PRELIMINARY ENGINEERING EVALUATION
Solano County Transit Operations, Plant: 6426
Application: 27003

BACKGROUND

The Solano County Transit Operations has applied to obtain an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

S-6 Emergency Diesel Generator, FPT Industrial F2CE9685A-E, 389 BHP

This Diesel generator will provide emergency power (in the event of a blackout) for all essential electrically powered equipment at the facility. This emergency engine must be periodically tested to ensure that it will generate power when needed.

S-6 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).

S-6 meets the Environmental Protection Agency and California (EPA) 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. The operation of the engine should not pose any health threat to the surrounding community or the public at large.

EMISSIONS

Annual Average Emissions:
The diesel engine is EPA Tier 3 Certified and the emission factors are listed below.

Pollutant	Tier 3 g/bhp-hr	S-6 g/bhp-hr
NMHC (POC)	[3.000x.05=] 0.150	[2.6x.05=] 0.13
NOx	[3.000x.95=] 2.850	[2.6x.95=] 2.47
NMHC+NOx	3.000	2.6
CO	2.600	0.40
PM	0.150	0.10

Emissions for each engine based on the 50 hr/yr testing and reliability operation allowed by the ATCM:

Pollutant	hours/yr		BHP		emission factor g/bhp-hr		lb=454 grams		lb/year		TPY
NOx	50	x	389	x	2.47	/	454	=	106	=	0.053
CO	50	x	389	x	0.40	/	454	=	17	=	0.009
POC	50	x	389	x	0.13	/	454	=	5.6	=	0.003
PM10	50	x	389	x	0.10	/	454	=	4.3	=	0.002

	Sulfur content		fuel density (lb/gal)		Max fuel use (gph)		(lb SO2/ lb S)		hr/yr		lb/yr		TPY
SO2	0.000015	x	7.206	x	19.1	x	2	x	50	=	0.206	=	1.0E-05

Total Annual Emissions:

Pollutant	Total tons/yr
NOx	**0.053**
CO	**0.009**
POC	**0.003**
PM10	**0.002**
SO2	**0.000**

Maximum Daily Emissions:

Maximum 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 emergency operations.

Pollutant	hours/yr		BHP		emission factor g/bhp-hr		lb=454 grams		lb/day
NOx	24	x	389	x	2.47	/	454	=	50.8
CO	24	x	389	x	0.40	/	454	=	8.2
POC	24	x	389	x	0.13	/	454	=	2.7
PM10	24	x	389	x	0.10	/	454	=	2.1

	Sulfur content		fuel density (lb/gal)		Max fuel use		(lb SO2/ lb S)		hr/day		lb/day
SO2	0.000015	x	7.206	x	19.1	x	2	x	24	=	0.099

PLANT CUMULATIVE INCREASE

Table 1 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant 6426 from the operation of S-6.

Table 1

Pollutant	Current plant emissions (TPY)	Increase in plant emissions associated with this application (TPY)	Cumulative emissions (Current + Increase)
NOx	0.000	**0.053**	**0.0530**
CO	0.000	**0.009**	**0.0090**
POC	0.000	**0.003**	**0.0030**
PM10	0.000	**0.002**	**0.0020**
SO2	0.000	**0.000**	**0.0000**

TOXIC RISK SCREENING ANALYSIS

The cancer risk is calculated based on the emission rate of diesel exhaust particulate matter. Diesel exhaust particulate matter is used as a surrogate for all toxic contaminants found in diesel exhaust. Because the proposed emissions exceed the risk screening trigger level for diesel exhaust particulate matter in Regulation 2, Rule 5, Table 2-5-1, a risk screening was performed.

In order for these engines to meet the risk level set by the District's Risk Management Policy, the applicant has requested that S-6's hours of operation, excluding periods when operation is required due to emergency conditions, be limited to no more than 50 hours per year, as limited by the ATCM. Results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 2.8 in a million if the engines were to run for 50 hours/year.

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 exposure occurs 10 hours per day, 5 days per week, 36 weeks per year, for 9 years.

Based on 50 hours per year of operation, the emergency generator passed the Health Risk Screening Analysis (HRA) conducted on April 24, 2015 by the District's Toxic Evaluation Section. This source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is 2.8 in a million. The hazard index for a resident is 0.001. The increased cancer risk to workers is 1.3 in a million and the hazard index is 0.0009. The increased cancer risk to students is 0.3 in a million and the hazard index is 0.0002. In accordance with Regulation 2-5, the above risk level is considered acceptable for an engine such as S-6 that meets the current TBACT requirements.

BACT

BACT is triggered for NOx since the maximum daily emissions exceeds 10 lb/day. BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for this source category as shown below:

Source Category

Source:	**IC Engine – Compression Ignition, Stationary Emergency; non-Agricultural, non-direct drive fire pump**	**Revision:**	**7**
		Document #:	**96.1.3**
Class:	**> 50 BHP Output**	**Date:**	**12/22/2010**

Determination

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Archived in Practice	TYPICAL TECHNOLOGY
NOx	1. n/s[c] 2. CARB ATCM standard[a] for NOx at applicable horsepower rating (see attached Table 1).	1. n/s[c] *2.* Any engine certified or verified to achieve the applicable standard. [a]

References

a. ATCM standard (listed below): Where NMHC + NOx is listed (with no individual standards for NOx or NMHC) as the standard, the portions may be considered 95% NOx and 5% NMHC. For the purposes of determining BACT NMHC = POC. Any engine which has been certified or demonstrated to meet the current year tier standard may be considered compliant with the certified emission standard for that pollutant.
b. Deleted (no longer applies).
c. Cost effectiveness analysis must be based on lesser of 50 hr/yr or non-emergency operation as limited by District health risk screen analysis.

Table 1: BACT 2 Emission Limits based on CARB ATCM

Emissions Standards for Stationary Emergency Standby Diesel-Fueled CI Engines >50 BHP g/Kw-hr (g/bhp-hr)				
Maximum Engine Power	**PM**	**NMHC+NOx**	**CO**	
37 < KW < 56 (50 < HP < 75)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)	
56 < KW < 75 (75 < HP < 100)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)	
75 < KW < 130 (100 < HP < 175)	0.20 (0.15)	4.0 (3.0)	5.0 (3.7)	
130 < KW < 225 (175 < HP < 300)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)	
225 < KW < 450 (300 < HP < 600)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)	<--S-6
450 < KW < 560 (600 < HP < 750)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)	
KW > 560 (HP > 750)	0.20 (0.15)	6.4 (4.8)	3.5 (2.6)	

The more restrictive BACT 1 standards levels do not apply for engines used exclusively for emergency use during involuntary loss of power. Hence, the owner/operator has to meet the BACT 2 limits.

It can be seen from above that S-6 satisfies the current BACT 2 standard. The engine is EPA certified for Tier 3 emitting NMHC+NOx at 2.6 g/bhp-hr. This is below the 3.0 g/bhp-hr BACT 2 level.

OFFSETS

Offsets are not required since the facility's POC and NOx emissions are each less than 10 ton/yr per Regulation 2-2-302. Offsets are not required since the facility's PM10 and SOx emissions are each less than 1 ton/yr per Regulation 2-2-303.

CARB STATIONARY DIESEL ENGINE ATCM

The State Office of Administrative Law approved the Airborne Toxic Control Measure (ATCM) on November 8, 2004. The current version of 17 CCR 93115 is effective May 19, 2011. State law requires the local Air Districts to implement and enforce the requirements of the ATCM. The ATCM contains 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:

"Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations.
Diesel PM – General Requirements

1. Meet 0.15 g/bhp-hr PM standard
2. Operate 50 hours per year, or less, for maintenance and testing (except emergency use and emissions testing)

HC,NOx, NMHC+NOx, CO

1. Meet standards for off-road engines of the same model year and horsepower rating
   As specified in the Off-Road Compression Ignition Engine Standards;
   Or if no standards have been established
2. Meet the Tier 3 standards in Title 13, CCR, Section 2423 for off-road engines of the same horsepower rating, irrespective of the new engine's model year

This emergency standby diesel engine is in compliance with the above ATCM requirements. The diesel engine will operate for no more than 50 hours per year for maintenance and reliability testing. This engine is subject to the EPA Tier 3 requirements for HC, NOx, NMHC+NOx and CO. As shown in the Table 2, the engines meet these requirements.

Table 2. ATCM Tier 3 Compliance

	Engine Emissions g/bhp-hr	ATCM Tier 3 Requirements g/bhp-hr
NMHC (POC)	0.13	N/A
NOx	2.47	N/A
NMHC+NOx	2.6	3.0
CO	0.40	2.6
PM	0.10	0.15

NSPS

The engine is subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it was manufactured after April 1, 2006, as required by Section 60.4200(a)(2)(i).

The engine has a total displacement of 8.7 liters and has 6 cylinders, so each cylinder has a volume of less than 10 liters. The engine is a 2014 model year engine and is not a fire pump. Section 60.4205(b) requires these engines to comply with the emission standards in Section 60.4202, in which 60.4202(a)(2) refers to 40CFR89.112 and 40CFR89.113 for all pollutants. For engines between 300 and 600 hp, these standards are:

NMHC+NOx: 4.0 g/kw-hr (3.0 g/hp-hr)
CO: 3.5 g/kw-hr (2.6 g/hp-hr)
PM: 0.20 g/kw-hr (0.15 g/hp-hr)
20% opacity during acceleration mode
15% opacity during lugging mode
50% opacity during peaks in acceleration or lugging mode

Since this engine is EPA certified at Tier 3, the engine will comply with the standards.

Sections 60.4206 and 60.4211(a) require 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 maximum sulfur content of 15 parts per million (ppm), and a cetane index of 40 or a maximum aromatic content of 35 percent by volume. California Air Resources Board (CARB) diesel fuel, which has a maximum sulfur content of 15 ppm and a maximum aromatic content of 10 to 20 percent by volume, is the only available Diesel Fuel in California. Staff in the Stationary Source Division of CARB indicate that some verified diesel fuel in California may have a maximum aromatic content greater than 10 percent if the fuel has been demonstrated to have an equal or greater emissions benefit as diesel fuel with maximum aromatic content of 10 percent, but no verified fuel has had an aromatic content greater than 25 percent. The owner/operator is expected to comply with this requirement.

Section 60.4209(a) requires a non-resettable hour meter. This requirement is in the standard permit conditions.

The engine will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 89.

The engine will comply with the requirement in Section 60.4211(e) to run for less than 100 hours per year for maintenance checks and readiness testing, and the prohibition of running for any reason other than emergency operation, maintenance, and testing because they are limited by permit condition to 50 hours per year for reliability testing and otherwise may only operate for emergencies.

The owner/operator is not required to perform tests in accordance with Section 60.4212 or 60.4213.

Section 60.4214(b) states that owner/operators do not have to submit an initial notification to EPA for emergency engines.

Because the engine does not have a diesel particulate filter, it is not subject to Section 60.4209(b) (installation of a backpressure monitor) or 60.4214(c) (records of corrective action taken after high backpressure).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions. [Subpart IIII, Table 8]

NESHAP

This engine is 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. 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 in the "NSPS" section of this evaluation.

STATEMENT OF COMPLIANCE

Source S-6 is subject to and expected to be in compliance with the requirements of District Regulation 1-301 (Public Nuisance), Regulation 6-1-303 (Ringelmann No. 2 Limitation), Regulation 9-1 (Sulfur Dioxide) and Regulation 9-8 (NOx and CO from Stationary Internal Combustion Engines).

From Regulation 1-301, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30 day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.

Source S-6 is subject to the limitations of Regulation 6-1-303 (Ringelmann No. 2 Limitation). Regulation 6, Rule 1, Section 303 states that a person shall not emit for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 2 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 40% opacity. This low PM10 emitting engine is not expected to produce visible emissions or fallout in violation of this regulation, and it will be assumed to be in compliance with Regulation 6 pending a regular inspection.

Source S-6 is also subject to the SO2 limitations of Regulation 9-1-301 (Limitation on Ground Level Concentrations of Sulfur Dioxide), Regulation 9-1-302 (Limitations Sulfur Dioxide Emissions) and 9-1-304 (Burning of Solid and Liquid Sulfur Dioxide Fuel). From Regulation 9-1-301, the ground level concentrations of SO2 will not exceed 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. Per Regulation 9, Rule 1, Section 302, a person shall not emit from any source a gas stream containing sulfur dioxide in excess of 300 ppm (dry). And Regulation 9, Rule 1, Section 304, states that a person shall not burn any liquid fuel having sulfur content in excess of 0.5% by weight. Compliance with both Regulations 9-1-302 and 9-1-304 is likely since California law mandates using diesel fuel with a 0.0015% by weight sulfur.

Regulation 9, Rule 8, NOx and CO from Stationary Internal Combustion Engines. From Regulation 9-8-111.3, Limited Exemption for Low Usage, Source S-6 is not subject to the

requirements of Regulations 9-8-304 (Emission Limits – Compression-Ignited Engines), providing the recordkeeping requirements of 9-8-502.1 and 9-8-530 are met. The owner/operator will comply with these recordkeeping requirements.

This project is considered to be ministerial under the District's CEQA 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 2.3.1.

The project is within 1000 feet of Peoples High School and therefore the application is subject to the public notification requirements of Reg. 2-1-412.

The engine is subject to and in compliance with NSPS 40 CFR 60 Subpart IIII and NESHAP 40 CFR 63 Subpart ZZZZ.

Offsets and PSD are not triggered.

PERMIT CONDITIONS

Standard condition 22850 will be imposed on S-6.

```
   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 issue an Authority to Construct for the equipment listed below. However, the proposed source will be located within 1000 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 for the following source:

S-6 Emergency Diesel Generator, FPT Industrial F2CE9685A-E, 389 BHP

_____ _____

Arthur Valla April 29, 2015
Senior Air Quality Engineer