

ENGINEERING EVALUATION
CSAA Insurance Group
Plant: 20588
Application: 26144
3055 Oak Road, Walnut Creek, CA 94597

BACKGROUND

CSAA Insurance Group has applied to obtain a Permit to Operate (PO) for the following equipment:

S-2 Emergency Standby Diesel Fire Pump Engine
Make: Deutz, Model: DFP-4-2012-T15, Model Year: 2008, 100 BHP, 0.84 MMBTU/hr

The Emergency Standby Diesel Fire Pump Engine (S-2) is equipped with the best available control technology (BACT) for minimizing the release of air borne criteria pollutants and harmful air toxins due to fuel combustion. The criteria pollutants are nitrogen oxides (NOx), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO₂), and particulate matter (PM₁₀). All of these pollutants are briefly discussed on the District's web site at www.baaqmd.gov.

The engine meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 2 off-road standard. The engine will burn commercially available California low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight.

The engine is subject to attached condition no. 22850.

EMISSIONS

Basis:

- 100 hp output rating
- 50 hr/yr operation for testing and maintenance
- 6.1 gallons/hr max fuel use rate
- Except for SO₂, the emission factors for this engine are from the manufacturer's specification.

Annual Emissions:

Annual emissions are calculated based on the number of hours per year of operation for testing and maintenance.

Daily Emissions:

Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day of operation will be assumed since no daily limits are imposed on intermittent and unexpected operations. See Table 1.

Table 1. Estimated Emissions

Pollutant	Emission Factors (g/hp-hr)	Annual Emissions (lb/yr)	Annual Emissions (TPY)	Max. Daily (lb/day)
NOx	4.8	52.91	0.0265	25.40
POC	0.1	1.10	0.0006	0.53
CO	0.6	6.61	0.0033	3.17
PM ₁₀	0.09	0.99	0.0005	0.48
SO ₂ *	0.001515	0.06	0.00003	0.03
	*lb SO ₂ /MMBTU			

PLANT CUMULATIVE INCREASE

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-2.

Table 2. Cumulative Increase

Pollutant	Current Emissions Since April 5,1991 (TPY)	Increase with this application (TPY)	Cumulative Emissions (current + increase) (TPY)
NO _x	0.311	0.027	0.338
POC	0.016	0.001	0.017
CO	0.097	0.003	0.100
PM ₁₀	0.008	0.001	0.009
SO ₂	0.000	0.000	0.000

TOXIC RISK SCREENING ANALYSIS

This application required a Toxics Risk Screen because the diesel particulate emissions are greater than the toxic trigger level.

Table 3. Diesel Particulate Emissions

Toxic Pollutant Emitted	Emission Rate (lb/yr)	Risk Screening Trigger (lb/yr)
PM ₁₀ (Diesel Particulate)	0.99	0.34

S-2 meets Best Available Control Technology for toxics (TBACT) since the diesel particulate emissions are less than 0.15 g/bhp-hr. For an engine that meets the TBACT requirement, it must also pass the toxic risk screening level of less than ten in a million. Estimates of residential risk assume exposure to annual average toxic air contaminate concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume exposure occurs 8 hours per day, 245 days per year, for 40 years. Risk estimates for students assume a higher breathing rate, and exposure is assumed to occur 10 hours per day, 36 weeks per year, for 9 years.

Based on 50 hours per year of operation, the emergency generator passed the Health Risk Screening Analysis (HRSA) conducted on September 11, 2014 by the District's Toxic Evaluation Section. The source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is 0.2 in a million. The hazard index for a resident is 0.00008. The increased cancer risk to workers is 0.2 in a million and the hazard index is 0.0001. The emergency generator set is not located near students. Thus, in accordance with Regulation 2, Rule 5, this source is in compliance with the TBACT and project risk requirements.

BACT

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO_x, CO, SO₂ or PM₁₀.

Based on the emission calculations above, the owner/operator of S-2 is subject to BACT for the following pollutant(s): NO_x. The BACT/TBACT Workbook does not address direct-drive emergency standby fire pump engines. Since CARB Stationary Diesel ATCM requirements are at least as stringent as current BACT determinations and applicable NSPS, it is proposed that BACT for direct-drive emergency standby fire pump engines be compliance with the CARB Stationary Diesel ATCM.

This engine complies with the proposed BACT. Please refer to the "CARB Stationary Diesel Engine ATCM" section of this evaluation report.

OFFSETS

Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NOx per Regulation 2-2-302. Table 3 summarizes the increase in criteria pollutant emissions that will result from the operation of S-2.

Table 4. Increase in Criteria Pollutant Emissions

Pollutant	Current plant emissions (TPY)	Increase in plant emissions associated with this application (TPY)	Cumulative emissions (Current + Increase) (TPY)	Regulation 2-2-302 and 2-2-303 Offset Triggers (TPY)
NOx	.311	.027	.338	> 10; < 35
POC	.016	.001	0.017	> 10; < 35
CO	.097	.003	0.100	NA
PM ₁₀	.008	.001	0.009	> 1*
SO ₂	.000	.000	0.000	> 1*

*Applies to major facilities with a cumulative increase, minus contemporaneous emission reduction credits, in excess of 1 ton/year since April 5, 1991.

It can be seen from Table 4 above that S-2 does not trigger any offset. Therefore, offsets are not warranted for any emission.

NSPS

40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines applies to stationary fire pump engines that were manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

Table 3 to Subpart IIII of Part 60—Certification of stationary fire pump engines is required for 1) engines greater than 750 hp beginning in 2008, 2) engines between 175 and 750 hp (inclusive) beginning in 2009, 3) engines equal to and greater than 100 hp and less than 175 hp beginning in 2010, and 4) engines less than 100 hp beginning in 2011.

Per §60.4202(d), beginning with the model years in Table 3 to Subpart IIII of Part 60, stationary CI internal combustion engine manufacturers must certify their fire pump stationary CI ICE to the emission standards in Table 4 to Subpart IIII of Part 60, for all pollutants, for the same model year and NFPA nameplate power. Per §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 Subpart IIII of Part 60, for all pollutants.

S-2 is a fire pump engine that has a total displacement of 4.04 liters and has 4 cylinders and therefore is subject to the emission standards in Table 4 to Subpart IIII of Part 60, for all pollutants.

Per §60.4211(b), owner or operator of a CI fire pump engine that is manufactured prior to the model years in Table 3 to Subpart IIII of Part 60 (explained in the paragraph above) must comply with the emission standards specified in §60.4205(c) and demonstrate compliance according to one of the methods specified in paragraphs (1) through (5) below:

- (1) Purchasing an engine certified according to 40 CFR part 89 or 40 CFR part 94, as applicable, for the same model year and maximum engine power. The engine must be installed and configured according to the manufacturer's specifications.
- (2) Keeping records of performance test results for each pollutant for a test conducted on a similar engine. The test must have been conducted using the same methods specified in this subpart and these methods must have been followed correctly.

- (3) Keeping records of engine manufacturer data indicating compliance with the standards.
- (4) Keeping records of control device vendor data indicating compliance with the standards.
- (5) Conducting an initial performance test to demonstrate compliance with the emission standards according to the requirements specified in §60.4212, as applicable.

Per §60.4211(c), The owner or operator of a CI fire pump engine that is manufactured during or after the model year that applies to their fire pump engine power rating in Table 3 to Subpart III of Part 60 must comply with the emission standards specified in §60.4205(c) and must comply by purchasing an engine certified to the emission standards in §60.4205(c) for the same model year and maximum (or in the case of fire pumps, NFPA nameplate) engine power. The engine must be installed and configured according to the manufacturer's specifications.

This engine is model year 2008 and between 100 and 175 hp; therefore, it complies with the stationary fire pump engine certification requirements in Table 3 to Subpart III of Part 60. It also complies with Tier 2 emission standards. Therefore, S-2 is compliant with all applicable NSPS requirements.

Table 5. Subpart III of Part 60—Emission Standards for Stationary Fire Pump Engines

Maximum engine power	Model year(s)	NMHC + NO _x g/kW-hr (g/bhp-hr)	CO	PM
75=KW<130 (100=HP<175)	2009 and earlier	10.5 (7.8)	5.0 (3.7)	0.80 (0.60)

NESHAP

This engine is not subject to the emission or operating limitations in 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, because it is an emergency stationary reciprocating internal combustion engine (40 CFR 63.6600(c)).

CARB STATIONARY DIESEL ENGINE ATCM

The State Office of Administrative Law approved the Airborne Toxic Control Measure (ATCM) on November 8, 2004. State law requires the local Air Districts to implement and enforce the requirements of the ATCM. Effective January 1, 2005, there is a prohibition on the operation of new diesel emergency standby engines greater than 50 bhp unless the following operating requirements and emission standards are met:

The CARB Stationary Diesel ATCM Section 93115.6(a)(4)(A)(1)(a) requires new direct-drive emergency standby fire pump engines to meet the applicable emissions standards for all pollutants as specified in the Table 2 (Emissions Standards for New Stationary Emergency Standby Direct-Drive Fire Pump Engines) in the ATCM for the model year and NFPA nameplate power rating.

The CARB Stationary Diesel ATCM Section 93115.6(a)(4)(A)(1)(b) requires new direct-drive emergency standby fire pump engines to meet the new fire pump engine certification requirements and emission standards required by 40 CFR §60.4202(d). S-2 meets the new fire pump engine certification requirements because it is model year 2008. The emission standards are displayed in Table 5 in the “NSPS” section of this evaluation report.

These applicable emissions standards of Sections 93115.6(a)(4)(A)(1)(a) and 93115.6(a)(4)(A)(1)(b) are tabulated in Table 6 and are compared with the EPA-certified emissions of S-2. Table 6 shows S-2 is in compliance with the ATCM requirements of Section 93115.6(a)(4)(A)(1)(a).

This emergency standby diesel engine (S-2) is in compliance with the below ATCM requirements. The fire pump will operate for no more than 50 hours per year for maintenance and reliability testing.

Table 6. Compliance with ATCM Requirements

ATCM Emission Standard Compliance	CARB Certified g/bhp-hr	ATCM Tier 2 g/bhp-hr
NMHC+NOx	4.9	7.8
NOx	4.8	N/A
NMHC (POC)	0.1	N/A
CO	0.6	3.7
PM	0.09	0.60

STATEMENT OF COMPLIANCE

S-2 will be operated as an emergency standby engine and therefore is not subject to the emission rate limits in Regulation 9, Rule 8 (*NOx and CO from Stationary Internal Combustion Engines*). S-2 is exempt from the requirements of Sections 9-8-301 through 305, 501, and 503, per Regulation 9-8-110.5 (*Emergency Standby Engines*). S-2 is subject to and expected to comply with 9-8-330 (*Emergency Standby Engines, Hours of Operation*) since non-emergency hours of operation will be limited in the permit conditions to 50 hours per year.

S-2 is also subject to and expected to comply with monitoring and record keeping requirements of Regulation 9-8-530 and the SO₂ limitations of 9-1-301 (*Ground-level Concentration*) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9, Rule 1 is very likely since diesel fuel with a 0.0015% by weight sulfur is mandated for use in California.

Like all combustion sources, S-2 is subject to Regulation 6, Rule 1 (*Particulate Matter*). Regulation 6-1-303.1 limits opacity from internal combustion engines to Ringelmann 2. This engine is not expected to produce visible emissions or fallout in violation of this regulation and will be assumed to be in compliance with Regulation 6-1.

This application is considered to be ministerial under the District's Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

PSD is not triggered.

This facility is within 1,000 feet from the nearest school (Fusion Academy). Fusion Academy, located at 3003 Oak Road, Walnut Creek, is a private institution that offers one-to-one classes. This application is therefore subject to the public notification requirements of Regulation 2-1-412. A public notice will be prepared and sent to all addresses within 1,000 feet of the proposed source and to parents and guardians of students at Fusion Academy. All comments received will be summarized in this evaluation report.

PERMIT CONDITIONS

COND# 22850 -----

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing.
[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]
2. The owner/operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission

testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited.
[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained.
[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.
 - a. Hours of operation for reliability-related activities (maintenance and testing).
 - b. Hours of operation for emission testing to show compliance with emission limits.
 - c. Hours of operation (emergency).
 - d. For each emergency, the nature of the emergency condition.
 - e. Fuel usage for each engine(s).[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

5. At School and Near-School Operation:
If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:

The owner/operator shall not operate each stationary emergency standby diesel-fueled 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)
- b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session.

"School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, athletic field, or other areas of school property but does not include unimproved school property.

[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

RECOMMENDATION

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to waive an Authority to Construct and issue a Permit to Operate for the equipment listed below. However, the proposed source will be located within 1,000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of a Permit to Operate for the following source:

S-2 Emergency Standby Diesel Fire Pump Engine
Make: Deutz, Model: DFP-4-2012-T15, Model Year: 2008, 100 BHP, 0.84 MMBTU/hr

Prepared by: _____

Date: _____