

**Draft Engineering Evaluation  
 Mercy Retirement & Care Center  
 Application No. 28677  
 Plant No. 6968**

**BACKGROUND**

Mercy Retirement & Care Center has applied for an Authority to Construct and/or Permit to Operate for the following equipment:

**S-4 Emergency Standby Diesel Generator  
 John Deere, Model: SPJD-2100-60, Model Year 2014  
 315 Bhp, 2.12 MMBtu/hr**

The equipment will be located at 3431 Foothill Blvd., Oakland, CA 94601.

The four stroke compression ignition diesel powered generator set (S-4) will provide emergency standby power in the event of a disruption to power service. During an emergency, the generator will operate 24 hours a day until regular electric supply is restored. The engine will operate for a maximum of 50 hours per year for maintenance and testing, as limited by Regulation 9-8-330.3.

**EMISSIONS CALCULATIONS**

The primary pollutants from internal combustion (IC) engines are oxides of nitrogen (NO<sub>x</sub>), hydrocarbon and other organic compounds (POC), carbon monoxide (CO), particulate matter (PM<sub>10</sub>), and sulfur dioxide (SO<sub>2</sub>). Emissions factors for NO<sub>x</sub>, POC, CO, and PM<sub>10</sub> were obtained from EPA Certified Emissions Data for non-road compression ignition engines. SO<sub>2</sub> emissions were calculated based on the maximum allowable sulfur content (0.05 wt% S) of diesel fuel with the assumption that all of the sulfur present will be converted to SO<sub>2</sub> during the combustion process.

Annual emissions are calculated based on the number of hours per year of operation for testing and maintenance. 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 unexpected operations.

Hours of Operation: 50 hr/yr  
 Diesel Heat Capacity: 2.12 MMBtu/hr  
 Fuel Consumption Rate: 15.5 gal/yr  
 Brake Horsepower of Engine: 315 bhp

**Table 1. Annual and daily criteria pollutants from S-4**

<b>Pollutant</b>	<b>Emission Factor (g/kw-hr)</b>	<b>Emission Factor (g/bhp-hr)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Annual Emissions (TPY)</b>	<b>Maximum Daily Emissions (lb/day)</b>	<b>Chronic Trigger Level (lb/yr)</b>
NO <sub>x</sub>	3.31	2.47	85.66	0.043	41.12	
CO	0.60	0.45	15.53	0.008	7.45	
POC	0.11	0.08	2.85	0.001	1.37	
PM <sub>10</sub>	0.10	0.07	2.59	0.001	1.24	0.26

**Table 2. Annual and daily sulfur dioxide emissions from S-4**

<b>Pollutant</b>	<b>Emissions Factor (lb/MMBtu)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Annual Emissions (TPY)</b>	<b>Maximum Daily Emissions (lb/day)</b>
SO <sub>2</sub>	0.05	5.31	0.003	2.55

**PLANT CUMULATIVE INCREASE**

S-4 is located at an existing facility. Therefore, there are existing emissions at the plant. However, the existing cumulative increase is for S-3, Incinerator, which was demolished in 1998. Therefore, the previous cumulative increase will be subtracted. Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-4.

**Table 3. Cumulative increase in tons/yr**

Pollutant	Existing	Decrease	New	Total
NO <sub>x</sub>	0.060	0.060	0.043	0.043
CO	0.710	0.710	0.008	0.008
POC	0.040	0.040	0.001	0.001
PM <sub>10</sub>	0.170	0.170	0.001	0.001
SO <sub>2</sub>	0.002	0.002	0.003	0.003

**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<sub>x</sub>, CO, SO<sub>2</sub> or PM<sub>10</sub>.

BACT is triggered for NO<sub>x</sub> since the maximum daily emissions of these pollutants exceed 10 lb/day. BACT for this source is presented in the current 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. S-4 will comply with BACT (2) for NO<sub>x</sub> and CO because the emissions factors for these pollutants listed in Table 1 do not exceed BACT (2) emissions limits (shown in Table 4 below). The NO<sub>x</sub> standard is included in the “NO<sub>x</sub> + POC” standard. BACT (1) has not been determined.

**Table 4. BACT 2 emissions limits based on CARB ATCM**

Horsepower Range	NO <sub>x</sub> + POC(g/bhp-hr)	CO (g/bhp-hr)
300 ≤ HP < 600	3.0	2.6

**TOXIC RISK SCREENING ANALYSIS**

This application required a Toxics Risk Screen because the diesel particulate emissions are greater than the toxic trigger level as shown in Table 1.

S-4 meets the Best Available Control Technology for toxics (TBACT) since the diesel particulate emissions are less than 0.15 g/bhp-hr. For an engine that meets the TBACT requirement, it must also pass the toxic risk screening level of less than ten in a million.

Based on 50 hours per year of operation, the emergency generator passed the Health Risk Screening Analysis (HRSA) conducted September 22, 2017 by the Air District’s Toxic Evaluation Section. The source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is 7.0 in a million with a hazard index of 0.0019. The increased cancer risk to the Worker is 0.96 in a million with a hazard index of 0.00074. There is no increased cancer risk to students. These cancer risks are below the ten in a million limit and is acceptable in accordance with Regulation 2, Rule 5.

**OFFSETS**

Per Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NO<sub>x</sub>. Based on the emissions displayed in Table 3, offsets are not required for this application.

**NEW SOURCE PERFORMANCE STANDARDS (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 and is not a fire pump engine, as required by Section 60.4200(a)(2)(i).

The engine has a total displacement of 6.8 liters and has 6 cylinders, so each cylinder has a volume of less than 30 liters. Section 60.4205(b) requires these engines to comply with the emission standards in Section 60.4202, which refers to 40 CFR 89.112 and 40 CFR 89.113 for all pollutants. For engines greater than 225 kW and smaller than 450 kW, these standards are:

NMHC+NO<sub>x</sub>: 4.0 g/kW-hr  
CO: 3.5 g/kW-hr  
PM: 0.20 g/kW-hr  
20% opacity during acceleration mode  
15% opacity during lugging mode  
50% opacity during peaks in acceleration or lugging mode

According to the EPA Certified Emissions Data for non-road compression ignition engines, 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(a) requires that the owner/operator must use fuel that complies with 40 CFR 80.510(a). This means that the fuel must have a sulfur content of 500 parts per million (ppm) maximum, 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 diesel is required to be used in California.

Section 60.4207(b) requires that 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 the same cetane index or aromatic content as above. The owner/operator is expected to comply with this requirement because CARB diesel is required to be used in California.

Section 60.4209(a) requires a non-resettable hour meter. This requirement is already 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 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 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, the owner/operator is not subject to Section 60.4214(c).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions. The owner/operator is expected to comply with this requirement.

**NESHAP**

This engine is subject to 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, and complies by complying with the NSPS Subpart IIII.

**STATEMENT OF COMPLIANCE**

S-4 will be operated as an emergency standby engine and therefore is not subject to the emission rate limits in Regulation 9, Rule 8 (NOx and CO from Stationary Internal Combustion Engines). S-4 is exempt from the requirements of Sections 9-8-301 through 305, 501 and 503 per Reg. 9-8-110.5 (Exemptions). S-4 is subject to and expected to comply with 9-8-330 (Emergency Standby Engines, Hours of Operation) since nonemergency hours of operation will be limited in the permit conditions to 50 hours per year. S-4 is also subject to and expected to comply with monitoring and record keeping requirements of Regulation 9-8-530 and the SO<sub>2</sub> limitations of 9-1-301 (Limitations on Ground Level Concentrations) and 9-1-304 (Fuel Burning). Regulation 9-8-530 (Emergency Standby and Low Usage Engines, Monitoring and Recordkeeping) requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9, Rule 1(Sulfur Dioxide) is very likely since diesel fuel with a 0.0015% by weight sulfur is mandated for use in California. Like all combustion sources, S-4 is subject to Regulation 6, Rule 1 (Particulate Matter). Regulation 6-1-303.1 (Ringelmann No. 2 Limitations) limits opacity from internal combustion engines to Ringelmann 2. This engine 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.

The 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 emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3.1)

Life Academy and United for Success Academy, located at 2101 35th Ave., Oakland, CA 94601, are within 1000 ft of Mercy Retirement Center. Hence, this application is subject to the public notice requirement of 2-1-412. A public notice will be prepared and distributed to parents and guardians of students living within a quarter-mile of the source and to each address within 1,000 ft of the school. After the notice is distributed, 30 days will be given for receiving comments from the public. These comments will be reviewed and responses will be prepared before any final decision is taken in regards to the application. The following three schools are also within a quarter mile of S-4 and will be included on the public notice:

Urban Promise Academy  
3031 East 18<sup>th</sup> Street  
Oakland, CA 94601

Patten Academy of Christian Education  
2430 Coolidge Avenue  
Oakland, CA 94601

St. Elizabeth School  
1516 33<sup>rd</sup> Avenue  
Oakland, CA 94601

PSD does not apply.

**PERMIT CONDITIONS**

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]

*End of Conditions*

**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 -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 take any final action on issuance of an Authority to Construct for the following source:

- S-4     Emergency Standby Diesel Generator**  
**John Deere, Model: SPJD-2100-60, Model Year 2014**  
**315 Bhp, 2.12 MMBtu/hr**

By: \_\_\_\_\_  
Simrun Dhoot  
Air Quality Engineer II

Date: \_\_\_\_\_