SMAQMD BACT CLEARINGHOUSE

ACTIVE

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

BACT Category: Minor Source BACT

BACT Determination Number:	402	**BACT Determination Date:**	12/30/2025

Equipment Information

Permit Number:	N/A - Generic BACT Determination
Equipment Description:	IC ENGINE COMPRESSION STANDBY DIESEL FIRED
Unit Size/Rating/Capacity:	Greater than or Equal to 50 HP
Equipment Location:	N/A - Generic BACT Determination

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:	Tier 4 emission requirements for electrical generation, New Emergency Standby Direct Drive Fire Pump Engines Table 2: New Emergency Standby Direct Drive Fire pumps of the ATCM for Stationary CI Engines.
	Basis:	Achieved in Practice
NOx	**Standard:**	Applicable NOx or NMHC + NOx emission standard
	Technology Description:	Tier 4 emission requirements for electrical generation, New Emergency Standby Direct Drive Fire Pump Engines Table 2: New Emergency Standby Direct Drive Fire pumps 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% weight.
	Basis:	Achieved in Practice
PM10	**Standard:**	Applicable PM emission standard
	Technology Description:	Tier 4 emission requirements for electrical generation, New Emergency Standby Direct Drive Fire Pump Engines Table 2: New Emergency Standby Direct Drive Fire pumps of the ATCM for Stationary CI Engines.
	Basis:	Achieved in Practice
PM2.5	**Standard:**	Applicable PM emission standard
	Technology Description:	Tier 4 emission requirements for electrical generation, New Emergency Standby Direct Drive Fire Pump Engines Table 2: New Emergency Standby Direct Drive Fire pumps of the ATCM for Stationary CI Engines.
	Basis:	Achieved in Practice
CO	**Standard:**	Applicable CO emission standard

		Technology Description:	Tier 4 emission requirements for electrical generation, New Emergency Standby Direct Drive Fire Pump Engines Table 2: New Emergency Standby Direct Drive Fire pumps of the ATCM for Stationary CI Engines.
		Basis:	Achieved in Practice
	LEAD	**Standard:**	
		Technology Description:	
		Basis:	

Comments:	This is a generic BACT determination based on BACT determinations made, and published, by other air agencies in California and/or other States.

Printed: 12/30/2025

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

DETERMINATION NOS.:	402
DATE:	5/30/2025
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.: 330

This BACT determination will update the following determination:
BACT #330 which was made on September 6, 2023 for diesel emergency standby I.C. engines BHP ≥ 50. The requirements of BACT 330 will be reviewed and revised in the categories identified in the previous BACT determination.

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 engine for pumps. As part of a generator typical uses include providing power to life safety systems, building equipment, or computer equipment when there is a loss of power. 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 1/1/2015 and 5/30/2025 were reviewed for this BACT determination. 215 projects were identified and reviewed. A majority of them were found to be consistent with meeting current

Tier standards per NSPS 40 CFR 60 Subpart IIII. No projects were found to be stricter than SMAQMD for electrical generation (greater than Tier IV emission standards). One project was found to be stricter than SMAQMD current requirements, a Tier 4 certified engine for a fire pump.

BACT

Source: EPA RACT/BACT/LAER Clearinghouse

For Emergency Standby fire pump (B)	
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	0.0149 g/hp-hr
PM2.5	0.0149 g/hp-hr
CO	2.67 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.
(B) From RBLC ID: TX-0846 -Toyota Motor 214 KW (~286 HP) – Tier 4 compliant.

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].

Final rule changes from 8-16-2024 were published in the EPA website but have not yet been published in the federal registry. The proposed rule allows for electronic reporting, small clarifications and corrections, and provisions are being added that emergency engines can operate for up to 50 hours per year to mitigate local transmission and/or distribution limitations to avert potential voltage collapse or line overloads that could lead to interruption of power supply in a local area or region. Per part *D What are the benefits? "The EPA is not making changes to the emission limits and estimates that the final requirements for electronic reporting are not economically significant. Because these amendments are not considered economically significant, as defined by Executive Order 12866, and because no emission reductions were projected, we are not estimating any benefits from reducing emissions."*

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 pump engines are subject to the same emission standards as emergency use non-fire pump engines.

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 (30 0 ≤ 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. Similar to subpart IIII, on 8-30-2024, EPA is finalizing amendments to include electronic reporting, clarify and correct the text and allow for 50 hours per year for electric grid maintenance.

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.

California Air Resource Board (CARB)

BACT
From 3/14/2023 to 6/2/2025 there has been no stationary emergency engine BACT determinations entered under BACT Determinations.

Source: ARB BACT Clearinghouse

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 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 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)	3.7 (5.0)
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: SMAQMD BACT Clearinghouse, BACT Determination Number 330

BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED FOR ELECTRICAL GENERATION	
Pollutant	**Standard**
VOC	Tier 4 emission standards for the HP range
NOx	Tier 4 emission standards for the HP range
SOx	Diesel fuel with a sulfur content no greater than 0.0015% by weight.

BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED FOR ELECTRICAL GENERATION	
PM10	Tier 4 emission standards for the HP range
PM2.5	Tier 4 emission standards for the HP range.
CO	Tier 4 emission standards for the HP range

BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED FOR DIRECT DRIVE ENGINES	
Pollutant	**Standard**
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

T-BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED	
Pollutant	**Standard**
Diesel PM	Compliance with the current BACT standards listed for PM10 & PM2.5 (A)
	Particulate filter (B)

(A) Since the current BACT standards are more health protective than previously published T-BACT standards, T-BACT standards will be updated to follow the BACT standards.

(B) Applicable to major sources. This is included in the event that an emergency direct drive pump is placed at a major source which will be determined on a case by case basis if a particulate filter is technologically feasible at the time of application.

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 September 2, 2022, IC Engine, Stationary, Emergency BACT Rev 7 (2-2-2024)

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. (12-02-2015 Rev. 5)

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 3, 2023)

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 October 1, 2021)

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) Rule 1470 §(c)(2)(C)(vi) for PM Rule 1470 §(c)(2)(C)(vii), Table 2 for NMHC + NOx, and CO			
Maximum Engine Power	NMHC + NOx	CO	PM
50 < HP < 100 (37 < kW < 75)	4.7 (3.5)	5.0 (3.7)	(0.15)

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

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 a 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 APCD

BACT
Source: SJVAPCD BACT Guideline 3.1.1 (Last Updated: 4/29/22)

Emergency Diesel IC Engine >50 bhp Powering an Electrical Generator	
VOC	EPA Tier 4 Final certification level or equivalent for applicable horsepower range(A)
NOx	EPA Tier 4 Final certification level or equivalent for applicable horsepower range(A)
SOx	Very low sulfur diesel fuel (15 ppmw sulfur or less)
PM10	EPA Tier 4 Final certification level or equivalent for applicable horsepower range(A)
PM2.5	No standard
CO	Latest EPA Tier Certification level for applicable horsepower range

(A) The following emission levels are equivalent to the EPA Tier 4 Final certification levels:

50 - ≤ 75 bhp: 3.5 g-(NOx + VOC)/bhp-hr, 0.02 g-PM/bhp-hr, 3.7 g-CO/bhp-hr
75 - ≤ 175 bhp: 0.30 g-NOx/bhp-hr, 0.015 g-PM/bhp-hr, 3.7 g-CO/bhp-hr, 0.14 g-VOC/bhp-hr
175 - ≤ 750 bhp: 0.30 g-NOx/bhp-hr, 0.015 g-PM/bhp-hr, 2.6 g-CO/bhp-hr, 0.14 g-VOC/bhp-hr
> 750 bhp: 0.50 g-NOx/bhp-hr, 0.02 g-PM/bhp-hr, 2.6 g-CO/bhp-hr, 0.14 g-VOC/bhp-hr

Source: SJVAPCD 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] 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: SJVAPCD BACT Guideline 3.1.4 (3/2/2020)

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.

Per conversation with SJVAPCD engineering staff (Kevin Perez 209-557-6458 on 3/13/23), the agency has fully deployed requirements of Tier 4 (or equivalent emissions with controls) for all engines powering generators and is therefore considered achieved in practice. For direct drive engines, such as fire pumps, the Tier 4 or equivalent standards have not been required and are therefore not considered achieved in practice. Per conversation with Kevin Perez on 5/22/23, a specific BACT determination would have to be done for specific direct drive applications that are not connected to a fire pump.

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 August 19, 2021)

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

San Diego County APCD

BACT
Source: NSR Requirements for BACT (November 2023)
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 (12/02/24)

IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump rated ≥ 50 BHP and < 1,000	
VOC	U.S. EPA Final Tier 4
NOx	U.S. EPA Final Tier 4

IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump rated ≥ 50 BHP and < 1,000	
SOx	Fuel sulfur content not to exceed 0.0015% (wt.) or 15 ppm (wt.)
PM10	U.S. EPA Final Tier 4
PM2.5	U.S. EPA Final Tier 4
CO	U.S. EPA Final Tier 4

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

IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump ≥ 1,000 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 Guidline 96.1.3 (12/02/24)

IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump ≥ 50 BHP and < 1,000	
Diesel PM	U.S. EPA Final Tier 4 Standard

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

IC Engine-Compression Ignition: Stationary Emergency, Non-agricultural, Non-direct Drive Fire Pump ≥ 1,000 BHP	
Diesel PM	0.02 g/bhp-hr (A)

(A) This standard is equal to the Tier 4 standard for PM for engines running generators in the size range >750 HP.

RULE REQUIREMENTS:
Reg 9, Rule 8 – Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines (Revised 10/15/2019)

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

Summary of Achieved in Practice Control Technologies

The following control technologies have been identified and are ranked based on stringency:

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES for Compression Ignition Emergency Standby Engines	
Pollutant	**Standard**
VOC	1. Electrical generation and direct drive, Applicable Tier 4 emissions requirements for the HP range [EPA] 2. Electrical Generation: Applicable Tier 4 emission requirements for the HP range Direct Drive: NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [BAAQMD, SJVAPCD, SMAQMD] 3. Engines meeting the tier standard of the engine manufacture date [ARB] 4. No Standard [SDAPCD]
NOx	1. Electrical generation and direct drive, Applicable Tier 4 emissions requirements for the HP range [EPA] 2. Electrical Generation: Applicable Tier 4 emission requirements for all HP ranges Direct Drive: NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [BAAQMD, SMAQMD, SJVAPCD] 3. Applicable NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, SDAPCD]
SOx	1. Diesel fuel with a sulfur content no greater than 0.0015% by weight [EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, SDAPCD, BAAQMD]
PM10	1. Electrical generation and direct drive, Applicable Tier 4 emissions requirements for the HP range [EPA] 2. Electrical Generation: Applicable Tier 4 emission requirements for the HP range Direct Drive: NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [BAAQMD, SJVAPCD, SMAQMD] 3. Engines meeting the tier standard of the engine manufacture date [ARB] 4. No Standard [SDAPCD]
PM2.5	1. Electrical generation and direct drive, Applicable Tier 4 emissions requirements for the HP range [EPA] 2. Electrical Generation: Applicable Tier 4 emission requirements for the HP range Direct Drive: NMHC + NOx emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [BAAQMD, SJVAPCD, SMAQMD] 3. Engines meeting the tier standard of the engine manufacture date [ARB] 4. No Standard [SDAPCD]

SUMMARY OF ACHIEVED IN PRACTICE CONTROL TECHNOLOGIES for Compression Ignition Emergency Standby Engines	
Pollutant	**Standard**
CO	1. Applicable CO emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. This is equivalent to Tier 4 standards for CO. [ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD, EPA, SDAPCD]
Diesel PM (T-BACT)	1. Compliance with current BACT standards [SMAQMD, BAAQMD] 2. Use of a particulate filter [SCAQMD] 3. Compliance with SCAQMD Rule 1470(C) [SCAQMD] 4. 0.1 g/hp-hr if T-BACT is triggered for a direct-drive fire pump [SJVAPCD] 5. Applicable PM emission standard for horsepower range (A),(B) based on the ATCM for Stationary CI Engines. [ARB, SJVAPCD] 6. 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.

The SJVAPCD, BAAQMD & SMAQMD has shown that Tier 4 engines have been achieved in practice for all HP ranges, for electrical generation. No district has shown that Tier 4 standards are applicable for direct drive engines. There also does not seem to be enough market proliferation of fire pumps available at Tier 4 standards. Therefore, the EPA direct drive engine meeting Tier 4 standard is removed from the achieved in practice.

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

BEST CONTROL TECHNOLOGIES ACHIEVED IN PRACTICE For Standby Engines used for Electrical Generation		
Pollutant	**Standard**	**Source**
VOC	Tier 4 emission standards for the applicable HP range	SJVAPCD, SMAQMD, BAAQMD
NOx	Tier 4 emission standards for the applicable HP range	SJVAPCD, SMAQMD, BAAQMD
SOx	Diesel fuel with a sulfur content no greater than 0.0015% by weight.	EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, SDAPCD, BAAQMD
PM10	Tier 4 emission standards for the applicable HP range	SJVAPCD, SMAQMD, BAAQMD

BEST CONTROL TECHNOLOGIES ACHIEVED IN PRACTICE For Standby Engines used for Electrical Generation		
Pollutant	**Standard**	**Source**
PM2.5	Tier 4 emission standards for the applicable HP range	SJVAPCD, SMAQMD, BAAQMD
CO	Tier 4 emission standards for the applicable HP range	ARB, SMAQMD, SCAQMD, SJVAPCD, BAAQMD
Diesel PM (T-BACT)	Tier 4 emission standards for the applicable HP range	BAAQMD

BEST CONTROL TECHNOLOGIES ACHIEVED IN PRACTICE for Direct Drive Engines		
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, BAAQMD, SJVAPCD
SOx	Diesel fuel with a sulfur content no greater than 0.0015% by weight.	EPA, ARB, SMAQMD, BAAQMD, SCAQMD, SDAPCD, SJVAPCD
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, BAAQMD, SJVAPCD
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 the ATCM for Stationary CI Engines.	ARB, EPA, SMAQMD, SCAQMD, BAAQMD, SJVAPCD

BEST CONTROL TECHNOLOGIES ACHIEVED IN PRACTICE for Direct Drive Engines		
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)], SJVAPCD, 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 or statewide emergency declarations.

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

Discussion:

The three types of engines identified for standby operations include those used for (1) electrical generation, (2) direct drive engine connected to a pump in fire suppression applications and (3) other direct drive engines typically driving emergency pumps.

The use of standby Tier 4 or equivalent engines rated greater than or equal to 50 HP used for electrical generation has been shown to be achieved in practice. Therefore, a technologically feasible and cost effective analysis for this category is not required.

The use of Tier 4 or equivalent direct drive engines used for pumps in fire suppression applications are not considered technologically feasible due to other factors such as UL listing requirements and other regulatory agencies that have jurisdiction over use and installation of this type of equipment.

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.

Currently there are no additional technologically feasible alternative controls available beyond the achieved in practice controls.

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 ELECTRICAL GENERATION		
Pollutant	**Standard**	**Source**
VOC	Tier 4 emission standards for the HP range	BAAQMD SJVAPCD, SMAQMD
NOx	Tier 4 emission standards for the HP range	BAAQMD SJVAPCD, SMAQMD
SOx	Diesel fuel with a sulfur content no greater than 0.0015% by weight.	EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, SDAPCD, BAAQMD
PM10	Tier 4 emission standards for the HP range	BAAQMD SJVAPCD, SMAQMD
PM2.5	Tier 4 emission standards for the HP range.	BAAQMD SJVAPCD, SMAQMD
CO	Tier 4 emission standards for the HP range	BAAQMD SJVAPCD, SMAQMD

BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED FOR DIRECT DRIVE ENGINES		
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, SJVAPCD, 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, SJVAPCD, BAAQMD
SOx	Diesel fuel with a sulfur content no greater than 0.0015% by weight.	EPA, ARB, SMAQMD, SCAQMD, SJVAPCD, SDAPCD, BAAQMD

BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED FOR DIRECT DRIVE ENGINES		
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, SJVAPCD, 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, SJVAPCD, BAAQMD

T-BACT FOR I.C. ENGINES, EMERGENCY STANDBY, DIESEL-FUELED		
Pollutant	**Standard**	**Source**
Diesel PM	BACT 402 Standards listed for PM10 & PM2.5 (A)	SMAQMD
	Particulate filter (B)	SCAQMD

(A) Since the current BACT standards are more health protective than previously published T-BACT standards, T-BACT standards will be updated to follow the BACT standards.
(B) Applicable to major sources. This is included in the event that an emergency direct drive pump is placed at a major source which will be determined on a case by case basis if a particulate filter is technologically feasible at the time of application.

APPROVED BY: Steve Mosunic **DATE:** **12/30/2025**