DRAFT ENGINEERING EVALUATION
THE PYRAMID CENTER
PLANT 20461
APPLICATION 28903
505 SANSOME ST., SAN FRANCISCO, CA 94111

BACKGROUND

The Pyramid Center is applying for an Authority to Construct and/or Permit to Operate a new emergency diesel fire pump.

S-6 Emergency Standby Diesel Fire Pump; Make: Clarke; Model: JU4H-UFADW8; Model Year: 2016; Max Rated Horsepower: 144 hp;

The engine will be within 1,000 feet of the property boundary of Chinese Education Center (630 ft) and Sterne School (840 ft). The engine is also within ¼ mile of John Yehall Chin Elementary School. Thus, The Pyramid Center is subject to the public notice requirements in the District Regulation 2-1-412.

EMISSIONS SUMMARY

Annual and Maximum Daily Emissions:
Basis:
- Emission factors for S-6 for nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POC), and particulate matter less than 10 microns in diameter (PM_{10}) were provided by the manufacturer.
- S-6 has an Environmental Protection Agency (EPA) Engine Family Name GJDXL04.5119, and is certified to meet the EPA Tier 3 standards. Emission factors were calculated using the manufacturer's emission testing data submitted to EPA for certification.

The emission factor for sulfur dioxide (SO_2) is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors, which is based on full conversion of fuel sulfur to SO_2 and which will therefore be considered applicable to any diesel engine (sulfur content will be assumed to be the California limit of 0.0015 wt% sulfur):

SO_2: 8.09E-3 (% S in fuel oil) lb/hp-hr = 8.09E-3 (0.0015% S) (454 g/lb)
= 0.0055 g/hp-hr

Daily emissions are calculated to establish whether a source triggers the requirement for Best Available Control Technology (10 lb/highest day total source emissions for any class of pollutants). A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations. Annual and maximum daily emissions for S-6 are presented in Table 1.

Table 1 – Annual and Maximum Daily Emissions for S-6

Max Rated Output (bhp)	Fuel Use Rate (gal/hr)	Fuel Use Rate (MMBTU/hr)	Pollutant	Abated Emission Factors (g/bhp-hr)	Max Daily Emissions (lb/day)	Annual Emissions (lb/yr)	Annual Emissions (TPY)
144	10	1.34	NO_x	2.51	19.09	39.77	0.020
			CO	0.97	7.39	15.39	0.008
			POC	0.11	0.85	1.78	0.001
			PM_{10}	0.13	0.97	2.01	0.001

			SO_2	0.0055	0.04	0.09	0.000

PLANT CUMULATIVE INCREASE

The cumulative increase for The Pyramid Center is presented in Table 2.

Table 2 – Cumulative Increase for The Pyramid Center (Plant #20461)

Pollutant	Current (TPY)	Application Increase (TPY)	New Total (TPY)
NOx	4.356	3.544	7.900
CO	0.382	0.774	1.156
POC	0.225	0.187	0.412
PM_{10}	0.008	0.013	0.021
SO2	0.000	0.006	0.006

HEALTH RISK ASSESSMENT (HRA)

The calculated emissions increase of diesel exhaust particulate matter associated with the engine are in excess of the chronic risk screening trigger (0.26 lb/yr) as set forth in Regulation 2, Rule 5 as shown below.

Source	Operating Hours (hr/yr)	Max Rated Output (bhp)	Abated PM Emission Factor (g/hp-hr)	Annual PM Emissions (lb/yr)
S-6	50	144	0.13	2.01

S-6 meets Best Available Control Technology for toxics (TBACT) since the diesel particulate emissions are less than 0.15 g/bhp-hr. For a project with engine that meet the TBACT requirement, it must also pass the toxic risk screening level of less than 10 in one million for cancer risk, 1 for chronic hazard index, and 1 for acute hazard index.

Based on 50 hours per year of operation, the emergency generator set passed the HRA conducted on October 31, 2017 by the District's Toxic Evaluation Section. The increased cancer risk to the maximally exposed receptor (worker) is 0.81 in a million. The increased chronic non-cancer hazard index to the maximally exposed receptor (worker) is 0.00062. In accordance with the District's Regulation 2-5, this risk level is considered acceptable, as it has been determined that S-6 meets the current TBACT standards.

STATEMENT OF COMPLIANCE

The owner/operator of S-6 shall comply with Regulation 6-1 (Particulate Matter and Visible Emissions Standards), Regulation 9-1 (Inorganic Gaseous Pollutants: Sulfur Dioxide), and Regulation 9-8 (Inorganic Gaseous Pollutants: Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines).

Regulation 6-1-303 (Ringelmann No.2 Limitation) limits opacity from internal combustion engine to Ringelmann No. 2. Regulation 6-1-305 (Visible Particles) prohibits emissions of particles large enough to be visible as individually at the emission point. Regulation 6-1-310 (Particle Weight Limitation) limits emissions from any source particulate matter in excess of 343 mg per dry standard cubic meter. S-6 will be fueled using ultra-low sulfur diesel and meets the current TBACT standards. Thus, the engine is expected to comply with Regulation 6-1.

Regulation 9-1-301 (Limitations on Ground Level Concentrations) prohibits emissions from any sources other than ships, SO_2 in quantities which 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. Ultra-low sulfur diesel (15 PPM sulfur) will be used to meet the sulfur limitation of 0.5 wt% in Regulation 9-1-304 (Fuel Burning) as well as to minimize SO_2 emissions to comply with Regulation 9-1-301. Thus, S-6 is expected to comply with Regulation 9-1.

S-6 is an emergency standby generator, Regulation 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines) exempts the engines from the emission limits in Sections 9-8-301 through 305. Allowable operating hours and the corresponding record keeping in Regulation 9-8-330 (Emergency Standby engines, Hours of Operation) and 530 (Emergency Standby and Low Usage Engines, Monitoring and Recordkeeping) will be included in the permit conditions. Thus, S-6 is expected comply with Regulation 9-8.

S-6 diesel engine is subject to the Stationary Diesel Airborne Toxics Control Measure (ATCM) and is considered emergency standby direct-drive fire pump engine since it will be installed after January 1, 2005 and is larger than 50 bhp. The engine must comply with the emissions standards set forth in Table 2 of § 93115.6.

For engines between 100 and 175 hp, the standards in Table 2 are:

- NMHC + NO_x: 3.0 g/bhp-hr
- CO: 2.6 g/bhp-hr
- PM: 0.15 g/bhp-hr

Based on the EPA certified emission factors, S-6 complies with these emission standards. The requirements of the ATCM will be included in the permit conditions.

The project is considered to be ministerial under the District's California Environmental Quality Act (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 emissions factors outlined in the Permit Handbook Chapter 2.3.1 and therefore is not discretionary as defined by CEQA.

The project is within 1000 feet from the nearest school and therefore is subject to the public notification requirements of Reg. 2-1-412. Notifications will be distributed to parents or guardians of children enrolled at Chinese Education Center, Sterne School, and John Yehall Chin Elementary School within ¼ mile, and all residential and business neighbors within 1,000 feet of the proposed new source.

Best Available Control Technology (BACT):
In accordance with Regulation 2-2-301, 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, SO_2 or PM_{10}.

Based on the emission calculations above, the owner/operator of S-6 is subject to BACT for NO_x. The District's BACT requirements for "IC Engine - Compression Ignition: Stationary Emergency > 50 bhp" are addressed in the BACT Guideline, document # 96.1.3, revision 7, dated December 22, 2010.

The BACT2 requirements are 3.0 g/bhp-hr for NMHC+NO_x for engines with maximum power greater between 100 and 175 HP. According to the emission data in the EPA certification for the engine family for S-6, S-6 meets the BACT2 requirements.

Offsets:
Offsets must be provided for any new or modified source at a facility that emits more than 10 tons per year of POC or NOx. Since the facility's permitted emissions are less than 10 tons per year of POC or NO_x, offsets are not required.

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

S-6 has a total displacement of 4.5 liters and 4 cylinders. Therefore, each cylinder has a volume of less than 30 liters. The engine is a 2016 engine and is a fire pump. For stationary fire pump engines between 100 and 175 HP beginning with the model year 2010, 60.4202(d) requires that engine manufacturers certify that the engine meets the emission standards listed in Table 4 of 40 CFR 60, Subpart IIII for all pollutants. Section 60.4205(c) requires that the owners/operators of this engine comply with the standards in Table 4 in this subpart that apply to the same model year and maximum engine capacity.

For engines between 100 and 175 HP, the standards in Table 4 are:

- NMHC + NO_x: 4.8 g/hp-hr
- CO: 2.6 g/hp-hr
- PM: 0.15 g/hp-hr

Based on the emission factors certified by the EPA, S-6 will comply with the above standards.

Per 60.4211(c), the owners/operators of a CI fire pump engine that is manufactured during or after the model year that applies to their fire pump engine power rating listed under Table 3 in 40 CFR 60, Subpart IIII must comply with the emission standards specified in 60.4205(c). To be in compliance, the owner/operator must purchase an engine certified to the emission standards in 60.4205(c) for the same model year and maximum engine power. The engine must be installed and configured by the owner/operator according to the manufacturer's specifications. Since the engine purchased complies with the emission standards set forth in 60.4205(c), S-6 complies with this standard.

Prevention of Significant Deterioration (PSD):
The emission increase resulting from this project is expected to be less than 1 TPY for any class of pollutants. Since it is far below the PSD thresholds, the project is not subject to PSD review.

National Emission Standards for Hazardous Air Pollutants (NESHAP)
The engines are 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 they are new engines at an area source, the engines must meet the requirements in 40 CFR part 60 subpart IIII and no further requirements apply to this engine under this subpart according to §63.6590(c)(1).

PERMIT CONDITIONS

S-6 will be subject to Permit Condition Numbers 22850 as shown below.

Permit Condition #22850

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing. [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection 93115.6 (b)(3)(A)(1)(a)]
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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection 93115.6 (b)(3)(A)(1)(a)]

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 93115.10 (e)(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 93115.10 (g) (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/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 93115.6 (b)(2)]

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 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 the Authority to Construct for the following source:

S-6 Emergency Standby Diesel Fire Pump; Make: Clarke; Model: JU4H-UFADW8; Model Year: 2016; Max Rated Horsepower: 144 hp;

By:_____ Date:_____

Alexander Sohn
Air Quality Engineer