DRAFT

ENGINEERING EVALUATION
VETERAN ADMINISTRATION MEDICAL CENTER
PLANT 450
APPLICATION 29762

BACKGROUND

Veteran Administration Medical Center is applying for Authorities to Construct and/or Permits to Operate two new emergency standby generators.

S-41 Emergency Standby Generator Set: Diesel Engine, Make Kohler, Model KD45V20, Model Year 2018, 2561 BHP; Abated by A-41, Johnson Matthey CRT(+) Diesel Particulate Filter.

S-42 Emergency Standby Generator Set: Diesel Engine, Make Kohler, Model KD45V20, Model Year 2018, 2561 BHP; Abated by A-42, Johnson Matthey CRT(+) Diesel Particulate Filter.

According to the California Air Resources Board Executive Order DE-08-009-09, A-41 and A-42 are Level 3 devices with no less than 85% particulate reduction for diesel engines on stationary emergency standby generators.

The generators will be within 1000 feet of the property boundary of Henry Gunn High School, so it is subject to the school public notice requirements in the District Regulation 2-1-412.

EMISSIONS SUMMARY

Annual Emissions:

Basis:
- 2561 brake horsepower (bhp) output rating for full-load, standby operation for each engine
- 50 hours/year/engine operation for reliability-related activities
- The Kohler engine has an EPA Engine Family Name JLHAL45.0ESP, and is certified to meet the EPA Tier 2 standards. Emission factors were calculated using the manufacturer's emission testing data submitted to EPA for certification.
- 85% reduction is assumed for the PM emissions according to the CARB Executive Order DE-08-009-09. PM10 and PM2.5 emissions are estimated using the PM emission factor.

Pollutant	Emission Factor (g/bhp-hr)
NOx	4.35
CO	0.60

Pollutant	Emission Factor (g/bhp-hr)
POC	0.30
PM	0.017

- The emission factor for 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

For each source,

NOx	=	(	4.35	g/hp-hr)	(	2561	hp)	(	50	hr/yr)	(lb/454g)	=	1228.31	lb/yr	=	0.614	TPY
CO	=	(	0.60	g/hp-hr)	(	2561	hp)	(	50	hr/yr)	(lb/454g)	=	168.26	lb/yr	=	0.084	TPY
POC	=	(	0.30	g/hp-hr)	(	2561	hp)	(	50	hr/yr)	(lb/454g)	=	84.13	lb/yr	=	0.042	TPY
PM	=	(	0.017	g/hp-hr)	(	2561	hp)	(	50	hr/yr)	(lb/454g)	=	4.732	lb/yr	=	0.002	TPY
SO_2	=	(	0.0055	g/hp-hr)	(	2561	hp)	(	50	hr/yr)	(lb/454g)	=	1.55	lb/yr	=	0.001	TPY

Maximum Daily Emissions:

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.

For each source,

NOx	=	(	4.35	g/hp-hr)	(	2561.0	hp)	(	24	hr/day)	(lb/454g)	=	589.59	lb/day
CO	=	(	0.60	g/hp-hr)	(	2561.0	hp)	(	24	hr/day)	(lb/454g)	=	80.77	lb/day
POC	=	(	0.30	g/hp-hr)	(	2561.0	hp)	(	24	hr/day)	(lb/454g)	=	40.38	lb/day
PM	=	(	0.017	g/hp-hr)	(	2561.0	hp)	(	24	hr/day)	(lb/454g)	=	2.27	lb/day
SO_2	=	(	0.0055	g/hp-hr)	(	2561.0	hp)	(	24	hr/day)	(lb/454g)	=	0.74	lb/day

PLANT CUMULATIVE INCREASE (tons/year, post 4/5/1991)

Pollutant	Current	Application Increase	New Total
NOx	11.866	1.228	13.094
CO	4.300	0.168	4.468
POC	1.007	0.084	1.091
PM10	4.286	0.004	4.290
PM2.5	0.003	0.004	0.007
SO2	0.294	0.002	0.296

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.* An application is considered ministerial if the District's engineering evaluation and basis for approval or denial of the permit application for the project is limited to the criteria set forth in *Section 2-1-428 Criteria for Approval of Ministerial Permit Applications* and the specific procedures, fixed standards and objective measurements set forth in the District's Permit Handbook and BACT/TBACT Workbook.

> 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 the increase in emissions of a toxic air contaminant in Table 2-5-1 of *Regulation 2, Rule 5 New Source Review of Toxic Air Contaminants* shall prepare and distribute a public notice in accordance with subsections 412.1 and 412.2 of *Regulation 2, Rule 1 General Requirements*.

> The outer boundary of the nearest K-12 school, Henry M. Gunn High School, is 900 feet from the location of the sources. This application is subject to the public notification requirements of *Regulation 2-1-412*. Since they are greater than 500 feet from the school boundary, the hours of operation for this engine will not be limited to school time hours of operations are described in the permit conditions. Notification of the proposed new sources will be mailed to the parents or guardians of all children enrolled in any school within on-quarter mile of the sources, and to each address within a radius of 1,000 feet of the sources, in order to give these parties an opportunity to provide public comments on the proposed actions. A public notice period of 30 days is required, and comments will be considered before making a final decision.

Regulation 2 - Permits, Rule 2 – New Source Review

PSD Project (Section 2-2-224)

This section defines a PSD project as one at a facility that has the potential to emit 100 tons or more per year of any PSD pollutant.

> This facility will not have the potential to emit 100 tons or more of any PSD pollutant therefore, this project is not a PSD project.

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, PM2.5, 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, POC, and CO since the maximum daily emissions of each pollutant are greater than 10 lb/day. BACT for these sources are derived from the CARB ATCM Standards and set forth in the *BAAQMD BACT/TBACT Workbook for IC Engine Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document # 96.1.3, Revision 7 dated 12/22/2010.* The more restrictive BACT 1 standard is not applicable to these engines because they will be limited to operation as emergency standby engines. The BACT 2 emission limit for NO_x + NMHC and CO is 4.7 g/bhp-hr and 2.6 g/bhp-hr, respectively. According to the emission data submitted to EPA for this engine family, the NOx + NMHC and CO emission rates for the engines are 4.65 g/bhp-hr and 0.60 g/bhp-hr, respectively which are below the BACT 2 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 facility has the potential to emit 13.094 tons of NO_x per year which exceeds the 10 ton per year limit, but is less than 35 tons per year. This project results in an emission increase of POC and NOx are 1.228 and 0.084 tons per year. The NO_x emissions will need to be offset. Since the facility does not have a banking certificate, NO_x will be offset at a ratio of 1:1 from the Small Facility Bank.

Offset Requirement, $PM_{2.5}$, PM_{10} and Sulfur Dioxide (2-2-303)

This section establishes emission offset requirements for $PM_{2.5}$, PM_{10} and Sulfur Dioxide from new or modified sources located at facility with the potential to emit 100 tons per year of $PM_{2.5}$, PM_{10} or Sulfur Dioxide

> Since the potential to emit $PM_{2.5}$, PM_{10} 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)

Regulation 2-5-101 –Description states that any new or modified source of toxic air contaminant (TAC) shall be evaluated for potential public exposure and health risk. *Regulation 2-5-110 Exemption, Low Emission Levels* provides an exemption if, for each toxic air contaminant, the increase in emissions from the project is below the trigger levels listed in Table 2-5-1 of Regulation 2-5.

> The calculated emissions increase of diesel exhaust particulate matter (PM) associated with the engines are in excess of the chronic risk screening trigger as set forth in Regulation 2-5 as show below.

Source	Abated PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)
S-41	0.017	2561	50	4.73	0.26

Source	Abated PM_{10} Emission Factor (g/HP-hr)	HP	Annual Usage (Hours/year)	Diesel Exhaust Particulate Emissions (lb/year):	Trigger Level (lb/yr)
S-42	0.017	2561	50	4.73	0.26

Within the last three years, S-38, Standby Diesel Generator, was permitted under Application 29077 in 2018. S-38 has been considered as part of the "project" as defined by the District Regulation 2-5-216 in the HRA. Results from the HRA indicate that the maximum project cancer risk is 0.2 in a million, and the maximum chronic hazard index is 0.00006. Therefore, this project will comply with the requirements in the District Regulation 2-5-301 and 302.

Regulation 6 - Particulate Matter, Rule 1 - General Requirements

Ringelmann No. 1 Limitation (6-1-301)

Except as provided in Sections 6-1-303, 6-1-304 and 6-1-306, a person shall not emit from any source for a period or periods aggregating more than three minutes in any hour, a visible emission which is as dark or darker than No. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree.

> Since S-41 and S-42 will be abated by diesel particulate filters, they will emit very low amount of PM_{10} and they are expected to comply with *Regulation 6-1-301* pending a regular inspection.

Opacity Limitation (6-1-302)

Except as provided in Sections 6-1-303, 6-1-304 and 6-1-306, a person shall not emit from any source for a period or periods aggregating more than three minutes in any hour an emission equal to or greater than 20% opacity as perceived by an opacity sensing device, where such device is required by District regulations.

> Since S-41 and S-42 will be abated by diesel particulate filters, they will emit very low amount of PM_{10} and they are expected to comply with *Regulation 6-1-302* pending a regular inspection.

Visible Particles (Section 6-1-305)

A person shall not emit particles which are large enough to be visible as individual particles at the emission point or of such size and nature as to be visible individually as incandescent particles.

> Since S-41 and S-42 will be abated by diesel particulate filters, they will emit very low amount of PM_{10} and they are 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.

Particulate Weight Limitation (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-41 and S-42 each is 0.017 grams/bhp-hr, which results in an outlet grain loading of 0.0009 grains/dscf. The emission rate is much 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-41 and S-42 are 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 SO_2 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 NOx 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-41 and S-42 are subject to the requirements of *Regulation 9-8-330* which limits reliability related operation of the engines to 50 hours per year per engine.

> Permit Conditions for S-41 an S-42 will include operating limits that meet this standard.

Monitoring and Records (Section 9-8-500)

S-41 and S-42 are subject to the reporting requirements of Sections 502 and 530.

> Permit Conditions for S-41 and S-42 will include reporting requirements that meet this standard.

Regulation 10 – Standards of Performance for New Stationary Sources

New Source Performance Standards (NSPS)

Any new or modified source 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)(i) engines are subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines if they have a displacement of less than 30 liters per cylinder where the model year is 2007 or later, for engines that are not fire pump engines. S-41 and S-42 each has a 16-cylinder engine with a total displacement of 45 liters, so each cylinder has a volume less than 30 liters and these engines are subject to NSPS

Section 60.4205(b) requires that owners and operators of these engines comply with the emission standards in Section 60.4202, which refers to 40CFR89.112 and 40CFR89.113 for all pollutants.

> S-41 and S-42 meet the limits for engines greater than 750 HP, as shown in the table below:

Pollutant	Manufacturer's Performance Data (g/bhp-hr)	40CFR89.112 Emission Limits (g/bhp-hr)
PM	0.017	0.15
NMHC + NO_x	4.65	4.8
CO	0.60	2.6

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engines 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 engines.
> 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 for stationary engines in California.

Section 60.4209(a) requires a non-resettable hour meter.
> S-41 and S-42 each will be subject to standard permit conditions that includes this requirement.

> S-41 and S-42 will comply with the requirements of Section 60.4211(c) because each source has been certified in accordance with 40 CFR Part 1068 under engine family JLHAL45.0ESP-007.

> Standard permit conditions limiting operation to 50 hours per year for reliability testing except for operating during emergencies at S-41 and S-42 ensure that they will comply with the requirement in Section 60.4211(e) which limits such operation to less than 100 hours per year.

Regulation 11 – National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAP)

S-41 and S-42 are 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. The engines are in compliance with the requirements of 40 CFR part 60 subpart IIII, as shown in the "NSPS" section of this evaluation.

Other Regulations

The District is charged with enforcing the requirements of California's Air Toxic Control Measure for Stationary Compression Ignition Engines *Title 17, California Code of Regulations, Section 93115* for the purpose of reducing diesel particulate matter (PM) and criteria pollutant emissions from stationary diesel-fueled compression ignition (CI) engines.

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

Subsection 93115.6(a)(3)(A)(1)(a) sets forth Emission Standards for new stationary emergency standby diesel fueled compression ignition engines with maximum engine power greater than 750 HP.

> S-41 and S-42 are subject to and meet 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	0.017	0.15
NMHC + NO_x	4.65	4.8
CO	0.60	2.6

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, Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines*.

> S-41 and S-42 have been certified to meet EPA Tier 2 standards and therefore, they comply with this section of the ATCM.

Subsection 93115(a)(3)(A)(1)(c) limits the non-emergency operation of 50 hours/year for maintenance and testing.

> Permit Conditions for S-41 and S-42 will limit non-emergency operation to 50 hours/year/engine and as such they will comply with this section of the ATCM.

PERMIT CONDITIONS

S-41 and S-42 will be subject to Permit Condition Numbers 22850 and 24354 as shown below.

Permit Condition Number 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)]

Permit Condition Number 24354

1. The owner/operator shall abate the particulate emissions from the emergency diesel engine with a Diesel Particulate Filter at all times the engine is in operation.
[Basis: "ATCM for Stationary Compression Ignition Engines" Section 93115.6(a)(3) or 93115.6(b)(3), title 17, CA Code of Regulations]

2. The owner/operator shall install and maintain a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached. The owner/operator shall maintain records of any corrective action taken after the backpressure monitor has notified the owner or operator that the high backpressure limit of the engine is approached 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).
[Basis: "ATCM for Stationary Compression Ignition Engines" Section 93115.10(e), title 17, CA Code of Regulations; 40 CFR 60.4214c]

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 Authorities to Construct for the equipment listed below. However, the proposed sources will be located within 1000 feet of a school, which triggers the school public notification requirements of District Regulation 2-1-412.6. 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 Authorities to Construct for the following sources:

S-41 Emergency Standby Generator Set: Diesel Engine, Make Kohler, Model KD45V20, Model Year 2018, 2561 BHP; Abated by A-41, Johnson Matthey CRT(+) Diesel Particulate Filter.

S-42 Emergency Standby Generator Set: Diesel Engine, Make Kohler, Model KD45V20, Model Year 2018, 2561 BHP; Abated by A-42, Johnson Matthey CRT(+) Diesel Particulate Filter.

By:_____ Date:_____
Xuna Cai
Senior Air Quality Engineer