Used for Indirect Heating (SFN 8518) |
| ☐ Construct/Operate Incinerators (SFN 8522) | ☐ Hazardous Air Pollutant (HAP) Sources (SFN 8329) |
| ☐ Natural Gas Processing Plants (SFN 11408) | ☐ Manufacturing or Processing Equipment (SFN 8520) |
| ☐ Glycol Dehydration Units (SFN 58923) | ☐ Volatile Organic Compounds Storage Tank (SFN 8535) |
| ☐ Flares (SFN 59652) | ☑ Internal Combustion Engines and Turbines (SFN 8891) |
| ☐ Rock, Sand, and Gravel Plants (SFN 8530) | ☐ Oil/Gas Production Facility Registration (SFN 14334) |
| ☐ Asphalt Concrete Plants (SFN 8526) | ☐ Grain, Feed, and Fertilizer Operations (SFN 8524) |

## SECTION F2 – OTHER ATTACHMENTS INCLUDED AS PART OF THIS APPLICATION

| | | | |
|---|---|---|---|
| 1. | SFN 8532 | 4. | EPA Certificate KCPXL78.1NSF-015 |
| 2. | SFN 8891 | 5. | CAT Performance Data |
| 3. | CAT Engine Emission Data | 6. | |

I, the undersigned applicant, am fully aware that statements made in this application and the attached exhibits and statements constitute the application for Permit(s) to Construct and/or Operate Air Contaminant sources from the North Dakota Department of Health and certify that the information in this application is true, correct and complete to the best of my knowledge and belief. Further, I agree to comply with the provisions of Chapter 23-25 of the North Dakota Century Code and all rules and regulations of the Department, or revisions thereof. I also understand the permit is nontransferable and, if granted a permit, I will promptly notify the Department upon sale or legal transfer of this permitted establishment.

| Signature of Applicant | Date |
|---|---|
| Dale L. Haugen | 5/14/19 |

# PERMIT APPLICATION FOR INTERNAL COMBUSTION ENGINES AND TURBINES

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8891 (09-12)

## SECTION A – GENERAL INFORMATION

| | | |
|---|---|---|
| Name of Firm or Organization<br>Mountrail Williams Electric Cooperative | | |
| Applicant's Name<br>Dale Haugen | | |
| Title<br>General Manager | Telephone Number<br>701 770 0755 | E-mail Address<br>dhaugen@@MWEC.com |
| Mailing Address (Street & No.)<br>PO Box 1346 | | |
| City<br>Williston | State<br>ND | ZIP Code<br>58802 |
| Contact Person for Air Pollution Matters<br>Dale Haugen | | |
| Title<br>General Manager | Telephone Number<br>701 770 0755 | E-mail Address<br>dhaugen@mwec.com |

## SECTION B – FACILITY AND UNIT INFORMATION

| | | |
|---|---|---|
| Facility Location<br>218 58th St W, Williston, ND | | |
| County<br>Williams | Source ID Number (From SFN 8516)<br>1 | |
| Type of Unit (check all that apply) | ☐ Stationary Natural Gas-Fired Engine<br>■ Stationary Diesel and Dual Fuel Engine<br>☐ Stationary Gasoline Engine<br>☐ Stationary Natural Gas-Fired Turbine | ☐ Emergency Use Only<br>☐ Non-Emergency Use<br>■ Peaking<br>☐ Demand Response |
| | ☐ Other – Specify: | |

## SECTION C – MANUFACTURER DATA

| | | | |
|---|---|---|---|
| Make<br>Caterpillar | Model<br>3516C (Part # 516DLR2) | | Date of Manufacture<br>2018/2019 |
| Reciprocating Internal Combustion Engine | | | |
| ☐ Spark Ignition | | ■ Compression Ignition | |
| ■ 4 Stroke ☐ 2 Stroke | | ☐ Rich Burn ☐ Lean Burn | |
| Maximum Rating (BHP @ rpm)<br>2944 @ 1800 | | Operating Capacity (BHP @ rpm)<br>2944 @ 1800 | |
| Engine Subject to:<br>■ 40 CFR 60, Subpart IIII ☐ 40 CFR 60, Subpart JJJJ ■ 40 CFR 63, Subpart ZZZZ | | | |
| Turbine | | Dry Low Emissions? ☐ Yes ☐ No | |
| Heat Input (MMBtu/hr) | Maximum Rating (HP) | 75% Rating (HP) | Efficiency |
| Turbine Subject to: ☐ 40 CFR 60, Subpart GG ☐ 40 CFR 60, Subpart KKKK | | | |

## SECTION D – FUELS USED

| | | |
|---|---|---|
| Natural Gas ($10^6$ cu ft/year) | Percent Sulfur | Percent $H_2S$ |
| Oil (gal/year)<br>400 | Percent Sulfur<br>0.5 | Grade No.<br>#1 |
| LP Gas (gal/year) | Other – Specify: | |

## SECTION E – NORMAL OPERATING SCHEDULE

| Hours Per Day | Days Per Week | Weeks Per Year | Hours Per Year | Peak Production Season (if any) |
|---|---|---|---|---|
| | | | 100 | |

## SECTION F – STACK PARAMETERS

| Emission Point | | Stack Height Above Ground Level (feet) | |
|---|---|---|---|
| 1 | | 18 (estimated) | |
| Stack Diameter (feet at top) | Gas Discharged (SCFM) | Exit Temp (°F) | Gas Velocity (FPS) |
| | 16,301.3 | 1205.6 | 5806.5 FT3/Min |

## SECTION G – EMISSION CONTROL EQUIPMENT

Is any emission control equipment installed on this unit?

☐ No ☒ Yes – Complete and attach form SFN 8532

## SECTION H – MAXIMUM AIR CONTAMINANTS EMITTED

| Emission Point | Pollutant | Maximum Pounds Per Hour | Amount (Tons Per Year) | Basis of Estimate* |
|---|---|---|---|---|
| 1 & 2 | $NO_x$ | 2.54 | 508 | Manufacturer |
| 1 & 2 | CO | 0.16 | 32 | Manufacturer |
| 1 & 2 | PM | 0.08 | 16 | Manufacturer |
| NA | $PM_{10}$ (filterable and condensable) | N/A | | Manufacturer |
| NA | $PM_{2.5}$ (filterable and condensable) | N/A | | Manufacturer |
| NA | $SO_2$ | N/A | | Manufacturer |
| NA | VOC | N/A | | Manufacturer |
| 1 & 2 | GHG (as $CO_2e$) | 3,178 | 635,600 | Manufacturer |
| 1 & 2 | Formaldehyde | 0.02 PPM | 4 | Manufacturer |
| | Total HAPS** | N/A | | |

* If performance test results are available for the unit, submit a copy of test with this application

** Total HAPS includes formaldehyde

| IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS? ☒ YES ☐ NO | If "NO" a Compliance Schedule must be completed and attached. |
|---|---|

| Signature of Applicant | Date |
|---|---|
| Dale L. Haugen | 5/14/19 |

Attach and label separate sheet(s) if you need more space to explain any system or answers or to provide complete listings of Emissions, Contaminants, or other items.

SEND COMPLETED APPLICATION AND ALL ATTACHMENTS TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

# PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8532 (09-12)

NOTE: READ INSTRUCTIONS BEFORE COMPLETING THIS FORM.

## SECTION A – GENERAL INFORMATION

| | | |
|---|---|---|
| Name of Firm or Organization<br>Mountrail Williams Electric Cooperative | | |
| Applicant's Name<br>Dale Haugen | | |
| Title<br>General Manager | Telephone Number<br>1 800 279 2667 | E-mail Address<br>dhaugen@mwec.com |
| Mailing Address (Street & No.)<br>PO Box 1346 | | |
| City<br>Williston | State<br>ND | ZIP Code<br>58802 |

## SECTION B – FACILITY INFORMATION

| | | |
|---|---|---|
| Facility Name<br>Mountrail Williams Electric Cooperative | | |
| Contact Person for Air Pollution Matters<br>Dale Haugen | | |
| Title<br>General Manager | Telephone Number<br>1 800 279 2667 | E-mail Address<br>dhaugen@mwec.com |
| Facility Location<br>Williston, ND | | Source ID No. |

## SECTION C – EQUIPMENT

Type: ☐ Cyclone ☐ Multiclone ☐ Baghouse ☐ Electrostatic Precipitator
☐ Wet Scrubber ☐ Spray Dryer ☒ Other – Specify:
Selective Catalytic Reduction (SCR)

| | | |
|---|---|---|
| Name of Manufacturer<br>Caterpillar | Model Number<br>Clean Emission Module | Date to Be Installed<br>TBD |

Application: ☐ Boiler ☐ Kiln ☒ Engine ☐ Other – Specify:

| | | | | |
|---|---|---|---|---|
| Pollutants Removed | | | | |
| Design Efficiency (%) | | | | |
| Operating Efficiency (%) | | | | |

Describe method used to determine operating efficiency:

Please find the attached information for the CAT Tier 4 Final Certified Systems.
Because this is complete certified system, CAT can only provide the certifications and data for the complete engine and emission systems.
The EPA Certification is provided to confirm that the Manufacturer is in compliance

## SECTION D – GAS CONDITIONS

| Gas Conditions | | | Inlet | Outlet |
|---|---|---|---|---|
| Gas Volume (SCFM; 68°F; 14.7 psia) | | | | |
| Gas Temperature (°F) | | | | |
| Gas Pressure (in. $H_2O$) | | | | |
| Gas Velocity (ft/sec) | | | | |
| Pollutant Concentration (Specify Pollutant and Unit of Concentration) | Pollutant | Unit of Concentration | | |
| | | | | |
| | | | | |
| Pressure Drop Through Gas Cleaning Device (in. $H_2O$) | | | | |

| Signature of Applicant | Date |
|---|---|
| Dale L. Haugen | 5/14/19 |

# INSTRUCTIONS FOR PERMIT APPLICATION FOR AIR POLLUTION CONTROL EQUIPMENT

1. Complete this form for each piece of equipment or process, which has air pollution control equipment installed, described in the following Permit Applications: Hazardous Air Pollutant (HAP) Sources (SFN 8329), Fuel Burning Equipment for Indirect Heating (SFN 8518); Manufacturing or Processing Equipment (SFN 8520); Incinerators/Crematories (SFN 8522); Internal Combustion Engines and Turbines (SFN 8891); and Glycol Dehydration Units (SFN 58923). Print or type all information. If an item does not apply, place NA in the appropriate space.

2. Type of Equipment - If the type is not one of those listed; provide enough information so the operating principal of the equipment can be determined.

3. List each pollutant which the device is intended to control, the efficiency of removal intended by the designer, and the actual efficiency under operating conditions.

4. Please attach the following:

   - A brief description and sketch of the air pollution control device if it is of unusual design, or used in conjunction with other control devices. Show any bypass of the device and specify the conditions under which the bypass is used.

   - A description of what is done with collected air contaminants from the time they are collected until they reach the final disposal point. Include a description of the transportation methods used.

   - If a stack test has been conducted, attach a copy of the results, date of the test, a description of the techniques used, and the name and address of the organization which performed the test.

5. If the control device is a combustor (e.g.: thermal oxidizer, vapor combustion unit, etc.), include an estimate of potential greenhouse gas emissions ($CO_2e$).

SUBMIT YOUR APPLICATION WITH ALL SUPPORTING DOCUMENTS, ALONG WITH THE FORMS SPECIFIED IN THE FIRST PARAGRAPH ABOVE, TO:

North Dakota Department of Health
Division of Air Quality
918 E Divide Ave., 2nd Floor
Bismarck, ND 58501-1947
(701) 328-5188

CATERPILLAR

# Engine Emissions Data

For Emissions / Certification feedback and questions, please submit a ticket via our ERC Request Portal

This emission data is Caterpillar's best estimate for this rating. If actual emissions are required then an emission test needs to be run on your engine.

| | |
|---|---|
| Serial Number (Machine) | |
| Serial Number (Engine) | **LY600126** |
| Sales Model | 3516C |
| Regulatory Build Date | 05-FEB-2019 |
| **As Shipped Data** | |
| Engine Arrangement Number | 5157722 |
| Certification Arrangement | |
| Test Spec Number | 4581574 |
| Regulatory Status | EPA Nonroad and EPA/ARB Stationary @ Constant Spd |
| Labeled Model Year | 2019 |
| EPA Family Code | KCPXL78.1NSF |
| EPA Emissions Level | EPA TIER 4f |
| Current Flash file | 5153556 |
| Flash File Progression | 5153556 |
| CORR FL Power at RPM | 3,064 HP (2,285.0 KW )1800 RPM |
| Advertised Power | 2,937 HP 1,800RPM |
| Total Displacement | 78.1 |

**Disclaimer:** The information provided has been compiled from third party sources and is accurate to the best of Caterpillar's knowledge. However, Caterpillar cannot guarantee the accuracy, completeness, or validity of the information and is not liable for any errors or omissions contained therein. All information provided should be independently verified and confirmed, including by examining the emissions label located on the engine.

Need emission replacement label? Click here!

Caterpillar Confidential: **Green**
Content Owner: Commercial Processes Division
Web Master(s): PSG Web Based Systems Support
Current Date: 04/19/2019 3:59:57 PM

# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
## 2019 MODEL YEAR
## CERTIFICATE OF CONFORMITY
## WITH THE CLEAN AIR ACT

**OFFICE OF TRANSP**
**AND AIR QUA**
**ANN ARBOR, MICHI**

: **Caterpillar Inc.**
(U.S. Manufacturer or Importer)

**KCPXL78.1NSF-015**

**Effective Date:**
**07/24/2018**

**Expiration Date:**
**12/31/2019**

**Byron J. Bunker, Division Director**
**Compliance Division**

Original Engine Manufacturer
XL78.1NSF

**Mobile/Stationary Indicator:** Both
**Emissions Power Category:** kW>900
**Fuel Type:** Diesel
**After Treatment Devices:** Diesel Oxidation Catalyst, Ammonia Slip Catalys Reduction
**Non-after Treatment Devices:** Electronic Control, Engine Design Modificat
**FELs:** PM 0.09 g/kW-hr

and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Parts 60 and 1039, and subject to the terms and conditions prescribed in / is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by e ocumentation required by 40 CFR Parts 60 and 1039 and produced in the stated model year.

rmity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines desc by 40 CFR Parts 60 and 1039 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Parts 60 a

icate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requ ay lead to revocation or suspension of this certificate for reasons specified in 40 CFR Parts 60 and 1039. It is also a term of this certificate that this certificate r oid *ab initio* for other reasons specified in 40 CFR Parts 60 and 1039.

cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

rmity is conditional upon compliance of said manufacturer with the averaging, banking and trading provisions of 40 CFR Part 1039, Subpart H. Failure to com his certificate void *ab initio*.

# PERFORMANCE DATA[DM9368]

April 26, 2019

**Performance Number: DM9368** **Change Level: 02**

| | | | |
|---|---|---|---|
| **SALES MODEL:** | 3516C | **COMBUSTION:** | DIRECT INJECTION |
| **BRAND:** | CAT | **ENGINE SPEED (RPM):** | 1,800 |
| **ENGINE POWER (BHP):** | 2,944 | **HERTZ:** | 60 |
| **GEN POWER WITH FAN (EKW):** | 2,000.0 | **FAN POWER (HP):** | 130.1 |
| **COMPRESSION RATIO:** | 14 | **ASPIRATION:** | TA |
| **RATING LEVEL:** | STANDBY | **AFTERCOOLER TYPE:** | ATAAC |
| **PUMP QUANTITY:** | 1 | **AFTERCOOLER CIRCUIT TYPE:** | JW+OC, ATAAC |
| **FUEL TYPE:** | DIESEL | **INLET MANIFOLD AIR TEMP (F):** | 113 |
| **MANIFOLD TYPE:** | DRY | **JACKET WATER TEMP (F):** | 210.2 |
| **GOVERNOR TYPE:** | ADEM4 | **TURBO CONFIGURATION:** | PARALLEL |
| **ELECTRONICS TYPE:** | ADEM4 | **TURBO QUANTITY:** | 4 |
| **CAMSHAFT TYPE:** | STANDARD | **TURBOCHARGER MODEL:** | GTB6041BN-48T-1.04 |
| **IGNITION TYPE:** | CI | **CERTIFICATION YEAR:** | 2011 |
| **INJECTOR TYPE:** | EUI | **FUEL RATE (RATED RPM) NO LOAD (GAL/HR):** | 16.4 |
| **REF EXH STACK DIAMETER (IN):** | 12 | **PISTON SPD @ RATED ENG SPD (FT/MIN):** | 2,539.4 |

| INDUSTRY | SUBINDUSTRY | APPLICATION |
|---|---|---|
| OIL AND GAS | LAND PRODUCTION | PACKAGED GENSET |
| ELECTRIC POWER | STANDARD | PACKAGED GENSET |

## General Performance Data

THE INLET MANIFOLD AIR TEMP LISTED IN THE HEADER, AND IN THE GENERAL PERFORMANCE DATA, IS THE AVERAGE INLET MANIFOLD TEMP FRONT TO REAR ON THE ENGINE.

| GENSET POWER WITH FAN | PERCENT LOAD | ENGINE POWER | BRAKE MEAN EFF PRES (BMEP) | BRAKE SPEC FUEL CONSUMPTN (BSFC) | VOL FUEL CONSUMPTN (VFC) | INLET MFLD PRES | INLET MFLD TEMP | EXH MFLD TEMP | EXH MFLD PRES | ENGINE OUTLET TEMP |
|---|---|---|---|---|---|---|---|---|---|---|
| EKW | % | BHP | PSI | LB/BHP-HR | GAL/HR | IN-HG | DEG F | DEG F | IN-HG | DEG F |
| 2,000.0 | 100 | 2,941 | 272 | 0.332 | 139.4 | 58.4 | 111.5 | 1,204.7 | 49.7 | 916.8 |
| 1,800.0 | 90 | 2,660 | 246 | 0.333 | 126.4 | 51.5 | 108.3 | 1,175.1 | 44.3 | 910.4 |
| 1,600.0 | 80 | 2,382 | 220 | 0.335 | 114.0 | 45.0 | 105.5 | 1,144.6 | 39.3 | 898.3 |
| 1,500.0 | 75 | 2,243 | 207 | 0.337 | 108.1 | 42.0 | 104.3 | 1,129.6 | 37.0 | 891.6 |
| 1,400.0 | 70 | 2,104 | 194 | 0.341 | 102.4 | 39.4 | 103.4 | 1,114.9 | 34.9 | 884.8 |
| 1,200.0 | 60 | 1,828 | 169 | 0.350 | 91.3 | 34.3 | 102.1 | 1,086.2 | 31.1 | 869.9 |
| 1,000.0 | 50 | 1,552 | 143 | 0.354 | 78.5 | 27.6 | 99.2 | 1,039.8 | 26.3 | 841.7 |
| 800.0 | 40 | 1,282 | 118 | 0.361 | 66.1 | 21.5 | 98.6 | 981.3 | 21.9 | 807.4 |
| 600.0 | 30 | 1,010 | 93 | 0.375 | 54.1 | 16.1 | 97.7 | 904.6 | 18.2 | 760.3 |
| 500.0 | 25 | 872 | 81 | 0.384 | 47.8 | 13.4 | 96.3 | 850.1 | 16.2 | 717.9 |
| 400.0 | 20 | 731 | 67 | 0.392 | 40.9 | 10.3 | 94.7 | 778.0 | 13.9 | 657.1 |
| 200.0 | 10 | 438 | 40 | 0.445 | 27.8 | 5.6 | 92.5 | 616.7 | 10.5 | 529.7 |

| GENSET POWER WITH FAN | PERCENT LOAD | ENGINE POWER | COMPRESSOR OUTLET PRES | COMPRESSOR OUTLET TEMP | WET INLET AIR VOL FLOW RATE | ENGINE OUTLET WET EXH GAS VOL FLOW RATE | WET INLET AIR MASS FLOW RATE | WET EXH GAS MASS FLOW RATE | WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG) | DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG) |
|---|---|---|---|---|---|---|---|---|---|---|
| EKW | % | BHP | IN-HG | DEG F | CFM | CFM | LB/HR | LB/HR | FT3/MIN | FT3/MIN |
| 2,000.0 | 100 | 2,941 | 63 | 370.0 | 6,117.8 | 16,296.7 | 26,679.4 | 27,655.5 | 5,821.1 | 5,313.4 |
| 1,800.0 | 90 | 2,660 | 56 | 346.3 | 5,649.7 | 14,919.1 | 24,540.7 | 25,426.4 | 5,353.9 | 4,890.6 |
| 1,600.0 | 80 | 2,382 | 49 | 322.3 | 5,233.5 | 13,623.3 | 22,636.4 | 23,434.5 | 4,932.6 | 4,514.1 |
| 1,500.0 | 75 | 2,243 | 46 | 310.4 | 5,044.5 | 13,036.8 | 21,779.2 | 22,536.4 | 4,743.5 | 4,345.6 |
| 1,400.0 | 70 | 2,104 | 43 | 299.9 | 4,872.6 | 12,509.4 | 21,010.6 | 21,728.4 | 4,574.6 | 4,195.7 |
| 1,200.0 | 60 | 1,828 | 38 | 278.9 | 4,529.8 | 11,461.7 | 19,497.9 | 20,136.8 | 4,238.6 | 3,897.3 |
| 1,000.0 | 50 | 1,552 | 31 | 249.0 | 4,081.8 | 10,058.8 | 17,503.2 | 18,052.8 | 3,800.4 | 3,505.0 |
| 800.0 | 40 | 1,282 | 24 | 220.0 | 3,648.3 | 8,709.5 | 15,591.9 | 16,054.7 | 3,379.6 | 3,128.5 |
| 600.0 | 30 | 1,010 | 18 | 191.9 | 3,264.0 | 7,477.9 | 13,930.3 | 14,309.0 | 3,013.6 | 2,804.2 |
| 500.0 | 25 | 872 | 16 | 176.6 | 3,074.2 | 6,792.8 | 13,112.0 | 13,446.6 | 2,836.3 | 2,648.4 |
| 400.0 | 20 | 731 | 12 | 158.5 | 2,849.6 | 5,937.6 | 12,132.8 | 12,419.2 | 2,614.1 | 2,450.9 |
| 200.0 | 10 | 438 | 7 | 131.6 | 2,527.3 | 4,684.4 | 10,754.6 | 10,949.4 | 2,327.8 | 2,206.2 |

## Heat Rejection Data

HEAT REJECTION TO ATMOSPHERE SHOWN HERE IS ENGINE ONLY. CEM HEAT REJECTION TO ATMOSPHERE SHOWN IN THE SUPPLEMENTARY DATA IS THE ADDITIONAL HEAT REJECTED TO ATMOSPHERE FROM THE CEM. THIS ADDITIONAL HEAT IS INCLUDED IN THE HEAT REJECTION TO EXH AND EXH RECOVERY SHOWN HERE AND WOULD NEED TO BE DEDUCTED FROM THE

# PERFORMANCE DATA[DM9368]

April 26, 2019

EXH AND EXH RECOVERY VALUES WHEN SIZING EXHAUST RECOVERY HEAT EQUIPMENT.

| GENSET POWER WITH FAN | PERCENT LOAD | ENGINE POWER | REJECTION TO JACKET WATER | REJECTION TO ATMOSPHERE | REJECTION TO EXH | EXHUAST RECOVERY TO 350F | FROM OIL COOLER | FROM AFTERCOOLER | WORK ENERGY | LOW HEAT VALUE ENERGY | HIGH HEAT VALUE ENERGY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EKW | % | BHP | BTU/MIN | BTU/MIN | BTU/MIN | BTU/MIN | BTU/MIN | BTU/MIN | BTU/MIN | BTU/MIN | BTU/MIN |
| 2,000.0 | 100 | 2,941 | 40,137 | 8,595 | 117,592 | 66,550 | 15,934 | 27,755 | 124,739 | 299,165 | 318,686 |
| 1,800.0 | 90 | 2,660 | 37,265 | 8,230 | 107,071 | 60,439 | 14,452 | 23,576 | 112,812 | 271,341 | 289,046 |
| 1,600.0 | 80 | 2,382 | 34,765 | 7,921 | 96,968 | 54,405 | 13,027 | 19,880 | 100,998 | 244,583 | 260,543 |
| 1,500.0 | 75 | 2,243 | 33,626 | 7,807 | 92,267 | 51,635 | 12,352 | 18,062 | 95,121 | 231,910 | 247,042 |
| 1,400.0 | 70 | 2,104 | 32,494 | 7,660 | 88,043 | 49,106 | 11,709 | 16,552 | 89,226 | 219,828 | 234,172 |
| 1,200.0 | 60 | 1,828 | 30,269 | 7,310 | 79,707 | 44,130 | 10,432 | 13,963 | 77,505 | 195,863 | 208,643 |
| 1,000.0 | 50 | 1,552 | 27,435 | 6,926 | 68,593 | 37,291 | 8,972 | 10,585 | 65,823 | 168,453 | 179,445 |
| 800.0 | 40 | 1,282 | 24,601 | 6,521 | 58,060 | 30,727 | 7,559 | 7,637 | 54,383 | 141,923 | 151,184 |
| 600.0 | 30 | 1,010 | 21,553 | 6,025 | 47,781 | 24,426 | 6,182 | 5,286 | 42,840 | 116,063 | 123,636 |
| 500.0 | 25 | 872 | 20,101 | 5,692 | 42,164 | 20,481 | 5,460 | 4,213 | 36,971 | 102,516 | 109,205 |
| 400.0 | 20 | 731 | 18,971 | 5,327 | 35,071 | 15,693 | 4,675 | 3,089 | 30,983 | 87,777 | 93,505 |
| 200.0 | 10 | 438 | 14,511 | 4,702 | 24,157 | 7,981 | 3,182 | 1,703 | 18,564 | 59,734 | 63,631 |

## Sound Data

SOUND DATA REPRESENTATIVE OF NOISE PRODUCED BY THE "ENGINE AND CEM" AS A UNIT WITHOUT A MUFFLER INSTALLED

### EXHAUST: Sound Power (1/3 Octave Frequencies)

| GENSET POWER WITH FAN | PERCENT LOAD | ENGINE POWER | OVERALL SOUND | 100 HZ | 125 HZ | 160 HZ | 200 HZ | 250 HZ | 315 HZ | 400 HZ | 500 HZ | 630 HZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EKW | % | BHP | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) |
| 2,000.0 | 100 | 2,941 | 97.8 | 68.7 | 75.2 | 74.3 | 82.8 | 87.5 | 87.1 | 84.5 | 88.6 | 88.2 |
| 1,800.0 | 90 | 2,660 | 95.8 | 67.9 | 74.7 | 72.8 | 80.9 | 85.7 | 85.4 | 83.1 | 86.6 | 86.1 |
| 1,600.0 | 80 | 2,382 | 94.0 | 67.4 | 74.6 | 71.3 | 79.2 | 84.1 | 84.0 | 82.4 | 85.0 | 84.3 |
| 1,500.0 | 75 | 2,243 | 93.2 | 67.2 | 74.7 | 70.6 | 78.4 | 83.4 | 83.5 | 82.1 | 84.2 | 83.4 |
| 1,400.0 | 70 | 2,104 | 92.3 | 67.0 | 74.7 | 69.8 | 77.5 | 82.7 | 82.8 | 81.8 | 83.4 | 82.5 |
| 1,200.0 | 60 | 1,828 | 90.7 | 66.6 | 74.9 | 68.3 | 75.7 | 81.2 | 81.5 | 81.3 | 81.8 | 80.8 |
| 1,000.0 | 50 | 1,552 | 89.4 | 64.9 | 75.8 | 67.5 | 74.6 | 79.5 | 79.8 | 80.5 | 80.4 | 79.6 |
| 800.0 | 40 | 1,282 | 88.0 | 65.1 | 75.5 | 65.7 | 72.7 | 78.2 | 78.9 | 80.2 | 78.9 | 77.6 |
| 600.0 | 30 | 1,010 | 86.6 | 64.6 | 75.5 | 64.9 | 70.8 | 76.6 | 77.4 | 79.4 | 77.3 | 75.9 |
| 500.0 | 25 | 872 | 86.2 | 62.8 | 76.3 | 65.9 | 70.4 | 75.4 | 75.9 | 78.6 | 76.4 | 75.6 |
| 400.0 | 20 | 731 | 85.9 | 60.9 | 77.1 | 67.0 | 70.1 | 74.4 | 74.5 | 77.8 | 75.5 | 75.5 |
| 200.0 | 10 | 438 | 85.8 | 60.5 | 77.3 | 67.2 | 70.0 | 74.2 | 74.2 | 77.6 | 75.3 | 75.5 |

### EXHAUST: Sound Power (1/3 Octave Frequencies)

| GENSET POWER WITH FAN | PERCENT LOAD | ENGINE POWER | 1000 HZ | 1250 HZ | 1600 HZ | 2000 HZ | 2500 HZ | 3150 HZ | 4000 HZ | 5000 HZ | 6300 HZ | 8000 HZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EKW | % | BHP | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) |
| 2,000.0 | 100 | 2,941 | 90.3 | 85.2 | 82.8 | 79.8 | 77.1 | 73.8 | 69.3 | 63.6 | 63.3 | 55.1 |
| 1,800.0 | 90 | 2,660 | 87.9 | 82.9 | 80.7 | 77.9 | 75.4 | 72.0 | 67.7 | 62.3 | 62.1 | 55.2 |
| 1,600.0 | 80 | 2,382 | 85.5 | 80.4 | 78.5 | 76.3 | 74.0 | 70.6 | 66.5 | 61.7 | 61.7 | 55.6 |
| 1,500.0 | 75 | 2,243 | 84.3 | 79.1 | 77.4 | 75.6 | 73.3 | 70.0 | 66.0 | 61.5 | 61.6 | 56.0 |
| 1,400.0 | 70 | 2,104 | 83.1 | 77.9 | 76.3 | 74.9 | 72.6 | 69.3 | 65.5 | 61.3 | 61.5 | 56.3 |
| 1,200.0 | 60 | 1,828 | 80.7 | 75.5 | 74.1 | 73.5 | 71.2 | 67.9 | 64.5 | 60.9 | 61.3 | 57.0 |
| 1,000.0 | 50 | 1,552 | 79.5 | 74.8 | 73.0 | 73.1 | 70.8 | 67.4 | 63.5 | 60.8 | 61.4 | 55.0 |
| 800.0 | 40 | 1,282 | 76.6 | 71.5 | 70.3 | 71.3 | 69.0 | 65.7 | 62.5 | 60.2 | 61.1 | 56.8 |
| 600.0 | 30 | 1,010 | 74.2 | 69.3 | 68.4 | 69.9 | 67.7 | 64.5 | 61.7 | 59.8 | 60.8 | 57.3 |
| 500.0 | 25 | 872 | 74.5 | 70.6 | 69.2 | 70.2 | 68.2 | 65.0 | 61.6 | 59.9 | 60.9 | 54.2 |
| 400.0 | 20 | 731 | 75.0 | 72.2 | 70.2 | 70.8 | 68.9 | 65.6 | 61.5 | 60.1 | 61.0 | 51.2 |
| 200.0 | 10 | 438 | 75.1 | 72.5 | 70.4 | 70.9 | 69.0 | 65.7 | 61.5 | 60.1 | 61.0 | 50.5 |

## Sound Data (Continued)

### MECHANICAL: Sound Power (1/3 Octave Frequencies)

| GENSET POWER WITH FAN | PERCENT LOAD | ENGINE POWER | OVERALL SOUND | 100 HZ | 125 HZ | 160 HZ | 200 HZ | 250 HZ | 315 HZ | 400 HZ | 500 HZ | 630 HZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EKW | % | BHP | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) |

# PERFORMANCE DATA[DM9368]

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,000.0 | 100 | 2,941 | 123.0 | 89.3 | 107.2 | 96.2 | 99.4 | 100.3 | 102.8 | 101.0 | 105.5 | 106.8 |
| 1,800.0 | 90 | 2,660 | 122.2 | 88.6 | 106.6 | 95.4 | 98.5 | 99.4 | 102.5 | 100.9 | 105.4 | 106.5 |
| 1,600.0 | 80 | 2,382 | 121.4 | 88.1 | 106.0 | 94.6 | 97.5 | 98.5 | 102.0 | 100.9 | 104.7 | 106.1 |
| 1,500.0 | 75 | 2,243 | 121.1 | 88.0 | 105.7 | 94.1 | 97.0 | 98.1 | 101.8 | 100.8 | 104.2 | 106.0 |
| 1,400.0 | 70 | 2,104 | 120.8 | 87.8 | 105.4 | 93.5 | 96.3 | 97.5 | 101.4 | 100.5 | 103.8 | 105.9 |
| 1,200.0 | 60 | 1,828 | 120.3 | 87.7 | 104.7 | 92.0 | 94.5 | 96.2 | 100.4 | 99.7 | 103.4 | 106.1 |
| 1,000.0 | 50 | 1,552 | 119.9 | 87.8 | 104.3 | 91.0 | 93.7 | 95.8 | 99.7 | 101.4 | 103.4 | 106.2 |
| 800.0 | 40 | 1,282 | 119.5 | 87.9 | 103.9 | 90.9 | 93.3 | 95.6 | 98.5 | 101.6 | 103.9 | 106.0 |
| 600.0 | 30 | 1,010 | 119.3 | 87.6 | 103.4 | 90.9 | 93.6 | 95.3 | 97.8 | 100.6 | 105.1 | 106.1 |
| 500.0 | 25 | 872 | 119.1 | 87.1 | 103.3 | 90.5 | 94.3 | 95.2 | 98.2 | 100.3 | 105.9 | 106.6 |
| 400.0 | 20 | 731 | 119.0 | 86.5 | 103.1 | 90.2 | 94.9 | 95.0 | 98.8 | 100.2 | 106.6 | 107.1 |
| 200.0 | 10 | 438 | 119.0 | 85.8 | 102.4 | 90.0 | 94.7 | 95.5 | 99.2 | 101.4 | 106.4 | 107.7 |

### MECHANICAL: Sound Power (1/3 Octave Frequencies)

| GENSET POWER WITH FAN | PERCENT LOAD | ENGINE POWER | 1000 HZ | 1250 HZ | 1600 HZ | 2000 HZ | 2500 HZ | 3150 HZ | 4000 HZ | 5000 HZ | 6300 HZ | 8000 HZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EKW | % | BHP | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) | dB(A) |
| 2,000.0 | 100 | 2,941 | 112.2 | 113.0 | 111.8 | 111.5 | 110.6 | 110.0 | 109.1 | 108.6 | 107.3 | 106.4 |
| 1,800.0 | 90 | 2,660 | 112.1 | 112.5 | 111.3 | 111.2 | 110.3 | 109.7 | 108.8 | 108.3 | 106.8 | 106.2 |
| 1,600.0 | 80 | 2,382 | 111.8 | 111.9 | 110.9 | 110.7 | 109.8 | 109.2 | 108.2 | 107.8 | 106.2 | 106.4 |
| 1,500.0 | 75 | 2,243 | 111.6 | 111.6 | 110.7 | 110.3 | 109.6 | 109.0 | 107.9 | 107.5 | 105.9 | 106.8 |
| 1,400.0 | 70 | 2,104 | 111.4 | 111.3 | 110.5 | 109.9 | 109.4 | 108.7 | 107.5 | 107.2 | 105.7 | 108.0 |
| 1,200.0 | 60 | 1,828 | 111.1 | 110.8 | 110.3 | 109.5 | 109.0 | 108.2 | 106.9 | 106.6 | 105.4 | 111.2 |
| 1,000.0 | 50 | 1,552 | 110.9 | 110.7 | 110.0 | 109.4 | 108.8 | 108.1 | 106.5 | 106.2 | 105.2 | 109.7 |
| 800.0 | 40 | 1,282 | 110.9 | 110.6 | 109.5 | 109.1 | 108.7 | 107.7 | 106.0 | 105.9 | 107.0 | 105.7 |
| 600.0 | 30 | 1,010 | 110.8 | 110.2 | 108.8 | 108.8 | 108.4 | 107.3 | 105.4 | 105.6 | 107.7 | 101.8 |
| 500.0 | 25 | 872 | 110.7 | 109.9 | 108.6 | 108.7 | 108.3 | 107.0 | 105.1 | 105.7 | 106.0 | 100.6 |
| 400.0 | 20 | 731 | 110.7 | 109.7 | 108.4 | 108.6 | 108.2 | 106.8 | 104.8 | 105.7 | 104.0 | 99.7 |
| 200.0 | 10 | 438 | 110.3 | 109.8 | 108.1 | 108.4 | 108.1 | 106.8 | 105.7 | 104.9 | 102.0 | 98.7 |

## Emissions Data

EMISSIONS VALUES ARE TAILPIPE OUT WITH AFTERTREATMENT. VALUES SHOWN AS ZERO MAY BE GREATER THAN ZERO BUT WERE BELOW THE DETECTION LEVEL OF THE EQUIPMENT USED AT TIME OF MEASUREMENT.

CATERPILLAR EMISSIONS CERTIFIED ENGINES TESTED WITHIN EPA SPECIFIED TEST CONDITIONS, AND USING TITLE 40 CFR PART 1065 TEST PROTOCOL, MEET THE NEW SOURCE PERFORMANCE STANDARDS. POTENTIAL SITE VARIATION DATA ACCOUNT FOR PRODUCTION ENGINE AND SYSTEM VARIABILITY IN ADDITION TO MEASUREMENT VARIABILITY FOR TYPICAL FIELD TEST METHODS AS DESCRIBED IN DM1176. THIS DATA ASSUMES SITE CORRECTIONS FOR AMBIENT HUMIDITY TO 75 GRAINS, AND STANDARD CONDITIONS OF 25 C (77 F) AIR TO TURBO TEMPERATURE AND 152.4 M (500 FT) ALTITUDE. GUIDANCE ON HUMIDITY CORRECTION METHODS ARE AVAILABLE IN TITLE 40 CFR SECTION 1065.670. FOR APPLICATIONS WITH GEOGRAPHIC OR AMBIENT CONDITIONS BEYOND THESE PUBLISHED VALUES, CONSULT CATERPILLAR (APPLICATION SUPPORT CENTER) FOR ADDITIONAL VARIABILITY INFORMATION.

### RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

| GENSET POWER WITH FAN | | EKW | 2,000.0 | 1,500.0 | 1,000.0 | 500.0 | 200.0 |
|---|---|---|---|---|---|---|---|
| PERCENT LOAD | | % | 100 | 75 | 50 | 25 | 10 |
| ENGINE POWER | | BHP | 2,941 | 2,243 | 1,552 | 872 | 438 |
| TOTAL NOX (AS NO2) | | G/HR | 1,788 | 1,240 | 740 | 438 | 537 |
| TOTAL CO | | G/HR | 367 | 251 | 165 | 102 | 81 |
| TOTAL HC | | G/HR | 95 | 108 | 102 | 81 | 99 |
| PART MATTER | | G/HR | 69.3 | 68.2 | 61.4 | 55.3 | 24.3 |
| TOTAL NOX (AS NO2) | (CORR 5% O2) | MG/NM3 | 269.4 | 243.1 | 200.9 | 196.9 | 429.7 |
| TOTAL CO | (CORR 5% O2) | MG/NM3 | 58.0 | 51.6 | 46.6 | 47.3 | 65.3 |
| TOTAL HC | (CORR 5% O2) | MG/NM3 | 12.9 | 19.3 | 25.0 | 32.6 | 68.5 |
| PART MATTER | (CORR 5% O2) | MG/NM3 | 9.1 | 11.8 | 14.8 | 22.4 | 17.8 |
| TOTAL NOX (AS NO2) | (CORR 5% O2) | PPM | 131 | 118 | 98 | 96 | 209 |
| TOTAL CO | (CORR 5% O2) | PPM | 46 | 41 | 37 | 38 | 52 |
| TOTAL HC | (CORR 5% O2) | PPM | 24 | 36 | 47 | 61 | 128 |
| TOTAL NOX (AS NO2) | | G/HP-HR | 0.61 | 0.56 | 0.48 | 0.50 | 1.23 |
| TOTAL CO | | G/HP-HR | 0.13 | 0.11 | 0.11 | 0.12 | 0.19 |
| TOTAL HC | | G/HP-HR | 0.03 | 0.05 | 0.07 | 0.09 | 0.23 |
| PART MATTER | | G/HP-HR | 0.02 | 0.03 | 0.04 | 0.06 | 0.06 |
| TOTAL NOX (AS NO2) | | LB/HR | 3.94 | 2.73 | 1.63 | 0.96 | 1.18 |
| TOTAL CO | | LB/HR | 0.81 | 0.55 | 0.36 | 0.22 | 0.18 |
| TOTAL HC | | LB/HR | 0.21 | 0.24 | 0.22 | 0.18 | 0.22 |
| PART MATTER | | LB/HR | 0.15 | 0.15 | 0.14 | 0.12 | 0.05 |

### RATED SPEED NOMINAL DATA: 1800 RPM

| GENSET POWER WITH FAN | EKW | 2,000.0 | 1,500.0 | 1,000.0 | 500.0 | 200.0 |
|---|---|---|---|---|---|---|

# PERFORMANCE DATA[DM9368]

April 26, 2019

| PERCENT LOAD | | % | 100 | 75 | 50 | 25 | 10 |
|---|---|---|---|---|---|---|---|
| **ENGINE POWER** | | **BHP** | **2,941** | **2,243** | **1,552** | **872** | **436** |
| TOTAL NOX (AS NO2) | | G/HR | 1,117 | 775 | 462 | 274 | 336 |
| TOTAL CO | | G/HR | 72 | 49 | 32 | 20 | 16 |
| TOTAL HC | | G/HR | 21 | 24 | 23 | 18 | 22 |
| TOTAL CO2 | | KG/HR | 1,445 | 1,110 | 805 | 489 | 287 |
| PART MATTER | | G/HR | 26.7 | 26.2 | 23.6 | 21.3 | 9.3 |
| TOTAL NOX (AS NO2) | (CORR 5% O2) | MG/NM3 | 168.4 | 151.9 | 125.6 | 123.1 | 268.6 |
| TOTAL CO | (CORR 5% O2) | MG/NM3 | 11.4 | 10.1 | 9.1 | 9.3 | 12.8 |
| TOTAL HC | (CORR 5% O2) | MG/NM3 | 2.9 | 4.3 | 5.6 | 7.3 | 15.2 |
| PART MATTER | (CORR 5% O2) | MG/NM3 | 3.5 | 4.5 | 5.7 | 8.6 | 6.9 |
| TOTAL NOX (AS NO2) | (CORR 5% O2) | PPM | 82 | 74 | 61 | 60 | 131 |
| TOTAL CO | (CORR 5% O2) | PPM | 9 | 8 | 7 | 7 | 10 |
| TOTAL HC | (CORR 5% O2) | PPM | 5 | 8 | 10 | 14 | 28 |
| FORMALDEHYDE | (CORR 15% O2) | PPM | 0.02 | 0.02 | 0.02 | 0.04 | 0.14 |
| ACROLEIN | (CORR 15% O2) | PPM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ACETALDEHYDE | (CORR 15% O2) | PPM | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| METHANOL | (CORR 15% O2) | PPM | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |
| TOTAL NOX (AS NO2) | | G/HP-HR | 0.38 | 0.35 | 0.30 | 0.32 | 0.77 |
| TOTAL CO | | G/HP-HR | 0.02 | 0.02 | 0.02 | 0.02 | 0.04 |
| TOTAL HC | | G/HP-HR | 0.01 | 0.01 | 0.01 | 0.02 | 0.05 |
| PART MATTER | | G/HP-HR | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 |
| TOTAL NOX (AS NO2) | | LB/HR | 2.46 | 1.71 | 1.02 | 0.60 | 0.74 |
| TOTAL CO | | LB/HR | 0.16 | 0.11 | 0.07 | 0.04 | 0.03 |
| TOTAL HC | | LB/HR | 0.05 | 0.05 | 0.05 | 0.04 | 0.05 |
| TOTAL CO2 | | LB/HR | 3,185 | 2,447 | 1,776 | 1,077 | 632 |
| PART MATTER | | LB/HR | 0.06 | 0.06 | 0.05 | 0.05 | 0.02 |
| OXYGEN IN EXH | | % | 9.6 | 10.3 | 11.4 | 13.2 | 15.5 |
| DRY SMOKE OPACITY | | % | 0.3 | 0.4 | 0.8 | 1.5 | 0.9 |
| BOSCH SMOKE NUMBER | | | 0.17 | 0.20 | 0.32 | 0.50 | 0.33 |

## Regulatory Information

| EPA TIER 4 FINAL | | 2015 - ---- | | |
|---|---|---|---|---|
| GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 1039 SUBPART F AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS BY PARTICIPATING IN THE AVERAGE, BANKING, AND TRADING PROGRAM. | | | | |
| **Locality** | **Agency** | **Regulation** | **Tier/Stage** | **Max Limits - G/BKW - HR** |
| U.S. (INCL CALIF) | EPA | NON-ROAD GENSET | TIER 4 FINAL | CO: 3.5 NOx: 0.67 HC: 0.19 PM: 0.03 |

| EPA TIER 4 INTERIM | | 2011 - 2014 | | |
|---|---|---|---|---|
| GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 1039 SUBPART F AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS. | | | | |
| **Locality** | **Agency** | **Regulation** | **Tier/Stage** | **Max Limits - G/BKW - HR** |
| U.S. (INCL CALIF) | EPA | NON-ROAD GENSET | TIER 4 INTERIM | CO: 3.5 NOx: 0.67 HC: 0.4 PM: 0.10 |

| EPA NON-EMERGENCY STATIONARY GENSET | | 2015 - ---- | | |
|---|---|---|---|---|
| GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-EMERGENCY STATIONARY REGULATIONS BY PARTICIPATING IN THE AVERAGE, BANKING, AND TRADING PROGRAM. | | | | |
| **Locality** | **Agency** | **Regulation** | **Tier/Stage** | **Max Limits - G/BKW - HR** |
| U.S. (INCL CALIF) | EPA | STATIONARY | NON-EMERGENCY STATIONARY GENSET | CO: 3.5 NOx: 0.67 HC: 0.19 PM: 0.03 |

## Altitude Derate Data

### ALTITUDE CORRECTED POWER CAPABILITY (BHP)

| AMBIENT OPERATING TEMP (F) | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 | 130 | 140 | NORMAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALTITUDE (FT) | | | | | | | | | | | | | |
| 0 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 |
| 1,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 |
| 2,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 |
| 3,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 |
| 5,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 |
| 6,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,935 | 2,885 | 2,837 | 2,944 |
| 7,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,926 | 2,874 | 2,825 | 2,777 | 2,730 | 2,944 |
| 8,000 | 2,944 | 2,944 | 2,944 | 2,944 | 2,944 | 2,919 | 2,866 | 2,815 | 2,766 | 2,718 | 2,672 | 2,627 | 2,944 |
| 9,000 | 2,944 | 2,944 | 2,944 | 2,916 | 2,861 | 2,808 | 2,757 | 2,708 | 2,660 | 2,614 | 2,570 | 2,527 | 2,944 |
| 10,000 | 2,944 | 2,916 | 2,859 | 2,804 | 2,751 | 2,700 | 2,651 | 2,604 | 2,558 | 2,514 | 2,471 | 2,430 | 2,853 |
| 11,000 | 2,861 | 2,804 | 2,749 | 2,696 | 2,645 | 2,596 | 2,549 | 2,503 | 2,459 | 2,417 | 2,376 | 2,336 | 2,762 |
| 12,000 | 2,750 | 2,695 | 2,642 | 2,591 | 2,542 | 2,495 | 2,449 | 2,406 | 2,363 | 2,323 | 2,283 | 2,245 | 2,673 |
| 13,000 | 2,642 | 2,589 | 2,539 | 2,490 | 2,443 | 2,397 | 2,354 | 2,312 | 2,271 | 2,232 | 2,194 | 2,157 | 2,587 |
| 14,000 | 2,539 | 2,488 | 2,439 | 2,392 | 2,347 | 2,303 | 2,262 | 2,221 | 2,182 | 2,144 | 2,108 | 2,073 | 2,504 |
| 15,000 | 2,439 | 2,390 | 2,343 | 2,298 | 2,255 | 2,213 | 2,173 | 2,134 | 2,096 | 2,060 | 2,025 | 1,991 | 2,423 |

## Cross Reference

| Test Spec | Setting | Engine Arrangement | Engineering Model | Engineering Model Version | Start Effective Serial Number | End Effective Serial Number |
|---|---|---|---|---|---|---|
| 3704798 | LL6338 | 3709874 | GS538 | - | SCJ00001 | SCJ00114 |
| 3704981 | GG0624 | 3994250 | GS718 | - | DD700001 | |
| 3704981 | GG0624 | 5075758 | GS538 | - | SCJ01000 | |
| 4581574 | LL6763 | 5157722 | PG238 | - | LY600001 | |

## Supplementary Data

| Type | Classification | Performance Number |
|---|---|---|
| AFTERTREATMENT | SCR | DM8842 |

## Performance Parameter Reference

**Parameters Reference:DM9600-11**

**PERFORMANCE DEFINITIONS**

PERFORMANCE DEFINITIONS DM9600
APPLICATION:
Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.
PERFORMANCE PARAMETER TOLERANCE FACTORS:
Power +/- 3%
Torque +/- 3%
Exhaust stack temperature +/- 8%
Inlet airflow +/- 5%
Intake manifold pressure-gage +/- 10%
Exhaust flow +/- 6%
Specific fuel consumption +/- 3%
Fuel rate +/- 5%
Specific DEF consumption +/- 3%
DEF rate +/- 5%
Heat rejection +/- 5%
Heat rejection exhaust only +/- 10%
Heat rejection CEM only +/- 10%
Heat Rejection values based on using treated water.
Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.
On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.
These values do not apply to C280/3600. For these models, see the tolerances listed below.
C280/3600 HEAT REJECTION TOLERANCE FACTORS:
Heat rejection +/- 10%
Heat rejection to Atmosphere +/- 50%
Heat rejection to Lube Oil +/- 20%

# PERFORMANCE DATA[DM9368]

Heat rejection to Aftercooler +/- 5%
TEST CELL TRANSDUCER TOLERANCE FACTORS:
Torque +/- 0.5%
Speed +/- 0.2%
Fuel flow +/- 1.0%
Temperature +/- 2.0 C degrees
Intake manifold pressure +/- 0.1 kPa
OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.
REFERENCE ATMOSPHERIC INLET AIR
FOR 3500 ENGINES AND SMALLER
SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.
FOR 3600 ENGINES
Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.
MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE
Location for air temperature measurement air cleaner inlet at stabilized operating conditions.
REFERENCE EXHAUST STACK DIAMETER
The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.
REFERENCE FUEL
DIESEL
Reference fuel is #2 distillate diesel with a 35API gravity;
A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 29 deg C (84.2 deg F), where the density is 838.9 G/Liter (7.001 Lbs/Gal).
GAS
Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.
ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD
Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.
ALTITUDE CAPABILITY
Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set.
Standard temperature values versus altitude could be seen on TM2001.
When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.
Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.
Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.
REGULATIONS AND PRODUCT COMPLIANCE
TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.
Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.
EMISSIONS DEFINITIONS:
Emissions : DM1176
EMISSION CYCLE DEFINITIONS
1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets

test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.
HEAT REJECTION DEFINITIONS:
Diesel Circuit Type and HHV Balance : DM9500
HIGH DISPLACEMENT (HD) DEFINITIONS:
3500: EM1500
RATING DEFINITIONS:
Agriculture : TM6008
Fire Pump : TM6009
Generator Set : TM6035
Generator (Gas) : TM6041
Industrial Diesel : TM6010
Industrial (Gas) : TM6040
Irrigation : TM5749
Locomotive : TM6037
Marine Auxiliary : TM6036
Marine Prop (Except 3600) : TM5747
Marine Prop (3600 only) : TM5748
MSHA : TM6042
Oil Field (Petroleum) : TM6011
Off-Highway Truck : TM6039
On-Highway Truck : TM6038
SOUND DEFINITIONS:
Sound Power : DM8702
Sound Pressure : TM7080
Date Released : 11/29/18

**ATTACHMENT 2-4**

PERMITS & SUPPORTING DOCUMENTS FOR TIER 4 GENERATOR ENGINES LOCATED AT THE CAL POLY UNIVERSITY (WILLIAM & LINDA FROST CENTER FOR RESEARCH AND INNOVATION)

San Luis Obispo County Air Pollution Control District

# Authority to Construct
# ENGINEERING EVALUATION

**I. Permit Processing Summary:**

| | | | |
|---|---|---|---|
| Owner: | Cal Poly<br>1 Grand Avenue<br>San Luis Obispo, CA 93408 | Engineer: | SEW |
| | | Appl No: | 6856 |
| | | Site ID: | 0171 |
| | | Date Rcvd: | Jul 22, 2019 |
| Contact: | Ms. Christina Juarez<br>805-756-6674 | Incomplete:<br>Additional Info: | Jul 24, 2019 |
| Facility: | Cal Poly State University<br>Risk Management Office<br>San Luis Obispo, CA 93407 | Complete: | Aug 28, 2020 |

| | | | |
|---|---|---|---|
| Process Address: | Cal Poly State University, BLDG 181 San Luis Obispo, CA 93407 | | |
| Reason for Appl: | Install 500Kw Tier 4 Emergency Generator | (a) Filling Fee Rcvd: | $220.00 |
| Permit Number: | 890-5 | (b) Processing Fee: | $1,062.50 |
| Process ID: | 1074-7 | (b-a) Total Fee Due: | $842.50 |
| Facility ID: | 24 | | |

**II. Proposal/Process Description**:
An application was submitted for a backup generator for the new William and Linda Frost Center for Research and Innovation (Frost Center) building at Cal Poly. The generator will be powered by a Tier 4 final diesel engine and will be placed adjacent to the existing engine for the Baker Science (Center for Science) building.

Considering the open Health Risk Assessment (HRA) action for application 6539, the facility was required to add the new engine to the review, as the addition of the new engine would trigger the same requirement. There was miscommunication between the District and Trinity Consultants, and Trinity was set up to do a 2017 emission-inventory based HRA for compliance with the Air Toxics HotSpots program (AB2588). The HRA mandated by application 6539 should have been for District Rule 219, Toxic New Source Review, so the District came to a consensus with Trinity to do two runs of the health risk: one with 2017 emission inventory data to satisfy AB2588 and one for District Rule 219 to include: newer engines that were not installed in 2017, engines that didn't run in 2017 (and therefore weren't quantified in the AB2588 HRA), and the newly proposed equipment under this application. The gaps in data were filled in by hour limits and potential to emit rather than actual run time. For the 219 HRA, Trinity Consultants used 50 hours/year for the Frost Center engine, as that is what the applicant proposed, however the District would not allow more than 30 hours and therefore this estimate is deemed more conservative.

The AB2588 HRA was submitted on May 1, 2020 following complications with the estimates used for the meat consumption by the receptors. The results demonstrated a cancer risk less than 10-in-a-million and a Health Hazard Index (HHI) less than 1.0. The 219 HRA was submitted on August 28, 2020 and demonstrated a cancer risk less than 10-in-a-million and an HHI less than 1.0. Results are tabulated below. The 219 HRA excluded non-permitted sources, therefore resulting in a lower risk.

**Table 1.** Health Risk Assessment Results for AB2588 and Rule 219 review at maximum exposed individual resident (MEIR).

| Parameter for MEIR | AB2588 Result (2017 data) | Rule 219 Result (2017 data and PTE) | Limit and Compliance |
|---|---|---|---|
| Cancer risk (in-a-million) | 7.13 | 5.88 | 10-in-a-million, in compliance |
| Chronic risk (HHI) | 0.0782 | 0.0467 | 1.0 HHI, in compliance |
| Acute risk (HHI) | 0.794 | 0.470 | 1.0 HHI, in compliance |

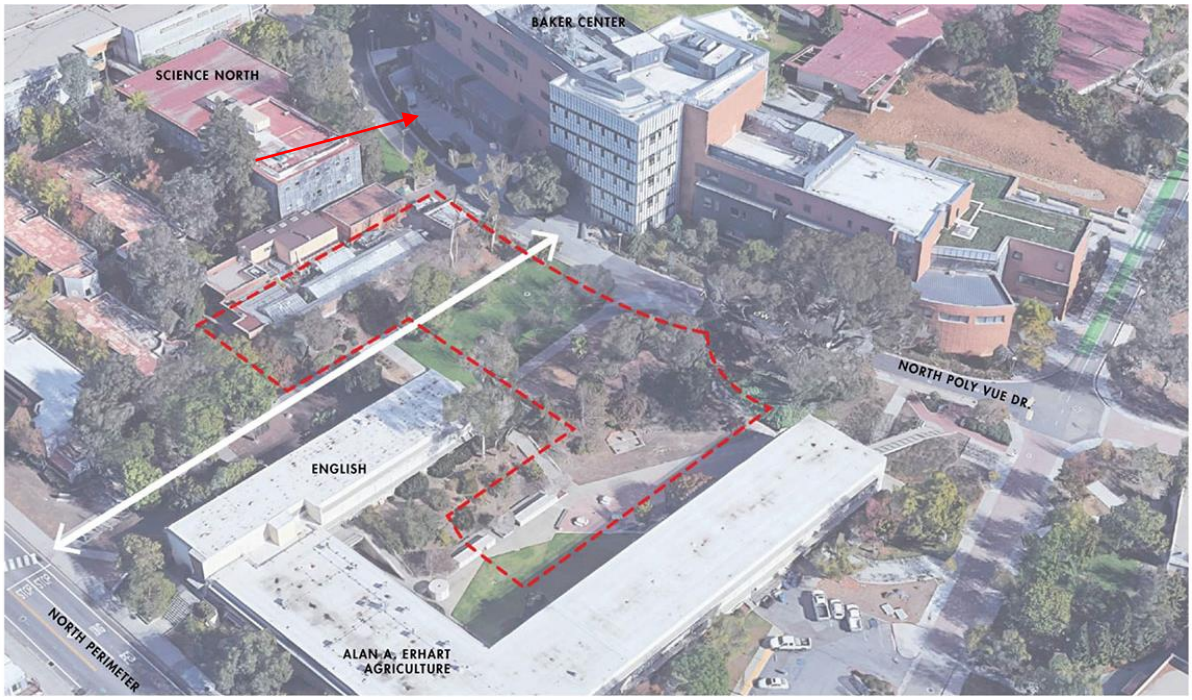



**Figure 1.** Facility map with planned Frost Center building location and engine location in red.

In light of the fact that the facility will be expanding per their Master Plan, the facility was informed that future changes will likely trigger this requirement again and they should consider health risk implications on new installations of backup power generation equipment.

**III. Applicable Rules**:

17CCR93115, Stationary Diesel IC Engine ATCM: Exhaust particulate controls are required for new and existing standby and prime use stationary diesel engines. New standby generators operating <50 hr/yr are limited to the more stringent of 0.15 g/bhph or the current non-road engine standard. Existing generator engines do not have an exhaust particulate matter limit if maintenance operation

is <20 hr/yr; limited to <0.4 g/bhph for 21-30hr/yr; <0.15 g/bhph for 31-50 hr/yr, and <0.01 g/bhph for 51-100 hr/yr. Section 93115.9 requires that new engines less than or equal to 50 brake horsepower meet the current off-road compression ignition engine standards for an off-road engine of the same maximum rated power. **The engine meets the new engine requirements of 0.15 g PM/hp-hr, 4.8 g NMHC+NOx/hp-hr and 2.6 g CO/hp-hr. The non-emergency operation will be limited to less than or equal to 30 hours per year of maintenance operation. The owner has also agreed to use only CARB certified fuel. Compliance is indicated.**

Rule 201, Equipment Not Requiring a Permit: Specific equipment exemptions are identified along with a general exemption for emissions of less than two pounds per day (<2 lb/day) on a monthly operating day average. **The proposed equipment includes a diesel engine greater than 50 hp that emits toxic air contaminants. A permit is required per sections B.1 and A.1.b of the Rule, respectively.**

Rule 204, Requirements (New Source Review): RACT is required for <25 lb/day, BACT for >=25 lb/day, and offsets for >=25 tpy. Section 204.C.2 exempts projects from control technology & offsets if NEI is <200 lb/yr. Section D requires that the project's emissions not result in an exceedance of an ambient air quality standard. Section E requires certification of statewide compliance for facilities with PTE >=25 tpy. **The potential to emit for all affected pollutants is less than 25 lb/day so RACT is required and will be satisfied by compliance with the hour limit and opacity requirements. Emissions should not exceed 25 tons per year, so offsets are not required. Compliance is indicated.**

Rule 214, Notification: Newspaper public notice is required for an authority to construct which will increase PTE 100 lb/day for NOx, ROG, or SOx; 80 lb/day for PM10; and 550 lb/day for CO. **Not required because the potential to emit will not increase above notification thresholds.**

Rule 219, Toxics New Source Review: Applies to permitted sources that increase toxic emissions that result in >=1.0E-6 risk or >=0.10 HHI. Modified sources must increase toxic emissions above permitted or normal operating values to be subject. New and modified sources of toxic air contaminants must show that their emissions will cause a facility-wide cancer risk of <1.0E-6 and a non-cancer hazard index of <0.1, unless they employ toxics best available control technology (TBACT). A facility-wide cancer risk equal to or greater than ten-in-a-million and/or a non-cancer hazard index equal to or greater than 1.0 are not allowed, unless the Air Toxics "Hot Spots" audit and reduction plan program is required along with Public Notification. **The facility was in the process of conducting a Rule 219 Health Risk Assessment triggered by application 6539 for the Health Center generator, so the District requested that this new engine be placed on the assessment as well, in an incomplete letter issued on July 24, 2019. The HRA was submitted on August 28, 2020 and as shown above in Table 1, demonstrates a cancer risk between 1 and 10-in-a-million, an acute risk between 0.1 and 1.0 HHI, and a chronic risk less than 0.1 HHI. The engine triggers Toxics Best Available Control Technology requirements, which are satisfied by the use of a Tier 4 final engine. Cal Poly has historically agreed to only install Tier 4 final/TBACT if installing diesel engines.**

**Table 2.** Diesel equipment and emissions analyzed in Rule 219 Health Risk Assessment.

| Device ID | Device Description | Annual Emissions (lb/yr) | Hourly Emissions (lb/hr) |
|---|---|---|---|
| 10002 | 465 HP Cummins, #230 | 2.011 | 0.231 |
| 10003 | 164 HP John Deere, #601 | 0.634 | 0.083 |
| 10004 | 120 HP Allis Chalmers, #603 | 0.216 | 0.033 |
| 10005 | 192 HP Caterpillar, #605 | 1.438 | 0.120 |
| 10006 | 749 HP Caterpillar, #613 | 4.619 | 0.385 |
| 10007 | 742 HP Caterpillar, #618 | 0.662 | 0.078 |
| 10008 | 207 HP Cummins, #619 | 1.701 | 0.106 |
| 10009 | 80 HP Generac #622 | 0.061 | 0.012 |
| 10010 | 95 HP Caterpillar/Perkins, #631 | 0.409 | 0.023 |
| 10011 | 80 HP John Deere, #663 | 0.128 | 0.010 |
| 10012 | 230 HP Caterpillar 3202, #302 | 0.303 | 0.303 |
| 10014 | 375 HP Caterpillar 3306B, #712 | 1.273 | 0.053 |
| 10103 | 755 HP Cummins, #1091 | 0.287 | 0.017 |
| 10104 | 116 BHP Ag Irrigation Pump Engine (P-104) | 3.048 | 0.057 |
| 10105 | 116 BHP Ag Irrigation Pump Engine (P-105) | 0.308 | 0.057 |
| 10107 | 62 BHP Low Use Demonstration Pump Engine | 0.484 | 0.117 |
| 10108 | 132 HP Perkins | 0.022 | 0.001 |
| 10109 | 778 HP Caterpillar | 0.044 | 0.001 |
| 6856 | 779 HP Tier 4 Diesel Engine | 1.717 | 0.034 |

Rule 302, Schedule of Fees: Establishes the fee amounts for application filing, permit issuance, permit renewal, and various other actions. Filing fees are credited toward subsequent permit action fees. **A $220.00 filing fee was submitted with the application. An evaluation fee will be charged based on the actual time spent to review the application and issue the Authority to Construct. One additional Category 28d equipment fee will be charged upon permit issuance, bringing the total count to thirteen (13) category 28d fees**.

Rule 308, Fees for Air Toxics "Hot Spots" (ATHS) Program: Establishes the fees to be paid for the ATHS program as set by the California Air Resources Board. Fee categories are based off of the prioritization and/or health risk assessment result from actual emissions reported in an approved inventory year. Facilities are categorized as "simple, medium or complex" based on the number processes at the facility as determined by the number of six-digit SCC codes. **This facility was previously prioritized using the 2017 emissions inventory data and resulted in a cancer score above 10 and a non-cancer score above 1. A Health Risk Assessment was required and was submitted on May 1, 2020. The HRA resulted in a cancer risk of 7.13 in-a-million and a non-cancer Health Hazard Index of 0.794. With a total of six (6) six-digit SCC codes as described below, the fee category F for a complex Tracking Facility applies and will be billed a $134 fee this month with the other HotSpots facilities.**

1. **SCC 103006: External Combustion Boilers, Natural Gas**
2. **SCC 202001: Internal Combustion Engines, Diesel**
3. **SCC 401003: Chemical Evaporation from Organic Solvent Evaporation, Cold Solvent Cleaning/Stripping**
4. **SCC 402001: Chemical Evaporation from Surface Coating Operations, Surface Coating Application**
5. **SCC 405004: Chemical Evaporation from Printing/Publishing, Lithographic**

6. **SCC 406888: Chemical Evaporation from Transportation and Marketing of Petroleum Products, Fugitive Emissions**

Rule 401, Visible Emissions: This rule limits visible emissions to 20% opacity. **A more stringent opacity of five percent (5%), or Ringelmann ¼ is applied as RACT for a Tier 4 Final engine.**

Rule 402, Nuisance: No source of air pollution is allowed to create a public nuisance. **The applicant has demonstrated that they can operate equipment of this type without causing nuisance complaints. Continued compliance with this rule is expected.**

Rule 431, Stationary Internal Combustion Engines: Rich burn, spark ignited engines are limited to 50 ppm NOx (D.1) or 90% control (D.2); lean burn, spark ignited engines are limited to 125 ppm NOx (D.1) or 80% control (D.2); and diesel engines are limited to 600 ppm NOx or 30% control (D.3). CO emissions are limited to 4500 ppmv. **Compliance with the Stationary ATCM ensures compliance with the emission limits of this Rule. Per section C.2, since the engine will be operated less than 200 hours per year, no source testing is required.**

H&SC 42301.6, Schools Notification: Projects that increase the emission of a toxic air contaminant within 1,000 feet of a school must distribute a notification to the students at the school and the surrounding residences. **The new engine is not within 1,000 feet of a school so a notification is not required. The nearest school is Pacheco Elementary School, which is approximately 2,722 feet from the nearest emission point (measured from Spanos Stadium engine).**

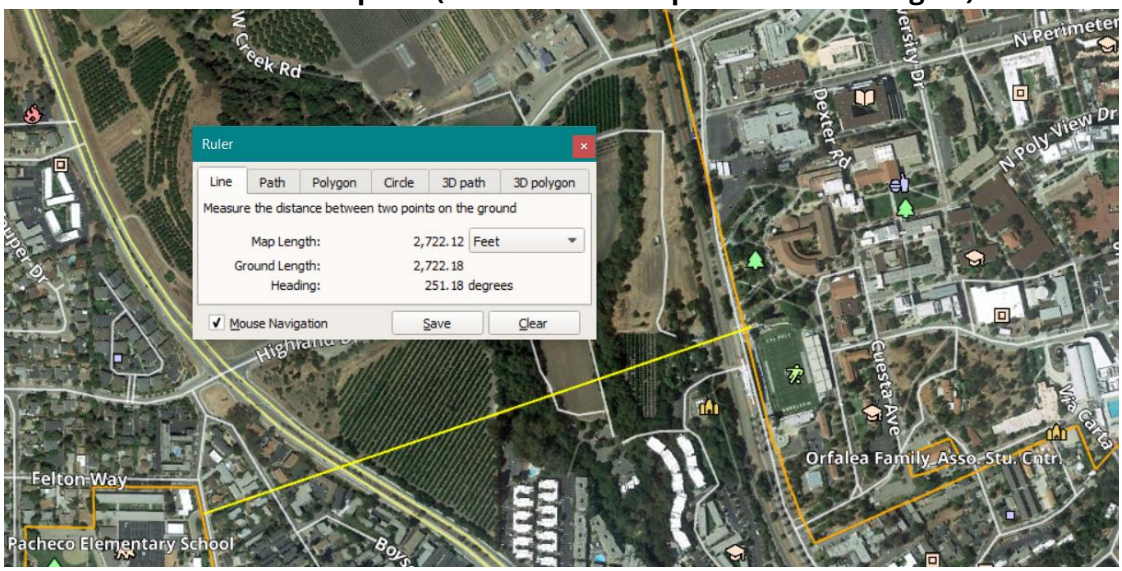



**Figure 2. Google Earth measurement between nearest emission point (Spanos Stadium) and Pacheco Elementary School.**

H&SC 44300, Air Toxics "Hot Spots": A prioritization score should be evaluated for all new or modified sources, except in the case of non-diesel modified sources where there is no increase in emissions. All stationary diesel engines should be prioritized or screened for facility-wide cancer risk, including modified or replacement engines with a decrease or no increase in emissions.

Facilities with a prioritization score less than or equal to 1.0 are exempt from further reporting requirements. Facilities with a score > 1.0 must perform a screening or refined HRA. **The facility conducted a Toxics emission inventory plan, report and Health Risk Assessment using 2017 emission inventory data as required by application 6539. The facility wide emissions resulted in a cancer score between 1 and 10 and a non-cancer score between 0.1 and 1. The submittal of the Health Risk Assessment changes the facility from a "Prioritization Greater than 10.0" facility to a "tracking facility." With at least six (6) SCC codes, it is deemed a complex facility.**

**IV. Equipment Description**:

Installation of a backup generator for the new William and Linda Frost Center for Research and Innovation (Frost Center) building consisting of:

One (1) Caterpillar 500 kW backup generator, fueled by a 779 hp 2019 Caterpillar diesel engine, Model C18, S/N TBD, EPA Tier 4 final certified, EPA Family #KCPXL18.1HTH.

**V. Emissions:**

Engine is 779 hp, emissions are as certified by the California Air Resources Board for EPA engine family #KCPXL18.1HTH, Executive Order U-R-001-0609.

**Table 2.** Emissions of the Frost Center engine.

| | CO | NMHC | NOx | PM |
|---|---|---|---|---|
| **g/kW-hr** | 0.01 | 0.02 | 0.10 | 0.01 |
| **lb/hr** | 0.01 | 0.03 | 0.13 | 0.01 |
| **lb/day** | 0.31 | 0.61 | 3.07 | 0.31 |
| **lb/yr** | 0.38 | 0.77 | 3.84 | 0.38 |

0.01 g CO/kW-hr x 1 lb/453.59 g x 1 kW/1.341 hp x 779 hp x 30 hrs/yr = 0.38 lb CO/yr
0.02 g NMHC/kW-hr x 1 lb/453.59 g x 1 kW/1.341 hp x 779 hp x 30 hrs/yr = 0.77 lb NMHC/yr
0.10 g NOx/kW-hr x 1 lb/453.59 g x 1 kW/1.341 hp x 779 hp x 30 hrs/yr = 3.84 lb NOx/yr
0.01 g PM/kW-hr x 1 lb/453.59 g x 1 kW/1.341 hp x 779 hp x 30 hrs/yr = 0.38 lb PM/yr

**VI. Basis for Conditions:** Standard Authority to Construct conditions for a stationary diesel emergency engine.

**VII. Conclusions/Recommendations:** I recommend that an Authority to Construct for the equipment listed in Section IV be issued subject to the conditions listed below.

1. The Air Pollution Control Officer (APCO) shall be notified of the completion of construction within three (3) days. This Authority to Construct will then serve as a temporary Permit to Operate for a period of time not to exceed ninety (90) days.

2. Non-Emergency Operation

a. Non-emergency operation of the William and Linda Frost Center for Research and Innovation (Frost Center) engine shall be limited to maintenance and performance testing only and shall not exceed thirty (30) hours per calendar year. Operation for emissions testing required by the District shall not be limited by this condition.
b. The APCO shall be notified in writing within seven (7) days of exceeding the yearly non-emergency operation limit.
c. An emergency is defined as failure of normal electrical power service that is beyond the control of the permit holder and does not include voluntarily disconnecting from utility grid power.

3. Only diesel fuel that meets the California Air Resources Board's specifications for on-road use shall be used to fuel the engine(s) unless otherwise approved by the APCO. Records of the fuel purchases shall be maintained to demonstrate compliance with this condition.

4. Visible emissions from the engine shall not exceed Ringelmann No. ¼ or five percent (5%) opacity for periods aggregating more than three (3) minutes in any hour.

5. A non-resettable hour meter for each engine shall be installed and maintained unless an APCO approved alternative tracking procedure is approved.

6. An operating log for the current calendar year shall be maintained for each engine on a monthly basis. Entries shall also be made for any day that the engine is operated and for any day that the engine receives fuel. The logs shall be retained for at least three (3) years and shall include the following data:

    a. Operating mode: emergency, maintenance, or District required testing
    b. Engine hour meter reading at start-up,
    c. Engine hour reading at shutdown,
    d. Operating hours for the calendar day,
    e. Running total calendar year to date operating hours,
    f. Running total calendar year to date operating hours in maintenance mode,
    g. Running total calendar year to date operating hours in emergency mode,
    h. Estimated fuel use for the day in gallons,
    i. Running total calendar year to date fuel use in gallons,
    j. Fuel purchased in gallons, and
    k. Total costs of any engine repair or reconstruction, excluding consumable items associated with standard maintenance activities.

7. Within fourteen (14) days of a request, the following information shall be submitted to the APCO for the previous calendar year for each engine:

    a. Maintenance operating hours,
    b. Emergency operating hours,

c. District required testing operating hours,
d. Total engine operating hours,
e. Total fuel usage,
f. Copies of all fuel purchase records, and
g. Total cost of engine repairs to date for each engine.

8. The APCO shall be notified prior to the repair or reconstruction of any diesel engine under permit. Consumable items used for regular maintenance, such as filters, hoses, belts, fluids, and glow plugs, are not considered repairs. In addition, replacement parts costing less than $1,000.00 can be omitted from this requirement. This condition is a result of a state regulation on rebuilds or repairs. Extensive repairs could trigger lower allowable emission rates. If lower emission rates apply, they may not be achievable with a simple rebuild.

9. Temporary Engine Replacement: Any engine subject to this permit may be temporarily replaced with another engine if all the requirements listed in sections a. through e. below are satisfied:

   a. The APCO shall be notified in writing or by fax at (805) 781-1002 within seventy-two (72) hours of a permitted engine being replaced. The notification shall include the replacement engines make, model, rated horsepower, engine family number if available, the current engine hour meter reading, manufacturer's particulate matter and oxides of nitrogen ($NO_x$) emission rates in grams per horsepower-hour (g/hp-hr) and the reason for the replacement.

   b. The permitted engine is in need of routine repair or maintenance and is returned to its original service within 180 days of installation of the temporary engine.

   c. The temporary replacement engine has the same or lower emission rate in g/hp-hr for particulate matter and $NO_x$ as the permitted engine that is being temporarily replaced or if written approval from the APCO is obtained for an engine that meets current permitting requirements. For breakdown conditions reported under the procedures of Rule 107, Breakdowns or Upset Conditions and Emergency Variances, the APCO may approve the use of any replacement engine that meets the requirements of the State Airborne Toxic Control Measure and would not create a public nuisance.

   d. The temporary replacement engine shall comply with all conditions of this permit, including but not limited to, engine operating hour limits, recordkeeping and reporting requirements.

   e. The APCO shall be notified in writing or by fax at (805) 781-1002 within fourteen (14) days of removal of the temporary engine.

10. The engine exhaust shall discharge vertically free of obstructions.

11. This equipment shall be operated and maintained in accordance with the manufacturer's recommendations and the information presented in the application under which this permit was issued.

12. If the APCO determines that the operation of this equipment is causing a public nuisance, the owner/operator shall take immediate action and eliminate the nuisance.

13. All information needed to estimate air pollution emissions shall be provided to the District upon request. This information may consist of, but is not limited to: throughput data, process variables, device characteristics, and pollutant release characteristics.

14. The APCO shall be notified and authorization obtained prior to making any changes in operating procedures, equipment, or materials used which have the potential to increase the emission of any air contaminant or which would change the equipment description or the applicability of a permit condition.

15. This Authority to Construct is not transferable to a new owner or location without the APCO's approval. A change of ownership application shall be submitted to the APCO at least ten (10) working days prior to any change in the person, partnership, company, corporation, or agency that is responsible for the operation of the equipment described above. An authority to construct application must be submitted and approved by the APCO prior to moving the permitted equipment to a new location.

BY: Sarah Wade DATE: 09/18/2020
Air Pollution Control Engineer

APPROVED: Dora K. Dreyclu DATE: 09/18/2020
Division Manager

H:\PERMITS\AC\EVAL\6856EAC.docx

**ATTACHMENT 3**

FUEL CELLS

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CA | 91309 | Certified Natural Gas Fuel Cell (DG) | PAFC | Professional, Scientific, and Technical Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | CA | 92111 | Certified Natural Gas Fuel Cell (DG) | PAFC | Retail Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CA | 92357 | Certified Natural Gas Fuel Cell (DG) | PAFC | Health Care and Social Assistance |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CA | 94588 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | CA | 92688 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | CA | 92105 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CA | 95118 | Certified Natural Gas Fuel Cell (DG) | PAFC | Retail Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | CA | 94574 | Certified Natural Gas Fuel Cell (DG) | PAFC | Health Care and Social Assistance |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CA | 92081 | Certified Natural Gas Fuel Cell (DG) | PAFC | Utilities |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CA | 91604 | Certified Natural Gas Fuel Cell (DG) | PAFC | Arts, Entertainment, and Recreation |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CA | 90036 | Certified Natural Gas Fuel Cell (DG) | PAFC | Arts, Entertainment, and Recreation |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CA | 91765 | Certified Natural Gas Fuel Cell (DG) | PAFC | Other Services (except Public Administration) |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CA | 95134 | Certified Natural Gas Fuel Cell (DG) | PAFC | Data Center |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CA | 95605 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CA | 92860 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2015 | CA | 92096 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2017 | CA | 92101 | Certified Natural Gas Fuel Cell (DG) | PAFC | Accommodation and Food Services |

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2019 | CA | 91342 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2019 | CA | 90802 | Certified Natural Gas Fuel Cell (DG) | PAFC | Arts, Entertainment, and Recreation |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | CT | 6510 | Certified Natural Gas Fuel Cell (DG) | PAFC | Other Services (except Public Administration) |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | CT | 6790 | Certified Natural Gas Fuel Cell (DG) | PAFC | Retail Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CT | 6457 | Certified Natural Gas Fuel Cell (DG) | PAFC | Professional, Scientific, and Technical Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CT | 6510 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CT | 6118 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CT | 6457 | Certified Natural Gas Fuel Cell (DG) | PAFC | Retail Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CT | 6824 | Certified Natural Gas Fuel Cell (DG) | PAFC | Retail Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CT | 6517 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | CT | 6074 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CT | 6106 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CT | 6269 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CT | 6510 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CT | 6226 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CT | 6141 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2012 | CT | 6122 | Certified Natural Gas Fuel Cell (DG) | PAFC | Health Care and Social Assistance |

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CT | 6105 | Certified Natural Gas Fuel Cell (DG) | PAFC | Health Care and Social Assistance |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CT | 6810 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | CT | 6457 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2015 | CT | 6103 | Certified Natural Gas Fuel Cell (DG) | PAFC | Other Services (except Public Administration) |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2015 | CT | 6517 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2015 | CT | 6383 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2016 | CT | 6484 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2016 | CT | 6457 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2016 | CT | 6051 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2017 | CT | 6770 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2017 | CT | 6824 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2017 | CT | 6708 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2018 | CT | 6516 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2019 | CT | 6074 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2019 | CT | 6074 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2019 | CT | 6010 | Certified Natural Gas Fuel Cell (DG) | PAFC | Public Administration |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2019 | CT | 6074 | Certified Natural Gas Fuel Cell (DG) | PAFC | Utilities |

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NE | 68102 | Certified Natural Gas Fuel Cell (DG) | PAFC | Finance and Insurance |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NJ | 7920 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | NY | 10006 | Certified Natural Gas Fuel Cell (DG) | PAFC | Wholesale Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | NY | 10006 | Certified Natural Gas Fuel Cell (DG) | PAFC | Wholesale Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | NY | 12205 | Certified Natural Gas Fuel Cell (DG) | PAFC | Retail Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2010 | NY | 10523 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | NY | 10047 | Certified Natural Gas Fuel Cell (DG) | PAFC | Other Services (except Public Administration) |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | NY | 10036 | Certified Natural Gas Fuel Cell (DG) | PAFC | Wholesale Trade |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NY | 14623 | Certified Natural Gas Fuel Cell (DG) | PAFC | Educational Services |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NY | 11237 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NY | 11432 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NY | 11233 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NY | 11238 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2013 | NY | 11301 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2015 | NY | 11530 | Certified Natural Gas Fuel Cell (DG) | PAFC | Telecommunications |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2015 | NY | 10523 | Certified Natural Gas Fuel Cell (DG) | PAFC | Data Center |
| Doosan Fuel Cell America, Inc. | M400 | 460 | 2011 | WI | 53177 | Certified Natural Gas Fuel Cell (DG) | PAFC | Manufacturing |

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Bloom Energy | ES5 | 300 | 2020 | CA | 91125 | Certified Natural Gas Fuel Cell (DG) | SOFC | Educational Services |
| Bloom Energy | ES5 | 300 | 2019 | CA | 91403 | Certified Natural Gas Fuel Cell (DG) | SOFC | Telecommunications |
| Bloom Energy | ES5 | 300 | 2019 | CA | 94089 | Certified Natural Gas Fuel Cell (DG) | SOFC | Manufacturing |
| Bloom Energy | ES5 | 300 | 2019 | CA | 95119 | Certified Natural Gas Fuel Cell (DG) | SOFC | Manufacturing |
| Bloom Energy | ES5 | 300 | 2019 | MA | 2125 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2019 | CA | 95119 | Certified Natural Gas Fuel Cell (DG) | SOFC | Telecommunications |
| Bloom Energy | ES5 | 300 | 2019 | CT | 6477 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 2322 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NJ | 7069 | Certified Natural Gas Fuel Cell (DG) | SOFC | Manufacturing |
| Bloom Energy | ES5 | 300 | 2018 | NJ | 7069 | Certified Natural Gas Fuel Cell (DG) | SOFC | Manufacturing |
| Bloom Energy | ES5 | 300 | 2018 | NY | 13057 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 12205 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 10591 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES5 | 300 | 2018 | CT | 6118 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | CA | 95403 | Certified Natural Gas Fuel Cell (DG) | SOFC | Manufacturing |
| Bloom Energy | ES5 | 300 | 2018 | NY | 13413 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 12144 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 1752 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 2169 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 1906 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 13031 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 12205 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 12065 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 12010 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 12304 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Bloom Energy | ES5 | 300 | 2018 | NY | 13090 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 13039 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | NY | 12866 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | CA | 93313 | Certified Natural Gas Fuel Cell (DG) | SOFC | Manufacturing |
| Bloom Energy | ES5 | 300 | 2018 | CT | 6611 | Certified Natural Gas Fuel Cell (DG) | SOFC | Data Center |
| Bloom Energy | ES5 | 300 | 2018 | CT | 6611 | Certified Natural Gas Fuel Cell (DG) | SOFC | Data Center |
| Bloom Energy | ES5 | 300 | 2018 | MA | 1095 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 2132 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | CT | 6473 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 1606 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 2538 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 1844 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 2703 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2018 | MA | 2747 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2017 | MA | 2771 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2017 | MA | 2360 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2017 | CA | 95054 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES5 | 300 | 2017 | NY | 10532 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2017 | CA | 95014 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES5 | 300 | 2017 | CA | 95014 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES5 | 300 | 2017 | CA | 95014 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES5 | 300 | 2017 | CA | 95014 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES5 | 300 | 2017 | NY | 11420 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Bloom Energy | ES5 | 300 | 2017 | NY | 11743 | Certified Natural Gas Fuel Cell (DG) | SOFC | Telecommunications |
| Bloom Energy | ES5 | 300 | 2016 | NY | 11214 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2016 | CA | 95131 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES5 | 300 | 2016 | CA | 94544 | Certified Natural Gas Fuel Cell (DG) | SOFC | Telecommunications |
| Bloom Energy | ES-5700 | 200 | 2016 | NY | 10303 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES-5700 | 200 | 2016 | NY | 10309 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2016 | NY | 11239 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2016 | CA | 95691 | Certified Natural Gas Fuel Cell (DG) | SOFC | Telecommunications |
| Bloom Energy | ES5 | 300 | 2016 | CT | 6106 | Certified Natural Gas Fuel Cell (DG) | SOFC | Public Administration |
| Bloom Energy | ES-5700 | 200 | 2016 | NY | 10547 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES5 | 300 | 2016 | DE | 19713 | Certified Natural Gas Fuel Cell (DG) | SOFC | Data Center |
| Bloom Energy | ES5 | 300 | 2015 | CA | 95119 | Certified Natural Gas Fuel Cell (DG) | SOFC | Data Center |
| Bloom Energy | ES-5710 | 250 | 2015 | CA | 94085 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES-5700 | 200 | 2015 | NY | 10566 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES-5710 | 250 | 2015 | CA | 90301 | Certified Natural Gas Fuel Cell (DG) | SOFC | Health Care and Social Assistance |
| Bloom Energy | ES-5710 | 250 | 2015 | UT | 84095 | Certified Natural Gas Fuel Cell (DG) | SOFC | Data Center |
| Bloom Energy | ES-5710 | 250 | 2015 | CA | 92614 | Certified Natural Gas Fuel Cell (DG) | SOFC | Data Center |
| Bloom Energy | ES-5700 | 200 | 2015 | CT | 6037 | Certified Natural Gas Fuel Cell (DG) | SOFC | Telecommunications |
| Bloom Energy | ES-5710 | 250 | 2015 | CA | 92618 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES-5710 | 250 | 2015 | CA | 95630 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES-5710 | 250 | 2015 | CA | 95054 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES-5710 | 250 | 2014 | NY | 10550 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |

| Table A-3: Fuel Cell Installations | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer:** | **Model Name:** | **Rated Power: (kW)** | **Install Year:** | **Installation State:** | **Installation Zip:** | **Energy_Tech_Type:** | **Unit_Type:** | **Industry Use of Installation:** |
| Bloom Energy | ES-5710 | 250 | 2014 | CA | 94085 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES-5710 | 250 | 2014 | CA | 92408 | Certified Natural Gas Fuel Cell (DG) | SOFC | Professional, Scientific, and Technical Services |
| Bloom Energy | ES-5710 | 250 | 2014 | NY | 10577 | Certified Natural Gas Fuel Cell (DG) | SOFC | Finance and Insurance |
| Bloom Energy | ES-5710 | 250 | 2014 | CT | 6385 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES-5700 | 200 | 2014 | CT | 6513 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES-5700 | 200 | 2013 | UT | 84095 | Certified Natural Gas Fuel Cell (DG) | SOFC | Data Center |
| Bloom Energy | ES-5700 | 200 | 2013 | CA | 92008 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES-5710 | 250 | 2013 | CA | 90064 | Certified Natural Gas Fuel Cell (DG) | SOFC | Retail Trade |
| Bloom Energy | ES-5700 | 200 | 2013 | CT | 6410 | Certified Natural Gas Fuel Cell (DG) | SOFC | Transportation and Warehousing |
| Bloom Energy | ES-5700 | 200 | 2011 | CA | 90222 | Certified Natural Gas Fuel Cell (DG) | SOFC | Manufacturing |

CALIFORNIA
AIR RESOURCES BOARD

Gavin Newsom, Governor
Jared Blumenfeld, CalEPA Secretary
Liane M. Randolph, Chair

May 28, 2021

Mr. Venk Reddy
Sacramento Metropolitan Air Quality Control Management District
777 12th Street, Third Floor
Sacramento, California 95814

Dear Mr. Reddy:

Thank you for the opportunity to comment on Sacramento Metropolitan Air Quality Management District's (SMAQMD) updated Best Available Control Technology (BACT) determination for Emergency Standby Diesel-Fueled Engines ≥ 1000 BHP. The California Air Resources Board (CARB) strongly supports the SMAQMD's BACT determination for newly permitted engines in this category to meet Tier 4 final emission standards.

We understand you have received some comments from industry stakeholders, and the information we provide in this letter is offered in the spirit of supporting your efforts. Some industry representatives assert Tier 4 emission levels are not achieved in practice because they have not been proven in operation, that the technology is unreliable, and is not cost effective. CARB does not agree with these arguments.

Recent CARB and Bay Area Air Quality Management District (BAAQMD) analysis of back-up generators reveals more operation during emergencies, and not just for maintenance and testing purposes. CARB's analysis of back-up generator emissions caused by public safety power shutoffs in October 2019 resulted in 8 excess tons of diesel PM and 125 excess tons of NOx, which was equivalent to 29,000 heavy duty diesel trucks (above 14,000 lbs.) driving on California roadways for the period of one month[1]. A recent BAAQMD assessment found back-up generators in data centers in the Bay Area were operating because of emergency events:

> *"Between September 1, 2019, and September 30, 2020, nearly half of the identified data centers in Santa Clara, San Jose, and Sunnyvale operated backup diesel generators for reasons other than routine testing and maintenance. Many of the data centers operated diesel generators during multiple non-testing/non-maintenance events; non-testing/non-maintenance hours of operation approached 50 hours for one generator for one event; it appears 40 or more generators operated concurrently at two facilities; and one facility ran diesel generators for approximately 400 hours for non-testing/non-maintenance purposes during this time period."*[2]

[1] Potential Emissions Impact of Public Safety Power Shutoff (PSPS) Draft – Deliberative (ca.gov)
[2] https://efiling.energy.ca.gov/GetDocument.aspx?tn=236946&DocumentContentId=70110

During prolonged emergencies, NOx and diesel PM emissions from large diesel engines must be adequately controlled to prevent exceedance of federal and state ambient air quality standards and to protect public health.

There is sufficient evidence that emergency standby engines can achieve Tier 4 final emission rates at a variety of facilities throughout California. Meeting Tier 4 emission limits requires the installation of after-treatment controls: diesel particulate filters (DPF) and selective catalytic reduction (SCR) to control NOx (although some Tier 4 off-road engines can meet emission limits without a DPF).

Tier 4 emission control technologies operate by filtering particulate from the exhaust stream, and then injecting urea into the SCR, which is a catalyst designed to reduce oxides of nitrogen to nitrogen gas. These technologies are very effective, providing maximum emission control under hot-stabilized engine conditions. Like all emission controlled engines, emissions are marginally higher during cold start conditions until the SCR warms-up. Engines which are properly sized for the application reach higher load factors for which the engines are designed, leading to rapid system heating and emission control. Periodically, under normal operations, the diesel particulate filter may need to regenerate by burning soot off the filter. This is part of normal engine operation.

Tier 4 technologies are not new, and are ubiquitous in California. Since 2010, every new diesel on-road heavy-duty engine in California has been certified to 2010 standard emission levels (which are analogous to Tier 4 off-road emission levels), and is equipped with a DPF and SCR. Every day there are more than 750,000 diesel vehicles on the road in California equipped with these technologies, representing more than 75 percent of all diesel vehicle miles traveled in the State.[3] Since 2015, new off-road engines have been certified to Tier 4 final emission limits.

Approximately 95 percent of portable engines operated in California are registered in the Portable Equipment Registration Program (PERP). In 2020, over 90% of newly registered engines were certified Tier 4 engines. Specifically, since 2015, there have been 5,578 Tier 4 generators registered in PERP. These engines may provide back-up power for maintenance and emergency use, similar to stationary back-up generators.

Both diesel on-road engines certified to 2010 standards,[4] and diesel Tier 4 off-road engines[5] are subject to rigorous testing requirements to be certified by EPA and CARB. Engines must meet emission requirements on steady state test cycles, at multiple loads which helps assure emission controls are effective in real-world operation. Engines must also meet not-to-exceed emission limits, meet extensive durability testing requirements, and demonstrate emissions will continue to be met over the useful life of the engine.[6]

---

[3] EMFAC (ca.gov)
[4] On-Road Heavy-Duty Certification Program | California Air Resources Board
[5] Off-Road Compression-Ignition Certification Program | California Air Resources Board
[6] On-Road Heavy-Duty and Off-Road Compression Ignition Certification Programs:Useful Life Compliance and Durability Demonstration | California Air Resources Board

Manufacturers must also report customer claims for warranty-driven repairs on individual engine and emission control parts, and take action when regulatory thresholds are exceeded. Analysis of these data shows steady decreases in warranty claims reflecting substantially improved reliability over-time as the durability in engine and emission control technologies has improved. A significant decrease in warranty claims over the past five years in on-road diesel engines demonstrate engines with both SCR and DPF are more reliable than engines without SCR. Certification demonstrates, before these engines can be legally sold in California or the United States, that emission limits will be met over the lifetime of the engine.

On-road engines certified to the 2010 emission standard, and off-road engines certified to the Tier 4 standard are durable and reliable, provided the engines are properly maintained.[7,8] New diesel fueled emergency vehicles, like fire trucks, are certified to 2010 emission standards and equipped with SCR. Diesel-fueled engines require fuel to operate, and also require diesel exhaust fluid (DEF) for the SCR to function properly. These engines do not run without fuel, and can derate if DEF fluids run out, and so during use the operator must ensure the engine has sufficient fuel and DEF to operate. Both diesel fuel and DEF have a shelf life, and this should be factored in to testing and maintenance requirements for diesel back-up generators.

Tier 4 compliant and Tier 4 certified engines have been installed in back-up generator applications. CARB is charged with maintaining a statewide clearinghouse of Best Available Control Technology (BACT) and other air pollution control permitting decisions (Health & Safety Code § 40920.8.) Appendix A provides a list of 150 Tier 4 back-up engines used at facilities throughout the United States capable of providing >1,000 BHP installed in various locations.

There are two types of operation of an emergency back-up generator – operations during emergency events, and operation during testing. Emergencies, like PSPS events, can last anywhere from hours to a few days. While operating during an emergency, the emissions generated at startup are negligible, while the emission reductions during steady state operation can quickly become significant. Often these engines are located at industrial facilities in disadvantaged communities, where public health protection is paramount.

Back-up generators are also operated periodically for relatively short periods of time to test the engine, and ensure proper maintenance so the engine is ready for an emergency event. During these shorter-term tests, the degree of NOx emission control will depend on the load on the engine. Under a higher load, the emission control system will heat up rapidly, while under lower loads, the exhaust temperatures will be lower and the catalyst system operate at lower efficiencies. In lower load tests, catalyst efficiency can be maximized within a few minutes with the use of electric heater technology upstream of the catalyst.[9] Preventive

---

[7] https://ww2.arb.ca.gov/sites/default/files/2020-08/dpfeval_0.pdf
[8] PERP ISOR Appendix K - Tier 4 Engines Assessment (ca.gov)
[9] Culbertson, D., Khair, M., Zhang, S., Tan, J. et al., "The Study of Exhaust Heating to Improve SCR Cold Start Performance," *SAE Int. J. Engines* 8(3):1187-1195, 2015

maintenance is important to ensure proper functioning of any back-up generator during an emergency, and CARB's Air Toxic Control Measure provides adequate time for an operator to test and repair the engine as necessary to ensure proper functioning.

CARB is in the process of contacting air districts that have permitted Tier 4 engines in California listed in Appendix A to request source testing information demonstrating the achievement of Tier 4 emission levels. As soon as we receive that information, we will forward it to SMAQMD.

Industry stakeholders point out that Tier 4 engines are more expensive than older, outdated Tier 2 engines. This is true. However, because diesel engines are sold certified to the United States and California Tier 4 standard (2010 on-road standard), are operated in on- and off-road applications including in emergency configurations, and at least 150 Tier 4 engines have been installed in California and other states, per SMAQMD Rule 202, cost-effectiveness need not be considered.[10]

CARB recognizes that BACT evaluations are completed on a case-by-case basis for a particular type of application, and the definition of BACT for a particular application evolves over time, becoming more stringent, as technology progresses. In this case advanced technology diesel engines, equipped with SCR and DPF, have been certified, demonstrated, and operated, in a variety of on-road, off-road, portable and stationary applications, in a wide variety of size ranges and a wide variety of applications and duty cycles. These engines and emission control systems are effective, reliable, and durable. Therefore, CARB fully supports SMAQMD's updated BACT determination for emergency standby diesel-fueled engines rated ≥ 1,000 BHP.

Thank you for your on-going efforts to control stationary sources as part of the state's plans to achieve national ambient air quality standards and protect public health, especially in disadvantaged communities. We look forward to continuing to work with you in these endeavors.

Sincerely,

Todd P. Sax, D.Env.
Chief, Enforcement Division

[10] *http://www.airquality.org/ProgramCoordination/Documents/rule202.pdf*

# Attachment D

## Other Information

**Manufacturers of Emission Controls Association**
2020 Wilson Boulevard, Suite 310
Arlington, VA 22201
(202) 296-4797

June 10, 2021

VIA E-MAIL (aroberts@airquality.org)

Amy Roberts
Manager, Stationary Sources Division
Sacramento Metropolitan Air Quality Management District
777 12th Street, Suite 300
Sacramento, California 95814

**Re: MECA Comments on Proposed Revised BACT Determination (SMAQMD Rule 202, §205.1) for Emergency Diesel IC Engines: BACT #281**

Dear Ms. Roberts,

MECA is pleased to provide comments in response to the Sacramento Metropolitan Air Quality Management District (SMAQMD) notice proposing to change the BACT determination (BACT #281) for standby diesel IC engines ("Emergency Diesel Engines"). In particular, SMAQMD is proposing that BACT for Emergency Diesel Engines rated at above 1000 hp will be NOx: 0.5 g/hp-hr and PM10: 0.02 g/hp-hr which represents Tier 4 emission standards requiring the use of selective catalyst reduction (SCR) and diesel particulate filters (DPFs) systems.

MECA is an industry trade association of the world's leading manufacturers of clean mobility technology. Our members have nearly 50 years of experience and a proven track record in developing and commercializing emission control, efficiency and electric technology for a wide variety of on-road and off-road vehicles and equipment in all world markets. Our members provide the technologies that enable heavy-duty on-road vehicles to meet the most stringent NOx and PM emission standards, as well as electrification and all-electric technologies that reduce emissions of all pollutants, criteria and climate, and allow commercial vehicles to be the cleanest possible. Our industry has played an important role in the environmental success story associated with light- and heavy-duty vehicles in the United States and has continually supported regulatory agencies in their efforts to develop innovative, technology-advancing, programs to deal with air quality and climate challenges.

It is MECA's position that the proposed BACT determination of emissions standards for standby, diesel-fueled IC engines is technically feasible based upon technology availability and in-use performance. Indeed, emission control technologies including diesel oxidation catalysts (DOCs), particulate filters (DPFs) and selective catalytic reduction (SCR) systems have been commercially available to reduce PM10, NOx and HAP's emissions on a wide range of stationary engines including emergency standby engines for over three decades. Prior to Tier 4 standards being implemented, these technologies were offered by MECA members as retrofit systems as we show in the two examples below. Or industry has extensive experience in integrating DPFs and SCR catalysts with ammonia or urea dosing strategies on stationary engines and have supplied these aftertreatment solutions in response to requirements by other air districts in California.

**Feasibility of Emission Control Technologies for Existing Stationary Diesel Engines Over 1000hp**

Our members have been commercializing exhaust emission controls for reducing emissions from in-use stationary diesel engines over 1000 hp for decades. This includes numerous documented California installations in the Bay Area, the San Joaquin Valley and the South Coast.

The local air districts justify the measures that protect the air quality of frontline communities and SMAQMD correctly cites a number of air district determinations including SCAQMD, SJVUAPCD, and BAAQMD that require the use of DPFs and SCR systems as BACT or TBACT.

In particular, the BAAQMD in their March 29, 2021 workshop cited several 2013 or newer state-of-the-art installations of Tier 4 engines and engines equipped with DPFs and SCR systems as BACT examples that are achieved in practice. Moreover, BAAQMD cites in their BACT technology regulation that BACT requirements are based upon the "potential to emit" (PTE) during 24 hour per day emergency operation. The BAAQMD PTE is defined as "the maximum capacity of a source or facility to emit a pollutant based on its physical and operational design". BAAQMD does not distinguish between planned and emergency operation of standby emergency engines.

Our members experience indicates that the newest facilities (typically data centers) are increasingly employing dedicated, on-site load banks to exercise emergency standby engines under load to ensure the readiness of the engine to operate under emergency full load conditions. The practice of testing under loaded engine conditions produces exhaust temperatures that also ensure the maintenance and emergency operational readiness of DPF and SCR emissions controls and their ability to continue to meet their certified emission limits.

An important part of routine preventative maintenance and testing includes the examination of fluids such as diesel fuel, engine oil, coolant and diesel exhaust fluid

(DEF). DEF (an aqueous urea solution) is a vital component in today's SCR equipped engines. It's a non-hazardous, non-toxic, non-flammable material that does not pose any serious health risks to people, so it is safe to handle and has optimal storage requirements identical to diesel fuel. Sold in dated coded containers, DEF has a shelf life of up to two years when stored under optimal conditions (between 12°F and 86°F)-again, a similar period of time to the usable life of today's diesel fuel. The inspection, cycling / use of diesel fuel and DEF are all part of the routine maintenance and management of standby emergency engines.

It is also common that SCR systems on engines >1000hp employ air-assisted urea injection systems that are capable of clearing the injector of DEF and avoiding the occurrence of deposits and plugging.

**Longer Term Experience with the Application of DPF and SCR Systems to Existing Stationary Diesel Engines**

Several MECA member companies have experience with the application of DPF and SCR systems to stationary diesel engines which includes successful application to engines as small as 25 hp to very large emergency standby or continuous power engines producing several megawatts of power. This experience base includes both passively regenerated DPF systems and actively regenerated DPF systems.

Below are two older examples of the earlier application of DPF+SCR emission control systems installed on stationary diesel engines highlighting that this technology is well known and proven effective. These examples pre-date the installations cited by BAAQMD:

- In July 2007, Janssen Ortho, a subsidiary of Johnson & Johnson, located in Gurabo, Puerto Rico, installed DPF+SCR systems on three 2220-hp Cummins KTTA50-G2 engines (approximately 0.2 g/bhp-hr PM). The engines are used to provide emergency backup power for their pharmaceutical R&D and manufacturing facility. Despite the limited amount of space around the engines, the company and emission control technology provider worked together to arrive at a compact and efficient solution – a platform design that allowed all of the emission control equipment to be installed above the engines. The DPF+SCR systems achieve PM reductions of >90 percent and NOx reductions of 91-92 percent.
- In September 2003, Snow Summit Ski Resort in Big Bear Lake, California, installed DPF+SCR systems on two large stationary engines. The two engines are Cummins QSK78-G6 diesel engines (0.2 g/bhp-hr PM), which power two 2-MW generators during the yearly ski season. The generators are used to operate snow-making and other auxiliary equipment during the annual ski season. Source test results showed PM reductions of greater than 90 percent and NOx reductions of greater than 94 percent.

**Conclusion**

MECA commends the SMAQMD for taking an important step to reduce emissions from new and existing emergency standby stationary engines and protecting the health of affected frontline communities. MECA and our member companies look forward to working with SMAQMD in implementing this proposed BACT determination.

**Contact:**

Dr. Rasto Brezny
MECA Executive Director
2200 Wilson Boulevard, Suite 310
Arlington, VA 22201
Tel: (202) 296-4797
E-Mail: rbrezny@meca.org

cc: Alberto Ayala, SMAQMD
Steve Mosunic, SMAQMD