

**DRAFT  
ENGINEERING EVALUATION REPORT**

<b>Plant Name:</b>	<b>UCSF/Mount Zion</b>
<b>Application Number:</b>	<b>22213</b>
<b>Plant Number:</b>	<b>5755</b>

**BACKGROUND**

The applicant is applying for an Authority to Construct for a new Emergency Stand-By Diesel Power Generator Set. The applicant is requesting an Authority to Construct for the following equipment:

**S-11 Emergency Stand-By Diesel Generator Set; John Deere Model 6068HF285, 237 BHP**

**CRITERIA POLLUTANT EMISSIONS CALCULATIONS**

The proposed engine has been certified by the California Air Resources Board (CARB) under Executive Order U-R-004-0386 (EPA Engine Family AJDXL06.8104). CARB certified emission factors for the engine were used for all criteria pollutant emission calculations. The emission factors used are as follows:

PM10	0.134	g/bhp-hr
NMHC	0.134	g/bhp-hr
NOX	2.550	g/bhp-hr
SO2 <sup>1</sup>	0.005	g/bhp-hr
CO	0.969	g/bhp-hr

The applicant requested operation at 50 hours per year, which is consistent with the California Air Resources Board Air Toxic Control Measure for Stationary Compression Ignition Engines, 17 CFR 93115, (December 4, 2004). At a 50 hours per year testing and maintenance limitation, criteria emissions are as follows:

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<sup>1</sup> SO2 emission factor calculated from fuel rate for CARB certified engine  
SO2 g/bhp-hr = (83.87 lb/hr)\*(0.0015 lb S/100 lb)\*(64.06 lb SO2/lb mol/32.06 lb S/lb mol)\*(453.6 g/lb)  
\*(1/237 BHP) = 0.005 g/bhp/hr

**TABLE 1 - CRITERIA POLLUTANT EMISSIONS**

SOURCE	BHP	PM10 G/BHP-HR	POC G/BHP-HR	NOX G/BHP-HR	SO2 G/BHP-HR	CO G/BHP-HR
S-11	237	0.134	0.134	2.550	0.005	0.969
<b>TOTAL G/HR</b>		<b>32</b>	<b>32</b>	<b>604</b>	<b>1.14</b>	<b>230</b>
BACT (Tier 3-g/bhp-hr)		0.15	0.15	2.85		2.60
Meets BACT?		YES	YES	YES		YES
<b>TOTAL LB/HR</b>		<b>0.07</b>	<b>0.07</b>	<b>1.33</b>	<b>0.00</b>	<b>0.51</b>
<b>TOTAL LB/DAY</b>		<b>1.68</b>	<b>1.68</b>	<b>31.98</b>	<b>0.06</b>	<b>12.16</b>
<b>TOTAL LB/50 HR</b>		<b>3.51</b>	<b>3.51</b>	<b>66.63</b>	<b>0.13</b>	<b>25.33</b>
<b>TOTAL TPY</b>		<b>0.002</b>	<b>0.002</b>	<b>0.033</b>	<b>6.28E-05</b>	<b>0.013</b>

**OFFSETS**

The total Potential to Emit for the facility after start-up of the new source will be less than 100 TPY for each criteria pollutant and less than 10 TPY for each ozone precursor (NOx and POC) (see Attachment 1).

Since the facility does not have the potential to emit more than 10 tons per year of nitrogen oxide or precursor organic compounds emissions on a pollutant-specific basis, the facility is not subject to NOx or POC offsets under Regulation 2-2-302.

Since the facility will not have the potential to emit more than 100 tons per year of any criteria pollutant, the facility is not a "Major Facility" as defined in Regulation 2-1-203, and is not subject to PM10 or SO2 offsets under Regulation 2-2-303.

**CUMULATIVE EMISSIONS INCREASE**

The applicant is not planning to shut down any sources on start-up of these new sources. Changes to the cumulative emissions inventory are then as follows:

**TABLE 2 - CUMULATIVE EMISSION INCREASE INVENTORY**

Pollutant	Current Emissions (TPY)	Application Emissions Increase (TPY)	Onsite Emissions Reductions Credits (TPY)	Offsets From DSFB (TPY)	Final Emissions (TPY)
PM10	0	0.002	0	0	0.002
POC	0	0.002	0	0	0.002
NPOC	0	0.000	0	0	0.000
NOx	0	0.033	0	0	0.033
SO2	0	0.000	0	0	0.000
CO	0	0.013	0	0	0.013

**TOXIC RISK MODELING**

The District uses PM10 emissions as a proxy for toxic emission exposure to surrounding residential and industrial populations. A PM10 emissions level of 0.34 lbs/year automatically triggers a health risk screening assessment pursuant to Regulation 2, Rule 5. At a maximum 50 hours per year permitted operation, the application exceeds a PM10 emission level of 0.34 lbs/year and so requires that a health risk screening assessment be performed.

Because no representative meteorological data was available for this site, an ISCST3 model for PM10 exposure using SCREEN3 meteorological data was used to estimate maximum 1-hour average ambient PM10 concentrations. Since the ISCST3 model does not estimate air concentrations within a building cavity region, where potential receptors are located, the ISC Prime model was also run. Annual average concentrations were estimated to be equal to ten percent of the predicted maximum 1-hour maximum average concentration at each receptor. Distance and directionality were used as the primary considerations to determine sites of maximum exposure. Elevated terrain was considered using 10m DEM input from the USGS San Francisco North sub area

Estimates of residential risk assume potential exposure to annual average TAC concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 245 day per year, for 40 years. Risk estimates for students assume a higher breathing rate, and potential exposure is assumed to occur 10 hours per day, 36 weeks per year, for 9 years. Cancer risk adjustment factors (CRAFs) were used to calculate all cancer risk estimates. The CRAFs are age-specific weighting factors used in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. Model runs were made with both urban and rural dispersion coefficients. Stack and building parameters for the analysis were based on information provided by the applicant.

The highest risks were obtained by modeling emissions using the ISCST3 model with rural terrain dispersion coefficients. This model produced a maximum annual residential GLC of 86.4  $\mu\text{g}/\text{m}^3$  per g/sec, resulting in a cancer risk of approximately 2.46 in a million, a maximum annual worker GLC of 100.8  $\mu\text{g}/\text{m}^3$  per g/sec, resulting in a cancer risk of approximately 1.40 in a million, and a maximum annual student GLC of 46.9  $\mu\text{g}/\text{m}^3$  per g/sec, resulting in a cancer risk of approximately 0.42 in a million. Associated health hazard indices are less than 1.0 for all cases.

The maximum calculated carcinogenic risk is below 10 in a million and the maximum calculated chronic hazard index is less than 1.0, and so the engine as proposed is acceptable under Regulation 2, Rule 5.

### **BACT/TBACT REVIEW**

Under Regulation 2, Rule 2, any new source which results in an increase of more than 10 lbs per day of any criteria pollutant must be evaluated for adherence to BACT and TBACT control technologies. This engine triggers BACT for CO, and NOx. For compression ignition I.C. engines with firing rates greater than 50 BHP, this means the engine must be fired on ultra-low sulfur diesel fuel (fuel oil with less than 0.0015% by weight sulfur content). BACT/TBACT also requires that the engine meet current tier standards for POC and NOx emissions, meet the more stringent of either 0.15 g/bhp-hr or the current tier standard for PM10 emissions, and meet the more stringent of 2.75 g/bhp-hr or the current tier standard for CO emissions. For these engines, the current tier standard is Tier 3. The proposed engine complies with the applicable Tier standards and meets BACT and TBACT requirements. Tier 2 PM10, NOx, CO, and NMHC standards are less than or equal to the District's BACT and TBACT limits.

### **COMPLIANCE DETERMINATION**

The generator is are covered under ministerial exemption, Chapter 2.3.1 of the BAAQMD Permit Handbook. CEQA is not triggered for emergency standby generators under this provision.

The generator is governed by and complies with the **California Air Resources Board's Air Toxic Control Measure for Stationary Compression Ignition Engines, CCR Title 17, Section 93115**. The explicit annual equipment usage limitation of 50 hours per year except for operations under emergency conditions will be included as part of the permit conditions.

The generator is governed by and complies with the provisions of **Regulation 2, Rule 5, “New Source Review for Toxic Air Contaminants.”**

The generator is exempt from the emission limitations of District **Regulation 9, Rule 8-305, 8-501, and 8-503,** since it meets the provisions of **Regulation 9, Rule 8-110.5, "Exemptions: Emergency Standby Engines."**

The generator is required to meet NSPS requirements as set out in 40 CFR Part 60, Subpart IIIIG, **Standards of Performance for Stationary Compression-Ignition Internal Combustion Engines, Set G, 2007 and Later Model Non-Fire Pump Emergency Less than 10L per Cylinder,** since the rated engine power is greater than 25 BHP. Under 40 CFR 60.4211(c), the applicant may show compliance by buying and operating engines certified to the emission standards for new non-road CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 (PM10 emissions less than 0.2 g/kW-hr, NMHC+NO<sub>x</sub> emissions less than 6.4 g/kW-hr, and CO emissions less than 3.5 g/kW-hr). The generator proposed in this application is certified to these emission levels.

Visible emissions from the generator will be required to meet Ringelmann 2.0 limitation per **Regulation 6-303.1.**

Sulfur emissions will be controlled by the requirement that any fuel used in the engine meet California Clean Air fuel content of 0.0015% bw sulfur, as required by the **California Air Resources Board’s Air Toxic Control Measure for Stationary Compression Ignition Engines, CCR Title 17, Section 93115.**

### **CONDITIONS**

Condition #22850, setting out the operating conditions and recordkeeping requirements for operations at Source S-11 shall be made part of the sources' authority to construct/permit to operate.

### **RECOMMENDATION**

The proposed 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 sources will be located within 1000 feet of a school, which triggers the public notification requirements of Regulation 2-1-412.

I recommend that the District initiate a public notice, and consider any comments received before taking final action on issuance of an Authority to Construct for the following source:

**S-11 Emergency Stand-By Diesel Generator Set; John Deere Model 6068HF285, 237 BHP**

subject to Condition #22850.

By \_\_\_\_\_ Date 8/2/10  
*Catherine S. Fortney*

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 (e)(2)(A)(3) or (e)(2)(B)(3)]
  
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 (e)(2)(A)(3) or (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/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: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

**ATTACHMENT 1  
FACILITY-WIDE POTENTIAL TO EMIT**