

DRAFT ENGINEERING EVALUATION REPORT
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PLANT NAME	Commons at Dallas Ranch
PLANT NUMBER	17381
APPLICATION NUMBER	13592
CONDITION NUMBER	22666
PLANT/SITE ADDRESS	4751 Dallas Ranch Road, Antioch, CA 94509
ENGINEER	Hari S. Doss

1. BACKGROUND

This application is for an Authority to Construct / Permit to Operate a 158 bhp diesel-fired internal combustion engine used as a driver for an emergency standby generator to be located at a residential care facility in Antioch.

S-1 Emergency Standby Diesel Engine, Perkins Model 1104C-44TAG2, 158 bhp, Driver to Power a 100kw Emergency Standby Generator; Abated by A-1, Diesel Oxidation Catalyst

While the engine is certified by the California Air Resources Board (CARB) as constructed, it does not meet the current District TBACT standards or State Airborne Toxic Control Measure (ATCM). Therefore an additional control device, a diesel oxidation catalyst, will be required. The source is located within 1000 feet of Dallas Ranch Middle School. Thus a school public notification will be required.

2. EMISSION CALCULATIONS

Detailed emission calculations are in the permit file for standard diesel particulate emissions.

A. Calculations Basis (Testing and Maintenance) :

Hours of Operation, Annual:	50
Horsepower at Operation:	158
Maximum Fuel Usage Rate:	7.9 gal/hr

Table 1, Emission Factors

CARB certified engine emission factors, based on ISO-8178-D2 cycle testing, were used to calculate engine emissions. The combined NMHC and NOx emission factor of 4.77 g/bhp-hr was split out assuming 95% NOx, following District experience and policy for certified engines. The Authority to Construct will be conditioned to require installation of an oxidation catalyst to meet TBACT and ATCM standards. The sulfur dioxide emission factor is based on mandatory 15-ppm ultra low sulfur low sulfur diesel use for improved catalyst effectiveness. Conservative 30% PM, 50% NMHC, 50% CO reduction will be credited to the oxidation catalyst, based on engineering experience.

FACTORS	PM₁₀	NO_x	HC	CO	SO₂
Emission Factors (g/bhp-hr) without oxidation catalyst	0.21	4.00	0.045	0.45	2.4 E-3
Emissions (lbs/year) Without oxidation catalyst	3.65	69.5	0.8	7.8	0.017
Emission Factors (g/bhp-hr) with Oxidation catalyst	0.15	4.00	0.022	0.22	2.4 E-3
Emissions (lbs/year) With Oxidation Catalyst	2.61	69.5	0.4	3.9	0.017
Emissions (ton/year)	1.3 E-3	0.035	2 E-4	1.9 E-3	9 E-6

** Based on 15-ppm sulfur.

B. Cumulative Increase:

This source is subject to cumulative increase driven regulations. The values (tons/yr) are in the following table:

Pollutant	PM10	NOx	HC	CO	SO2
Emissions (tons/yr)	1.3 E-3	0.035	2 E-4	1.9 E-3	9 E-6

3. Compliance Statement:**A. Carcinogenic Risk Evaluation**

This engine will comply with TBACT for diesel particulate emissions after installation of an oxidation catalyst and use of ultra low sulfur diesel fuel. The oxidation catalyst with ultra low sulfur diesel fuel can achieve up to 40% PM reduction. For this analysis a 30% PM reduction was assumed, resulting in a PM emission rate of 0.15 g/bhp-hr, meeting TBACT and ATCM requirements for new emergency standby diesel engine. The facility is located in a residential area. There are residences within the company fence-line as well. These residents were also included in the risk evaluation. Further, Dallas Ranch Middle School is located within 1000 feet of the engine. The maximum increased cancer risk due to the diesel particulate emissions is 9.1 in a million for the maximally exposed residential receptor and 2.8 in a million for the maximally exposed industrial receptor for 50 hours of engine operation per year. The increased risk to the maximally exposed receptor at the school is 0.4 in a million. The 50 hours of engine operation is for testing and maintenance purposes only. The risk screen passes in accordance with Regulation 2-5.

B. This engine will meet the diesel PM emission limit, 0.15 g/bhp-hr, and annual operating hour limit, 50 hr/yr, for an emergency standby diesel engine under the state Airborne Toxic Control Measure.

C. Regulation 1 – General Provisions and Definitions

§1-301: Prohibits discharging emissions in quantities that cause injury, detriment, nuisance, or annoyance. The diesel particulate emission limits and the toxic risk screening analysis address these issues.

D. Permits – General Requirements, Regulation 2 Rule 1

The engine is located within 1000 feet of the Dallas Ranch Middle School, and therefore a public notification will be completed pursuant to Regulation 2-1-412. There are no other schools within a quarter mile of the source.

E. Permits – New Source Review, Regulation 2, Rule 2 (dated 10/7/98)

1. **BACT:** District policy for new emergency standby diesel engines is to require BACT for NOX, CO, SO2 and POC where emissions are greater than 10 lb/highest day and TBACT for toxic diesel PM10. A comparison of BACT against the ISO 8178, D-2 test emission factors is as follows:

Pollutant	BACT Level (g/bhp-hr)	Mfr. Certified Emissions (g/bhp-hr)	Emission Factor with Oxidation Catalyst Installation (g/bhp-hr)
NOx	6.9 (Level 2)	4.00*	4.0
CO	2.75 (Level 2)	0.45	0.22
PM10	0.15 (TBACT)	0.21	0.15
POC	1.5 (Level 2)	0.045	0.022
SO2	Diesel less than 0.05% sulfur	Ultra low sulfur (<15ppm)diesel specified in the condition	Use ultra low sulfur as specified in the permit conditions

* NOx & POC split estimated based on certified engine experience.

The engine will comply with BACT and TBACT requirements after the installation of the oxidation catalyst..

2. **Offset Requirements:** Regulation 2-2-302
Since the plant NO_x and POC emissions are far each below 10 tons per year, emission offsets are not required for this project.
3. **Prevention of Significant Deterioration:** Regulation 2-2-304:
Federal PSD requirements do not apply to this facility because none of its SO₂, NO₂, CO, and PM10 emissions exceed 100 tons per year.

F. Regulation 3 – Fees

The company has complied with fee requirements for this permit application.

G. Particulate Matter and Visible Emissions, Regulation 6

1. Section 301 prohibits for more than 3 minutes per hour, visible emissions as dark or darker than Ringelmann 1 or equivalent opacity. S-1 is expected to comply with this requirement.
2. Section 305 prohibits emissions of visible particles from causing a nuisance on property other than the operators. S-1 is expected to comply with this standard.
3. Section 310 limits the particulate concentration in exhaust gases to 0.15 gr/dscf. At the estimated 721 cfm exhaust rate and 0.15 gm/bhp-hr PM emission rate, the resulting PM concentration in the exhaust would be far below 0.15 grain/dscf. Hence the proposed engine will comply.

H. NSPS/NESHAPS

There is no New Source Performance Standard or National Emission Standards for Hazardous Air Pollutants that applies to this source.

I. CEQA

This project is considered to be ministerial under the District's CEQA Regulation 2-1-311. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA.

5. CONDITIONS

CONDITIONS

Commons at Dallas Ranch
Application Number: 13592 Plant Number: 17381
Condition Number: 22666

The conditions apply to the following source:

S-1 Emergency Standby Diesel Engine, Perkins Model 1104C-44TAG2, 158 Bhp, Driver to Power a 100kw Emergency Standby Generator; Abated by A-1, Diesel Oxidation Catalyst

1. Emergency standby diesel engine shall be equipped and operated with a diesel oxidation catalyst to reduce particulate emissions. The oxidation catalyst shall be maintained in accordance with the manufacturer's recommendation.
2. The emergency standby diesel engine shall burn only CARB ultra low sulfur diesel fuel with sulfur content less than 15 ppm by weight.
3. Hours of Operation: The owner/operator shall operate the emergency standby engine only to mitigate emergency conditions or for reliability-related activities. Operating while mitigating emergency conditions is unlimited. Operating for reliability-related activities is limited to 50 hours per any calendar year. [Basis: Regulation 9-8-330 and CARB ATCM]

"Emergency Conditions" is defined as any of the following:

- 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.
[Basis: Regulation 9-8-231]

"Reliability-related activities" is defined as any of the following:

- 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.
[Basis: Regulation 9-8-232]

4. The owner/operator shall equip the emergency standby engine with a non-resettable totalizing meter that measures the hours of operation for the engine, with a minimum display capability of 9,999 hours. (Basis: Regulation 9-8-530 and CARB ATCM)
5. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 3 years from the date of entry and shall make the log available to District staff upon request:
 - a. Hours of operation (total).
 - b. Hours of operation (emergency).
 - c. For each emergency, the nature of the emergency condition.
 - d. Fuel usage for engine(s) if a non-resettable fuel usage meter is utilized.[Basis: Regulations 9-8-530 and 1-441, ATCM]

End of Conditions

6. RECOMMENDATIONS

Issue a Conditional Authority to Construct S-1 subject to Condition # 22666.

By: Hari S. Doss, P.E.
April 27, 2006