

**DOCKETED**

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**Table 1  
Emergency Generator NO<sub>x</sub> Emissions  
Sequoia Back-up Power Facility  
Santa Clara, CA**

Percent Load	NO <sub>x</sub> Emission Factors (g/kW-hr)		Engine Rating
	Uncontrolled (Tier 2)	Controlled (Tier 4)	kW
Full Load <sup>1</sup>	5.37	0.67	2,250
10% <sup>2</sup>	8.3		225

Input	Units	Testing & Maintenance Usage <sup>5</sup>
		Full Buildout
Number of Generators	#	54
<b>Maximum Emissions</b>		
Annual Testing Hours <sup>3</sup>	hr/year/ generator	50
Average Hourly Emission Factor <sup>4</sup>	g/kW-hr	1.85
<b>NO<sub>x</sub> Potential To Emit<sup>5</sup></b>	<b>tons/year</b>	<b>12</b>
<b>Actual Emissions</b>		
Monthly Testing Hours <sup>6</sup>	hr/month/ generator	0.5
Annual Testing Hours <sup>6</sup>	hr/year/ generator	4
NO <sub>x</sub> Monthly Testing Emissions <sup>7</sup>	tons/year	0.67
NO <sub>x</sub> Annual Testing Emissions <sup>8</sup>	tons/year	0.52
<b>NO<sub>x</sub> Actual Emissions<sup>9</sup></b>	<b>tons/year</b>	<b>1.18</b>

**Notes**

- Uncontrolled (Tier 2) engine emission factor at 100% engine load is assumed from USEPA's Engine Family Certification data for Large Non-road Compression-Ignition (NRCI) Engines - engine family group number KMDDL95.4GTR. Controlled (Tier 4) emission factors assume each generator is equipped with a Miratech Selective Catalytic Reduction/Diesel Oxidation Catalyst/Diesel Particulate Filter system and are provided by the equipment manufacturer.
- Uncontrolled (Tier 2) engine emission factor at 10% engine load is assumed based on engine raw emissions data from the generator manufacturer.
- Generator operating hours assume 50 hours for testing and maintenance under maximum emissions scenario.
- To account for NO<sub>x</sub> control limitations from exhaust temperature during engine start-up, average hourly emission factor assumes 15 minutes of uncontrolled (Tier 2) emissions and 45 minutes of controlled (Tier 4) emissions.
- Potential to Emit emissions are the maximum potential emissions based on expected permitted activating and assume annual operation will effectively consist of 50 individual 1-hour operating periods, each consisting of 15 minutes of uncontrolled (Tier 2) emissions and 45 minutes of controlled (Tier 4) emissions.
- Each generator will have a thirty minute monthly test and a 4 hour annual test. This testing schedule is consistent with Response to CEC Staff Data Request Set 1 (1-92), submitted October 2019.
- The monthly test is run at 10% load. Monthly testing emissions are calculated based on 10% load emission factor and engine rating. To account for NO<sub>x</sub> control limitations from exhaust temperature during engine start-up, these emissions are assumed to be uncontrolled (Tier 2).
- The annual test is run at ramping up loads. Emissions are calculated using the emission factors for full load and the full engine rating, assuming 15 minutes of uncontrolled (Tier 2) emissions and 3 hours and 45 minutes of controlled (Tier 4) emissions. While actual annual generator testing is expected to consist of varying engine loads (per the Project Sponsor's Response to CEC Staff Data Request Set 1 (1-92), submitted October 2019), emissions estimated here are expected to be conservative.
- Actual emissions are based on the actual testing schedule of the generators and the assumptions discussed above.

**Abbreviations:**

g - grams                      kW - kilowatt                      NO<sub>x</sub> - nitrogen oxides  
hr - hour                      lb - pounds

**References:**

USEPA. 2019. Large Engine Certification Data for Model Year 2015. Available at: <https://www.epa.gov/compliance-and-fuel-economy-data/annual-certification-data-vehicles-engines-and-equipment>