

DRAFT

**ENGINEERING EVALUATION
CUMMINS WEST
PLANT NO. 16146
APPLICATION NO. 9787**

BACKGROUND

Cummins West is applying for an Authority to Construct and/or Permit to Operate for the following equipment:

- S-1 Emergency Generator Set: Diesel Engine; Make: Cummins; Model: LTA10-G1; Rated Horsepower: 380 HP; Abated by A-1: Cleaire BUGtrap Diesel Particulate Filter**
- S-2 Emergency Generator Set: Diesel Engine; Make: Cummins; Model: LTA10-G1; Rated Horsepower: 380 HP; Abated by A-2: Cleaire BUGtrap Diesel Particulate Filter**

The standby generator sets will be used at 14775 Wicks Blvd., San Leandro, CA 94577.

EMISSIONS SUMMARY**Annual Emissions:**

The load adjusted engine emission data per test method ISO 8178 D-2 for the 380 HP engine is provided by the engine manufacturer, and the emission factors are listed below. The diesel particulate filter (A-1) with a minimum 70% PM reduction will be installed to reduce the PM10 emission, so both the unabated and abated emission factors of PM10 are listed below.

Pollutant	Emission (g/bhp-hr)	Diesel Particulate Filter Efficiency (%)	Emission with DPF (g/bhp-hr)
NOx	6.16	0	6.16
CO	0.63	0	0.63
POC*	0.27	0	0.27
PM ₁₀	0.16	70	0.048

** For this report, it is assumed that the emission value of Total Unburned Hydrocarbons (HC) is equivalent to the emission value of POC.*

The emission factor for SO₂ is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.

SO₂ 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.05% S) (454 g/lb) = 0.18 g/hp-hr

NO_x = 6.16 g/bhp-hr * 380 hp * 100 hrs/yr * lb/454 g = 515.595 lbs/yr = 0.25780 TPY
 CO = 0.63 g/bhp-hr * 380 hp * 100 hrs/yr * lb/454 g = 52.731 lbs/yr = 0.02637 TPY
 POC = 0.27 g/bhp-hr * 380 hp * 100 hrs/yr * lb/454 g = 22.599 lbs/yr = 0.01130 TPY
 PM₁₀ = 0.048 g/bhp-hr * 380 hp * 100 hrs/yr * lb/454 g = 4.018 lbs/yr = 0.00201 TPY
 SO₂ = 0.18 g/bhp-hr * 380 hp * 100 hrs/yr * lb/454 g = 15.066 lbs/yr = 0.00753 TPY

Maximum Daily Emissions:

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

NO_x = 6.16 g/bhp-hr * 380 hp * 24 hrs/yr * lb/454 g = 123.743 lbs/yr
 CO = 0.63 g/bhp-hr * 380 hp * 24 hrs/yr * lb/454 g = 12.656 lbs/yr
 POC = 0.27 g/bhp-hr * 380 hp * 24 hrs/yr * lb/454 g = 5.424 lbs/yr
 PM₁₀ = 0.048 g/bhp-hr * 380 hp * 24 hrs/yr * lb/454 g = 0.964 lbs/yr
 SO₂ = 0.18 g/bhp-hr * 380 hp * 24 hrs/yr * lb/454 g = 3.616 lbs/yr

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New for S-1	New for S-2	Total
NO _x	0	0.258	0.258	0.516
CO	0	0.026	0.026	0.052
POC	0	0.011	0.011	0.022
PM ₁₀	0	0.002	0.002	0.004
SO ₂	0	0.008	0.008	0.016
NPOC	0	0.000	0.000	0.000

Toxic Risk Screening:

The toxic emission of diesel particulate exceeds the District Risk Screening Trigger, as shown in Table (1) below, and a Risk Screening Analysis has been performed.

Table (1)

Source:	PM ₁₀ Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year) ¹	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)	Risk Screen Required? (Yes/No)
1	0.048	380	100	4.018	0.64	Yes
2	0.048	380	100	4.018	0.64	Yes

Results from the health risk screening analysis show that for 100 hours of operation per year when, excluding periods when operation is required due to emergency conditions, the maximum cancer risk for the operation of these two sources is 7.07 in a million. In accordance with the District's Risk Management Policy, this risk level is considered acceptable.

The ISCST3 computer model with Oakland Airport meteorological data was used to estimate annual average ambient air concentrations. Stack and building parameters for the analysis were based on information provided by the applicant. Estimates of residential risk assume continuous 70-year exposure to annual average TAC concentrations. For off-site workers, exposure was assumed to occur 46 years out of a 70-year lifetime. For students attending James Elementary School, exposure was assumed to occur 36 weeks per year over a 9-year period. Students were assumed to have a higher breathing rate than residents.

PUBLIC COMMENT

The project is within a thousand feet of a school and therefore subject to the public notification requirements of Reg. 2-1-412. The public notice will be posted on the internet and mailed to all Parents or Guardians with children enrolled at James Madison Elementary School. It will also be mailed to all residential neighbors located within 1000 feet of the proposed new sources of pollution.

STATEMENT OF COMPLIANCE

S-1 and S-2 will be operated as emergency standby engines and therefore are not subject to the emission rate limits in Regulation 9, Rule 8 ("NOx and CO from Stationary Internal Combustion Engines"). S-1 and S-2 are subject to the 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 9-1 is expected since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, S-1 and S-2 are subject to Regulation 6 ("Particulate and Visible Emissions"). These engines are not expected to produce visible emissions or fallout in violation of this regulation and they will be assumed to be in compliance with Regulation 6 pending a regular inspection.

¹ Annual Usage based on 100 hours per year of operation for reliability-related activities as defined in Regulation 9-8-330 ("Emergency Standby Engines, Hours of Operations").

This application is considered to be ministerial under the District's proposed CEQA guidelines (Regulation 2-1-312) 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.

Best Available Control Technology:

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-1 and S-2 is subject to BACT for the following pollutants: NO_x and CO. BACT 1 levels do not apply for 'engines used exclusively for emergency use during involuntary loss of power' as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines. Hence, the owner/operator has to meet the BACT 2 limits presented below.

POLLUTANT	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
NO _x	<ol style="list-style-type: none"> 1. 1.5 g/bhp-hr [107 ppmvd @ 15% O₂]^{a,b} 2. 6.9 g/bhp-hr [490 ppmvd @ 15% O₂]^{a,b,c} 3. 6.9 g/bhp-hr [490 ppmvd @ 15 % O₂] 	<ol style="list-style-type: none"> 1. Selective Catalytic Reduction (SCR) + Timing Retard + Turbocharger w/ Intercooler^{a,b} 2. Timing Retard $\leq 4^\circ$ + Turbocharger w/ Intercooler^{a,b,c} 3. Timing Retard $\leq 4^\circ$ + Turbocharger w/ Intercooler
CO	<ol style="list-style-type: none"> 1. n/s 2. 2.75 g/bhp-hr [319 ppmvd @ 15% O₂]^{b,c} 	<ol style="list-style-type: none"> 1. Catalytic Oxidation^b 2. CARB or EPA (or equivalent) low-CO emitting certified engine^{b,c}

As for NO_x and CO, the emission limits set by BACT 2 are met, as shown in Table (2) below.

Table (2)

Pollutant	Engine Emission Factors (g/hp-hr)	Emission Factor Limits as set by BACT 2 (g/hp-hr)	Have the limits been met?
NO _x	6.16	6.9	YES
CO	0.63	2.75	YES

Therefore, S-1 and S-2 are determined to be in compliance with the BACT 2 limits for NO_x and CO.

Since data obtained through the ISO 8178-D2 test method was used to establish the NOx and CO emission factors, the BACT 2 emission limits have not been incorporated into the permit conditions and is assumed to be complied with through the design standards demonstrated by the ISO 8178-D2 test method.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 15 tons/yr of POC or NOx. Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Application 9787; Cummins West; Plant 16146; Conditions for S-1 and S-2 Emergency Diesel Generator: (PC# 19533)

1. Hours of Operation: The owner/operator will operate the emergency standby engine(s) only to mitigate emergency conditions or for the reliability-related activities. Operation for reliability-related activities shall not exceed 100 hours in any calendar year. Operation while mitigating emergency conditions is unlimited. [Basis: Reg. 9-8-330]

“Emergency Conditions” is defined as any of the following: [Basis: Reg. 9-8-231]

- a. Loss of regular natural gas supply.
- b. Failure of regular electric power supply.
- c. Flood mitigation.
- d. Sewage overflow mitigation.
- e. Fire.
- f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.

“Reliability-related activities” is defined as any of the following: [Basis: Reg. 9-8-232]

- a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
- b. Operation of an emergency standby engine during maintenance of a primary motor.

2. The owner/operator shall equip the emergency standby engine with either: [Basis: Reg. 9-8-530]

- a. a non-resettable totalizing meter that measures and records the hours of operation for the engine.
- b. a non-resettable fuel usage meter, , the maximum hourly fuel rate shall be used to convert fuel usage to hours of operation.

3. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 2 years and shall be made available for District inspection upon request: [Basis: Reg. 9-8-530, 1-441]
- a. Hours of operation (total).
 - b. Hours of operation (emergency).
 - c. For each emergency, the nature of the emergency condition.

RECOMMENDATION

Issue an Authority to Construct to Cummins West for the following sources:

- S-1 Emergency Generator Set: Diesel Engine; Make: Cummins; Model: LTA10-G1; Rated Horsepower: 380 HP; Abated by A-1: Cleaire BUGtrap Diesel Particulate Filter**

- S-2 Emergency Generator Set: Diesel Engine; Make: Cummins; Model: LTA10-G1; Rated Horsepower: 380 HP; Abated by A-2: Cleaire BUGtrap Diesel Particulate Filter**

EXEMPTIONS

None.

By: _____ Date: _____
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Air Quality Engineering Intern