

DRAFT ENGINEERING EVALUATION
TE Connectivity
Plant: 13213
Application: 29546

BACKGROUND

TE Connectivity has applied for an Authority to Construct for the following source:

S-334 Emergency Standby Diesel Generator Set for a Fire Pump
2010 John Deere Model 4045HFC28
125 bhp, 1.34 MMBtu/hr

The Emergency Diesel Engine Generator Set for a fire pump (S-334) will be located at 501 Oakside Avenue, Redwood City, CA 94603. The engine will be used to provide power to a fire pump in case of an emergency. S-334 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 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.

EMISSION CALCULATIONS

Criteria Pollutants

Emission calculations for criteria pollutants (nitrogen oxides [NO_x], precursor organic compounds [POC], carbon monoxide [CO], particulate emissions less than 10 micrometers [PM₁₀], particulate emissions less than 2.5 micrometers [PM_{2.5}], and sulfur dioxide [SO₂]) are summarized in the table below:

Pollutant	Emission Factor	Emissions		
	(g/hp-hr)	Annual (lb/yr)	Annual (TPY)	Maximum Daily (lb/day)
NO _x	2.41	21.22	0.011	15.9
POC	0.13	1.12	0.001	0.84
CO	1.12	9.86	0.005	7.39
PM _{2.5} = PM ₁₀ (diesel particulate)	0.19	1.64	0.001	1.23
SO ₂	0.007	0.06	0.000	0.05

Basis:

- 125 hp Max Rated Output – 9.8 gallons/hr Max Fuel Use Rate; 1.34 MMBTU/hr Max Combustion Capacity
- The NO_x, NMHC, CO, and PM₁₀ emission factors are from CARB certification
 NO_x is assumed to be 95% of (NMHC + NO_x)
 POC is assumed to be 5% of (NMHC + NO_x)
- The SO₂ emission factor is based on 15 ppm sulfur in ULSD fuel derived from EPA AP-42, Table 3.4-1.
- Annual emissions are based on the annual limit (32 hr/yr) of operation for testing and maintenance
- Max daily emissions are based on 24 hr/day since no daily limits are imposed on operations

Toxic Pollutants

The only Toxic Air Contaminant listed on Table 2-5-1 emitted from S-334 is diesel particulate which has a chronic trigger level of 0.26 lb/yr. It is assumed that all of the PM₁₀ is diesel particulate. We also assume that all of the PM₁₀ is PM_{2.5}. Based on the above calculations the annual diesel particulate emissions are 1.64 lb/year. As such, this application requires a Toxics Risk Screening Analysis. Regulation 2-5 requires that the cumulative impacts from all related projects permitted within the last three years be included in the risk

screening analysis. The table below tabulates the project associated with this permit application along with related projects permitted within the last three years.

Pollutant	Application No.	Hourly Emissions (lb/hr)	Acute Trigger Level (lb/hr)	Annual Emissions (lb/yr)	Chronic Trigger Level (lb/yr)
PM (diesel particulate)	29546	N/A	N/A	1.64	0.26
Manganese and compounds	28081	N/A	N/A	2.09	3.5
Lead	28081	N/A	N/A	0.00165	3.2
Methyl ethyl ketone (MEK)	28081	0.43	29	452.64	39,000
Xylene	28081	0.07	49	77.41	27,000
Ethyl benzene	28081	N/A	N/A	77.41	43.0
Toluene	28081	1.7	82	1,769.44	12,000
Propylene (propene)	28081	N/A	N/A	174.0	270,000

Cumulative Increase

The table below summarizes the cumulative increase in criteria pollutants that will result from the operation of S-334:

Plant Cumulative Emissions Increase

Pollutant	Permitted Emissions, Post 4/5/91 Subject to Offsets (TPY)		Project Cumulative Emissions Subject to Offsets (TPY)		Permitted Emissions, Pre 4/5/91 Not Subject to Offsets (TPY)		Plant Cumulative Emissions Increase (TPY)
NO _x	0.000	+	0.011	+	0.000	=	0.011
POC	2.959	+	0.001	+	9.234	=	12.194
CO	0.000	+	0.005	+	0.000	=	0.005
PM ₁₀	0.008	+	0.001	+	0.008	=	0.009
PM _{2.5}	0.000	+	0.001	+	0.000	=	0.001
SO ₂	0.000	+	0.000	+	0.000	=	0.000

STATEMENT OF COMPLIANCE:

Regulation 2 - Permits, Rule 1 – General Requirements

Ministerial Projects (Section 2-1-311)

An application that is classified as ministerial is exempt from the CEQA requirement of *Section 2-1-310 Applicability of CEQA*. Section 2.3.1 of the District’s Permit Handbook, which sets forth evaluation guidelines for Stationary Diesel Engines, was used to evaluate this engine. As such, this application is classified as ministerial and this engine is exempt from CEQA review with respect to air quality.

Public Notice, Schools (Section 2-1-412)

A new or modified source located within 1,000 feet of the outer boundary of a K-12 school site which results in an increase of emissions from toxic air contaminants are subject to the public notice requirement. The outer boundary of the nearest K-12 school, Fair Oaks Elementary School and Connect Community Charter School, are less than 500 feet from the location of this project as shown on the attached Google Earth screen shot. This project is subject to the public notification requirements of *Regulation 2-1-412*. Notification of the proposed new source must be mailed to the parents or guardians of all children enrolled in any school within a quarter mile of the source, and to each address within a radius of 1,000 feet of the source, in order to give these parties an opportunity

to provide public comments on the proposed actions. All comments received within 30 days of the publication of this notice will be reviewed and considered in the final evaluation and approval or denial of the application.

Regulation 2 - Permits, Rule 2 – New Source Review

Best Available Control Technology Requirement (Section 2-2-301)

Any new source is required to use Best Available Control Technology (BACT) to control emissions of any District BACT pollutants [precursor organic compounds (POC), non-precursor organic compounds (NPOC), oxides of nitrogen (NO_x), sulfur dioxide (SO₂), PM₁₀, PM_{2.5}, and/or carbon monoxide (CO)] that have the potential to emit 10 or more pounds on any day. Based on the emission calculations, BACT is triggered for NO_x since the maximum daily emission is greater than 10 lb/day. BACT for this source is derived from the CARB ATCM Standards. This engine will be limited to operation as an emergency standby engine so more restrictive standards are not applicable. The emission limit based on the California Air Resource Board Airborne Toxic Control Measures for Stationary Compression Ignition Engines 93115.6(a)(4) Table 2 for NO_x 2.85 g NO_x/bhp-hr. According to the engine’s specifications the NO_x emission rate for this engine is 2.41 g NO_x/bhp-hr which is below the CARB ATCM emission limits.

Offset Requirements, POC and NO_x (Section 2-2-302)

This section establishes emission offset requirements for POC and NO_x at facilities that will have the potential to emit more than 10 tons per year of POC or NO_x. If the facility will have the potential to emit more than 10 tons per year but less than 35 tons per year of NO_x or POC after the new or modified source is constructed, offsets must be provided at a 1:1 ratio for any un-offset cumulative increase in emissions at the facility. These offsets shall be provided by the District’s Small Facility Banking Account unless the applicant owns offsets. The operation of S-334 results in an emission increase of 0.001 tons per year (tpy) of POC and 0.011 tons per year of NO_x. The potential to emit for NO_x and POC emissions are 0.011 tpy of NO_x and 12.194 tpy of POC. The facility will need to provide offsets for emissions accumulated after April 5, 1991. Since the facility does not have any banking certificates, 2.960 tpy of POC will be offset at a ratio of 1:1 from the Small Facility Bank.

Offset Requirement, PM_{2.5}, PM₁₀ and Sulfur Dioxide (2-2-303)

Since the potential to emit PM_{2.5}, PM₁₀ or Sulfur Dioxide at the facility where this engine operates are each below 100 tons per year, this engine is not subject to the offset requirements of Regulation 2-2-303.

Regulation 2- Permits, Rule 5 New Source Review of Toxic Air Contaminants

General (2-5-100)

Diesel particulate emissions from the planned operation of S-334 are calculated to be 1.64 lb/year which exceeds the trigger level of 0.26 lb/year. Therefore, S-334 is subject to the requirements of this regulation and a health risk screening analysis (HRSA) was performed for this project. Although two applications were permitted in the last three years, only one application (Application #28081) emitted any pollutants that are listed in Regulation 2-5. Emissions from the sources in Application #28081 were included in the HRA. The following table summarizes the results of the health risk assessment:

HRA Analysis	Cancer Risk	Chronic Hazard Index	Acute Hazard Index
Risk from the Source: Application #29546	1.0 in a million	0.00027	N/A
Risk from the Project: Application #28081 Application #29546	1.4 in a million	0.039	0.024

The risk from the engine does not exceed a cancer risk of 1.0 in a million and has a chronic hazard index less than 0.20. The risk from the project is less than 10 in a million, has a chronic hazard index less than 1.0, and has an acute hazard index less than 1.0. This project complies with Regulation 2, Rule 5, Section 301 and 302.

Regulation 6 - Particulate Matter, Rule 1 - General Requirements

Ringelmann No. 2 Limitation (Section 6-1-303)

Since S-334 has a displacement of 275 in³ it is subject to *Regulation 6-1-303*. The engine is expected to meet this requirement with regular maintenance and inspection.

Visible Particles (Section 6-1-305)

Since S-334 will emit a very small amount of PM₁₀ it is not expected to produce visible emissions or fallout in violation of this regulation and will be assumed to be in compliance with *Regulation 6-1-305* pending a regular inspection.

Total Suspended Particulate (Section 6-1-310)

A person shall not emit from any source particulate matter in excess of 0.15 grains/dscf of exhaust gas volume. The emission rate from S-334 is 0.19 grams/bhp-hr, which results in an outlet grain loading of 0.029 grains/dscf at 0% O₂. The emission rate is less than the limit 0.15 grains/dscf and is in compliance with *Regulation 6-1-310*.

Regulation 9 – Inorganic Gaseous Pollutants, Rule 1 Sulfur Dioxide

S-334 is subject to the following sections of Regulation 9, Rule 1 and will comply with all sections by burning Ultra Low Sulfur Diesel with a sulfur content of 15 ppm, which results in less than 1 ppmv of SO₂ in the exhaust gas.

Limitations on Ground Level Concentrations (Section 9-1-301)

Sulfur Dioxide emissions shall not result in ground level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes or 0.05 ppm averaged over 24 hours.

General Emission Limitation (Section 9-1-302)

A gas stream containing Sulfur Dioxide shall not contain sulfur dioxide in excess of 300 ppm (dry).

Fuel Burning (Liquid and Solid Fuels) (Section 9-1-304)

The sulfur content of liquid fuel burned shall not exceed 0.5% by weight.

Regulation 9 – Inorganic Gaseous Pollutants, Rule 8 NO_x and CO from Stationary Internal Combustion Engines

Exemptions (Section 9-8-110)

Section 110.5 exempts emergency standby engines from the requirements of Sections 9-8-301 through 305, 501 and 503.

Emergency Standby Engines, Hours of Operation (Section 9-8-330)

S-334 is subject to the requirements of *Regulation 9-8-330* which limits reliability related operation of the engines to 50 hours per year. Permit Conditions for S-334 will include operating limits of 32 hours per year that will meet this standard.

Federal Requirements

S-334 is considered a new stationary source and is required to comply with *Regulation 10, Standard of Performance for New Stationary Sources* – which is Title 40, Part 60 of the Code of Federal Regulation incorporated by reference. According to *40 CFR Section 60.4200(a)(1)(ii)* engines are subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines if the model year for the fire pump is either equal to or later than model year listed in Table 3 of this subpart. Per Table 3, the starting model year for an engine with a power rating between 100 HP and 175 HP is 2010. S-334 is a 2010 model year. This engine is subject to this subpart.

Section 60.4202(d), *Section 60.4205(c)* and *Section 60.4211(c)* require that the owner/operator of this engine comply with the emission standards in Table 4 of 40 CFR 60, Subpart III, for all pollutants. S-334 meets the limits for engines between 100 HP and 175 HP with a model year of 2010 or later, as shown in the table below:

Pollutant	Manufacturer's Performance Data (g/bhp-hr)	40 CFR 60 Table 4 Emission Limits (g/bhp-hr)
PM	0.19	0.22
NMHC + NO _x	2.54	3.0
CO	1.12	3.7

Section 60.4206 requires that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine. The owner/operator is expected to comply with this requirement.

Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a sulfur content of 15 parts per million (ppm) maximum, and a cetane index of 40 or a maximum aromatic content of 35 volume percent. The owner/operator is expected to comply with this requirement because CARB allows only ultra-low sulfur diesel to be used in California.

Section 60.4209(a) requires a non-resettable hour meter. S-334 will be subject to standard permit conditions that includes this requirement.

S-334 will comply with the requirements of Section 60.4210(c)(3) because it has been certified in accordance with 40 CFR Part 89 under engine family AJDXL06.8105.

Standard permit conditions limiting operation to 32 hours per year for reliability testing except for operating during emergencies at S-334 ensure that it will comply with the requirement in Section 60.4211(f) which limits such operation to less than 100 hours per year.

S-334 is subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (RICE). Per 40 CFR 63.6590(c)(1), a new or reconstructed stationary RICE located at an area source must meet the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines. This engine is in compliance with the requirements of 40 CFR part 60 subpart IIII, as shown above in this evaluation.

State Regulations

Airborne Toxic Control Measure (ATCM) for Stationary Emergency Standby Diesel-Fueled CI Engines (>50 bhp)

Subsection 93115.6(a)(4)(A)(1)(a) sets forth Emission Standards for new stationary emergency standby diesel fueled compression ignition engines with maximum engine power between 100 to 175 bhp with a model year of 2010 or later. S-334 is subject to and meets the requirement of this section of the ATCM as shown in the table below:

Pollutant	Manufacturer's Performance Data Sheet Emission Rate (g/bhp-hr)	ATCM Emission Standards (g/bhp-hr)
PM	0.19	0.22
NMHC + NO _x	2.54	3.0
CO	1.12	3.0

Subsection 93115(a)(3)(A)(1)(b) requires that new stationary emergency standby diesel-fueled engines (>50 bhp) be certified to the emission standards as specified in 40 CFR 60.4202(d) *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (2006)*. The engine is in compliance with the requirements of 40 CFR 4202(d) Table 4 as shown above in this evaluation.

Subsection 93115.6(a)(4)(A)(1)(c) limits the non-emergency operation to no more than the hours necessary to comply with the testing requirements of the National Fire Protection Associated (NFPA) 25. Permit Conditions for S-334 will limit non-emergency operation to 32 hours/year which accounts for the minimum of 30 minutes of testing every 2 weeks and some additional hours for maintenance. S-334 will comply with this section of the ATCM.

CONDITIONS

I recommend the following permit condition for S-334:

COND# 26949-----

1. Operating for reliability-related activities is limited to no more than 32 hours per year per engine which is the number of hours necessary to comply with the testing requirements of the National Fire Protection Association (NFPA) 25. This emergency fire pump is subject to the current National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems."
[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations]
2. The owner or 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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(B)(3)]
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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection(e)(4)(G)(1)]
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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(4)(I), (or, Regulation 2-6-501)]
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 or 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, playground, athletic field, or other areas of school property but does not include unimproved school property.

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

RECOMMENDATIONS:

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 issue an Authority to Construct/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 an Authority to Construct/Permit to Operate for the following source:

**S-334 Emergency Standby Diesel Generator Set for a Fire Pump
2010 John Deere Model 4045HFC28
125 bhp, 1.34 MMBtu/hr**

Loi Chau, Air Quality Engineer

Date