

December 19, 2025

Mr. James Kyle  
Virginia Department of Environmental Quality  
Piedmont Regional Office  
4949-A Cox Road  
Glen Allen, VA 23060

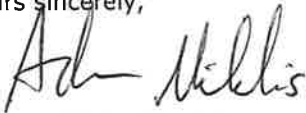
**RE: STATE MAJOR PERMIT TO CONSTRUCT APPLICATION  
POINTONE RICHMOND, LLC.**

Dear Mr. Kyle:

PointOne Richmond, LLC (PointOne) is submitting the enclosed State Major Permit to Construct Application to the Virginia Department of Environmental Quality (VDEQ) for a new data center located in Charles City County, Virginia at 2840 Roxbury Rd, Charles City, VA 23030. Supporting documentation is provided in the enclosed application and remaining appendices.

We appreciate VDEQ's review of the enclosed application documents. If you have any questions, please feel free to contact Adam Michaelis (adam@pointonecorp.com or (408) 829-7687) at your convenience.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Adam Michaelis". The signature is fluid and cursive, written over a light blue horizontal line.

**Adam Michaelis, PE**  
**Vice President of Hyperscale Engineering**  
PointOne Richmond, LLC

Intended for  
**Virginia Department of Environmental Quality**

Date  
**December 2025**

# **APPLICATION FOR A STATE MAJOR PERMIT TO CONSTRUCT**

## CONTENTS

<b>1.</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>2.</b>	<b>FACILITY DESCRIPTION</b>	<b>2</b>
2.1	Proposed Site-Wide Usage Limitations	3
2.2	Source Aggregation Considerations	3
<b>3.</b>	<b>FACILITY-WIDE EMISSIONS ESTIMATES</b>	<b>4</b>
3.1	Diesel-Fired Emergency Generator Engines, Black Start Engines, and Fire Pump	4
3.2	Diesel Belly Storage Tanks	5
3.3	Natural Gas-Fired Simple Cycle Turbines	5
3.4	Facility-Wide Potential Emissions	6
<b>4.</b>	<b>FEDERAL AND STATE REGULATORY APPLICABILITY</b>	<b>7</b>
4.1	Federal New Source Review	7
4.2	Title V Operating Permits	7
4.3	New Source Performance Standards	7
4.4	National Emission Standards for Hazardous Air Pollutants	12
4.5	Chemical Accident Prevention Provisions	12
4.6	Title 9, Agency 5 of the Virginia Administrative Code	13
<b>5.</b>	<b>DETERMINATION OF BEST AVAILABLE CONTROL TECHNOLOGY (BACT)</b>	<b>14</b>
5.1	BACT for Diesel-Fired Generators	14
5.2	BACT for Natural Gas-Fired Turbines	17

## TABLES

Table 1. Emission Point IDs .....	2
Table 2. Facility-Wide Potential Emissions .....	6
Table 3. Tier 2 Emission Standards .....	8

Table 4. Fire Pump Emission Standards ..... 9

Table 5. Selected BACT for Diesel-Fired Generators.....15

Table 6. Selected BACT for Natural Gas-Fired Turbines .....17

## **APPENDICES**

### **Appendix 1 Facility Location & Building Layout Maps**

### **Appendix 2 VDEQ Form 7 Air Permit Application**

### **Appendix 3 Proposed Generator and Turbine Manufacturer Specifications and Emissions Data Sheet**

### **Appendix 4 Potential Emissions Calculations**

### **Appendix 5 Modeling Protocol**

## 1. INTRODUCTION

PointOne Richmond, LLC (“the applicant”) is submitting this application to the Virginia Department of Environmental Quality (VDEQ) to request authority to construct a new data center at 2840 Roxbury Rd, Charles City, Virginia 23030 in Charles City County. The proposed facility will include thirty-five (35) simple cycle combustion natural gas-fired turbines that will provide primary power for data center operations. The applicant is also requesting authorization to construct and operate four (4) diesel-fired generator engines associated with turbine start up procedures at the turbine power plants. Additionally, two hundred and seventy-one (271) diesel-fired generators are proposed for installation. These generators will burn ultra-low sulfur diesel (ULSD) conforming to ASTM D975 specifications for petroleum during periods of time when the turbines experience operational issues. Of the 271 generators, two hundred and fifty-two (252) generators are for critical operation of the IT equipment; these generators are Tier 2 certified and equipped with selective catalytic reduction (SCR) control devices. Eighteen (18) are emergency house generators, and one (1) is a diesel-fired emergency fire water pump. The fire water pump engine will provide power to convey water for fire suppression. A map of the proposed building layout is provided in **Appendix 1**.

The proposed facility is requesting fuel usage limitations in order to be classified as a synthetic minor source with respect to the Prevention of Significant Deterioration (PSD) permitting program. The applicant respectfully submits this application for a State Major Permit to Construct for the proposed facility in accordance with Title 9, Agency 5 of the Virginia Administrative Code (9 VAC 5) Chapter 80. The Form 7 Permit Application is included in **Appendix 2** of this report. Proposed turbine, emergency generator, and black-start generator manufacturer specification sheets are provided in **Appendix 3**. Potential emissions calculations are provided in **Appendix 4**.

## 2. FACILITY DESCRIPTION

The applicant is proposing to construct and operate a new data center located in Charles City County at 2840 Roxbury Rd, Charles City, Virginia. The facility will include 271 diesel-fired generators to support facility operations. The critical diesel-fired generators at the site will have a maximum rated capacity of 3 megawatts (MW) and will be equipped with SCR for the control of nitrogen oxides (NO<sub>x</sub>). The house generators and diesel fire pump generator will have maximum rated capacities of 800 kW and 500 kW, respectively. Additionally, the facility is proposing to install thirty-five (35) simple cycle combustion natural gas-fired turbines, individually rated at 17.8 MW (Solar SMT-130) or 18 MW (Solar PGM-130), that will provide the primary ("prime") power for data center operations, as well as four (4) Black Start engines for turbine start-up. Specifically, these Black Start engines are planned to be utilized for the start-up of one turbine (initial or in the event of an onsite power disruption/outage), and the remaining turbines will be started using power generated by the preceding turbines. Only one black start generator at each plant would be required for the black start of the respective plant. The subsequent generator at each plant is a redundant back up unit. A list of proposed emission point ID numbers is included in **Table 1**. The manufacturer's specification sheets for the proposed emissions units are provided in **Appendix 3**.

**Table 1. Emission Point IDs**

Engine Group	Proposed Emission Unit ID Numbers
<b>Group 1 - Critical Generators</b> (252 X 3 MW Engines – CAT model 3516E)	EG-01 through EG-252
<b>Group 2 – Black Start Generators for Turbine Startup</b> (4 X 2 MW – CAT model 3516C)	BSDG-P1-01 and BSDG-P1-02 BSDG-P2-01 and BSDG-P2-02
<b>Group 3 – House Generators</b> (18 x 800 kW – CAT model C27)	HS-01 through HS-18
<b>Group 4 – Diesel Fire Pump</b> (1 x 500 kW – CAT model C15)	FP-01
<b>Plant 1 – SMT-130 Turbines</b> (16 x 17.8 MW)	CTG-P1-1 through CTG-P1-16
<b>Plant 2 – PGM-130 Turbines</b> (19 x 18 MW)	CTG-P2-1 through CTG-P2-19

Other sources of emissions at the proposed facility will consist of diesel belly tanks for each generator.

**2.1 Proposed Site-Wide Usage Limitations**

**2.1.1 Derivation of Turbine Usage Limitations**

In order to be classified as a PSD minor source of NO<sub>x</sub> located in Charles City County, Virginia, the applicant is requesting federally enforceable fuel usage limitations for each turbine grouping (Plant 1 and Plant 2) in millions of British thermal units (MMBtu) per year on an aggregate, 12-month rolling basis. Potential emissions are calculated based on individual turbine group fuel usages of 19,070,520 and 23,914,800 MMBtu/yr for the sixteen (16) SMT-130 and nineteen (19) PGM-130 turbines, respectively. The turbine diesel fuel usage limits are calculated assuming a site-wide synthetic minor source limitation of 245 tpy of NO<sub>x</sub> emissions and account for emissions from the generators.

**2.1.2 Derivation of Generator Usage Limitations**

In order to be classified as a PSD minor source of NO<sub>x</sub> located in Charles City County, Virginia, the applicant is requesting federally enforceable fuel usage limitations in gallons per year on an aggregate, 12-month rolling basis for the generator groups. Potential emissions are calculated based on potential fuel usage for each individual engine group. Each individual engine will not operate for more than 500 hours per year. The facility is proposing to limit generator usage as shown in Equation 1. The generator diesel fuel usage limits are calculated assuming a site-wide synthetic minor source limitation of 245 tpy of NO<sub>x</sub> emissions and account for emissions from the turbines.

**Equation 1: Facility-wide Fuel Usage Limit Equation**

$$1 \geq \frac{\text{CAT 3516E Fuel Usage, Uncontrolled } \left(\frac{\text{gal}}{\text{yr}}\right)}{619,700 \text{ gal}} + \frac{\text{CAT 3516E Fuel Usage, Controlled } \left(\frac{\text{gal}}{\text{yr}}\right)}{2,385,477 \text{ gal}} + \frac{\text{CAT 3516C Fuel Usage } \left(\frac{\text{gal}}{\text{yr}}\right)}{604,045 \text{ gal}} + \frac{\text{CAT C27 Fuel Usage } \left(\frac{\text{gal}}{\text{yr}}\right)}{608,589 \text{ gal}} + \frac{\text{CAT C15 Fuel Usage } \left(\frac{\text{gal}}{\text{yr}}\right)}{651,278 \text{ gal}}$$

The critical generators will only operate uncontrolled during periods of start-up/shutdown or during an unexpected failure of the SCR. To demonstrate compliance with this limitation, the generators will be equipped with a non-resettable hour meter, and the duration, purpose, and fuel usage of each run will be recorded.

To meet the synthetic minor limitation of 245 tpy of NO<sub>x</sub> emissions, potential emissions are calculated in one of two ways. First, the maximum fuel usage for each individual engine group is calculated assuming 500 hours of operation per generator. Second, the annual fuel usage to meet the Major Source Threshold is calculated using the PSD Major Source threshold of 250 tpy minus emissions from the turbines and a buffer of five (5) tpy and the maximum NO<sub>x</sub> and CO emission factors per engine (lb/gal). The lower of the two values is used to calculate potential emissions and annual fuel consumption.

**2.2 Source Aggregation Considerations**

Currently, there are no PointOne data centers contiguous or adjacent to the new data center that the applicant is proposing to construct and operate through this application in Charles City County. Therefore, there are no sites that could potentially be permitted together with this site as a single source, which is referred to as "source aggregation."

### 3. FACILITY-WIDE EMISSIONS ESTIMATES

Pollutants emitted from the proposed diesel-fired generator engines, black start engines, and natural gas-fired turbines will include NO<sub>x</sub>; carbon monoxide (CO); volatile organic compounds (VOC); sulfur dioxide (SO<sub>2</sub>); particulate matter (PM), including PM less than 10 microns in diameter (PM<sub>10</sub>) and PM less than 2.5 microns in diameter (PM<sub>2.5</sub>); hazardous air pollutants (HAPs); and greenhouse gases (GHGs) in the form of carbon dioxide equivalent (CO<sub>2</sub>e). Pollutants emitted from the diesel belly tanks include VOC.

The methodology used to estimate the potential emissions from each source is discussed in the sections below. The manufacturer's specification sheets for each proposed generator type are provided in

Appendix 3, and detailed calculations are provided for the generators, their associated diesel belly tanks, and the turbines in **Appendix 4**.

#### 3.1 Diesel-Fired Emergency Generator Engines, Black Start Engines, and Fire Pump

Operation of the diesel-fired generator engines, black start engines, and fire pump engine will result in emissions of byproducts of combustion. The derivation of potential annual emissions from the generators is based on the proposed fuel usage limitations listed in **Section 2**. The following emission factors were used to calculate the potential emissions from the generators.

##### 3.1.1 Derivation of Fuel Usage-Based Potential Emissions

The following emission factors were used to estimate the potential hourly emissions from the engines:

- The manufacturer's maximum rated potential site variation (i.e., "not-to-exceed"), engine load-specific emission factors for VOC (hydrocarbons), CO, and filterable PM (except for the 3516E engines) were used to estimate the emissions of those pollutants at each generator load level. It was conservatively assumed that all filterable particulate matter in the engine exhaust is PM<sub>2.5</sub>.
- For uncontrolled NO<sub>x</sub>, the minimum of the not-to-exceed, engine load-specific emission factor and VDEQ's presumptive Best Available Control Technology (BACT) of 6.0 gram per brake horsepower hour (g/bhp-hr) for diesel-fired emergency generator engines was used to estimate hourly emissions.
- The generators will not operate at 10% load outside of short periods of maintenance and testing. Therefore, emissions were not calculated at 10% load since it would not be representative of the true maximum emissions operation of the generators.
- All of the proposed 3516E engines are equipped with SCRs. A control efficiency of 90% for NO<sub>x</sub> emissions was used, which is a figure provided by the manufacturer.
- For CAT 3516E engines, filterable PM emission factors were not provided by the manufacturer. Emissions of filterable PM were estimated based on the diesel fuel emissions factors in the United States Environmental Protection Agency's (USEPA) AP-42, Section 3.4, *Large Stationary Diesel and All Stationary Dual-fuel Engines* (April 2025). The emissions calculations assumed a diesel high heating value of 0.137 MMBtu/gal, based on AP-42, Table 3.4-1, Footnote a.
- Emissions of SO<sub>2</sub>, condensable PM, and HAPs were estimated based on the diesel fuel emissions factors in the USEPA's AP-42, Section 3.4, *Large Stationary Diesel and All Stationary Dual-fuel Engines* (April 2025). The emission factor for SO<sub>2</sub> was calculated based on the maximum allowable diesel fuel sulfur content of 0.0015% by weight, per 40 CFR 60 Subpart IIII (see

Section 4.3.2 of this report). The emissions calculations assumed a diesel high heating value of 0.137 MMBtu/gal, based on AP-42, Table 3.4-1, Footnote a.

- Emissions of CO<sub>2e</sub> from diesel fuel combustion were estimated based on the GHG emission factors and global warming potentials provided in 40 CFR Part 98.
- The site-wide potential annual emissions were based on the maximum emission factor between all engine groups, in units of pounds of emissions per gallon of fuel consumed.

### 3.1.2 Derivation of Potential Annual Emissions – All Engine Operations

The potential annual emissions from the generators are based on the proposed annual operation limitations as detailed in **Equation 1**. This includes emergency, non-emergency, and maintenance checks and readiness testing and will limit the facility to 245 tpy of NO<sub>x</sub>, below the minor PSD emissions limitation of 250 tpy. Furthermore, operation for maintenance and testing will be limited to 100 hours per year to meet the Federal definition of an emergency engine.

## 3.2 Diesel Belly Storage Tanks

Emissions of VOC from the diesel belly tanks will result from storage tank standing and working losses.<sup>1</sup> These emissions were estimated using the equations from AP-42, Section 7.1, *Organic Liquid Storage Tanks* (October 2024). The maximum annual fuel throughput for each tank was based on:

- The maximum hourly diesel fuel consumption for each generator, per the manufacturer's specifications; and
- A maximum of 500 hours of operation per engine annually.

Tank specifications and detailed emission calculations are included in **Appendix 4**.

## 3.3 Natural Gas-Fired Simple Cycle Turbines

Operation of the turbines will result in emissions of byproducts of combustion. The derivation of potential annual emissions from the turbines are based on fuel consumption limits of 19,070,520 and 23,914,800 MMBtu/yr for the sixteen (16) SMT-130 and nineteen (19) PGM-130 turbines, respectively.

### 3.3.1 Derivation of Fuel Usage-Based Potential Emissions

The following emission factors were used to calculate the potential emissions from the turbines:

- Emissions of uncontrolled NO<sub>x</sub>, uncontrolled CO, VOC, PM, SO<sub>2</sub>, and HAPs (except formaldehyde) were estimated based on the natural gas emissions factors in USEPA's AP-42, Section 3.1, *Stationary Gas Turbines* (April 2000). The Lean-Premix NO<sub>x</sub> and CO emissions factors from AP-42 were used as the proposed turbines utilize Solar's SoLoNO<sub>x</sub> combustion system, which is a lean-premixed dry emissions system that reduces the formation of criteria pollutant combustion products by limiting peak flame temperature during combustion.
- The control device manufacturer's maximum emissions concentration, 2 ppmvd at 15% O<sub>2</sub> was used to estimate controlled NO<sub>x</sub> emissions.
- The control device manufacturer's maximum emissions concentration, 2 ppmvd at 15% O<sub>2</sub> was used to estimate controlled CO emissions.
- Emissions of formaldehyde were estimated based on the emissions factor for lean-premix turbines from U.S. EPA's August 2001 memo, *Hazardous Air Pollutant (HAP) Emission Control*

---

<sup>1</sup> Any potential HAP emissions from the operation of the diesel tanks are expected to be *de minimis*.

*Technology for New Stationary Combustion Turbines.* In accordance with the memo, the 95th upper percentile emission factor was used to be conservative as it accounts for test result variability.

- Emissions of CO<sub>2</sub>e from natural gas combustion were estimated based on the GHG emission factors and global warming potentials provided in 40 CFR Part 98.

### 3.3.2 Derivation of Potential Annual Emissions – All Turbine Operations

The potential annual emissions from the turbines are based on fuel consumption limits of 19,070,520 and 23,914,800 MMBtu/yr for the sixteen (16) SMT-130 and nineteen (19) PGM-130 turbines, respectively.

### 3.4 Facility-Wide Potential Emissions

A summary of the potential emissions for the proposed facility is provided in **Table 2** and indicates that the facility will be a Title V major and PSD synthetic minor source of air emissions. Detailed emission calculations are included in **Appendix 4**.

**Table 2. Facility-Wide Potential Emissions**

Pollutant	Potential Annual Emissions (tpy)			Facility-Wide Potential Emissions (tpy)	PSD Major Source Threshold (tpy)	Above Thresholds?
	Emergency Generators	Diesel Tanks	Turbines			
NO <sub>x</sub>	86.15	--	158.85	245.00	250	No
CO	148.31	--	96.69	245.00	250	No
VOC	4.41	1.01	45.13	50.55	250	No
PM <sub>10</sub> /PM <sub>2.5</sub>	11.39	--	141.85	153.24	250	No
SO <sub>2</sub>	0.25	--	73.08	73.32	250	No
Max. Individual HAP (formaldehyde)	0.01	--	4.34	4.35	--	--
Total HAP	0.26	--	11.16	11.42	--	--
CO <sub>2</sub> e	26,737	--	2,386,455	2,413,192	--	--

## 4. FEDERAL AND STATE REGULATORY APPLICABILITY

The following sections outline the federal and state air regulations that are potentially applicable to the proposed facility. Specifically, requirements under the federal NSR permitting program, Title V of the Clean Air Act Amendments, New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), other federal air regulations, and the Virginia regulations in 9 VAC 5 are discussed herein.

### 4.1 Federal New Source Review

The federal NSR permitting program regulates emissions from major stationary sources of regulated air pollutants. NSR is comprised of two elements: Nonattainment NSR (NNSR) and Prevention of Significant Deterioration (PSD). NNSR permitting is applicable in areas that have been designated as nonattainment for a regulated pollutant under the National Ambient Air Quality Standards (NAAQS). PSD permitting applies in areas that have been designated as attainment or unclassifiable. The proposed facility will be located in Charles City County, which has been designated as attainment/unclassifiable for all criteria pollutants.<sup>2</sup> Certain counties in Virginia are included in the Ozone Transport Region (OTR) which affects the attainment status of the county and applicable major source thresholds. Charles City County is not located in the OTR.<sup>3</sup> As such, PSD is the applicable permitting program for all criteria pollutants.

The PSD major source threshold for all NSR-regulated criteria pollutants is 250 tpy each.<sup>4</sup> The applicant is requesting federally enforceable limitations as presented in **Section 2** to maintain site-wide NO<sub>x</sub> emissions of less than or equal to 245 tpy, which will keep the facility below the applicable PSD major source thresholds. Thus, the proposed facility will be classified as a synthetic minor source with respect to the federal PSD permitting program.

### 4.2 Title V Operating Permits

The Title V Operating Permit program, promulgated in 40 CFR Part 70, requires a facility to obtain a Title V operating permit if it has potential emissions of a regulated criteria pollutant exceeding 100 tpy for all criteria pollutants, of any single HAP exceeding 10 tpy, or of the aggregate of all HAPs exceeding 25 tpy. As presented in **Table 2** of this application and in **Appendix 4**, site-wide potential emission rates of CO, NO<sub>x</sub>, and PM are above the respective major source thresholds, and below major source thresholds for all other criteria pollutants and HAPs. As such, the site will be classified as a Title V major source of CO, NO<sub>x</sub>, and PM. The initial Title V operating permit application will be submitted within 12 months of commencing operation as a major source.

### 4.3 New Source Performance Standards

New Source Performance Standards (NSPS), promulgated in 40 CFR Part 60, provide emissions standards for criteria pollutant emissions from new, modified, and reconstructed sources. The following sections discuss the NSPS that are potentially applicable to the proposed diesel-fired emergency generators, natural gas-fired turbines, and the diesel belly tanks.

---

<sup>2</sup> 40 CFR 81.347

<sup>3</sup> 40 CFR 81.457

<sup>4</sup> Data centers are not on the list of 28 source categories for which there is a lower major source threshold of 100 tpy for regulated criteria pollutants.

#### 4.3.1 40 CFR 60, Subpart A – General Provisions (**Applicable**)

NSPS Subpart A provides generally applicable requirements for testing, monitoring, notifications, and recordkeeping. Any source that is subject to another subpart under 40 CFR Part 60 is also subject to Subpart A, unless otherwise stated in the specific subpart.

#### 4.3.2 40 CFR 60, Subpart IIII – Stationary Compression Ignition Internal Combustion Engines (**Applicable**)

NSPS Subpart IIII applies to new, modified, and reconstructed compression ignition (CI) internal combustion engines (ICE). New engines are subject to this regulation if construction of the CI ICE commenced after July 11, 2005, and if the engine was manufactured after April 1, 2006, for CI ICE that are not fire pump engines, or July 1, 2006, for CI ICE that are fire pump engines.<sup>5</sup> This rule is applicable to each of the proposed CI ICE that will be operated at the facility.

The proposed generators will meet the definition of emergency stationary ICE in 40 CFR 60.4219.

##### 4.3.2.1 *Emissions Standards for Emergency Generators*

The proposed generators will be classified as emergency generators under this regulation and will each have a displacement of less than 30 liters per cylinder. Per 40 CFR 60.4205(b), each generator will be subject to the applicable emissions standards in 40 CFR 60.4202. The Tier 2 emissions standards for nonroad engines with a rated power greater than 560 kW are depicted in **Table 3**.<sup>6</sup> The USEPA Tier 2 standards for nonroad engines are based on a weighted cycle and cannot be used for comparison to the actual emissions from the engine.

**Table 3. Tier 2 Emission Standards**

Pollutant	Emission Standard (g/kW-hr)
NO <sub>x</sub> + Non-Methane Hydrocarbons (NMHC)	6.4
CO	3.5
PM	0.20

Additionally, the facility is required to only combust in its generators fuel that complies with the following requirements in 40 CFR 80.510(b) for nonroad diesel fuel:<sup>7</sup>

- Maximum sulfur content of 15 ppm; and
- Either a minimum cetane index of 40 or a maximum aromatic content of 35 volume percent.

The applicant will comply with the emission standards in 40 CFR 60.4202 by purchasing engines certified by the manufacturer to comply with the Tier 2 or 3 emission standards, as applicable.<sup>8</sup> Further, the site will operate and maintain each engine according to the manufacturer's emission-

<sup>5</sup> 40 CFR 60.4200(a)(2)

<sup>6</sup> Appendix I to Part 1039, Table 2

<sup>7</sup> 40 CFR 60.4207(b)

<sup>8</sup> 40 CFR 60.4211(c)

related written instructions and only change those emission-related settings that are permitted by the manufacturer.<sup>9</sup>

#### 4.3.2.2 *Emission Standards for Fire Pump*

The proposed fire pump has a displacement of less than 30 liters per cylinder. Per 40 CFR 60.4205(c), the fire pump is subject to the applicable emission standards in Table 4 of NSPS Subpart IIII. These emissions standards are summarized in **Table 4**.<sup>10</sup>

**Table 4. Fire Pump Emission Standards**

Pollutant	Emission Standard (g/kW-hr)
NO <sub>x</sub> + Non-Methane Hydrocarbons (NMHC)	4.0
CO	3.5
PM	0.20

The applicant will comply with the emission standards in 40 CFR 60 Subpart IIII by purchasing an engine certified by the manufacturer to comply with these emission standards.<sup>11</sup> Further, the site will operate and maintain the fire pump according to the manufacturer's emission-related written instructions and only change those emission-related settings that are permitted by the manufacturer.<sup>12</sup>

#### 4.3.2.3 *Fuel Requirements*

The facility is required to only combust fuel in its generators that complies with the following requirements in 40 CFR 80.510(b) for nonroad diesel fuel:<sup>13</sup>

- Maximum sulfur content of 15 ppm; and
- Either a minimum cetane index of 40 or a maximum aromatic content of 35 volume percent.

The applicant will comply with the emission standards in 40 CFR Part 1039 Appendix I by purchasing engines certified by the manufacturer to comply with the Tier 2 or 3 emission standards, as applicable.<sup>14</sup> Further, the site will operate and maintain each engine according to the manufacturer's emission-related written instructions and only change those emission-related settings that are permitted by the manufacturer.<sup>15</sup>

---

<sup>9</sup> 40 CFR 60.4211(a)

<sup>10</sup> Table 4 to Subpart IIII of Part 60

<sup>11</sup> 40 CFR 60.4211(c)

<sup>12</sup> 40 CFR 60.4211(a)

<sup>13</sup> 40 CFR 60.4207(b)

<sup>14</sup> 40 CFR 60.4211(c)

<sup>15</sup> 40 CFR 60.4211(a)

#### 4.3.2.4 *Run Time Restrictions for Emergency ICE*

In order for a stationary engine to be considered an emergency ICE under NSPS Subpart IIII, it must meet the run time restrictions in 40 CFR 60.4211(f).

There is no restriction on usage of an emergency ICE in emergency situations.<sup>16</sup> Each engine is restricted to a maximum of 100 hours per calendar year of operation for maintenance checks and readiness testing.<sup>17</sup> Each engine is allowed up to 50 hours per calendar year of non-emergency operation other than maintenance, testing, and emergency demand response; however, any non-emergency run time must be counted as part of the 100 hours per calendar year for maintenance and testing.<sup>18</sup> Any other operations are prohibited.

The facility will equip each emergency ICE with a non-resettable hour meter prior to startup of the unit in order to verify compliance with the run time restrictions for emergency and non-emergency runs.<sup>19</sup>

#### 4.3.2.5 *Notifications, Reporting, and Recordkeeping*

An Initial Notification under NSPS Subpart A is not required for emergency stationary ICE. The facility will retain records of the emergency and non-emergency runs for each engine, as recorded through the engine's non-resettable hour meter. The records will indicate the time of operation of the engine and the reason the engine was in operation during that time.<sup>20</sup>

#### 4.3.3 40 CFR 60, Subpart KKKK – Standards of Performance for Stationary Combustion Turbines ***(Applicable)***

NSPS Subpart KKKK applies to stationary combustion turbines with a heat input capacity of greater than or equal to 10 MMBtu/hr that commence construction after February 18, 2005. This regulation establishes NO<sub>x</sub> and SO<sub>2</sub> emission limits as well as monitoring, recordkeeping, and reporting requirements.

The facility will also be required to comply with the NO<sub>x</sub> emissions limits specified in §60.4320 since the turbines will provide primary power to the site (i.e., non-emergency use). The facility is proposing SCRs for control of NO<sub>x</sub> emissions and does not plan to use water or steam injection for NO<sub>x</sub> control. In order to demonstrate compliance with the NO<sub>x</sub> emission limitations, the facility will perform emissions testing as required in §60.4340(a). Initial performance testing results for NO<sub>x</sub> could allow the facility to conduct performance tests every two (2) years, with no more than 26 calendar months following the previous performance test. If the results of any performance test exceed 75 percent of the NO<sub>x</sub> emission limit for the turbine, the facility will be required to conduct annual performance tests.

In addition, NSPS Subpart KKKK limits fuel sulfur content to 0.06 lb SO<sub>2</sub>/MMBtu as required by §60.4330(a)(2). Compliance with this requirement is demonstrated via the fuel sulfur content and performance testing requirements in §60.4360, §60.4365, §60.4370, and/or §60.4415.

---

<sup>16</sup> 40 CFR 60.4211(f)(1)

<sup>17</sup> 40 CFR 60.4211(f)(2)

<sup>18</sup> 40 CFR 60.4211(f)(3)

<sup>19</sup> 40 CFR 60.4209(a)

<sup>20</sup> 40 CFR 60.4214(b)

4.3.4 40 CFR 60, Subpart K – Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978  
(Not Applicable)

NSPS Subpart K is applicable to petroleum storage tanks which were constructed, reconstructed, or modified between June 1973 and May 1978, and which have a storage capacity greater than 40,000 gallons.<sup>21</sup> The facility will maintain diesel belly tanks for its proposed generators; however, each of these tanks will be new units constructed after 1978. Furthermore, none of the belly tanks will have a storage capacity greater than 40,000 gallons. Therefore, NSPS Subpart K does not apply.

4.3.5 40 CFR 60, Subpart Ka – Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984  
(Not Applicable)

Similar to NSPS Subpart K, NSPS Subpart Ka is applicable to petroleum storage tanks which were constructed, reconstructed, or modified between May 1978 and July 1984, and which have a storage capacity greater than 40,000 gallons.<sup>22</sup> The proposed diesel belly tanks will be new units constructed after 1984. Furthermore, none of the belly tanks will have a storage capacity greater than 40,000 gallons. Therefore, NSPS Subpart Ka is also not applicable.

4.3.6 40 CFR 60, Subpart Kb – Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984  
(Not Applicable)

NSPS Subpart Kb applies to volatile organic liquid (VOL) storage vessels which were constructed, reconstructed, or modified after July 1984. VOL storage tanks are only subject to this rule if they meet one of the following criteria:<sup>23</sup>

- The storage vessel has a maximum storage capacity greater than or equal to 151 m<sup>3</sup> (39,890 gallons) and which stores a VOL with a maximum true vapor pressure exceeding 3.5 kPa (0.51 psia); or
- The storage vessel has a maximum storage capacity greater than or equal to 75 m<sup>3</sup> (19,812.9 gallons) but less than 151 m<sup>3</sup> and which stores a VOL with a maximum true vapor pressure exceeding 15.0 kPa (2.2 psia).

The new diesel belly tanks for the proposed generators each will have a storage capacity less than 19,812.9 gallons. In addition, diesel fuel has a maximum true vapor pressure less than 2.2 psia. Therefore, NSPS Subpart Kb does not apply.

4.3.7 40 CFR 60, Subpart Kc – Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) For Which Construction, Reconstruction, or Modification commenced after October 4, 2023  
(Not Applicable)

NSPS Subpart Kc applies to VOL storage vessels which were constructed, reconstructed, or modified after October 4, 2023, and which have a storage capacity greater than 20,000 gallons with maximum true vapor pressure greater than or equal to 1.5 pounds per square inch absolute (psia), or greater than 40,000 gallons with maximum true vapor pressure greater than 0.5 psia. The diesel belly tanks for the proposed generators will each have a storage capacity less than 20,000 gallons.<sup>24</sup>

---

<sup>21</sup> 40 CFR 60.110

<sup>22</sup> 40 CFR 60.110a

<sup>23</sup> 40 CFR 60.110b(b)

<sup>24</sup> 40 CFR 60.110b(c)

- 4.3.8 40 CFR 60, Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines (*Not Applicable*)  
NSPS Subpart JJJJ is applicable to new, modified, and reconstructed stationary spark ignition (SI) ICE. All proposed generators will be categorized as CI ICE. As such, NSPS Subpart JJJJ does not apply.

#### 4.4 National Emission Standards for Hazardous Air Pollutants

NESHAPs, promulgated in 40 CFR Part 63, regulate emissions of HAPs from specific source categories. A facility that has potential emissions exceeding 10 tpy for any individual HAP and/or emissions exceeding 25 tpy for the sum of all HAPs is classified as a major source of HAP emissions. A facility that is not a major source of HAPs is classified as an area source.

The proposed facility will be classified as an area source since it has potential HAP emissions less than the major source thresholds. The following sections discuss the potentially applicable NESHAP standards to the proposed facility.

- 4.4.1 40 CFR 63, Subpart A – General Provisions (**Applicable**)  
NESHAP Subpart A provides generally applicable requirements for testing, monitoring, notifications, and recordkeeping. Any source that is subject to another subpart under 40 CFR Part 63 is also subject to Subpart A, unless otherwise stated in the specific subpart.
- 4.4.2 40 CFR 63, Subpart YYYY – Turbines (*Not Applicable*)  
NESHAP Subpart YYYY applies to stationary combustion turbines located at major sources of HAP emissions. This regulation does not apply because the facility is classified as an area source of HAP emissions.
- 4.4.3 40 CFR 63, Subpart EEEE – Organic Liquids Distribution (Non-Gasoline) (*Not Applicable*)  
NESHAP Subpart EEEE is applicable to organic liquids distribution operations, including organic liquid storage tanks, located at major sources of HAP emissions.<sup>25</sup> This regulation does not apply since the facility will be an area source of HAP emissions.
- 4.4.4 40 CFR 63, Subpart ZZZZ – Stationary Compression Ignition Internal Combustion Engines (**Applicable**)  
NESHAP Subpart ZZZZ applies to new and existing stationary reciprocating internal combustion engines (RICE) located at both major and area sources of HAP emissions. Per 40 CFR 63.6590(c), for new or reconstructed stationary RICE located at an area source of HAP emissions, the only requirement under NESHAP Subpart ZZZZ is to meet the requirements of NSPS Subpart IIII for CI ICE and of NSPS Subpart JJJJ for SI ICE. Since all the proposed CI ICE at the facility will be operated in compliance with NSPS Subpart IIII, the units will also comply with NESHAP Subpart ZZZZ. No further requirements apply for these engines under this regulation.

#### 4.5 Chemical Accident Prevention Provisions

The Chemical Accident Prevention Provisions, promulgated in 40 CFR Part 68, provide requirements for the development of risk management prevention (RMP) plans for regulated substances. Applicability to RMP plan requirements is based on the types and amounts of chemicals stored at a facility. Diesel fuel is not on the list of regulated substances in Subpart F of this rule. Furthermore, aqueous ammonia, with a concentration of 19% or less of ammonia, will be used in the SCR systems for NO<sub>x</sub> control. Ammonia with a concentration of 19% or less is not listed in Appendix A of 40 CFR 68. As a result, the facility is not required to develop an RMP plan under 40 CFR Part 68.

---

<sup>25</sup> 40 CFR 63.2330

#### 4.6 Title 9, Agency 5 of the Virginia Administrative Code

In addition to the federal regulations, 9 VAC 5 establishes regulations applicable at the emission unit level and at the facility level. The state regulations also include general requirements for facilities, such as the requirement to obtain construction and operating permits. Source-specific standards in 9 VAC 5 that are potentially applicable to the proposed facility are discussed in the following sections. **Section 5.0** contains the required state-level BACT analysis.

##### 4.6.1 9VAC5-50, Part II, Article 1 –Visible Emissions and Fugitive Dust/Emissions (Rule 5-1) (Applicable)

Under this regulation, visible emissions from all sources are limited to no more than 20% opacity, except for one six-minute period per hour of not more than 30% opacity.<sup>26</sup> The facility will comply with this limitation through the exclusive use of ultra-low sulfur diesel fuel in its emergency generator engines, black start units, and natural gas in its turbines, which will result in negligible visible emissions.

Additionally, this regulation also requires facilities to take reasonable measures to prevent fugitive dust from becoming airborne.<sup>27</sup> The proposed facility will comply with the requirements of this rule, including during periods of construction.

##### 4.6.2 9VAC5-60, Part II, Article 5 –Toxic Pollutants from New and Modified Sources (Rule 6-5) (Not Applicable)

This regulation outlines requirements for evaluating the emissions of toxic pollutants. Pursuant to 9 VAC5-60-300.C.7, the rule does not apply to generators or boilers that burn only clean fuels, including diesel (i.e., No. 2 fuel oil) and natural gas. Since the facility's proposed emergency generators and black start engines will exclusively combust ultra-low sulfur diesel fuel and the turbine generators will exclusively combust natural gas, this rule is not applicable.

##### 4.6.3 9VAC5-80-1180 – Standards and Conditions for Granting Permits (Applicable)

This rule outlines requirements for NSR permits. 9VAC5-80-1180.A.3 states that permitted sources must be designed, built, and equipped to operate without preventing or interfering with the attainment or maintenance of any applicable ambient air quality standard and without causing or exacerbating a violation of any applicable ambient air quality standard. The emergency generators at the planned facility will operate intermittently. Any other operation of the emergency generators will be unplanned and/or infrequent (i.e., unplanned maintenance, during emergency loss of power, etc.). The emergency generators will meet VDEQ's presumptive BACT requirements (refer to **Section 5**). The turbines will operate full-time to supply primary power to the facility. While the uncontrolled emissions from the turbines are significant, each turbine will be equipped with SoLoNOx burners and SCR, as described in **Section 5**, to minimize any detrimental impacts on the ambient air quality of the airshed.

---

<sup>26</sup> 9 VAC 5-50-80

<sup>27</sup> 9 VAC 5-50-90

## 5. DETERMINATION OF BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Pursuant to 9 VAC 5-50-260(A), new and modified sources of air emissions in Virginia are required to implement BACT for control of emissions when applying to construct or modify a source. BACT is “an emissions limitation (including a visible emission standard) based on the maximum degree of emission reduction for any pollutant” that is determined to be achievable for a new or modified emission unit.<sup>28</sup> In accordance with the Clean Air Act, VDEQ recognizes that BACT is determined on a case-by-case basis and accounts for the technical feasibility of potential air pollution control technologies, as well as factors such as the energy, environmental, and economic impacts of the technology.

The uncontrolled emission rates of CO, NO<sub>x</sub>, VOC, and PM (including PM<sub>10</sub> and PM<sub>2.5</sub>) in the potential-to-emit calculations exceed the permitting thresholds stated in Article 6 of Part II of 9-VAC-580. However, per a pre-application meeting with VDEQ on October 20, 2025, because the facility will be located in an attainment/unclassifiable area and will not be a major source with respect to PSD thresholds, the applicant is not required to conduct a full review of potential control technologies in accordance with the USEPA’s top-down approach for BACT analyses.

Despite not being required to conduct top-down BACT analyses, below are the comprehensive BACT discussions for diesel-fired generators and natural gas-fired turbines.

### 5.1 BACT for Diesel-Fired Generators

The emergency generator engines and the black start engines to be installed at the proposed facility will be certified by the manufacturer to meet the requirements of USEPA’s Tier 2 or 3 emission standards, in accordance with the requirements of 40 CFR 60, Subpart IIII. Additionally, the two hundred and fifty-two (252) CAT 3516E critical emergency generators will be equipped with SCR to further reduce emissions of NO<sub>x</sub>. The black start engines will operate for turbine start-up when power is not available and are therefore considered emergency generators. The primary pollutant of concern from the generators is NO<sub>x</sub>, as indicated by the potential emissions of the generators. The facility proposes to obtain Tier 2- or 3-certified and Tier 2-certified with SCR engines and operate the facility’s emergency generators and black start engines in accordance with good engine design practices to satisfy the requirements of BACT. The facility is proposing the NO<sub>x</sub> emission limits shown in **Table 5**, and compliance with VDEQ’s presumptive BACT requirements will be demonstrated through stack testing using USEPA Method 7 or 7E. In order to meet the proposed NO<sub>x</sub> emission limits, the NO<sub>x</sub> emissions from each emergency generator will be controlled – at a minimum – by NO<sub>x</sub> reduction technologies that are inherent to the engine design, including (but not limited to) the use of: electronic fuel injection, a turbocharged engine, an aftercooler, and electronic engine controls. As noted above, most of the generators will be equipped with SCR systems for additional NO<sub>x</sub> control.

These proposed emission limits ensure that the NO<sub>x</sub> emissions from the emergency generators and black start engines do not exceed VDEQ’s presumptive NO<sub>x</sub> BACT emission limit of 6.0 g/hp-hr for the diesel-fired generators.<sup>29</sup> As a result of meeting this presumptive limit, the requirements for

---

<sup>28</sup> 9 VAC 5-50-250(C)

<sup>29</sup> [http://townhall.virginia.gov/I/GetFile.cfm?File=C:%5CTownHall%5Cdocroot%5CGuidanceDocs%5C440%5CGDoc\\_DEQ\\_5121\\_v1.pdf](http://townhall.virginia.gov/I/GetFile.cfm?File=C:%5CTownHall%5Cdocroot%5CGuidanceDocs%5C440%5CGDoc_DEQ_5121_v1.pdf)

meeting state BACT are satisfied, and the applicant is not required to conduct a full review of potential NO<sub>x</sub> control technologies in accordance with the USEPA's top-down approach for BACT analyses.

The uncontrolled emission rates for all other criteria pollutants (specifically CO, VOC, PM<sub>2.5</sub>, PM<sub>10</sub>, and SO<sub>2</sub>) do not warrant control technology beyond those inherent to Tier 2-certified generators, which is considered BACT for this facility. This conclusion is consistent with USEPA's determination in the development of 40 CFR 60 Subpart IIII that add-on controls are not cost effective for emergency ICEs.

A summary of the selected BACT for the emergency generators by pollutant, emission or operation limit, and the method that will be used to demonstrate compliance is presented in **Table 5** below.

**Table 5. Selected BACT for Diesel-Fired Generators**

Engine Type	Pollutant	Selected Controls	Emission Limit	Compliance Method
<b>Critical Engines (3 MW)</b>	NO <sub>x</sub>	SCRs, Electronic fuel injection, turbocharged engine, aftercooler, and electronic engine controls	5.81 lb/hr per engine during controlled operation; 58.11 lb/hr during uncontrolled operation	Purchase Tier 2 certified engine with pollution control equipment, recordkeeping, Method 7 or 7E
	CO	USEPA Tier 2 certification; good operating practices and appropriate maintenance	N/A	Purchase Tier 2-certified engine, recordkeeping
	PM		N/A	Purchase Tier 2-certified engine, recordkeeping
	VOC		N/A	Purchase Tier 2-certified engine, recordkeeping
	Visible Emissions (Opacity)		10%, except during one 6-minute period per hour of not more than 20%	Method 9
	SO <sub>2</sub>	Exclusive use of ULSD fuel	15 ppm fuel sulfur content	Certification of sulfur content by fuel supplier
<b>Black Start Engines (2 MW)</b>	NO <sub>x</sub>	USEPA Tier 2 certification; good operating practices and appropriate maintenance	38.85 lb/hr per engine;	Purchase Tier 2 certified engine, recordkeeping
	CO		N/A	Purchase Tier 2-certified engine, recordkeeping
	PM		N/A	Purchase Tier 2-certified engine, recordkeeping
	VOC		N/A	Purchase Tier 2-certified engine, recordkeeping

	Visible Emissions (Opacity)		10%, except during one 6-minute period per hour of not more than 20%	Method 9
	SO <sub>2</sub>	Exclusive use of ULSD fuel	15 ppm fuel sulfur content	Certification of sulfur content by fuel supplier
<b>CAT C27 Engines (800 kW)</b>	NO <sub>x</sub>	USEPA Tier 2 certification; good operating practices and appropriate maintenance	15.74 lb/hr per engine;	Purchase Tier 2 certified engine, recordkeeping
	CO		N/A	Purchase Tier 2-certified engine, recordkeeping
	PM		N/A	Purchase Tier 2-certified engine, recordkeeping
	VOC		N/A	Purchase Tier 2-certified engine, recordkeeping
	Visible Emissions (Opacity)		10%, except during one 6-minute period per hour of not more than 20%	Method 9
	SO <sub>2</sub>	Exclusive use of ULSD fuel	15 ppm fuel sulfur content	Certification of sulfur content by fuel supplier
<b>CAT C15 Engines (500 kW)</b>	NO <sub>x</sub>	USEPA Tier 2 certification; good operating practices and appropriate maintenance	9.31 lb/hr per engine;	Purchase Tier 2 or 3 certified engine, recordkeeping
	CO		N/A	Purchase Tier 2 or 3 certified engine, recordkeeping
	PM		N/A	Purchase Tier 2 or 3 certified engine, recordkeeping
	VOC		N/A	Purchase Tier 2 or 3 certified engine, recordkeeping
	Visible Emissions (Opacity)		10%, except during one 6-minute period per hour of not more than 20%	Method 9
	SO <sub>2</sub>	Exclusive use of ULSD fuel	15 ppm fuel sulfur content	Certification of sulfur content by fuel supplier

## 5.2 BACT for Natural Gas-Fired Turbines

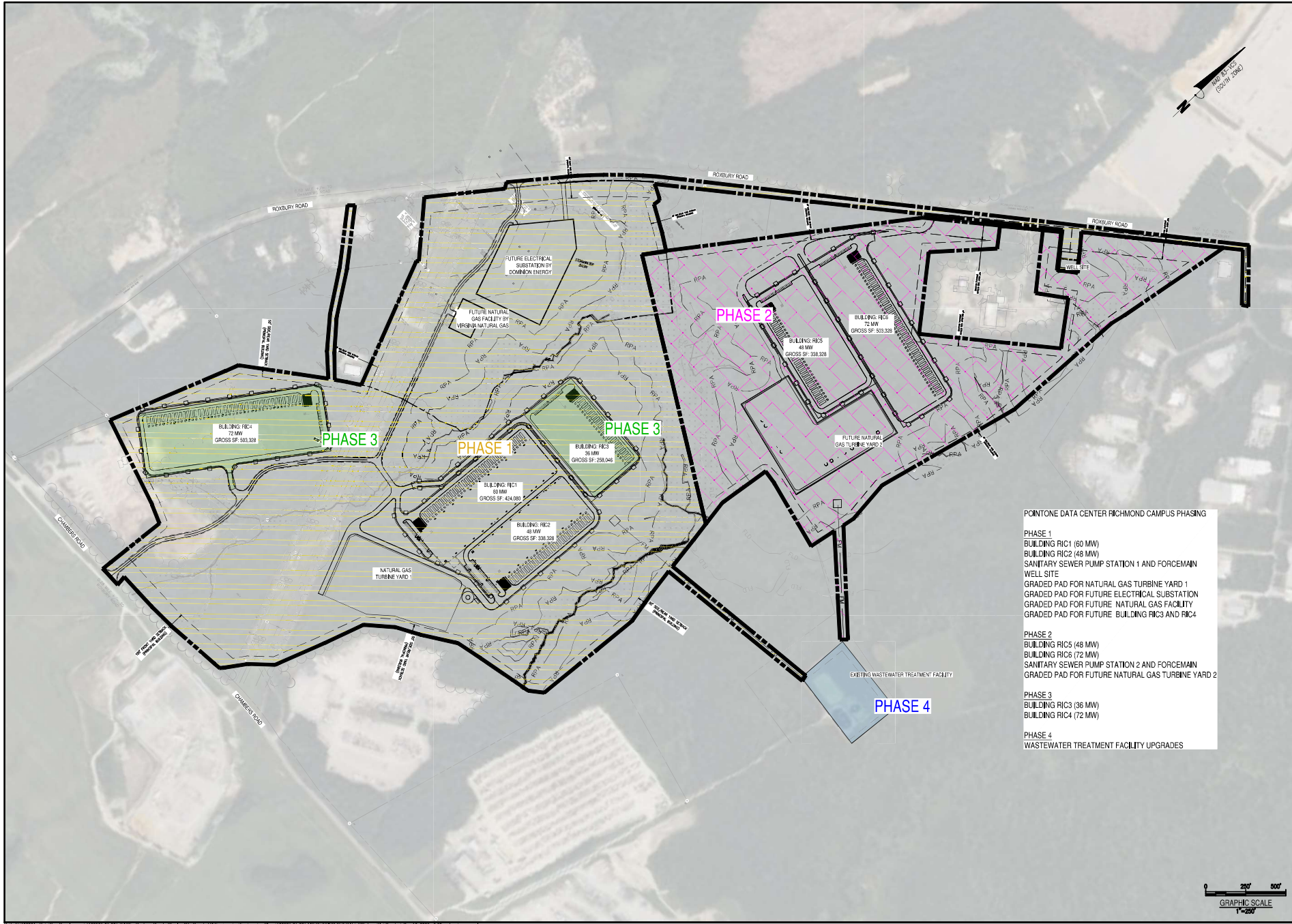
The applicant will install selective catalytic reduction (SCR) controls on all of the turbines to control NO<sub>x</sub> and CO emissions, which are the primary pollutants of concern based on the potential emission calculations. Additionally, the proposed turbines utilize Solar's SoLoNO<sub>x</sub> combustion system, a proprietary lean-premixed dry emissions system that reduces the formation of criteria pollutant combustion products by limiting peak flame temperature during combustion. The applicant proposes a NO<sub>x</sub> BACT emission limit of 2 ppmvd and a CO BACT emission limit of 2 ppmvd, both at 15% O<sub>2</sub>, for each combustion turbine stack. The limit will apply during periods of steady state operations only (i.e., periods of startup and shutdown are excluded). Compliance will be demonstrated by operating the turbines and associated controls in accordance with manufacturer recommendations.

A summary of the selected BACT for the turbines by pollutant and turbine model is presented in **Table 6** below.

**Table 6. Selected BACT for Natural Gas-Fired Turbines**

Turbine Type	Pollutant	Range of Emissions Limits from BACT		Selected Control Devices & Work Practices	
		Limit	Units		
PGM-130	NO <sub>x</sub>	2 - 9	ppmvd @ 15% O <sub>2</sub>	<ul style="list-style-type: none"> <li>• Selective Catalytic Reduction (SCR)</li> <li>• Good Combustion Practices</li> </ul>	
		0.099	lb/MMBtu		
	CO	2 - 15	ppmvd @ 15% O <sub>2</sub>		<ul style="list-style-type: none"> <li>• SCR</li> <li>• Good Combustion Practices</li> </ul>
		0.015	lb/MMBtu		
	VOC	15	ppmvd @ 15% O <sub>2</sub>		<ul style="list-style-type: none"> <li>• Good Combustion Practices</li> </ul>
		0.0021	lb/MMBtu		
	PM	0.0066	lb/MMBtu		<ul style="list-style-type: none"> <li>• Good Combustion Practices</li> </ul>
	SMT-130	NO <sub>x</sub>	2 - 15		ppmvd @ 15% O <sub>2</sub>
0.099			lb/MMBtu		
CO		2 - 25	ppmvd @ 15% O <sub>2</sub>	<ul style="list-style-type: none"> <li>• SCR</li> <li>• Good Combustion Practices</li> </ul>	
		0.015	lb/MMBtu		
VOC		25	ppmvd @ 15% O <sub>2</sub>	<ul style="list-style-type: none"> <li>• Good Combustion Practices</li> </ul>	
		0.0021	lb/MMBtu		
PM		0.0066	lb/MMBtu	<ul style="list-style-type: none"> <li>• Good Combustion Practices</li> </ul>	

**APPENDIX 1**  
**FACILITY LOCATION & BUILDING LAYOUT MAPS**



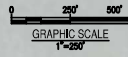
OVERALL PHASED SITE PLAN  
 POINTONE DATA CENTER  
 RICHMOND CAMPUS, PHASE 1  
 CHARLES CITY COUNTY, VIRGINIA  
 DISTRICT 1

- POINTONE DATA CENTER RICHMOND CAMPUS PHASING**
- PHASE 1**  
 BUILDING RIC1 (60 MW)  
 BUILDING RIC2 (48 MW)  
 SANITARY SEWER PUMP STATION 1 AND FORCEMAIN  
 WELL SITE  
 GRADED PAD FOR NATURAL GAS TURBINE YARD 1  
 GRADED PAD FOR FUTURE ELECTRICAL SUBSTATION  
 GRADED PAD FOR FUTURE NATURAL GAS FACILITY  
 GRADED PAD FOR FUTURE BUILDING RIC3 AND RIC4
- PHASE 2**  
 BUILDING RIC5 (48 MW)  
 BUILDING RIC6 (72 MW)  
 SANITARY SEWER PUMP STATION 2 AND FORCEMAIN  
 GRADED PAD FOR FUTURE NATURAL GAS TURBINE YARD 2
- PHASE 3**  
 BUILDING RIC3 (36 MW)  
 BUILDING RIC4 (72 MW)
- PHASE 4**  
 WASTEWATER TREATMENT FACILITY UPGRADES

NO.	DATE	CONSTRUCTION REVISION SUMMARY	DESCRIPTION

BWM	BWM	BWM
DESIGN	DRAWN	CHKD
JOB No.	V1100561-01-2011	
DATE :	Sep 10, 2025	
SHEET	C-0.5	



File: V:\100561-Pointone Development\100561-01-2011-0000 - Rockybury Road - Charles City County VA Engineering Engineering Plans\100561-01-2011-0000 PHASING OVERALL SITE PLAN.dwg \*E:\Cresador Sep 10, 2025 5:08pm by gmacmillan

**APPENDIX 2**  
**VDEQ FORM 7 AIR PERMIT APPLICATION**

**PERMIT FORMS PURSUANT TO REGULATIONS FOR  
THE CONTROL AND ABATEMENT OF AIR POLLUTION**



**COMMONWEALTH OF VIRGINIA  
DEPARTMENT OF ENVIRONMENTAL QUALITY**


**AIR PERMIT  
FORM 7 APPLICATION**

**for**

**NEW SOURCE REVIEW PERMITS  
and STATE OPERATING PERMITS**



**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY - AIR PERMITS  
LOCAL GOVERNING BODY CERTIFICATION FORM**

Business Entity Name (same name on file with the <a href="#">Virginia SCC</a> ) <i>PointOne Richmond, LLC</i>	Registration Number: <i>TBD</i>
Applicant's Name: <i>PointOne Richmond LLC</i>	Name of Contact Person at the site: <i>Adam Michaelis</i>
Applicant's Mailing address: <i>13221 Woodland Park Road Suite 440 Herndon, VA, 20171</i>	Contact Person Telephone Number: <i>(408) 829-7687</i>
Facility location (also attach map): <i>2840 Roxbury Road, Charles City, VA 23030</i>	
Facility type, and list of activities to be conducted: <i>Data center with 271 diesel-fired emergency generators and their associated diesel belly tanks, 35 natural gas-fired turbines to provide prime power to the facility, and four (4) diesel-fired generator engines associated with turbine start up procedures at the turbine power plants.</i>	
The applicant is in the process of completing an application for an air pollution control permit from the Virginia Department of Environmental Quality. In accordance with § 10.1-1321.1. Title 10.1, Code of Virginia (1950), as amended, before such a permit application can be considered complete, the applicant must obtain a certification from the governing body of the county, city or town in which the facility is to be located that the location and operation of the facility are consistent with all applicable ordinances adopted pursuant to Chapter 22 (§§ 15.2-2200 <u>et seq.</u> ) of Title 15.2. The undersigned requests that an authorized representative of the local governing body sign the certification below.	
Applicant's signature: 	Date: <i>DEC 17 2025</i>
<p><b>The undersigned local government representative certifies</b> to the consistency of the proposed location and operation of the facility described above with all applicable local ordinances adopted pursuant to Chapter 22 (§§15.2-2200 <u>et seq.</u>) of Title 15.2. of the Code of Virginia (1950) as amended, as follows:</p> <p><b>(Check one block)</b></p> <p><input type="checkbox"/> The proposed facility is <b>fully consistent</b> with all applicable local ordinances.</p> <p><input type="checkbox"/> The proposed facility is <b>inconsistent</b> with applicable local ordinances; see attached information.</p>	
Signature of authorized government representative:	Date:
Type or print name:	Title:
County, city or town:	

**[THE LOCAL GOVERNMENT REPRESENTATIVE SHOULD FORWARD THE SIGNED CERTIFICATION TO THE APPROPRIATE DEQ REGIONAL OFFICE AND SEND A COPY TO THE APPLICANT.]**

**VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY – 2025 AIR PERMIT APPLICATION FEES**

**VALID JANUARY 1, 2025 TO DECEMBER 31, 2025**

Air permit applications are subject to a fee and fee are adjusted January 1 of each calendar year. **The fee does not apply to administrative amendments or [true minor sources](#).** Applications will be considered incomplete if the proper fee is not paid and will not be processed until full payment is received. **Air permit application fees are not refundable. Please contact the Regional Air Permit Manager if you are unsure of your fee amount.**

**Step 1:** Send this **ORIGINAL** form and a check (or money order) payable to “Treasurer of Virginia” to:

Department of Environmental Quality  
Receipts Control  
P.O. Box 1104  
Richmond, VA 23218

OR  
FOR OVERNIGHT  
DELIVERY

Department of Environmental Quality  
Receipts Control  
1111 East Main Street, Suite 1400  
Richmond, VA 23219

**Step 2:** Send a **COPY** of this form with the permit application to the appropriate [DEQ Regional Office](#)

**Step 3:** Retain a copy for your records. Questions should be directed to the DEQ regional office where the application will be submitted

COMPANY NAME:	<i>PointOne Richmond, LLC</i>	FIN:	<i>TBD</i>
COMPANY REPRESENTATIVE:	<i>Colin Clish</i>	EMAIL ADDRESS:	<i>colin@pointonecorp.com</i>
MAILING ADDRESS:	<i>13221 Woodland Park Rd, Suite 440, Herndon, VA 20171</i>		
BUSINESS PHONE:	<i>(780) 862-0874</i>	FAX:	<i>N/A</i>
FACILITY NAME:	<i>PointOne Richmond</i>	REGISTRATION NUMBER:	<i>TBD</i>
PHYSICAL LOCATION:	<i>2840 Roxbury Rd, Charles City, VA 23030</i>		

PERMIT ACTIVITY <b>AIR PERMIT APPLICATION FEES ARE NOT REFUNDABLE</b> Please contact the <a href="#">Regional Air Permit Manager</a> if you are unsure of your fee amount	APPLICATION FEE AMOUNT	CHECK ONE
<b>Sources subject to Title V permitting requirements:</b>		
• Major NSR permit (Articles 7, 8, 9)	\$86,518	
• Major NSR permit amendment (Articles 7, 8, 9) <b>(except administrative)*</b>	\$13,733	
• State major permit (Article 6)	\$34,332	<b>X</b>
• Title V permit (Articles 1, 3)	\$48,065	
• Title V permit renewal (Articles 1, 3)	\$20,599	
• Title V permit modification (Articles 1, 3)	\$5,493	
• Minor NSR permit (Article 6)	\$6,866	
• Minor NSR amendment (Article 6) <b>(except administrative)*</b>	\$3,433	
• State operating permit (Article 5)	\$13,733	
• State operating permit amendment (Article 5) <b>(except administrative)*</b>	\$5,493	
<b>Sources subject to Synthetic Minor permitting requirements:</b>		
• Minor NSR permit (Article 6)	\$4,119	
• Minor NSR amendment (Article 6)* <b>(except administrative)*</b>	\$1,373	
• State operating permit (Article 5)	\$6,866	
• State operating permit amendment (Article 5)* <b>(except administrative)*</b>	\$3,433	

**\*AIR PERMIT APPLICATION FEES DO NOT APPLY TO ADMINISTRATIVE AMENDMENTS**

DEQ OFFICE TO WHICH PERMIT APPLICATION WILL BE SUBMITTED (check one)

<input type="checkbox"/> <a href="#">SWRO/Abingdon</a> <input type="checkbox"/> <a href="#">NRO/Woodbridge</a> <input checked="" type="checkbox"/> <a href="#">PRO/Richmond</a>	<b>FOR DEQ USE ONLY</b> Date: _____ DC #: _____ Reg. No.: _____
<input type="checkbox"/> <a href="#">VRO/Harrisonburg</a> <input type="checkbox"/> <a href="#">BRRO/Roanoke</a> <input type="checkbox"/> <a href="#">TRO/Virginia Beach</a>	

## AIR PERMIT APPLICATION CHECKLIST

### APPLICATION FORM PAGES AND NUMBER OF COPIES

Place a "√" In Boxes Below to Indicate Pages Included with Application Submittal	Page Title and Page Number	Indicate Number of Copies Included with Application Submittal
√	Local Governing Body Certification Form, Page 5	1
√	Application Fee Form, Page 6	1
√	Application and Attachments Checklist, Page 9	1
√	Document Certification Form, Page 10	1
√	General Information, Pages 11-12	1
√	Fuel Burning Equipment, Page 13	1
√	Stationary Internal Combustion Engines, Page 14	1
	Incinerators, Page 15	
	Processing, Page 16	
	Inks, Coatings, Stains, and Adhesives, Page 17	
√	VOC/Petroleum Storage Tanks, Pages 18-19	1
	Loading Rack and Oil-Water Separators, Page 20	
	Fumigation Operations, Page 21	
√	Air Pollution Control and Monitoring Equipment, Page 22	1
√	Air Pollution Control/Supplemental Information, Page 23	1
√	Stack Parameters and Fuel Data, Page 24	1
√	Proposed Permit Limits for Criteria Pollutants, Page 25	1
√	Proposed Permit Limits for Toxic Pollutants/HAPs, Page 26	1
	Proposed Permit Limits for Other Reg. Pollutants, Page 27	
	Proposed Permit Limits for GHGs on Mass Basis, Page 28	
	Proposed Permit Limits for GHGs on CO <sub>2e</sub> Basis, Page 29	
	BAE for Criteria Pollutants, Page 30	
	BAE for GHGs on Mass Basis, Page 31	
	BAE for GHGs on CO <sub>2e</sub> Basis, Page 32	
√	Operating Periods, Page 33	1

### ATTACHMENTS AND NUMBER OF COPIES

Place a "√" In Boxes Below to Indicate Attachments Included with Application Submittal	Attached Document Names (Use Blank Spaces to Write In Names of any Attachments Not Listed Below)	Indicate Number of Copies Included with Application Submittal
√	Map of Site Location	1
√	Facility Site Plan	1
	Process Flow Diagram/Schematic	
	MSDS or CPDS Sheets	
√	Estimated Emission Calculations	1
	Stack Tests	
	Air Modeling Data	
	Confidential Information (see Instructions)	
√	BACT Analysis	1



## DOCUMENT CERTIFICATION FORM

*I certify under penalty of law that this document and all attachments [as noted above] were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering and evaluating the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

*I certify that I understand that the existence of a permit under [Article 6 of the Regulations] does not shield the source from potential enforcement of any regulation of the board governing the major NSR program and does not relieve the source of the responsibility to comply with any applicable provision of the major NSR regulations.*

DATE:

Dec. 17, 2025

SIGNATURE:



NAME:

Colin Clish

TITLE:

President

PHONE:

(780) 862-0874

EMAIL:

colin@pointonecorp.com

REGISTRATION NO:

TBD

COMPANY NAME:

PointOne Richmond, LLC

ADDRESS:

13221 Woodland Park Road, Suite 440

Herndon, VA 20171

References: Virginia Regulations for the Control and Abatement of Air Pollution (Regulations), [9VAC5-20-230B](#) and [9VAC5-80-1140E](#).

**GENERAL INFORMATION**

Person Completing Form: <i>Chris Aberg (Ramboll), caberg@ramboll.com</i>		Date: <i>December 2025</i>	Registration Number: <i>TBD</i>
Company and Division Name: <i>PointOne Richmond, LLC</i>			FIN: <i>TBD</i>
Mailing Address: <i>13221 Woodland Park Road, Suite 440, Herndon, VA 20171</i>			
Exact Source Location – Include Name of City (County) and Full Street Address or Directions: <i>2840 Roxbury Road, Charles City, VA 23030</i>			
Facility Phone Number: <i>(780) 292-3157</i>	No. of Employees: <i>0-5</i>	Property Area at Site: <i>139 acres</i>	
Person to Contact on Air Pollution Matters – Name and Title:  Name: <i>Adam Michaelis</i>  Title: <i>Vice President of Hyperscale Engineering</i>		Contact Phone Number: <i>(408) 829-7687</i>  Contact Email: <i>adam@pointonecorp.com</i>  Contact Fax: <i>N/A</i>	
Latitude and Longitude Coordinates OR UTM Coordinates of Facility: <i>37.450358111421956, -77.15826817519229</i>			

**Reason(s) for Submission (Check all that apply):**

<input type="checkbox"/> State Operating Permit	<input type="checkbox"/> This permit is applied for pursuant to provisions of the Virginia Administrative Code, 9 VAC 5 Chapter 80, Article 5 (SOP)
<input checked="" type="checkbox"/> New Source	<input type="checkbox"/> This permit is applied for pursuant to the following provisions of the Virginia Administrative Code:
<input type="checkbox"/> Modification of a Source	<input checked="" type="checkbox"/> 9 VAC 5 Chapter 80, Article 6 (Minor Sources)
<input type="checkbox"/> Relocation of a Source	<input type="checkbox"/> 9 VAC 5 Chapter 80, Article 8 (PSD Major Sources)
	<input type="checkbox"/> 9 VAC 5 Chapter 80, Article 9 (Non-Attainment Major Sources)
<input type="checkbox"/> Amendment to a Permit Dated: _____ Permit Type: <input type="checkbox"/> SOP (Art. 5) <input type="checkbox"/> NSR (Art. 6, 8, 9)	
Amendment Type:	<input type="checkbox"/> This amendment is requested pursuant to the provisions of:
<input type="checkbox"/> Administrative Amendment	<input type="checkbox"/> 9 VAC 5-80-970 (Art. 5 Adm.) <input type="checkbox"/> 9 VAC 5-80-1935 (Art. 8 Adm.)
<input type="checkbox"/> Minor Amendment	<input type="checkbox"/> 9 VAC 5-80-980 (Art. 5 Minor) <input type="checkbox"/> 9 VAC 5-80-1945 (Art. 8 Minor)
<input type="checkbox"/> Significant Amendment	<input type="checkbox"/> 9 VAC 5-80-990 (Art. 5 Sig.) <input type="checkbox"/> 9 VAC 5-80-1955 (Art. 8 Sig.)
	<input type="checkbox"/> 9 VAC 5-80-1270 (Art. 6 Adm.) <input type="checkbox"/> 9 VAC 5-80-2210 (Art. 9 Adm.)
	<input type="checkbox"/> 9 VAC 5-80-1280 (Art. 6 Minor) <input type="checkbox"/> 9 VAC 5-80-2220 (Art. 9 Minor)
	<input type="checkbox"/> 9 VAC 5-80-1290 (Art. 6 Sig.) <input type="checkbox"/> 9 VAC 5-80-2230 (Art. 9 Sig.)
<input type="checkbox"/> Other (specify): _____	

**Explanation of Permit Request (attach documents if needed):**

<p><i>Permitting of data center with 271 diesel-fired emergency generators and their associated diesel belly tanks, 35 natural gas-fired turbines to provide prime power to the facility, and four (4) diesel-fired generator engines associated with turbine start up procedures at the turbine power plants.</i></p>
--

**GENERAL INFORMATION (CONTINUED)**

**For Portable Plants:**

Is this facility designed to be portable?  Yes  No

• If yes, is this facility already permitted as a portable plant?  Yes  No Permit Date: \_\_\_\_\_

If not permitted, is this an application to be permitted as a portable plant?  Yes  No

If permitted as a portable facility, is this a notification of relocation?  Yes  No

• Describe the new location or address (include a site map): \_\_\_\_\_

• Will the portable facility be co-located with another source?  Yes  No Reg. No. \_\_\_\_\_

• Will the portable facility be modified or reconstructed as a result of the relocation?  Yes  No

• Will there be any new emissions other than those associated with the relocation?  Yes  No

• Is the facility suitable for the area to which it will be located? (attach documentation)  Yes  No

**Describe the products manufactured and/or services performed at this facility:**

*Data center for data center processing, hosting, and related services – equipment includes 271 diesel-fired emergency generators and their associated diesel belly tanks, 35 natural gas-fired turbines to provide prime power to the facility, and four (4) diesel-fired generator engines associated with turbine start up procedures at the turbine power plants.*

**List the Standard Industrial Classification (SIC) Code(s) for the facility:**

**List the North American Industry Classification System (NAICS) Code(s) for the facility:**

**List all the facilities in Virginia under common ownership or control by the owner of this facility:**


**Milestones:** This section is to be completed if the permit application includes a new emissions unit or modification to existing operations.

Milestones*:	Starting Date:	Estimated Completion Date:
New Equipment Installation	February 2027	August 2027
Modification of Existing Process or Equipment	N/A	N/A
Start-up Dates	May 2027	November 2028

\*For new or modified installations to be constructed in phased schedule, give construction/installation starting and completion date for each phase.

**FUEL BURNING EQUIPMENT: (Boilers, Turbines, Kilns, and Other External Combustion Units)**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Unit Ref. No.	Equipment Manufacturer, Type, and Model Number	Date of Manuf.	Date of Const.	Max. Rated Input Heat Capacity For Each Fuel (Million Btu/hr/turbine)	Type of Fuel	Type of Equip. (use Code A)	Usage (use Code B)	Requested Throughput* (hrs/yr OR fuel/yr)	Federal Regulations that Apply
CTG-P1-1 through CTG-P1-16	Solar Turbines SMT-130 Turbine	2025+	2027	175.78	Natural Gas	19 – Simple Cycle Turbine	6	See Appendix 4.	40 CFR Part 60, Subpart KKKK
CTG-P2-1 through CTG-P2-19	Solar Turbines PGM-130 Turbine	2025+	2027	171.76	Natural Gas	19 – Simple Cycle Turbine	6	See Appendix 4.	40 CFR Part 60, Subpart KKKK

Estimated Emission Calculations Attached (include references of emission factors) and/or Stack Test Results if Available

<p><b>Code A – Equipment</b></p> <p><u>BOILER TYPE:</u></p> <ol style="list-style-type: none"> <li>1. Pulverized Coal – Wet Bottom</li> <li>2. Pulverized Coal – Dry Bottom</li> <li>3. Pulverized Coal – Cyclone Furnace</li> <li>4. Circulating Fluidized Bed</li> <li>5. Spreader Stoker</li> <li>6. Chain or Travelling Grate Stoker</li> <li>7. Underfeed Stoker</li> <li>8. Hand Fired Coal</li> <li>9. Oil, Tangentially Fired</li> <li>10. Oil, Horizontally Fired (except rotary cup)</li> </ol>	<ol style="list-style-type: none"> <li>11. Gas, Tangentially Fired</li> <li>12. Gas, Horizontally Fired</li> <li>13. Wood with Flyash Reinjection</li> <li>14. Wood without Flyash Reinjection</li> <li>15. Other (specify) _____</li> </ol> <p><u>OTHER COMBUSTION UNITS:</u></p> <ol style="list-style-type: none"> <li>16. Oven / Kiln</li> <li>17. Rotary Kiln</li> <li>18. Process Furnace</li> <li>19. Other (specify) _____</li> </ol>	<p><b>Code B – Usage</b></p> <ol style="list-style-type: none"> <li>1. Steam Production</li> <li>2. Drying / Curing</li> <li>3. Space Heating</li> <li>4. Process Heat</li> <li>5. Food Processing</li> <li>6. Electrical Generation</li> <li>7. Mechanical Work</li> <li>8. Other (specify) _____</li> </ol>
---	---	---

**\*Pick only one option for a requested throughput.**

**NOTE: Dryers, kilns, and furnaces also must fill out [Page 16](#), Processing, Manufacturing, Surface Coating and Degreasing Operations.**

**STATIONARY INTERNAL COMBUSTION ENGINES:**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Unit Ref. No.	Equipment Manufacturer, Type, and Model Number	Date of Manuf.	Date of Const.	Output Brake Horsepower (bhp)	Output Electrical Power (kW)	Type of Fuel	Usage* (use Code C)	Requested Throughput** (hrs/yr OR fuel/yr)	Federal Regulations that Apply
EG-01 through EG-252	Caterpillar Model 3516E Emergency Generator	2025+	2027	4,393	3,000	Ultra-low Sulfur Diesel (ULSD)	1	See Appendix 4.	40 CFR 60 Subpart III; 40 CFR 63 Subpart ZZZZ
BSDG-P1-01 and BSDG-P1-02 BSDG-P2-01 and BSDG-P2-02	Caterpillar Model 3516C Emergency Generator	2025+	2027	2,937	2,000	ULSD	1	See Appendix 4.	40 CFR 60 Subpart III; 40 CFR 63 Subpart ZZZZ
HS-01 through HS-18	Caterpillar Model C27 Emergency Generator	2025+	2027	1,190	800	ULSD	1	See Appendix 4.	40 CFR 60 Subpart III; 40 CFR 63 Subpart ZZZZ
FP-01	Caterpillar Model C15 Emergency Generator	2025+	2027	762	500	ULSD	1	See Appendix 4.	40 CFR 60 Subpart III; 40 CFR 63 Subpart ZZZZ

Estimated Emission Calculations Attached (include references of emission factors and manufacturer specifications per engine) and/or Stack Test Results if Available.

**Code C – Usage**

1. Emergency Generator
2. Participates in Emergency Load Response Program
3. Non-Emergency Generator
4. Participates in Demand Response Program(s)
5. Other (specify) \_\_\_\_\_

**\*Can pick more than one option**  
(i.e. 1 and 2 **OR** 3 and 4)

**\*\*Pick only one option for a requested throughput.**

**VOLATILE ORGANIC COMPOUND (VOC)/PETROLEUM LIQUID STORAGE TANKS:**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Unit Ref. No.	Tank Type (use Code H)	Source of Tank Contents (use Code I)	Date of Manuf.	Date of Const.	Material Stored - Name and CAS # (include Reid Vapor Pressure for Gasoline)	Max. True Vapor Pressure (psia)	Density* (lbs/gal)	Max. Average Storage Temp. (°F)	Tank Diameter (feet)	Tank Capacity (gal)	Requested Throughput (gal/yr)	Federal Regulations that Apply
<i>See Appendix 4 for information on the proposed diesel fuel storage tanks.</i>												

Estimated Emission Calculations Attached (include TANKS Program printouts)

<p><b>Code H – Tank Type</b></p> <ol style="list-style-type: none"> <li>1. Fixed Roof             <ol style="list-style-type: none"> <li>a. Vertical Tank</li> <li>b. Horizontal Tank</li> </ol> </li> <li>2. Floating Roof             <ol style="list-style-type: none"> <li>a. Internal (welded deck)</li> <li>b. Internal (bolted deck) – Specify Panel or Sheet</li> <li>c. External (welded deck)</li> <li>d. External (riveted deck)</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>3. Variable Vapor Space</li> <li>4. Pressure Tank (over 15 psig)</li> <li>5. Underground Splash Loading</li> <li>6. Underground Submerged Loading</li> <li>7. Underground Submerged Loading, Balanced</li> <li>8. Other: _____</li> </ol>	<p><b>Code I – Source of Tank Contents</b></p> <ol style="list-style-type: none"> <li>1. Pipeline</li> <li>2. Rail Car</li> <li>3. Tank Truck</li> <li>4. Ship or Barge</li> <li>5. Process</li> </ol>
--	--	--

\* Specify the ASTM temperature standard at which the density was measured.

**VOLATILE ORGANIC COMPOUND (VOC)/PETROLEUM LIQUID STORAGE TANKS (CONTINUED):**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Unit Ref. No.	Tank Color		Fixed Roof Only					Floating Roof Only						
	Shell	Roof	Internal Tank Height or Length (feet)	Max. Hourly Filling (gallons)	External Fixed Roof			Seal Type (use Code J)	Max. Hourly Withdrawal (gallons)	Internal Floating Roof				
					Type of Roof (cone or dome)	Cone height (ft) and slope (ft/ft)	Dome height (ft) and radius (ft)			Self Supporting?	If no,			
												No. of Columns	Column Diameter (ft)	
<i>See Appendix 4 for information on the proposed diesel fuel storage tanks.</i>														

<p><b>Code J – Seal Type (Pontoon External Only)</b></p> <ol style="list-style-type: none"> <li>1. Mechanical Shoe                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Shoe mounted secondary</li> <li>c. Rim mounted secondary</li> </ol> </li> <li>2. Liquid Mounted                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Weather shield secondary</li> <li>c. Rim mounted secondary</li> </ol> </li> <li>3. Vapor Mounted                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Weather shield secondary</li> <li>c. Rim mounted secondary</li> </ol> </li> </ol>	<p><b>(Double Deck External Only)</b></p> <ol style="list-style-type: none"> <li>4. Mechanical Shoe                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Shoe mounted secondary</li> <li>c. Rim mounted secondary</li> </ol> </li> <li>5. Liquid Mounted                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Weather shield secondary</li> <li>c. Rim mounted secondary</li> </ol> </li> <li>6. Vapor Mounted                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Weather shield secondary</li> <li>c. Rim mounted secondary</li> </ol> </li> </ol>	<p><b>(Internal Only)</b></p> <ol style="list-style-type: none"> <li>7. Mechanical Shoe                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Shoe mounted secondary</li> <li>c. Rim mounted secondary</li> </ol> </li> <li>8. Liquid Mounted                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Rim mounted secondary</li> </ol> </li> <li>9. Vapor Mounted                     <ol style="list-style-type: none"> <li>a. Primary only</li> <li>b. Rim mounted secondary</li> </ol> </li> </ol>
--	---	---

**AIR POLLUTION CONTROL AND MONITORING EQUIPMENT:**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Unit Ref. No.	Vent/ Stack No.	Device Ref. No.	Pollutant/Parameter	Air Pollution Control Equipment			Monitoring Instrumentation
				Manufacturer and Model No.	Type (use Code N)	Percent Efficiency (%)	Specify Type, Measured Pollutant, and Recorder Used
<i>See Appendix 3 for information about the proposed air pollution control devices.</i>							

Manufacturer Specifications Included

<p><b>Code N – Type of Air Pollution Control Equipment</b></p> <ol style="list-style-type: none"> <li>1. Settling Chamber</li> <li>2. Cyclone</li> <li>3. Multicyclone</li> <li>4. Cyclone scrubber</li> <li>5. Orifice scrubber</li> <li>6. Mechanical scrubber</li> <li>7. Venturi scrubber             <ol style="list-style-type: none"> <li>a. Fixed throat</li> <li>b. Variable throat</li> </ol> </li> <li>8. Mist eliminator</li> <li>9. Filter             <ol style="list-style-type: none"> <li>a. Baghouse</li> <li>b. Other: _____</li> </ol> </li> <li>10. Electrostatic Precipitator</li> </ol>	<ol style="list-style-type: none"> <li>a. Hot side</li> <li>b. Cold side</li> <li>c. High voltage</li> <li>d. Low voltage</li> <li>e. Single stage</li> <li>f. Two stage</li> <li>g. Other: _____</li> <li>11. Catalytic Afterburner</li> <li>12. Direct Flame Afterburner</li> <li>13. Diesel Oxidation Catalyst (DOC)</li> <li>14. Thermal Oxidizer</li> <li>15. Regenerative Thermal Oxidizer (RTO)</li> <li>16. Selective Catalytic Reduction (SCR)</li> <li>17. Selective Non-Catalytic Reduction (SNCR)</li> </ol>	<ol style="list-style-type: none"> <li>18. Absorber             <ol style="list-style-type: none"> <li>a. Packed tower</li> <li>b. Spray tower</li> <li>c. Tray tower</li> <li>d. Venturi</li> <li>e. Other: _____</li> </ol> </li> <li>19. Adsorber             <ol style="list-style-type: none"> <li>a. Activated carbon</li> <li>b. Molecular sieve</li> <li>c. Activated alumina</li> <li>d. Silica gel</li> <li>e. Other: _____</li> </ol> </li> <li>20. Condenser (specify)</li> <li>21. Other: _____</li> </ol>
--	--	---

**AIR POLLUTION CONTROL EQUIPMENT - SUPPLEMENTAL INFORMATION:**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Device Ref. No.	Type (use Code N)	Liquid Flow Rate (gpm) (4, 5, 6, 7, 17, 19)	Liquid Medium (4, 5, 6, 7, 17, 19)	Cleaning Method (9, 10, 17, 18)	Number of Fields (10)	Number of Sections (9, 10)	Air to Cloth Ratio (fpm) (9)	Filter Material (9)	Inlet Temp. (°F)	Regeneration Method & Cycle Time (sec) (18)	Chamber Temp. (°F) (11, 12, 14, 15)	Retention Time (sec) (11, 12, 14, 15)	Pressure Drop (inch H <sub>2</sub> O) (3, 4, 5, 6, 7, 9, 17)
<i>See Appendix 3 for information about the proposed air pollution control devices.</i>													

**NOTE:** Numbers listed in parenthesis in the columns above represent the Control Equipment in Code N below.

<p><b>Code N – Type of Air Pollution Control Equipment</b></p> <ol style="list-style-type: none"> <li>1. Settling Chamber</li> <li>2. Cyclone</li> <li>3. Multicyclone</li> <li>4. Cyclone scrubber</li> <li>5. Orifice scrubber</li> <li>6. Mechanical scrubber</li> <li>7. Venturi scrubber             <ol style="list-style-type: none"> <li>a. Fixed throat</li> <li>b. Variable throat</li> </ol> </li> <li>8. Mist eliminator</li> <li>9. Filter             <ol style="list-style-type: none"> <li>a. Baghouse</li> <li>b. Other: _____</li> </ol> </li> <li>10. Electrostatic Precipitator</li> </ol>	<ol style="list-style-type: none"> <li>a. Hot side</li> <li>b. Cold side</li> <li>c. High voltage</li> <li>d. Low voltage</li> <li>e. Single stage</li> <li>f. Two stage</li> <li>g. Other: _____</li> <li>11. Catalytic Afterburner</li> <li>12. Direct Flame Afterburner</li> <li>13. Diesel Oxidation Catalyst (DOC)</li> <li>14. Thermal Oxidizer</li> <li>15. Regenerative Thermal Oxidizer (RTO)</li> <li>16. Selective Catalytic Reduction (SCR)</li> <li>17. Selective Non-Catalytic Reduction (SNCR)</li> </ol>	<ol style="list-style-type: none"> <li>18. Absorber             <ol style="list-style-type: none"> <li>a. Packed tower</li> <li>b. Spray tower</li> <li>c. Tray tower</li> <li>d. Venturi</li> <li>e. Other: _____</li> </ol> </li> <li>19. Adsorber             <ol style="list-style-type: none"> <li>a. Activated carbon</li> <li>b. Molecular sieve</li> <li>c. Activated alumina</li> <li>d. Silica gel</li> <li>e. Other: _____</li> </ol> </li> <li>20. Condenser (specify)</li> <li>21. Other: _____</li> </ol>
--	--	---

**STACK PARAMETERS AND FUEL DATA:**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Unit Ref. No.	Vent/ Stack No.	Vent/Stack or Exhaust Data						Fuel(s) Data				
		Vent/Stack Config. (use Code O)	Vent/Stack Height (feet)	Exit Diameter (feet)	Exit Gas Velocity (ft/sec)	Exit Gas Flow Rate (acfm)	Exit Gas Temp. (°F)	Type of Fuel	Heating Value* (Btu/____)	Max. Rated Burned/hr (specify units)	Max. Sulfur %	Max. Ash %
EG-01 through EG-252	ST-EG-01 through ST-EG-252	5	26	2.5	81.4	23,970.8	903.0	ULSD	0.137 MMBtu/gal	28.64 MMBtu/hr	0.0015	Neg.
BSDG-01 through BSDG-04	ST-BSDG-01 through ST-BSDG-04	5	14	1	324.64	15,298.2	752.1	ULSD	0.137 MMBtu/gal	18.66 MMBtu/hr	0.0015	Neg.
HS-01 through HS-18	ST-HS-01 through ST-HS-18	5	7.1	0.83	181.61	5,943.3	947.8	ULSD	0.137 MMBtu/gal	7.62 MMBtu/hr	0.0015	Neg.
FP-01	ST-FP-01	5	7	0.5	328.45	3,869.5	988.0	ULSD	0.137 MMBtu/gal	4.89 MMBtu/hr	0.0015	Neg.
CTG-1 through CTG-16	ST-CTG-1 through ST-CTG-16	5	60	9	TBD	TBD	977	Natural Gas	1,020 – 1,050 Btu/scf	175.78 MMBtu/hr	Neg.	Neg.
CTG-17 through CTG-35	ST-CTG-17 through ST-CTG-35	5	66	9	73.77	16,894,721	963	Natural Gas	1,020 – 1,050 Btu/scf	171.76 MMBtu/hr	Neg.	Neg.

**Code O – Vent/Stack Configuration**

1. Stack discharging downward, or nearly downward
2. Equivalent stack representing a combination of multiple actual stacks
3. Gooseneck stack
4. Stack discharging in a horizontal direction
5. Stack with an unobstructed opening discharge in a vertical direction
6. Vertical stack with a weather cap or similar obstruction in exhaust system

**\* Specify units for each heating value in Btus per unit of fuel.**

**PROPOSED PERMIT LIMITS FOR CRITERIA POLLUTANTS:**

Company Name: <i>PointOne Richmond LLC</i>	Date: <i>December 2025</i>	Registration Number: <i>TBD</i>
--	----------------------------	---------------------------------

Unit Ref. No.	Proposed Permit Limits for Criteria Pollutants															
	PM <sup>a</sup> (Particulate Matter)		PM-10 <sup>a,b</sup> (10 µM or smaller particulate matter)		PM 2.5 <sup>a,b</sup> (2.5 µM or smaller particulate matter)		SO <sub>2</sub> (Sulfur Dioxide)		NO <sub>x</sub> (Nitrogen Oxides)		CO (Carbon Monoxide)		VOC <sup>a</sup> (Volatile Organic Compounds)		Pb (Lead)	
	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
<i>See Appendix 4 of the submittal for information on the proposed permit limits.</i>																
<b>TOTAL:</b>																

Estimated Emission Calculations Attached (totals and per Unit Ref. No.)

<sup>a</sup> PM, PM-10, PM 2.5, and VOC should also be split up by component and reported under the Proposed Permit Limits for Toxic Pollutants/HAPs.

<sup>b</sup> PM-10 and PM 2.5 includes filterable and condensable.

**PROPOSED PERMIT LIMITS FOR TOXIC POLLUTANTS/HAPS:**

Company Name: <i>PointOne Richmond LLC</i>										Date: <i>December 2025</i>				Registration Number: <i>TBD</i>			
Unit Ref. No.	<b>Proposed Permit Limits for Toxic/HAP Pollutants*</b>																
	<u>HAP Name:</u>		<u>HAP Name:</u>		<u>HAP Name:</u>		<u>HAP Name:</u>		<u>HAP Name:</u>		<u>HAP Name:</u>		<u>HAP Name:</u>		<u>HAP Name:</u>		
	<u>CAS #:</u>		<u>CAS #:</u>		<u>CAS #:</u>		<u>CAS #:</u>		<u>CAS #:</u>		<u>CAS #:</u>		<u>CAS #:</u>		<u>CAS #:</u>		
	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	
<i>See Appendix 4 of this submittal for information on the proposed permit limits.</i>																	
<b>TOTAL:</b>																	

Estimated Emission Calculations Attached (totals and per Unit Ref. No.)

\* Specify the name of the toxic pollutant/HAP for each Unit Ref. No. along with the respective CAS Number. Toxic Pollutant means a pollutant on the designated list in the Form 7 Instructions document. Particulate matter and volatile organic compounds are not toxic pollutants as generic classes of substances, but individual substances within these classes may be toxic pollutants because their toxic properties or because a TLV (tm) has been established.

**OPERATING PERIODS:**

<b>Company Name:</b> <i>PointOne Richmond LLC</i>	<b>Date:</b> <i>December 2025</i>	<b>Registration Number:</b> <i>TBD</i>
---	-----------------------------------	--

Unit Ref. No.	Percent Annual Use/Throughput by Season				Normal Process/Equipment Operating Schedule			Maximum Process/Equipment Operating Schedule		
	December February	March May	June August	September November	Hours per Day	Days per Week	Weeks per Year	Hours per Day	Days per Week	Weeks per Year
<i>All Generators</i>	<i>25%</i>	<i>25%</i>	<i>25%</i>	<i>25%</i>	<i>Maximum of 500 hours annually per generator. Requested fuel usage limits for generators based on emissions calculations in Appendix 4.</i>					
<i>All Turbines</i>	<i>25%</i>	<i>25%</i>	<i>25%</i>	<i>25%</i>	<i>Maximum of 8,760 hours of operation annually per turbine. Requested fuel usage limits for turbines based on emissions calculations in Appendix 4.</i>					

Maximum Facility Operating Schedule		
<b>Hours per Day</b> <i>24</i>	<b>Days per Week</b> <i>7</i>	<b>Weeks per Year</b> <i>52</i>

**APPENDIX 3  
PROPOSED GENERATOR AND TURBINE MANUFACTURER SPECIFICATIONS  
AND EMISSIONS DATA SHEET**

# Group 1 - Critical Generators (252 x 3 MW Engines – CAT Model 3516E)

January 30, 2025

## PERFORMANCE DATA[EM6285]

Performance Number: EM6285

Change Level: 01

SALES MODEL:	3516E	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,800
MACHINE SALES MODEL:		HERTZ:	60
ENGINE POWER (BHP):	4,393	FAN POWER (HP):	154.2
GEN POWER WITH FAN (EKW):	3,000.0	ASPIRATION:	TA
COMPRESSION RATIO:	13.9	AFTERCOOLER TYPE:	ATAAC
RATING LEVEL:	MISSION CRITICAL STANDBY	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
PUMP QUANTITY:	1	INLET MANIFOLD AIR TEMP (F):	122
FUEL TYPE:	DIESEL	JACKET WATER TEMP (F):	219.2
MANIFOLD TYPE:	DRY	TURBO CONFIGURATION:	PARALLEL
GOVERNOR TYPE:	ADEM5	TURBO QUANTITY:	4
ELECTRONICS TYPE:	ADEM5	TURBOCHARGER MODEL:	TPX44-H32-CT70-CA50-TT70-TA80
IGNITION TYPE:	CI	CERTIFICATION YEAR:	2022
INJECTOR TYPE:	MEUI-C	CRANKCASE BLOWBY RATE (FT3/HR):	4,390.2
FUEL INJECTOR:	5816980	FUEL RATE (RATED RPM) NO LOAD (GAL/HR):	17.2
UNIT INJECTOR TIMING (IN):	0.88	PISTON SPD @ RATED ENG SPD (FT/MIN):	2,539.4
REF EXH STACK DIAMETER (IN):	12		
MAX OPERATING ALTITUDE (FT):	6,562		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET

## General Performance Data

THE INLET MANIFOLD AIR TEMP LISTED IN THE HEADER, AND IN THE GENERAL PERFORMANCE DATA, IS THE AVERAGE INLET MANIFOLD TEMP FRONT TO REAR ON THE ENGINE.

THIS STANDBY RATING IS FOR A STANDBY ONLY ENGINE ARRANGEMENT. RERATING THE ENGINE TO A STANDARD PRIME OR CONTINUOUS RATING IS NOT PERMITTED.

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)	ELEC SPEC FUEL CONSUMPTN (ESFC)	ISO ELEC SPEC FUEL CONSUMPTN (ESFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR	LB/EKW-HR	LB/EKW-HR
3,000.0	100	4,393	406	0.337	0.331	209.0	205.0	0.494	0.485
2,700.0	90	3,976	367	0.340	0.333	190.3	186.7	0.500	0.491
2,400.0	80	3,557	328	0.349	0.343	175.1	171.7	0.517	0.508
2,250.0	75	3,347	309	0.356	0.349	168.1	164.9	0.530	0.520
2,100.0	70	3,137	290	0.362	0.355	160.2	157.1	0.541	0.531
1,800.0	60	2,716	251	0.370	0.363	141.7	139.0	0.559	0.548
1,500.0	50	2,294	212	0.389	0.382	125.9	123.5	0.595	0.584
1,200.0	40	1,872	173	0.406	0.398	107.2	105.2	0.634	0.622
900.0	30	1,449	134	0.401	0.393	81.8	80.3	0.645	0.633
750.0	25	1,236	114	0.381	0.374	66.4	65.1	0.628	0.616
600.0	20	1,022	94	0.392	0.384	56.4	55.4	0.667	0.655
300.0	10	590	55	0.441	0.433	36.7	36.0	0.869	0.852

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
3,000.0	100	4,393	96.6	118.3	1,235.5	64.4	903.0	104	449.1
2,700.0	90	3,976	82.2	119.3	1,247.9	54.4	904.4	90	423.5
2,400.0	80	3,557	74.9	118.9	1,242.3	48.9	913.3	82	403.8
2,250.0	75	3,347	72.1	119.0	1,240.1	46.9	917.3	79	395.9
2,100.0	70	3,137	67.8	119.3	1,240.0	43.8	925.8	74	384.0
1,800.0	60	2,716	56.0	120.2	1,245.9	35.5	953.4	62	348.0
1,500.0	50	2,294	47.1	118.6	1,248.2	29.9	973.6	52	318.8
1,200.0	40	1,872	33.9	114.2	1,255.9	21.9	1,002.7	38	269.7
900.0	30	1,449	16.7	112.4	1,203.6	12.3	984.1	20	191.4
750.0	25	1,236	8.9	110.5	1,091.8	8.1	915.3	11	150.2
600.0	20	1,022	5.8	108.3	1,004.5	6.6	847.7	8	133.3
300.0	10	590	0.9	104.2	780.2	4.2	671.9	3	108.0

## General Performance Data (Continued)

GENSET POWER	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL	ENGINE OUTLET	WET INLET AIR	WET EXH GAS	WET EXH VOL	DRY EXH VOL
--------------	--------------	--------------	-------------------	---------------	---------------	-------------	-------------	-------------

**PERFORMANCE DATA[EM6285]**

January 30, 2025

WITH FAN		FLOW RATE		WET EXH GAS VOL	MASS FLOW RATE	MASS FLOW RATE	FLOW RATE (32	FLOW RATE (32
				FLOW RATE			DEG F AND 29.98 IN	DEG F AND 29.98 IN
				CFM	LB/HR	LB/HR	HG)	HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
3,000.0	100	4,393	9,133.9	23,970.8	39,606.0	41,088.7	8,648.8	7,910.2
2,700.0	90	3,976	8,100.8	21,092.6	34,770.1	36,119.8	7,602.8	6,941.1
2,400.0	80	3,557	7,618.2	19,872.8	32,572.6	33,813.7	7,116.5	6,503.0
2,250.0	75	3,347	7,434.9	19,421.7	31,724.7	32,917.4	6,934.8	6,343.9
2,100.0	70	3,137	7,140.4	18,713.3	30,413.9	31,551.3	6,641.0	6,078.0
1,800.0	60	2,716	6,316.6	16,737.0	26,667.4	27,671.7	5,823.4	5,324.6
1,500.0	50	2,294	5,698.5	15,244.3	23,951.1	24,844.2	5,229.6	4,787.6
1,200.0	40	1,872	4,748.1	12,895.5	19,832.8	20,593.5	4,335.7	3,959.7
900.0	30	1,449	3,421.3	9,198.1	14,210.7	14,791.0	3,132.4	2,847.7
750.0	25	1,236	2,813.2	7,143.6	11,655.6	12,126.4	2,554.4	2,323.7
600.0	20	1,022	2,588.4	6,214.7	10,705.5	11,105.8	2,337.3	2,139.1
300.0	10	590	2,189.5	4,545.1	9,126.5	9,387.3	1,974.8	1,838.2

**Heat Rejection Data**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
3,000.0	100	4,393	52,144	8,993	175,769	96,459	23,854	53,683	186,315	447,861	477,084
2,700.0	90	3,976	48,348	8,755	162,671	85,128	21,755	46,560	168,590	408,442	435,094
2,400.0	80	3,557	45,188	8,663	152,310	80,972	19,852	39,923	150,835	372,717	397,037
2,250.0	75	3,347	43,721	8,625	147,003	79,360	18,929	37,161	141,942	355,388	378,578
2,100.0	70	3,137	42,430	8,593	141,837	77,229	18,002	34,024	133,031	337,986	360,040
1,800.0	60	2,716	40,153	8,591	130,286	71,150	16,087	27,442	115,184	302,034	321,742
1,500.0	50	2,294	37,137	8,662	118,761	66,069	14,137	20,821	97,288	265,422	282,742

**Emissions Data**

PARTICULATE EMISSIONS WERE NOT MEASURED FOR THIS RATING. PUBLISHED PM DATA IS ESTIMATED FROM MEASURED SMOKE METER DATA.

**DIESEL**

**RATED SPEED NOMINAL DATA: 1800 RPM**

GENSET POWER WITH FAN	EKW	3,000.0	2,250.0	1,500.0	750.0	300.0
PERCENT LOAD	%	100	75	50	25	10
ENGINE POWER	BHP	4,393	3,347	2,294	1,236	590
TOTAL NOX (AS NO2)	G/HR	22,368	12,160	6,934	8,735	6,302
TOTAL CO	G/HR	2,399	2,470	1,673	2,077	1,535
TOTAL HC	G/HR	190	142	118	84	160
TOTAL CO2	KG/HR	2,129	1,691	1,268	673	371
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,404.9	1,597.8	1,214.4	2,955.6	3,548.5
TOTAL CO (CORR 5% O2)	MG/NM3	257.5	319.2	290.7	686.3	917.4
TOTAL HC (CORR 5% O2)	MG/NM3	17.6	16.0	17.7	24.0	84.5
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	892.4	592.9	450.6	1,096.7	1,316.7
TOTAL CO (CORR 15% O2)	MG/NM3	95.6	118.5	107.9	254.7	340.4
TOTAL HC (CORR 15% O2)	MG/NM3	6.5	5.9	6.6	8.9	31.4
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,171	778	592	1,440	1,728
TOTAL CO (CORR 5% O2)	PPM	206	255	233	549	734
TOTAL HC (CORR 5% O2)	PPM	33	30	33	45	158
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	435	289	219	534	641
TOTAL CO (CORR 15% O2)	PPM	76	95	86	204	272
TOTAL HC (CORR 15% O2)	PPM	12	11	12	17	59
TOTAL NOX (AS NO2)	G/HP-HR	5.13	3.65	3.03	7.07	10.68
TOTAL CO	G/HP-HR	0.55	0.74	0.73	1.68	2.60
TOTAL HC	G/HP-HR	0.04	0.04	0.05	0.07	0.27
TOTAL NOX (AS NO2)	G/KW-HR	6.97	4.96	4.12	9.61	14.53
TOTAL CO	G/KW-HR	0.75	1.01	0.99	2.29	3.54
TOTAL HC	G/KW-HR	0.06	0.06	0.07	0.09	0.37

# PERFORMANCE DATA[EM6285]

January 30, 2025

TOTAL NOX (AS NO2)	LB/HR	49.31	26.81	15.29	19.26	13.89
TOTAL CO	LB/HR	5.29	5.44	3.69	4.58	3.38
TOTAL HC	LB/HR	0.42	0.31	0.26	0.18	0.35
TOTAL CO2	LB/HR	4,694	3,728	2,794	1,484	819
OXYGEN IN EXH	%	9.7	9.4	9.5	8.5	12.0
DRY SMOKE OPACITY	%	2.0	2.6	2.9	4.3	0.2
BOSCH SMOKE NUMBER		0.85	0.96	1.02	1.16	0.70

## RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN	EKW	3,000.0	2,250.0	1,500.0	750.0	300.0
PERCENT LOAD	%	100	75	50	25	10
ENGINE POWER	BHP	4,393	3,347	2,294	1,236	590
TOTAL NOX (AS NO2)	G/HR	26,841	14,592	8,321	10,482	7,562
TOTAL CO	G/HR	4,319	4,446	3,012	3,738	2,763
TOTAL HC	G/HR	252	188	157	111	213
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,885.9	1,917.4	1,457.3	3,546.7	4,258.2
TOTAL CO (CORR 5% O2)	MG/NM3	463.5	574.6	523.3	1,235.4	1,651.3
TOTAL HC (CORR 5% O2)	MG/NM3	23.4	21.3	23.6	31.9	112.4
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	1,070.9	711.5	540.8	1,316.1	1,580.1
TOTAL CO (CORR 15% O2)	MG/NM3	172.0	213.2	194.2	458.4	612.8
TOTAL HC (CORR 15% O2)	MG/NM3	8.7	7.9	8.8	11.8	41.7
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,406	934	710	1,728	2,074
TOTAL CO (CORR 5% O2)	PPM	371	460	419	988	1,321
TOTAL HC (CORR 5% O2)	PPM	44	40	44	60	210
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	522	347	263	641	770
TOTAL CO (CORR 15% O2)	PPM	138	171	155	367	490
TOTAL HC (CORR 15% O2)	PPM	16	15	16	22	78
TOTAL NOX (AS NO2)	G/HP-HR	6.15	4.38	3.64	8.49	12.82
TOTAL CO	G/HP-HR	0.99	1.33	1.32	3.03	4.68
TOTAL HC	G/HP-HR	0.06	0.06	0.07	0.09	0.36
TOTAL NOX (AS NO2)	G/KW-HR	8.36	5.95	4.94	11.54	17.43
TOTAL CO	G/KW-HR	1.35	1.81	1.79	4.11	6.37
TOTAL HC	G/KW-HR	0.08	0.08	0.09	0.12	0.49
TOTAL NOX (AS NO2)	LB/HR	59.17	32.17	18.34	23.11	16.67
TOTAL CO	LB/HR	9.52	9.80	6.64	8.24	6.09
TOTAL HC	LB/HR	0.56	0.42	0.35	0.25	0.47

## Regulatory Information

<b>EPA EMERGENCY STATIONARY</b>		<b>2011 - ----</b>			
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.					
<b>Locality</b>	<b>Agency</b>	<b>Regulation</b>	<b>Tier/Stage</b>	<b>Max Limits - G/BKW - HR</b>	
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 6.4 PM: 0.20	

## Altitude Derate Data

A BLANK IN THE ALTITUDE DERATE TABLE SIGNIFIES THAT NO RATING IS AVAILABLE AT THAT SPECIFIED ALTITUDE AND AMBIENT TEMPERATURE.

THE TEMPERATURES LISTED IN THE CHART ARE AMBIENT TEMPERATURES. THE FOLLOWING DERATE CHART WAS CALCULATED ASSUMING A 5 DEG C RISE IN AIR TEMPERATURE BETWEEN AMBIENT AND THE TURBOCHARGER INLET.

### STANDARD

#### ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													

# PERFORMANCE DATA[EM6285]

January 30, 2025

0	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	1,927	4,393
1,000	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	1,860	4,393
2,000	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,304		4,393
3,000	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,313	2,786	4,393
4,000	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,393	4,355	4,037	1,625	4,393
5,000	4,393	4,393	4,393	4,393	4,393	4,383	4,334	4,221	3,517			4,393
6,000	4,393	4,393	4,393	4,356	4,307	4,246	4,183	4,064	2,023			4,393
7,000	4,393	4,380	4,306	4,226	4,160	4,072	3,968	3,778				4,378
8,000	4,347	4,247	4,153	4,051	3,974	3,836	3,573	3,093				4,274
9,000	4,203	4,068	3,954	3,831	3,738	3,550	3,208	2,621				4,152
10,000	3,990	3,831	3,691	3,541	3,442	3,250	2,968	2,196				3,986
11,000	3,755	3,560	3,390	3,239	3,162	3,018	2,762	1,678				3,815
12,000	3,413	3,252	3,123	3,015	2,940	2,762	2,300	1,104				3,539
13,000	3,070	2,977	2,897	2,829	2,750	2,477	1,702					3,198
14,000	2,754	2,728	2,691	2,660	2,553	2,240						2,841
15,000	2,454	2,461	2,285	2,143	2,057	1,713						2,523

## Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
5958126	LL2386	6143182	PG296	-	ZNL00001	

## Supplementary Data

Type	Classification	Performance Number
ALTITUDE DATA	HIGH RESOLUTION	EM5585

## Performance Parameter Reference

<b>Parameters Reference:DM9600-15</b> PERFORMANCE DEFINITIONS
--

### PERFORMANCE DEFINITIONS DM9600

#### APPLICATION:

Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

#### PERFORMANCE PARAMETER TOLERANCE FACTORS:

- Power +/- 3%
- Torque +/- 3%
- Exhaust stack temperature +/- 8%
- Inlet airflow +/- 5%
- Intake manifold pressure-gage +/- 10%
- Exhaust flow +/- 6%
- Specific fuel consumption +/- 3%
- Specific fuel consumption (C7-C18) +/- 4%
- Fuel rate +/- 5%
- Specific DEF consumption +/- 3%
- DEF rate +/- 5%
- Heat rejection +/- 5%
- Heat rejection exhaust only +/- 10%
- Heat rejection CEM only +/- 10%
- Heat Rejection values based on using treated water.
- Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.
- On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.
- On 3500 and C175 engines, at speeds below Peak Torque these values are provided for reference only, and may not meet the tolerance listed.
- These values do not apply to C280/3600. For these models, see the

**PERFORMANCE DATA[EM6285]**

tolerances listed below.

C280/3600 HEAT REJECTION TOLERANCE FACTORS:

Heat rejection +/- 10%

Heat rejection to Atmosphere +/- 50%

Heat rejection to Lube Oil +/- 20%

Heat rejection to Aftercooler +/- 5%

TEST CELL TRANSDUCER TOLERANCE FACTORS:

Torque +/- 0.5%

Speed +/- 0.2%

Fuel flow +/- 1.0%

Temperature +/- 2.0 C degrees

Intake manifold pressure +/- 0.1 kPa

OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995

REFERENCE

AIR AND FUEL CONDITIONS.

REFERENCE ATMOSPHERIC INLET AIR

FOR 3500 ENGINES AND SMALLER

SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.

FOR 3600 ENGINES

Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE

Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

REFERENCE EXHAUST STACK DIAMETER

The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

REFERENCE FUEL

DIESEL

Reference fuel is #2 distillate diesel with a 35API gravity;

A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 Lbs/Gal).

GAS

Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS

EXTERNAL AUXILIARY LOAD

Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

ALTITUDE CAPABILITY

Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set.

Standard temperature values versus altitude could be seen on TM2001.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.

Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

REGULATIONS AND PRODUCT COMPLIANCE

TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.

Customer's may have special emission site requirements that need

# PERFORMANCE DATA[EM6285]

January 30, 2025

to be verified by the Caterpillar Product Group engineer.

## EMISSION CYCLE LIMITS:

Cycle emissions Max Limits apply to cycle-weighted averages only.

Emissions at individual load points may exceed the cycle-weighted limit.

## WET & DRY EXHAUST/EMISSIONS DESCRIPTION:

Wet - Total exhaust flow or concentration of total exhaust flow

Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded

## EMISSIONS DEFINITIONS:

Emissions : DM1176

## EMISSION CYCLE DEFINITIONS

1. For constant-speed marine engines for ship main propulsion, including diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied.

2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.

3. For constant-speed auxiliary engines test cycle D2 shall be applied.

4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

## HEAT REJECTION DEFINITIONS:

Diesel Circuit Type and HHV Balance : DM9500

## HIGH DISPLACEMENT (HD) DEFINITIONS:

3500: EM1500

## RATING DEFINITIONS:

Agriculture : TM6008

Fire Pump : TM6009

Generator Set : TM6035

Generator (Gas) : TM6041

Industrial Diesel : TM6010

Industrial (Gas) : TM6040

Irrigation : TM5749

Locomotive : TM6037

Marine Auxiliary : TM6036

Marine Prop (Except 3600) : TM5747

Marine Prop (3600 only) : TM5748

MSHA : TM6042

Oil Field (Petroleum) : TM6011

Off-Highway Truck : TM6039

On-Highway Truck : TM6038

## SOUND DEFINITIONS:

Sound Power : DM8702

Sound Pressure : TM7080

Date Released : 03/12/24

### Engine Cycle Data

Load	Speed	Power	Exhaust Flow	Exhaust Temp.	Fuel Cons.	NO <sub>x</sub>	O <sub>2</sub>	H <sub>2</sub> O
%		<i>bhp</i>	<i>acfm (cfm)</i>	<i>° F</i>		<i>g/bhp-hr</i>	%	%
100	Rated	4,393	23,971	903		6.15	9.7	12.5

### Emission Data (100% Load)

Emission	Raw Engine Emissions						Target Outlet Emissions						Calculated Reduction
	<i>g/bhp-hr</i>	<i>tons/yr</i>	<i>ppmvd @ 15% O<sub>2</sub></i>	<i>ppmvd</i>	<i>g/kW-hr</i>	<i>lb/MW-hr</i>	<i>g/bhp-hr</i>	<i>tons/yr</i>	<i>ppmvd @ 15% O<sub>2</sub></i>	<i>ppmvd</i>	<i>g/kW-hr</i>	<i>lb/MW-hr</i>	
NO <sub>x</sub> *	6.15	5.96	539	1,023	8.247	18.18	0.62	0.6	54	102	0.825	1.82	90%
NH <sub>3</sub>							0.04	0.04	10	19	0.057	0.12	



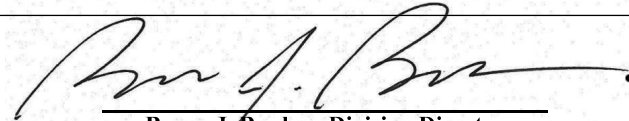
**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2025 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT**

**OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105**

**Certificate Issued To: Caterpillar Inc.**  
(U.S. Manufacturer or Importer)  
**Certificate Number: SCPXL78.1NZS-031**

Effective Date:  
08/05/2024

Expiration Date:  
12/31/2025

  
Byron J. Bunker, Division Director  
Compliance Division

Issue Date:  
08/05/2024

Revision Date:  
N/A

**Model Year:** 2025  
**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** SCPXL78.1NZS

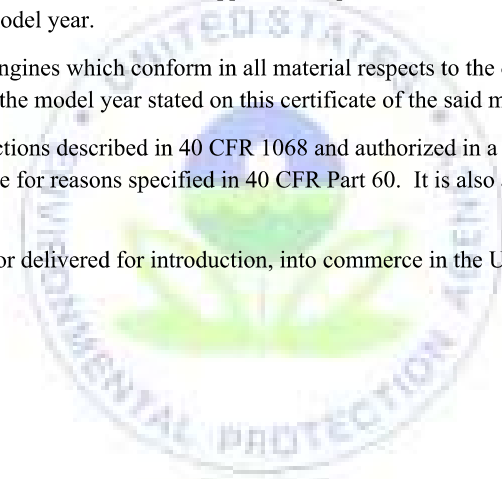
**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** kW>560  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.



# Group 2 – Black Start Generators for Turbine Startup (4 x 2 MW – CAT Model 3516C)

October 2, 2025

## PERFORMANCE DATA[EM6681]

Performance Number: EM6681

Change Level: 01

SALES MODEL:	3516C	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,800
MACHINE SALES MODEL:		HERTZ:	60
ENGINE POWER (BHP):	2,937	FAN POWER (HP):	114.0
GEN POWER WITH FAN (EKW):	2,000.0	ASPIRATION:	TA
COMPRESSION RATIO:	14.7	AFTERCOOLER TYPE:	ATAAC
RATING LEVEL:	STANDBY	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
PUMP QUANTITY:	1	INLET MANIFOLD AIR TEMP (F):	122
FUEL TYPE:	DIESEL	JACKET WATER TEMP (F):	219.2
MANIFOLD TYPE:	DRY	TURBO CONFIGURATION:	PARALLEL
GOVERNOR TYPE:	ADEM6	TURBO QUANTITY:	4
ELECTRONICS TYPE:	ADEM6	TURBOCHARGER MODEL:	GTA5518BN-56T-1.12
CAMSHAFT TYPE:	STANDARD	CERTIFICATION YEAR:	2025
IGNITION TYPE:	CI	CRANKCASE BLOWBY RATE (FT3/HR):	2,937.9
INJECTOR TYPE:	EUI	FUEL RATE (RATED RPM) NO LOAD (GAL/HR):	13.6
FUEL INJECTOR:	3920220	PISTON SPD @ RATED ENG SPD (FT/MIN):	2,244.1
UNIT INJECTOR TIMING (IN):	64.34		
REF EXH STACK DIAMETER (IN):	12		
MAX OPERATING ALTITUDE (FT):	3,117		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

### General Performance Data

THIS STANDBY RATING IS FOR A STANDBY ONLY ENGINE ARRANGEMENT. RERATING THE ENGINE TO A PRIME OR CONTINUOUS RATING IS NOT PERMITTED.

THE INLET MANIFOLD AIR TEMP LISTED IN THE HEADER, AND IN THE GENERAL PERFORMANCE DATA, IS THE AVERAGE INLET MANIFOLD TEMP FRONT TO REAR ON THE ENGINE.

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)	ELEC SPEC FUEL CONSUMPTN (ESFC)	ISO ELEC SPEC FUEL CONSUMPTN (ESFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR	LB/EKW-HR	LB/EKW-HR
2,000.0	100	2,937	307	0.329	0.323	136.2	133.6	0.483	0.474
1,800.0	90	2,641	276	0.331	0.325	123.3	120.9	0.486	0.477
1,600.0	80	2,353	246	0.337	0.330	111.6	109.5	0.495	0.486
1,500.0	75	2,212	231	0.340	0.334	106.1	104.1	0.502	0.492
1,400.0	70	2,071	216	0.344	0.338	100.5	98.6	0.509	0.500
1,200.0	60	1,795	188	0.352	0.345	88.9	87.3	0.526	0.516
1,000.0	50	1,521	159	0.357	0.350	76.5	75.1	0.543	0.533
800.0	40	1,250	131	0.357	0.350	62.9	61.7	0.558	0.547
600.0	30	977	102	0.365	0.358	50.2	49.3	0.594	0.583
500.0	25	839	88	0.374	0.367	44.2	43.4	0.628	0.616
400.0	20	699	73	0.388	0.381	38.3	37.5	0.678	0.666
200.0	10	411	43	0.450	0.441	26.1	25.6	0.926	0.908

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
2,000.0	100	2,937	78.3	121.2	1,118.5	71.5	752.1	83	454.3
1,800.0	90	2,641	73.1	119.6	1,067.5	65.7	716.0	77	428.8
1,600.0	80	2,353	68.0	118.2	1,027.0	60.0	693.3	72	404.5
1,500.0	75	2,212	65.2	117.5	1,008.1	57.2	684.6	69	392.7
1,400.0	70	2,071	62.3	116.8	989.4	54.4	676.9	66	380.9
1,200.0	60	1,795	55.5	115.4	952.0	48.0	662.8	59	353.9
1,000.0	50	1,521	46.5	113.7	913.4	40.1	654.0	50	318.8
800.0	40	1,250	34.8	111.8	863.8	30.3	655.0	38	271.1
600.0	30	977	24.2	110.6	803.8	22.0	650.0	27	225.0
500.0	25	839	19.7	110.2	767.0	18.7	641.7	22	204.1
400.0	20	699	15.7	109.8	724.6	15.7	629.0	18	184.1
200.0	10	411	9.0	109.1	596.9	10.9	552.8	11	148.5

### General Performance Data (Continued)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
2,000.0	100	2,937	6,548.9	15,292.8	28,512.8	29,478.4	6,205.0	5,738.7
1,800.0	90	2,641	6,318.7	14,243.0	27,390.5	28,264.7	5,956.5	5,533.7
1,600.0	80	2,353	6,073.3	13,331.0	26,220.6	27,012.9	5,685.0	5,301.6
1,500.0	75	2,212	5,932.2	12,897.9	25,568.0	26,319.7	5,542.0	5,176.6
1,400.0	70	2,071	5,777.2	12,448.0	24,862.1	25,573.8	5,384.8	5,037.5
1,200.0	60	1,795	5,397.2	11,422.5	23,141.0	23,771.1	5,003.4	4,694.0
1,000.0	50	1,521	4,857.3	10,138.7	20,731.5	21,274.5	4,476.2	4,208.4
800.0	40	1,250	4,090.0	8,488.8	17,357.1	17,803.6	3,744.5	3,524.2
600.0	30	977	3,394.1	6,989.6	14,328.5	14,684.4	3,097.0	2,920.6
500.0	25	839	3,103.5	6,328.1	13,075.2	13,388.4	2,825.1	2,668.8
400.0	20	699	2,840.4	5,696.0	11,947.2	12,218.4	2,572.5	2,435.7
200.0	10	411	2,409.4	4,478.2	10,105.7	10,290.7	2,174.6	2,076.8

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
2,000.0	100	2,937	43,150	7,564	101,696	49,615	15,778	38,240	124,558	296,234	315,563
1,800.0	90	2,641	40,179	7,175	92,069	43,106	14,280	34,105	111,977	268,102	285,596
1,600.0	80	2,353	37,427	6,907	84,225	38,510	12,931	30,201	99,774	242,774	258,615
1,500.0	75	2,212	36,092	6,791	80,632	36,523	12,286	28,303	93,784	230,664	245,715
1,400.0	70	2,071	34,737	6,671	77,064	34,629	11,640	26,432	87,835	218,548	232,809
1,200.0	60	1,795	31,877	6,341	69,432	30,722	10,302	22,179	76,103	193,426	206,048
1,000.0	50	1,521	28,631	6,026	60,835	26,675	8,865	17,129	64,508	166,434	177,294
800.0	40	1,250	24,910	5,810	50,784	22,387	7,288	11,280	53,005	136,837	145,766
600.0	30	977	21,252	5,496	41,420	18,139	5,820	6,677	41,431	109,268	116,397
500.0	25	839	19,405	5,303	37,082	16,055	5,124	4,986	35,574	96,210	102,488
400.0	20	699	17,492	5,098	32,738	13,986	4,431	3,593	29,634	83,193	88,622
200.0	10	411	13,286	4,670	23,481	8,473	3,022	1,516	17,448	56,745	60,447

Sound Data

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:1.5 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	117.0	107.0	122.0	118.0	110.0
1,800.0	90	2,641	116.0	106.0	121.0	117.0	109.0
1,600.0	80	2,353	115.0	105.0	120.0	116.0	108.0
1,500.0	75	2,212	114.0	104.0	119.0	115.0	107.0
1,400.0	70	2,071	114.0	104.0	119.0	115.0	107.0
1,200.0	60	1,795	112.0	103.0	117.0	113.0	105.0
1,000.0	50	1,521	111.0	101.0	116.0	112.0	104.0
800.0	40	1,250	110.0	100.0	115.0	111.0	103.0
600.0	30	977	108.0	99.0	113.0	109.0	101.0
500.0	25	839	108.0	98.0	113.0	109.0	101.0
400.0	20	699	107.0	97.0	112.0	108.0	100.0
200.0	10	411	104.0	95.0	109.0	105.0	97.0

EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:1.5 METER

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
-----------------------	--------------	--------------	---------	---------	---------	---------

**PERFORMANCE DATA[EM6681]**

October 2, 2025

EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	108.0	109.0	109.0	107.0
1,800.0	90	2,641	107.0	108.0	108.0	106.0
1,600.0	80	2,353	106.0	107.0	107.0	105.0
1,500.0	75	2,212	106.0	107.0	107.0	105.0
1,400.0	70	2,071	105.0	106.0	106.0	104.0
1,200.0	60	1,795	104.0	105.0	105.0	103.0
1,000.0	50	1,521	103.0	104.0	104.0	102.0
800.0	40	1,250	101.0	103.0	102.0	101.0
600.0	30	977	100.0	101.0	101.0	99.0
500.0	25	839	99.0	100.0	100.0	98.0
400.0	20	699	98.0	99.0	99.0	97.0
200.0	10	411	96.0	97.0	97.0	95.0

**EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:7 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	103.0	95.0	111.0	105.0	97.0
1,800.0	90	2,641	102.0	94.0	110.0	104.0	96.0
1,600.0	80	2,353	101.0	93.0	109.0	103.0	95.0
1,500.0	75	2,212	101.0	92.0	109.0	103.0	94.0
1,400.0	70	2,071	100.0	92.0	108.0	102.0	94.0
1,200.0	60	1,795	99.0	90.0	107.0	101.0	93.0
1,000.0	50	1,521	98.0	89.0	106.0	100.0	91.0
800.0	40	1,250	96.0	88.0	104.0	99.0	90.0
600.0	30	977	95.0	86.0	103.0	97.0	89.0
500.0	25	839	94.0	86.0	102.0	96.0	88.0
400.0	20	699	93.0	85.0	101.0	95.0	87.0
200.0	10	411	91.0	83.0	99.0	93.0	85.0

**EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:7 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	95.0	96.0	96.0	93.0
1,800.0	90	2,641	94.0	95.0	95.0	92.0
1,600.0	80	2,353	93.0	94.0	94.0	91.0
1,500.0	75	2,212	93.0	93.0	93.0	90.0
1,400.0	70	2,071	92.0	93.0	93.0	90.0
1,200.0	60	1,795	91.0	92.0	92.0	89.0
1,000.0	50	1,521	90.0	90.0	90.0	88.0
800.0	40	1,250	88.0	89.0	89.0	86.0
600.0	30	977	87.0	88.0	88.0	85.0
500.0	25	839	86.0	87.0	87.0	84.0
400.0	20	699	85.0	86.0	86.0	83.0
200.0	10	411	83.0	84.0	84.0	81.0

**EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:15 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	97.0	88.0	105.0	99.0	90.0
1,800.0	90	2,641	96.0	87.0	104.0	98.0	89.0
1,600.0	80	2,353	95.0	86.0	103.0	97.0	88.0
1,500.0	75	2,212	94.0	85.0	102.0	96.0	88.0
1,400.0	70	2,071	94.0	85.0	102.0	96.0	87.0
1,200.0	60	1,795	92.0	84.0	100.0	95.0	86.0
1,000.0	50	1,521	91.0	83.0	99.0	93.0	85.0
800.0	40	1,250	90.0	81.0	98.0	92.0	83.0
600.0	30	977	88.0	80.0	96.0	91.0	82.0
500.0	25	839	88.0	79.0	96.0	90.0	81.0
400.0	20	699	87.0	78.0	95.0	89.0	80.0
200.0	10	411	84.0	76.0	92.0	87.0	78.0

**PERFORMANCE DATA[EM6681]**

October 2, 2025

**EXHAUST:SOUND PRESSURE(OBCF) DISTANCE:15 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	89.0	89.0	89.0	86.0
1,800.0	90	2,641	88.0	88.0	88.0	85.0
1,600.0	80	2,353	87.0	87.0	87.0	84.0
1,500.0	75	2,212	86.0	87.0	87.0	84.0
1,400.0	70	2,071	86.0	86.0	86.0	83.0
1,200.0	60	1,795	84.0	85.0	85.0	82.0
1,000.0	50	1,521	83.0	84.0	84.0	81.0
800.0	40	1,250	82.0	83.0	82.0	80.0
600.0	30	977	80.0	81.0	81.0	78.0
500.0	25	839	80.0	80.0	80.0	77.0
400.0	20	699	79.0	79.0	79.0	76.0
200.0	10	411	76.0	77.0	77.0	74.0

**MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:1 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	105.0	92.0	100.0	101.0	99.0
1,800.0	90	2,641	105.0	92.0	100.0	101.0	99.0
1,600.0	80	2,353	105.0	92.0	100.0	101.0	99.0
1,500.0	75	2,212	105.0	92.0	100.0	101.0	99.0
1,400.0	70	2,071	105.0	92.0	100.0	101.0	99.0
1,200.0	60	1,795	105.0	92.0	100.0	101.0	99.0
1,000.0	50	1,521	105.0	92.0	100.0	101.0	99.0
800.0	40	1,250	105.0	92.0	100.0	101.0	99.0
600.0	30	977	105.0	92.0	100.0	101.0	99.0
500.0	25	839	105.0	92.0	100.0	101.0	99.0
400.0	20	699	105.0	92.0	100.0	101.0	99.0
200.0	10	411	105.0	92.0	100.0	101.0	99.0

**MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:1 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	100.0	101.0	99.0	103.0
1,800.0	90	2,641	100.0	101.0	99.0	103.0
1,600.0	80	2,353	100.0	101.0	99.0	103.0
1,500.0	75	2,212	100.0	101.0	99.0	103.0
1,400.0	70	2,071	100.0	101.0	99.0	103.0
1,200.0	60	1,795	100.0	101.0	99.0	103.0
1,000.0	50	1,521	100.0	101.0	99.0	103.0
800.0	40	1,250	100.0	101.0	99.0	103.0
600.0	30	977	100.0	101.0	99.0	103.0
500.0	25	839	100.0	101.0	99.0	103.0
400.0	20	699	100.0	101.0	99.0	103.0
200.0	10	411	100.0	101.0	99.0	103.0

**MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:7 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	94.0	81.0	88.0	89.0	87.0
1,800.0	90	2,641	94.0	81.0	88.0	89.0	87.0
1,600.0	80	2,353	94.0	81.0	88.0	89.0	87.0
1,500.0	75	2,212	94.0	81.0	88.0	89.0	87.0
1,400.0	70	2,071	94.0	81.0	88.0	89.0	87.0
1,200.0	60	1,795	94.0	81.0	88.0	89.0	87.0
1,000.0	50	1,521	94.0	81.0	88.0	89.0	87.0
800.0	40	1,250	94.0	81.0	88.0	89.0	87.0
600.0	30	977	94.0	81.0	88.0	89.0	87.0
500.0	25	839	94.0	81.0	88.0	89.0	87.0

**PERFORMANCE DATA[EM6681]**

October 2, 2025

400.0	20	699	94.0	81.0	88.0	89.0	87.0
200.0	10	411	94.0	81.0	88.0	89.0	87.0

**MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:7 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	89.0	90.0	87.0	91.0
1,800.0	90	2,641	89.0	90.0	87.0	91.0
1,600.0	80	2,353	89.0	90.0	87.0	91.0
1,500.0	75	2,212	89.0	90.0	87.0	91.0
1,400.0	70	2,071	89.0	90.0	87.0	91.0
1,200.0	60	1,795	89.0	90.0	87.0	91.0
1,000.0	50	1,521	89.0	90.0	87.0	91.0
800.0	40	1,250	89.0	90.0	87.0	91.0
600.0	30	977	89.0	90.0	87.0	91.0
500.0	25	839	89.0	90.0	87.0	91.0
400.0	20	699	89.0	90.0	87.0	91.0
200.0	10	411	89.0	90.0	87.0	91.0

**MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:15 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	OVERALL SOUND	63 HZ	125 HZ	250 HZ	500 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	88.0	76.0	83.0	84.0	82.0
1,800.0	90	2,641	88.0	76.0	83.0	84.0	82.0
1,600.0	80	2,353	88.0	76.0	83.0	84.0	82.0
1,500.0	75	2,212	88.0	76.0	83.0	84.0	82.0
1,400.0	70	2,071	88.0	76.0	83.0	84.0	82.0
1,200.0	60	1,795	88.0	76.0	83.0	84.0	82.0
1,000.0	50	1,521	88.0	76.0	83.0	84.0	82.0
800.0	40	1,250	88.0	76.0	83.0	84.0	82.0
600.0	30	977	88.0	76.0	83.0	84.0	82.0
500.0	25	839	88.0	76.0	83.0	84.0	82.0
400.0	20	699	88.0	76.0	83.0	84.0	82.0
200.0	10	411	88.0	76.0	83.0	84.0	82.0

**MECHANICAL:SOUND PRESSURE(OBCF) DISTANCE:15 METER**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	1000 HZ	2000 HZ	4000 HZ	8000 HZ
EKW	%	BHP	dB(A)	dB(A)	dB(A)	dB(A)
2,000.0	100	2,937	83.0	84.0	82.0	86.0
1,800.0	90	2,641	83.0	84.0	82.0	86.0
1,600.0	80	2,353	83.0	84.0	82.0	86.0
1,500.0	75	2,212	83.0	84.0	82.0	86.0
1,400.0	70	2,071	83.0	84.0	82.0	86.0
1,200.0	60	1,795	83.0	84.0	82.0	86.0
1,000.0	50	1,521	83.0	84.0	82.0	86.0
800.0	40	1,250	83.0	84.0	82.0	86.0
600.0	30	977	83.0	84.0	82.0	86.0
500.0	25	839	83.0	84.0	82.0	86.0
400.0	20	699	83.0	84.0	82.0	86.0
200.0	10	411	83.0	84.0	82.0	86.0

**Emissions Data**

**DIESEL**

**RATED SPEED NOMINAL DATA: 1800 RPM**

GENSET POWER WITH FAN	EKW	2,000.0	1,500.0	1,000.0	500.0	200.0
-----------------------	-----	---------	---------	---------	-------	-------

**PERFORMANCE DATA[EM6681]**

October 2, 2025

FAN						
PERCENT LOAD	%	100	75	50	25	10
ENGINE POWER	BHP	2,937	2,212	1,521	839	411
TOTAL NOX (AS NO2)	G/HR	16,047	8,598	4,842	3,518	2,444
TOTAL CO	G/HR	878	474	497	985	996
TOTAL HC	G/HR	317	386	385	308	333
TOTAL CO2	KG/HR	1,393	1,073	765	430	250
PART MATTER	G/HR	75.3	71.0	87.5	183.4	145.2
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,754.3	1,944.8	1,541.2	1,982.3	2,379.2
TOTAL CO (CORR 5% O2)	MG/NM3	143.3	101.0	151.4	497.5	952.4
TOTAL HC (CORR 5% O2)	MG/NM3	44.7	70.3	99.0	145.9	285.0
PART MATTER (CORR 5% O2)	MG/NM3	10.4	13.1	24.6	85.6	115.2
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	1,022.0	721.7	571.9	735.6	882.9
TOTAL CO (CORR 15% O2)	MG/NM3	53.2	37.5	56.2	184.6	353.4
TOTAL HC (CORR 15% O2)	MG/NM3	16.6	26.1	36.7	54.2	105.8
PART MATTER (CORR 15% O2)	MG/NM3	3.9	4.9	9.1	31.8	42.7
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,342	947	751	966	1,159
TOTAL CO (CORR 5% O2)	PPM	115	81	121	398	762
TOTAL HC (CORR 5% O2)	PPM	83	131	185	272	532
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	498	352	279	358	430
TOTAL CO (CORR 15% O2)	PPM	43	30	45	148	283
TOTAL HC (CORR 15% O2)	PPM	31	49	69	101	197
TOTAL NOX (AS NO2)	G/HP-HR	5.46	3.89	3.18	4.19	5.94
TOTAL CO	G/HP-HR	0.30	0.21	0.33	1.17	2.42
TOTAL HC	G/HP-HR	0.11	0.17	0.25	0.37	0.81
PART MATTER	G/HP-HR	0.03	0.03	0.06	0.22	0.35
TOTAL NOX (AS NO2)	G/KW-HR	7.33	5.21	4.27	5.62	7.97
TOTAL CO	G/KW-HR	0.40	0.29	0.44	1.57	3.25
TOTAL HC	G/KW-HR	0.14	0.23	0.34	0.49	1.08
PART MATTER	G/KW-HR	0.03	0.04	0.08	0.29	0.47
TOTAL NOX (AS NO2)	LB/HR	35.38	18.96	10.68	7.76	5.39
TOTAL CO	LB/HR	1.94	1.05	1.09	2.17	2.20
TOTAL HC	LB/HR	0.70	0.85	0.85	0.68	0.73
TOTAL CO2	LB/HR	3,070	2,365	1,687	949	552
PART MATTER	LB/HR	0.17	0.16	0.19	0.40	0.32
OXYGEN IN EXH	%	10.8	12.3	13.3	14.2	15.8
DRY SMOKE OPACITY	%	0.0	0.0	1.0	3.9	3.2
BOSCH SMOKE NUMBER		0.65	0.68	0.77	1.12	1.06

**RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM**

GENSET POWER WITH FAN						
PERCENT LOAD	%	100	75	50	25	10
ENGINE POWER	BHP	2,937	2,212	1,521	839	411
TOTAL NOX (AS NO2)	G/HR	19,256	10,318	5,811	4,222	2,933
TOTAL CO	G/HR	1,581	854	894	1,773	1,794
TOTAL HC	G/HR	422	514	512	410	442
PART MATTER	G/HR	105.4	99.5	122.5	256.7	203.2
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	3,305.2	2,333.8	1,849.4	2,378.8	2,855.1
TOTAL CO (CORR 5% O2)	MG/NM3	258.0	181.8	272.6	895.6	1,714.4
TOTAL HC (CORR 5% O2)	MG/NM3	59.5	93.5	131.7	194.1	379.0
PART MATTER (CORR 5% O2)	MG/NM3	14.6	18.4	34.4	119.9	161.2
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	1,226.5	866.0	686.3	882.7	1,059.4
TOTAL CO (CORR 15% O2)	MG/NM3	95.7	67.5	101.1	332.3	636.2
TOTAL HC (CORR 15% O2)	MG/NM3	22.1	34.7	48.9	72.0	140.7
PART MATTER (CORR 15% O2)	MG/NM3	5.4	6.8	12.8	44.5	59.8
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,610	1,137	901	1,159	1,391
TOTAL CO (CORR 5% O2)	PPM	206	145	218	716	1,371
TOTAL HC (CORR 5% O2)	PPM	111	175	246	362	708
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	597	422	334	430	516
TOTAL CO (CORR 15% O2)	PPM	77	54	81	266	509
TOTAL HC (CORR 15% O2)	PPM	41	65	91	134	263
TOTAL NOX (AS NO2)	G/HP-HR	6.56	4.67	3.82	5.03	7.13
TOTAL CO	G/HP-HR	0.54	0.39	0.59	2.11	4.36
TOTAL HC	G/HP-HR	0.14	0.23	0.34	0.49	1.08
PART MATTER	G/HP-HR	0.04	0.04	0.08	0.31	0.49
TOTAL NOX (AS NO2)	G/KW-HR	8.79	6.26	5.12	6.75	9.56
TOTAL CO	G/KW-HR	0.72	0.52	0.79	2.83	5.85
TOTAL HC	G/KW-HR	0.19	0.31	0.45	0.65	1.44
PART MATTER	G/KW-HR	0.05	0.06	0.11	0.41	0.66
TOTAL NOX (AS NO2)	LB/HR	42.45	22.75	12.81	9.31	6.47
TOTAL CO	LB/HR	3.48	1.88	1.97	3.91	3.95
TOTAL HC	LB/HR	0.93	1.13	1.13	0.90	0.98

PART MATTER	LB/HR	0.23	0.22	0.27	0.57	0.45
-------------	-------	------	------	------	------	------

### Regulatory Information

EPA EMERGENCY STATIONARY		2011 - ----			CYCLE :D2
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.					
Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR	
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 6.4 PM: 0.20	

### Altitude Derate Data

STANDARD

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTTITUDE (FT)													
0	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,849	2,731	2,937
1,000	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,931	2,820	2,702	2,937
2,000	2,937	2,937	2,937	2,937	2,937	2,937	2,937	2,927	2,876	2,826	2,761	2,614	2,937
3,000	2,937	2,937	2,937	2,937	2,937	2,926	2,873	2,822	2,772	2,724	2,673	2,526	2,937
4,000	2,849	2,849	2,849	2,849	2,849	2,820	2,768	2,719	2,671	2,625	2,581	2,467	2,849
5,000	2,752	2,752	2,752	2,752	2,752	2,716	2,667	2,619	2,573	2,529	2,486	2,350	2,752
6,000	2,659	2,659	2,659	2,659	2,659	2,616	2,569	2,523	2,478	2,436	2,379	2,261	2,659
7,000	2,570	2,570	2,570	2,570	2,567	2,519	2,473	2,429	2,386	2,345	2,261	2,144	2,570
8,000	2,484	2,484	2,484	2,484	2,471	2,425	2,381	2,338	2,297	2,257	2,144	1,968	2,484
9,000	2,401	2,401	2,401	2,401	2,377	2,333	2,291	2,250	2,211	2,172	1,997	1,792	2,401
10,000	2,321	2,321	2,321	2,321	2,287	2,245	2,204	2,165	2,127	1,997	1,792	1,586	2,321
11,000	2,244	2,244	2,244	2,242	2,200	2,159	2,120	2,082	2,027	1,821	1,615	1,439	2,244
12,000	2,171	2,171	2,171	2,156	2,115	2,076	2,038	1,997	1,821	1,615	1,439	1,292	2,171
13,000	2,100	2,100	2,100	2,072	2,033	1,995	1,959	1,850	1,645	1,439	1,292	1,175	2,100
14,000	2,027	2,027	2,027	1,991	1,954	1,917	1,821	1,645	1,469	1,322	1,175	1,028	2,027
15,000	1,938	1,938	1,938	1,913	1,877	1,792	1,674	1,469	1,322	1,175	1,057	940	1,938

### Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
5978226	LL3445	6444290	PG611	-	EZH00001	

### Performance Parameter Reference

Parameters Reference:DM9600-15
PERFORMANCE DEFINITIONS

PERFORMANCE DEFINITIONS DM9600

APPLICATION:

Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request

# PERFORMANCE DATA[EM6681]

October 2, 2025

(SERR) test data shall be noted.

## PERFORMANCE PARAMETER TOLERANCE FACTORS:

Power +/- 3%

Torque +/- 3%

Exhaust stack temperature +/- 8%

Inlet airflow +/- 5%

Intake manifold pressure-gage +/- 10%

Exhaust flow +/- 6%

Specific fuel consumption +/- 3%

Specific fuel consumption (C7-C18) +/- 4%

Fuel rate +/- 5%

Specific DEF consumption +/- 3%

DEF rate +/- 5%

Heat rejection +/- 5%

Heat rejection exhaust only +/- 10%

Heat rejection CEM only +/- 10%

Heat Rejection values based on using treated water.

Torque is included for truck and industrial applications, do not

use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values

are provided for reference only, and may not meet the tolerance

listed.

On 3500 and C175 engines, at speeds below Peak Torque these values

are provided for reference only, and may not meet the tolerance

listed.

These values do not apply to C280/3600. For these models, see the

tolerances listed below.

## C280/3600 HEAT REJECTION TOLERANCE FACTORS:

Heat rejection +/- 10%

Heat rejection to Atmosphere +/- 50%

Heat rejection to Lube Oil +/- 20%

Heat rejection to Aftercooler +/- 5%

## TEST CELL TRANSDUCER TOLERANCE FACTORS:

Torque +/- 0.5%

Speed +/- 0.2%

Fuel flow +/- 1.0%

Temperature +/- 2.0 C degrees

Intake manifold pressure +/- 0.1 kPa

OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995

REFERENCE

## AIR AND FUEL CONDITIONS.

### REFERENCE ATMOSPHERIC INLET AIR

#### FOR 3500 ENGINES AND SMALLER

SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other

engines, reference atmospheric pressure is 100 KPA (29.61 in hg),

and standard temperature is 25deg C (77 deg F) at 30% relative

humidity at the stated aftercooler water temp, or inlet manifold

temp.

#### FOR 3600 ENGINES

Engine rating obtained and presented in accordance with ISO 3046/1

and SAE J1995 JANJAN2014 reference atmospheric pressure is 100

KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F)

at 30% relative humidity and 150M altitude at the stated

aftercooler water temperature.

## MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE

Location for air temperature measurement air cleaner inlet at

stabilized operating conditions.

## REFERENCE EXHAUST STACK DIAMETER

The Reference Exhaust Stack Diameter published with this dataset

is only used for the calculation of Smoke Opacity values displayed

in this dataset. This value does not necessarily represent the

actual stack diameter of the engine due to the variety of exhaust

stack adapter options available. Consult the price list, engine

order or general dimension drawings for the actual stack diameter

size ordered or options available.

## REFERENCE FUEL

### DIESEL

Reference fuel is #2 distillate diesel with a 35API gravity;

A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at

15 deg C (59 deg F), where the density is

850 G/Liter (7.0936 Lbs/Gal).

### GAS

Reference natural gas fuel has a lower heating value of 33.74 KJ/L

(905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500

BTU/CU FT) lower heating value gas. Propane ratings are based on

87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER

(GROSS) LESS

## EXTERNAL AUXILIARY LOAD

Engine corrected gross output includes the power required to drive

standard equipment; lube oil, scavenge lube oil, fuel transfer,

common rail fuel, separate circuit aftercooler and jacket water

pumps. Engine net power available for the external (flywheel)

load is calculated by subtracting the sum of auxiliary load from

the corrected gross flywheel out put power. Typical auxiliary

loads are radiator cooling fans, hydraulic pumps, air compressors

and battery charging alternators. For Tier 4 ratings additional

Parasitic losses would also include Intake, and Exhaust

# PERFORMANCE DATA[EM6681]

October 2, 2025

Restrictions.

## ALTITUDE CAPABILITY

Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set.

Standard temperature values versus altitude could be seen on TM2001.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.

Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

## REGULATIONS AND PRODUCT COMPLIANCE

TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.

Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

## EMISSION CYCLE LIMITS:

Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.

## WET & DRY EXHAUST/EMISSIONS DESCRIPTION:

Wet - Total exhaust flow or concentration of total exhaust flow

Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded

## EMISSIONS DEFINITIONS:

Emissions : DM1176

## EMISSION CYCLE DEFINITIONS

1. For constant-speed marine engines for ship main propulsion, including diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

## HEAT REJECTION DEFINITIONS:

Diesel Circuit Type and HHV Balance : DM9500

## HIGH DISPLACEMENT (HD) DEFINITIONS:

3500: EM1500

## RATING DEFINITIONS:

Agriculture : TM6008

Fire Pump : TM6009

Generator Set : TM6035

Generator (Gas) : TM6041

Industrial Diesel : TM6010

Industrial (Gas) : TM6040

Irrigation : TM5749

Locomotive : TM6037

Marine Auxiliary : TM6036

Marine Prop (Except 3600) : TM5747

Marine Prop (3600 only) : TM5748

MSHA : TM6042

Oil Field (Petroleum) : TM6011

Off-Highway Truck : TM6039

On-Highway Truck : TM6038

## SOUND DEFINITIONS:

Sound Power : DM8702

Sound Pressure : TM7080

Date Released : 03/12/24

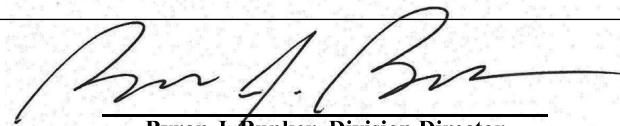


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2025 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

**Certificate Issued To:** Caterpillar Inc.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** SCPXL78.1NZS-031

**Effective Date:**  
08/05/2024  
**Expiration Date:**  
12/31/2025

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
08/05/2024  
**Revision Date:**  
N/A

**Model Year:** 2025  
**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** SCPXL78.1NZS

**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** kW>560  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.



# Cat® C27

## Diesel Generator Sets



Bore – mm (in)	137.2 (5.4)
Stroke – mm (in)	152.4 (6.0)
Displacement – L (in <sup>3</sup> )	27.03 (1649.47)
Compression Ratio	16.5:1
Aspiration	TA
Fuel System	MEUI
Governor Type	ADEM™ A4

Image shown may not reflect actual configuration

Standby 60 Hz ekW (kVA)	Prime 60 Hz ekW (kVA)	Standby 60 Hz ekW (kVA)	Prime 60 Hz ekW (kVA)	Emissions Performance
750 (937)	680 (850)	800 (1000)	725 (906)	U.S. EPA Emergency Stationary Use Only (Tier 2)

### Standard Features

#### Cat® Diesel Engine

- Meets U.S. EPA Emergency Stationary Use Only (Tier 2) emission standards
- Reliable performance proven in thousands of applications worldwide

#### Generator Set Package

- Accepts 100% block load in one step and meets NFPA 110 loading requirements
- Conforms to ISO 8528-5 G3 load acceptance requirements
- Reliability verified through torsional vibration, fuel consumption, oil consumption, transient performance, and endurance testing

#### Alternators

- Superior motor starting capability minimizes need for oversizing generator
- Designed to match performance and output characteristics of Cat diesel engines

#### Cooling System

- Cooling systems available to operate in ambient temperatures up to 50°C (122°F)
- Tested to ensure proper generator set cooling

#### EMCP 4 Control Panels

- User-friendly interface and navigation
- Scalable system to meet a wide range of installation requirements
- Expansion modules and site specific programming for specific customer requirements

#### Warranty

- 24 months/1000-hour warranty for standby and mission critical ratings
- 12 months/unlimited hour warranty for prime and continuous ratings
- Extended service protection is available to provide extended coverage options

#### Worldwide Product Support

- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- Your local Cat dealer provides extensive post-sale support, including maintenance and repair agreements

#### Financing

- Caterpillar offers an array of financial products to help you succeed through financial service excellence
- Options include loans, finance lease, operating lease, working capital, and revolving line of credit
- Contact your local Cat dealer for availability in your region

Provide with energy reducing maint switch

## Optional Equipment

### Engine

#### Air Cleaner

- Single element
- Dual element
- Heavy duty

#### Muffler

- Residential grade (25 dB)

#### Starting

- Standard batteries
- Oversized batteries
- Standard electric starter(s)
- Jacket water

### Alternator

#### Output voltage

- 208V
- 240V
- 480V
- 600V

#### Temperature Rise (over 40°C ambient)

- 150°C
- 125°C
- 105°C
- 80°C

#### Winding type

- Random wound

#### Excitation

- Internal excitation (IE)

#### Attachments

- Anti-condensation heater
- Stator and bearing temperature monitoring and protection

### Power Termination

#### Type

- Bus bar
- Circuit breaker
  - 400A     800A
  - 1200A    1600A
  - 2000A    2500A
  - 3000A
- UL     IEC
- 3-pole    4-pole
- Manually operated
- Electrically operated

#### Trip Unit

- LSI     LSI-G
- LSIG-P

### Factory Enclosure

- Sound attenuated

#### Attachments

- Cold weather bundle
- DC lighting package
- Motorized louvers

### Fuel Tank

- 1000 gal (3785 L)
- 2000 gal (7571 L)
- 3600 gal (13627 L)

### Control System

#### Controller

- EMCP 4.2B
- EMCP 4.3
- EMCP 4.4

#### Attachments

- Local annunciator module
- Remote annunciator module
- Expansion I/O module
- Remote monitoring software

### Charging

- Battery charger – 10A
- Battery charger – 20A
- Battery charger – 30A

### Vibration Isolators

- Rubber
- Spring
- Seismic rated

### Cat Connect

#### Connectivity

- Ethernet
- Cellular
- Satellite

### Extended Service Options

#### Terms

- 2 year (prime)
- 3 year
- 5 year
- 10 year

#### Coverage

- Silver
- Gold
- Platinum
- Platinum Plus

### Ancillary Equipment

- Automatic transfer switch (ATS)
- Uninterruptible power supply (UPS)
- Paralleling switchgear
- Paralleling controls

### Certifications

- UL 2200 Listed
- CSA
- IBC seismic certification
- OSHPD pre-approval

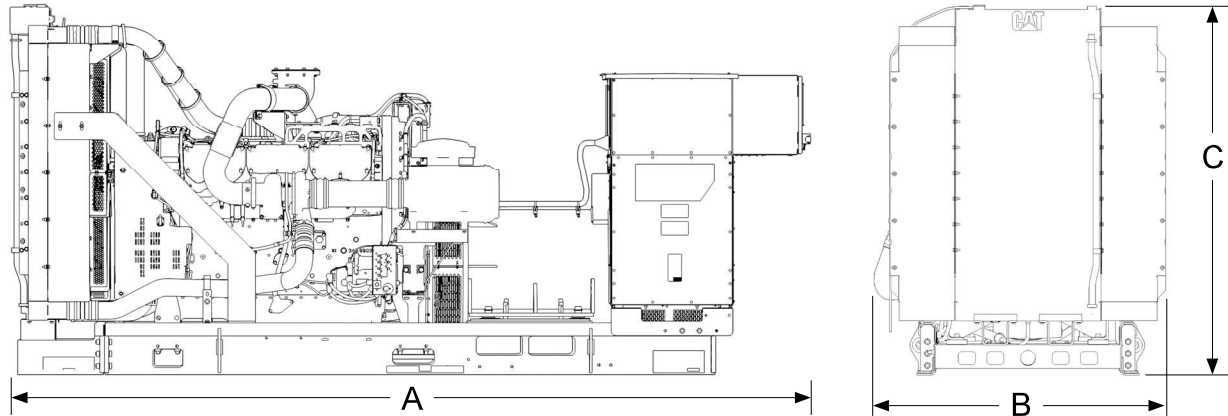
**Note:** Some options may not be available on all models. Certifications may not be available with all model configurations. Consult factory for availability.

**Package Performance**

Performance	Standby		Prime		Standby		Prime	
Frequency	60 Hz		60 Hz		60 Hz		60 Hz	
Gen set power rating with fan	750 ekW		680 ekW		800 ekW		725 ekW	
Gen set power rating with fan @ 0.8 power factor	937 kVA		850 kVA		1000 kVA		906 kVA	
Emissions	EPA ESE (Tier 2)		EPA ESE (Tier 2)		EPA ESE (Tier 2)		EPA ESE (Tier 2)	
Performance number	DM9071-03		DM9073-02		DM7696-02		DM9069-02	
<b>Fuel Consumption</b>								
100% load with fan – L/hr (gal/hr)	202.9	(53.6)	187.4	(49.5)	216.9	(57.3)	199.6	(52.7)
75% load with fan – L/hr (gal/hr)	162.4	(42.9)	149.6	(39.5)	171.7	(45.4)	157.8	(41.7)
50% load with fan – L/hr (gal/hr)	116.2	(30.7)	107.0	(28.3)	122.3	(32.3)	112.5	(29.7)
25% load with fan – L/hr (gal/hr)	70.6	(18.7)	66.0	(17.4)	73.9	(19.5)	69.0	(18.2)
<b>Cooling System</b>								
Radiator air flow restriction (system) – kPa (in. water)	0.12	(0.48)	0.12	(0.48)	0.12	(0.48)	0.12	(0.48)
Radiator air flow – m <sup>3</sup> /min (cfm)	1200	(42377)	1200	(42377)	1200	(42377)	1200	(42377)
Engine coolant capacity – L (gal)	55.0	(14.5)	55.0	(14.5)	55.0	(14.5)	55.0	(14.5)
Radiator coolant capacity – L (gal)	41.0	(10.0)	41.0	(10.0)	41.0	(10.0)	41.0	(10.0)
Total coolant capacity – L (gal)	96.0	(24.5)	96.0	(24.5)	96.0	(24.5)	96.0	(24.5)
<b>Inlet Air</b>								
Combustion air inlet flow rate – m <sup>3</sup> /min (cfm)	58.7	(2073.6)	56.0	(1977.7)	62.8	(2216.4)	60.3	(2129.4)
<b>Exhaust System</b>								
Exhaust stack gas temperature – °C (°F)	509.3	(948.7)	502.5	(936.5)	511.4	(952.5)	500.6	(933.0)
Exhaust gas flow rate – m <sup>3</sup> /min (cfm)	158.9	(5610.2)	149.7	(5285.5)	170.3	(6011.7)	160.7	(5674.4)
Exhaust system backpressure (maximum allowable) – kPa (in. water)	6.7	(27.0)	6.7	(27.0)	6.7	(27.0)	6.7	(27.0)
<b>Heat Rejection</b>								
Heat rejection to jacket water – kW (Btu/min)	324	(18441)	307	(17433)	330	(18785)	320	(18191)
Heat rejection to exhaust (total) – kW (Btu/min)	738	(41994)	693	(39387)	796	(45257)	741	(42135)
Heat rejection to aftercooler – kW (Btu/min)	139	(7898)	123	(6970)	162	(9235)	146	(8320)
Heat rejection to atmosphere from engine – kW (Btu/min)	110	(6249)	92	(5238)	110	(6240)	89	(5074)
Heat rejection from alternator – kW (Btu/min)	53	(3014)	47	(2644)	40	(2292)	37	(2081)
<b>Emissions* (Nominal)</b>								
NOx mg/Nm <sup>3</sup> (g/hp-h)	2637.1	(5.25)	2330.9	(4.68)	2580.0	(5.18)	2283.7	(4.61)
CO mg/Nm <sup>3</sup> (g/hp-h)	123.9	(0.25)	147.4	(0.29)	115.1	(0.23)	135.6	(0.27)
HC mg/Nm <sup>3</sup> (g/hp-h)	11.2	(0.03)	10.9	(0.02)	12.5	(0.03)	12.2	(0.03)
PM mg/Nm <sup>3</sup> (g/hp-h)	8.8	(0.02)	8.8	(0.02)	9.7	(0.02)	9.0	(0.02)

\*mg/Nm<sup>3</sup> levels are corrected to 5% O<sub>2</sub>. Contact your local Cat dealer for further information.

## Weights and Dimensions



Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
4674 (184.0)	1723 (67.8)	2162 (85.1)	6622 (14,600)

**Note:** For reference only. Do not use for installation design. Contact your local Cat dealer for precise weights and dimensions.

## Ratings Definitions

### Standby

Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

### Prime

Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated kW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

### Applicable Codes and Standards

AS 1359, CSA C22.2 No. 100-04, UL 142, UL 489, UL 869, UL 2200, NFPA 37, NFPA 70, NFPA 99, NFPA 110, IBC, IEC 60034-1, ISO 3046, ISO 8528, NEMA MG1-22, NEMA MG1-33, 2014/35/EU, 2006/42/EC, 2014/30/EU.

**Note:** Codes may not be available in all model configurations. Please consult your local Cat dealer for availability.

### Data Center Applications

- ISO 8528-1 Data Center Power (DCP) compliant per DCP application of Cat diesel generator set prime power rating.
- All ratings Tier III/Tier IV compliant per Uptime Institute requirements.
- All ratings ANSI/TIA-942 compliant for Rated-1 through Rated-4 data centers.

### Fuel Rates

Fuel rates are based on fuel oil of 35° API [16°C (60°F)] gravity having an LHV of 42,780 kJ/kg (18,390 Btu/lb) when used at 29°C (85°F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.)

[www.cat.com/electricpower](http://www.cat.com/electricpower)

©2019 Caterpillar

All rights reserved.

Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication.

# PERFORMANCE DATA [C27DRA1]

APRIL 14, 2025

For Help Desk Phone Numbers [Click here](#)

Perf No: DM7696

Change Level: 04

[General](#)

[Heat Rejection](#)

[Emissions](#)

[Regulatory](#)

[Altitude Derate](#)

[Cross Reference](#)

[Perf Param Ref](#)

[View PDF](#)

<b>SALES MODEL:</b>	C27	<b>COMBUSTION:</b>	DIRECT INJECTION
<b>BRAND:</b>	CAT	<b>ENGINE SPEED (RPM):</b>	1,800
<b>MACHINE SALES MODEL:</b>		<b>HERTZ:</b>	60
<b>ENGINE POWER (BHP):</b>	1,214	<b>FAN POWER (HP):</b>	39.3
<b>GEN POWER WITH FAN (EKW):</b>	800.0	<b>ASPIRATION:</b>	TA
<b>COMPRESSION RATIO:</b>	16.5	<b>AFTERCOOLER TYPE:</b>	ATAAC
<b>RATING LEVEL:</b>	STANDBY	<b>AFTERCOOLER CIRCUIT TYPE:</b>	JW+OC, ATAAC
<b>PUMP QUANTITY:</b>	1	<b>INLET MANIFOLD AIR TEMP (F):</b>	120
<b>FUEL TYPE:</b>	DIESEL	<b>JACKET WATER TEMP (F):</b>	210.2
<b>MANIFOLD TYPE:</b>	DRY	<b>TURBO CONFIGURATION:</b>	PARALLEL
<b>GOVERNOR TYPE:</b>	ADEM4	<b>TURBO QUANTITY:</b>	2
<b>ELECTRONICS TYPE:</b>	ADEM4	<b>TURBOCHARGER MODEL:</b>	GTA5008BS-56T-1.60
<b>IGNITION TYPE:</b>	CI	<b>CERTIFICATION YEAR:</b>	2010
<b>INJECTOR TYPE:</b>	EUI	<b>PISTON SPD @ RATED ENG SPD (FT/MIN):</b>	1,800.0
<b>REF EXH STACK DIAMETER (IN):</b>	10		
<b>MAX OPERATING ALTITUDE (FT):</b>	7,999		

INDUSTRY	SUB INDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

## General Performance Data [Top](#)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR
800.0	100	1,190	318	0.331	0.323	55.6	54.3
720.0	90	1,073	286	0.335	0.327	50.7	49.5
640.0	80	957	255	0.340	0.332	45.9	44.8
600.0	75	900	240	0.342	0.334	43.4	42.3
560.0	70	842	225	0.343	0.335	40.7	39.8
480.0	60	728	194	0.345	0.337	35.4	34.6
400.0	50	615	164	0.346	0.338	30.0	29.3
320.0	40	504	135	0.350	0.342	24.9	24.3
240.0	30	393	105	0.358	0.350	19.9	19.4
200.0	25	337	90	0.364	0.356	17.3	16.9
160.0	20	280	75	0.375	0.366	14.8	14.5
80.0	10	162	43	0.435	0.424	9.9	9.7

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
800.0	100	1,190	57.6	119.1	1,222.8	40.4	947.8	60	358.0
720.0	90	1,073	52.4	114.5	1,188.5	36.5	928.9	55	336.7
640.0	80	957	46.8	113.1	1,161.4	32.2	916.5	49	314.8
600.0	75	900	43.7	112.4	1,146.4	29.8	909.6	46	302.1

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
560.0	70	842	40.0	110.4	1,127.0	27.3	899.9	42	285.8
480.0	60	728	32.3	105.7	1,078.4	22.3	873.1	34	253.8
400.0	50	615	24.7	100.8	1,016.5	17.4	836.5	26	222.4
320.0	40	504	18.1	97.0	935.5	13.5	782.1	19	192.2
240.0	30	393	12.4	93.9	835.3	10.2	709.3	13	162.3
200.0	25	337	9.7	92.6	777.5	8.8	665.6	11	147.3
160.0	20	280	7.4	91.9	713.5	7.6	615.6	8	133.7
80.0	10	162	3.9	92.8	564.1	5.7	492.7	5	114.1

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
800.0	100	1,190	2,200.4	5,943.3	9,469.4	9,863.6	2,076.2	1,881.0
720.0	90	1,073	2,097.2	5,567.7	9,001.3	9,361.3	1,971.4	1,791.5
640.0	80	957	1,963.0	5,142.0	8,402.0	8,727.5	1,837.1	1,673.5
600.0	75	900	1,885.5	4,904.2	8,059.1	8,366.8	1,760.9	1,606.0
560.0	70	842	1,799.8	4,638.3	7,681.5	7,970.5	1,677.4	1,531.7
480.0	60	728	1,618.3	4,074.9	6,886.8	7,138.0	1,503.3	1,376.0
400.0	50	615	1,433.7	3,494.4	6,083.9	6,296.9	1,325.5	1,216.1
320.0	40	504	1,270.3	2,963.8	5,377.5	5,554.2	1,173.5	1,081.6
240.0	30	393	1,120.0	2,452.2	4,733.6	4,874.4	1,031.4	956.7
200.0	25	337	1,049.0	2,200.7	4,431.9	4,554.8	961.6	895.5
160.0	20	280	985.8	1,964.5	4,163.7	4,268.7	898.3	840.7
80.0	10	162	894.5	1,565.5	3,772.7	3,843.3	808.2	766.0

## Heat Rejection Data [Top](#)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
800.0	100	1,190	18,779	5,849	44,601	25,213	6,438	9,057	50,481	120,880	128,767
720.0	90	1,073	17,808	4,992	41,200	23,106	5,876	8,008	45,509	110,318	117,517
640.0	80	957	16,691	4,461	37,677	21,034	5,311	6,786	40,598	99,707	106,213
600.0	75	900	15,607	4,786	35,758	19,900	5,022	6,124	38,160	94,283	100,435
560.0	70	842	14,638	4,988	33,616	18,603	4,718	5,397	35,720	88,579	94,359
480.0	60	728	13,512	4,464	29,060	15,798	4,100	4,083	30,880	76,976	81,999
400.0	50	615	11,598	4,504	24,410	12,913	3,477	2,962	26,073	65,288	69,549
320.0	40	504	10,383	3,959	19,934	10,055	2,886	2,050	21,390	54,180	57,716
240.0	30	393	9,677	2,739	15,613	7,277	2,301	1,296	16,686	43,193	46,011
200.0	25	337	9,195	2,146	13,533	5,943	2,007	969	14,304	37,688	40,147
160.0	20	280	8,507	1,714	11,540	4,657	1,717	697	11,882	32,236	34,340
80.0	10	162	6,156	1,807	7,874	2,218	1,152	322	6,882	21,629	23,040

## Emissions Data [Top](#)

Units Filter All Units

### DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

<b>GENSET POWER WITH FAN ENGINE POWER PERCENT LOAD</b>	<b>EKW BHP %</b>	<b>800.0 1,190 100</b>	<b>600.0 900 75</b>	<b>400.0 615 50</b>	<b>200.0 337 25</b>	<b>80.0 162 10</b>
TOTAL NOX (AS NO2)	G/HR	5,956	3,529	2,229	1,524	818
TOTAL CO	G/HR	280	349	332	272	326
TOTAL HC	G/HR	33	46	47	37	51
TOTAL CO2	KG/HR	553	431	296	169	97
PART MATTER	G/HR	27.0	28.2	46.7	51.5	52.4
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	2,510.3	1,919.2	1,785.7	2,213.4	2,077.7
TOTAL CO	(CORR 5% O2) MG/NM3	118.7	192.5	268.7	409.6	929.9
TOTAL HC	(CORR 5% O2) MG/NM3	12.0	22.0	33.0	49.4	126.4
PART MATTER	(CORR 5% O2) MG/NM3	9.4	12.9	31.8	65.1	130.6
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	1,223	935	870	1,078	1,012
TOTAL CO	(CORR 5% O2) PPM	95	154	215	328	744
TOTAL HC	(CORR 5% O2) PPM	22	41	62	92	236
TOTAL NOX (AS NO2)	G/HP-HR	5.05	3.94	3.64	4.53	5.06
TOTAL CO	G/HP-HR	0.24	0.39	0.54	0.81	2.02
TOTAL HC	G/HP-HR	0.03	0.05	0.08	0.11	0.31
PART MATTER	G/HP-HR	0.02	0.03	0.08	0.15	0.32
TOTAL NOX (AS NO2)	LB/HR	13.13	7.78	4.91	3.36	1.80
TOTAL CO	LB/HR	0.62	0.77	0.73	0.60	0.72
TOTAL HC	LB/HR	0.07	0.10	0.10	0.08	0.11
TOTAL CO2	LB/HR	1,219	950	652	372	214
PART MATTER	LB/HR	0.06	0.06	0.10	0.11	0.12
OXYGEN IN EXH	%	9.0	10.1	11.3	13.5	16.2
DRY SMOKE OPACITY	%	0.3	1.3	2.8	4.8	5.3
BOSCH SMOKE NUMBER		0.15	0.44	1.05	1.58	1.69

### RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

<b>GENSET POWER WITH FAN ENGINE POWER PERCENT LOAD</b>	<b>EKW BHP %</b>	<b>800.0 1,190 100</b>	<b>600.0 900 75</b>	<b>400.0 615 50</b>	<b>200.0 337 25</b>	<b>80.0 162 10</b>
TOTAL NOX (AS NO2)	G/HR	7,207	4,271	2,697	1,844	990
TOTAL CO	G/HR	523	652	620	510	610
TOTAL HC	G/HR	62	87	89	71	96
PART MATTER	G/HR	52.7	55.0	91.2	100.4	102.2
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	3,037.5	2,322.3	2,160.7	2,678.2	2,514.0
TOTAL CO	(CORR 5% O2) MG/NM3	221.9	360.0	502.4	766.0	1,738.9
TOTAL HC	(CORR 5% O2) MG/NM3	22.7	41.5	62.3	93.4	239.0
PART MATTER	(CORR 5% O2) MG/NM3	18.3	25.1	62.1	126.9	254.7
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	1,479	1,131	1,052	1,305	1,225
TOTAL CO	(CORR 5% O2) PPM	178	288	402	613	1,391
TOTAL HC	(CORR 5% O2) PPM	42	78	116	174	446
TOTAL NOX (AS NO2)	G/HP-HR	6.11	4.77	4.40	5.48	6.12
TOTAL CO	G/HP-HR	0.44	0.73	1.01	1.52	3.77
TOTAL HC	G/HP-HR	0.05	0.10	0.15	0.21	0.59
PART MATTER	G/HP-HR	0.04	0.06	0.15	0.30	0.63
TOTAL NOX (AS NO2)	LB/HR	15.89	9.41	5.95	4.07	2.18
TOTAL CO	LB/HR	1.15	1.44	1.37	1.12	1.34
TOTAL HC	LB/HR	0.14	0.19	0.20	0.16	0.21
PART MATTER	LB/HR	0.12	0.12	0.20	0.22	0.23

## Regulatory Information [Top](#)

### EPA TIER 2

2006 - 2010

GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.

Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 2	CO: 3.5 NOx + HC: 6.4 PM: 0.20

### EPA EMERGENCY STATIONARY

2011 - ----

GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.

Locality	Agency	Regulation	Tier/Stage	Max Limits - G/BKW - HR
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 6.4 PM: 0.20

# Altitude Derate Data [Top](#)

## STANDARD

### ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	50	60	70	80	90	100	110	120	130	NORMAL
ALTITUDE (FT)										
0	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
1,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
2,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
3,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
4,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
5,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214
6,000	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,214	1,197	1,214
7,000	1,214	1,214	1,214	1,214	1,214	1,212	1,191	1,170	1,150	1,214
8,000	1,214	1,214	1,214	1,207	1,185	1,164	1,144	1,124	1,105	1,214
9,000	1,214	1,204	1,181	1,159	1,138	1,118	1,098	1,079	1,061	1,214
10,000	1,178	1,155	1,134	1,113	1,092	1,073	1,054	1,036	1,018	1,195
11,000	1,130	1,108	1,088	1,068	1,048	1,029	1,011	994	977	1,154
12,000	1,084	1,063	1,043	1,024	1,005	987	970	953	937	1,115
13,000	1,039	1,019	1,000	981	964	946	930	914	898	1,077
14,000	996	977	958	940	923	907	891	876	861	1,039
15,000	954	935	918	901	884	868	853	838	824	1,003

## Cross Reference [Top](#)

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K7925	PP5660	2671232	GS327	-	MJE00001	
3704841	GG0523	3495619	GS603	LS	MJE00001	
0K4031	GG0383	3541450	GS582	-	PEN00001	
3704841	GG0523	3884919	GS603	-	MJE00001	
3704841	GG0523	6034727	PG458	-	MJE00001	

## Performance Parameter Reference [Top](#)

### Parameters Reference: DM9600 - 15

#### PERFORMANCE DEFINITIONS

#### PERFORMANCE DEFINITIONS DM9600

**APPLICATION:** Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

**PERFORMANCE PARAMETER TOLERANCE FACTORS:** Power +/- 3% Torque +/- 3% Exhaust stack temperature +/- 8% Inlet airflow +/- 5% Intake manifold pressure-gage +/- 10% Exhaust flow +/- 6% Specific fuel consumption +/- 3% Specific fuel consumption (C7-C18) +/- 4% Fuel rate +/- 5% Specific DEF consumption +/- 3% DEF rate +/- 5% Heat rejection +/- 5% Heat rejection exhaust only +/- 10% Heat rejection CEM only +/- 10% Heat Rejection values based on using treated water.

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.

On 3500 and C175 engines, at speeds below Peak Torque these values are provided for reference only, and may not meet the tolerance listed.

These values do not apply to C280/3600. For these models, see the tolerances listed below.

**C280/3600 HEAT REJECTION TOLERANCE FACTORS:** Heat rejection +/- 10% Heat rejection to Atmosphere +/- 50% Heat rejection to Lube Oil +/- 20% Heat rejection to Aftercooler +/- 5%

**TEST CELL TRANSDUCER TOLERANCE FACTORS:** Torque +/- 0.5% Speed +/- 0.2% Fuel flow +/- 1.0% Temperature +/- 2.0 C degrees Intake manifold pressure +/- 0.1 kPa  
OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

**REFERENCE ATMOSPHERIC INLET AIR FOR 3500 ENGINES AND SMALLER** SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.  
**FOR 3600 ENGINES** Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

**MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE** Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

**REFERENCE EXHAUST STACK DIAMETER** The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

**REFERENCE FUEL DIESEL** Reference fuel is #2 distillate diesel with a 35API gravity; A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 Lbs/Gal).  
**GAS** Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

**ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD** Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

**ALTITUDE CAPABILITY** Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set. Standard temperature values versus altitude could be seen on TM2001.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet. Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001. Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

**REGULATIONS AND PRODUCT COMPLIANCE** TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative. Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

**EMISSION CYCLE LIMITS:** Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.

**WET & DRY EXHAUST/EMISSIONS DESCRIPTION:** Wet - Total exhaust flow or concentration of total exhaust flow Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded

**EMISSIONS DEFINITIONS:** Emissions : DM1176

#### **EMISSION CYCLE DEFINITIONS**

1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

**HEAT REJECTION DEFINITIONS:** Diesel Circuit Type and HHV Balance : DM9500

**HIGH DISPLACEMENT (HD) DEFINITIONS:** 3500: EM1500

**RATING DEFINITIONS:** Agriculture : TM6008

Fire Pump : TM6009  
Generator Set : TM6035  
Generator (Gas) : TM6041  
Industrial Diesel : TM6010  
Industrial (Gas) : TM6040  
Irrigation : TM5749  
Locomotive : TM6037  
Marine Auxiliary : TM6036  
Marine Prop (Except 3600) : TM5747  
Marine Prop (3600 only) : TM5748  
MSHA : TM6042  
Oil Field (Petroleum) : TM6011  
Off-Highway Truck : TM6039  
On-Highway Truck : TM6038

**SOUND DEFINITIONS:** Sound Power : DM8702  
Sound Pressure : TM7080

---

Caterpillar Confidential: **Green**

Content Owner: Commercial Processes Division

Web Master(s): [PSG Web Based Systems Support](#)

Current Date: 4/14/2025, 12:47:13 PM

© Caterpillar Inc. 2025 All Rights Reserved.

[Data Privacy Statement.](#)

[Cookie Settings](#)

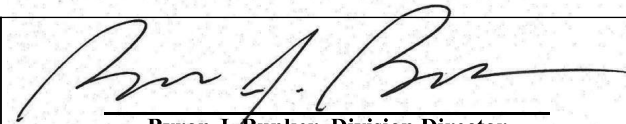


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2025 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105

**Certificate Issued To:** Caterpillar Inc.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** SCPXL27.0NZS-028

**Effective Date:**  
08/05/2024  
**Expiration Date:**  
12/31/2025

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
08/05/2024  
**Revision Date:**  
N/A

**Model Year:** 2025  
**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** SCPXL27.0NZS

**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** 560<kW<=2237  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Standby & Prime: 60Hz



Image shown might not reflect actual configuration

Engine Model	Cat® C15 In-line 6, 4-cycle Diesel
Bore x Stroke	137 mm x 171 mm (5.4 in x 6.8 in)
Displacement	15.2 L (928 in³)
Compression Ratio	16.1:1
Aspiration	Turbocharged Air-to-Air Aftercooled
Fuel Injection System	MEUI
Governor	Electronic ADEM™ A4

Model	Standby	Prime	Emission Strategy
<b>C15</b>	<b>500 ekW, 625 kVA</b>	<b>455 ekW, 569 kVA</b>	<b>TIER II Non-Road</b>

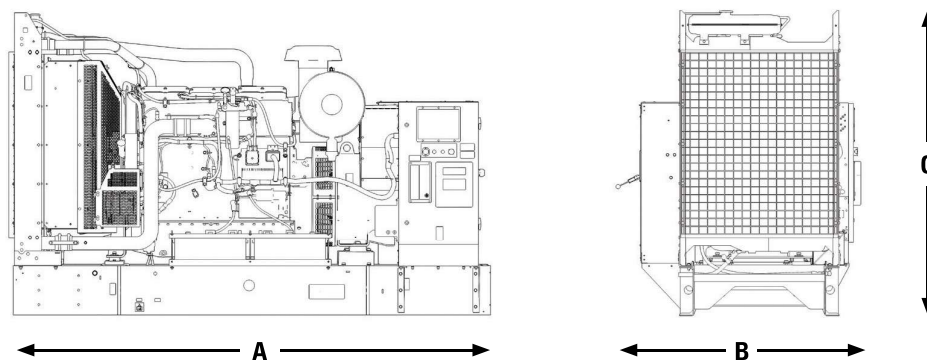
### PACKAGE PERFORMANCE

Performance	Standby	Prime
Frequency	60 Hz	
Genset Power Rating	625 kVA	569 kVA
Genset power rating with fan @ 0.8 power factor	500 ekW	455 ekW
Emissions	TIER II Non-Road	
Performance Number	DM8155	DM8154
<b>Fuel Consumption</b>		
100% load with fan, L/hr (gal/hr)	133.9 (35.3)	126.3 (33.3)
75% load with fan, L/hr (gal/hr)	108.0 (28.5)	97.2 (25.6)
50% load with fan, L/hr (gal/hr)	69.7 (18.4)	63.9 (16.8)
25% load with fan, L/hr (gal/hr)	40.9 (10.8)	38.2 (10.0)
<b>Cooling System<sup>1</sup></b>		
Radiator air flow restriction (system), kPa (in. water)	0.12 (0.48)	0.12 (0.48)
Radiator air flow, m³/min (CFM)	720 (25426)	720 (25426)
Engine coolant capacity, L (gal)	20.8 (5.5)	20.8 (5.5)
Radiator coolant capacity, L (gal)	54 (14)	54 (14)
Total coolant capacity, L (gal)	75 (20)	75 (20)
<b>Inlet Air</b>		
Combustion air inlet flow rate, m³/min (CFM)	38.2 (1349)	38.2 (1349)
Max. Allowable Combustion Air Inlet Temp, °C (°F)	49 (120)	49 (120)
<b>Exhaust System</b>		
Exhaust stack gas temperature, °C (°F)	531 (988)	524 (975)
Exhaust gas flow rate, m³/min (CFM)	109.6 (3870)	101.2 (3573.4)
Exhaust system backpressure (maximum allowable), kPa (in. water)	10.0 (40.0)	10.0 (40.0)
<b>Heat Rejection</b>		
Heat rejection to jacket water, kW (BTU/min)	182 (10375)	172 (9781)
Heat rejection to exhaust (total), kW (BTU/min)	493 (28036)	483 (27467)
Heat rejection to aftercooler, kW (BTU/min)	121 (6881)	120 (6824)
Heat rejection to atmosphere from engine, kW (BTU/min)	91 (5175)	87 (4947)

Emissions (Nominal) <sup>2</sup>	Standby	Prime
NOx, mg/Nm <sup>3</sup> (g/hp-hr)	2129.1 (4.6)	1554.5 (3.6)
CO, mg/Nm <sup>3</sup> (g/hp-hr)	301.5 (0.6)	362.9 (0.8)
HC, mg/Nm <sup>3</sup> (g/hp-hr)	8.8 (0.03)	12.2 (0.04)
PM, mg/Nm <sup>3</sup> (g/hp-hr)	9.5 (0.03)	11.9 (0.03)

Alternator <sup>3</sup>											
Duty Cycle		Standby					Prime				
Phase		3-Phase					3-Phase				
Voltages, V		208	220	240	480	600	208	220	240	480	600
Current, Amps		1735	1640	1504	752	601	1579	1493	1368	684	547
Frame: LC6124F Excitation: AREP	Temperature Rise @ 40°C	150	130	130	130	130	125	105	105	105	105
	Motor Starting Capability @ 30% Voltage Dip, skVA	1325	1466	1712	1712	1714	1325	1466	1712	1712	1714
Frame: LC6124G Excitation: AREP	Temperature Rise @ 40°C	130	130	105	105	105	105	105	105	105	105
	Motor Starting Capability @ 30% Voltage Dip, skVA	1335	1479	1729	1729	1731	1335	1479	1729	1729	1731
Frame: LC7024H Excitation: AREP	Temperature Rise @ 40°C					130					105
	Motor Starting Capability @ 30% Voltage Dip, skVA					2023					2023
Frame: LC7024J Excitation: AREP	Temperature Rise @ 40°C	105	105	105	105		80	80	80	80	
	Motor Starting Capability @ 30% Voltage Dip, skVA	1524	1694	1993	1993		1524	1694	1993	1993	
Frame: LC7024F Excitation: AREP	Temperature Rise @ 40°C	130	105	105			105	105	80		
	Motor Starting Capability @ 30% Voltage Dip, skVA	1248	1387	1633			1248	1387	1633		
Frame: LC6114F Excitation: SE	Temperature Rise @ 40°C	150	130	130	130		125	105	105	105	
	Motor Starting Capability @ 30% Voltage Dip, skVA	1104	1222	1428	1428		1104	1222	1428	1428	
Frame: LC6114G Excitation: SE	Temperature Rise @ 40°C	130	130	105	105		105	105	105	105	
	Motor Starting Capability @ 30% Voltage Dip, skVA	1116	1236	1445	1445		1116	1236	1445	1445	

## WEIGHTS & DIMENSIONS



Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
3476 (137)	1628 (64)	2128 (84)	4365 (9623)

**Note:** General configuration not to be used for installation. See general dimension drawings for detail.

### APPLICABLE CODES AND STANDARDS:

CSA C22.2 No 100-04, UL142, UL489, UL869, cUL/UL2200, NFPA 37, NFPA 70, NFPA 99, NFPA 110, IBC, IEC60034-1, ISO 3046, ISO 8528, NEMA MG 1-33.

Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

**STANDBY:** Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

**PRIME:** Output available with varying load for an unlimited time. Average power output is 70% of the prime power rating. Typical peak demand is 100% of prime rated kW with 10% overload capability for emergency use for a maximum of 1 hour in 12. Overload operation cannot exceed 25 hours per year.

**RATINGS:** Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

### DEFINITIONS AND CONDITIONS

<sup>1</sup> For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

<sup>2</sup> Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 BTU/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

<sup>3</sup> UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

## LET'S DO THE WORK.™

LEHE1577-04 (10/24)

[www.cat.com/electricpower](http://www.cat.com/electricpower)

© 2024 Caterpillar. All Rights Reserved.

Materials and specifications are subject to change without notice. The International System of Units (SI) is used in this publication. CAT, CATERPILLAR, LET'S DO THE WORK, their respective logos, "Caterpillar Corporate Yellow", the "Power Edge" and Cat "Modern Hex" trade dress as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission.

# PERFORMANCE DATA [LS6136]

APRIL 15, 2025

For Help Desk Phone Numbers [Click here](#)

Perf No: DM8155

Change Level: 06

[General](#)    
 [Heat Rejection](#)    
 [Emissions](#)    
 [Regulatory](#)    
 [Altitude Derate](#)    
 [Cross Reference](#)    
 [Perf Param Ref](#)

View PDF

<b>SALES MODEL:</b>	C15	<b>COMBUSTION:</b>	DIRECT INJECTION
<b>BRAND:</b>	CAT	<b>ENGINE SPEED (RPM):</b>	1,800
<b>MACHINE SALES MODEL:</b>		<b>HERTZ:</b>	60
<b>ENGINE POWER (BHP):</b>	762	<b>FAN POWER (HP):</b>	19.4
<b>GEN POWER WITH FAN (EKW):</b>	500.0	<b>ADDITIONAL PARASITICS (HP):</b>	14.2
<b>COMPRESSION RATIO:</b>	16.1	<b>ASPIRATION:</b>	TA
<b>RATING LEVEL:</b>	STANDBY	<b>AFTERCOOLER TYPE:</b>	ATAAC
<b>PUMP QUANTITY:</b>	1	<b>AFTERCOOLER CIRCUIT TYPE:</b>	JW+OC, ATAAC
<b>FUEL TYPE:</b>	DIESEL	<b>INLET MANIFOLD AIR TEMP (F):</b>	120
<b>MANIFOLD TYPE:</b>	DRY	<b>JACKET WATER TEMP (F):</b>	192.2
<b>GOVERNOR TYPE:</b>	ELEC	<b>TURBO CONFIGURATION:</b>	SINGLE
<b>CAMSHAFT TYPE:</b>	STANDARD	<b>TURBO QUANTITY:</b>	1
<b>IGNITION TYPE:</b>	CI	<b>TURBO CHARGER MODEL:</b>	GTA5518BS-56T-1.58
<b>INJECTOR TYPE:</b>	EUI	<b>CERTIFICATION YEAR:</b>	2006
<b>REF EXH STACK DIAMETER (IN):</b>	6	<b>PISTON SPD @ RATED ENG SPD (FT/MIN):</b>	2,025.0
<b>MAX OPERATING ALTITUDE (FT):</b>	3,281		

INDUSTRY	SUB INDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

## General Performance Data [Top](#)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)	ELEC SPEC FUEL CONSUMPTN (ESFC)	ISO ELEC SPEC FUEL CONSUMPTN (ESFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR	LB/EKW-HR	LB/EKW-HR
500.0	100	762	361	0.333	0.330	35.7	35.4	0.507	0.502
450.0	90	683	324	0.348	0.345	33.5	33.2	0.528	0.523
400.0	80	607	288	0.358	0.355	30.6	30.3	0.543	0.538
375.0	75	570	271	0.358	0.355	28.8	28.5	0.545	0.540
350.0	70	534	253	0.356	0.353	26.8	26.5	0.543	0.538
300.0	60	462	219	0.347	0.344	22.6	22.4	0.535	0.530
250.0	50	392	186	0.336	0.333	18.6	18.4	0.527	0.522
200.0	40	323	153	0.339	0.336	15.4	15.3	0.547	0.542
150.0	30	253	120	0.347	0.344	12.4	12.3	0.586	0.580
125.0	25	218	103	0.355	0.352	10.9	10.8	0.619	0.613
100.0	20	182	86	0.368	0.364	9.4	9.4	0.670	0.663
50.0	10	109	52	0.420	0.416	6.5	6.4	0.917	0.908

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
500.0	100	762	68.2	120.4	1,296.3	46.8	988.0	73	405.8
450.0	90	683	67.0	119.4	1,280.7	45.9	973.8	72	402.2
400.0	80	607	61.6	115.2	1,250.1	42.3	956.6	66	381.3

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
375.0	75	570	56.4	111.0	1,229.5	38.8	947.8	61	361.0
350.0	70	534	50.1	106.0	1,205.6	34.6	938.3	54	336.1
300.0	60	462	36.6	95.5	1,148.6	25.6	915.7	40	282.1
250.0	50	392	24.0	86.2	1,080.0	17.4	887.9	27	229.6
200.0	40	323	16.9	83.6	1,003.8	13.3	838.1	19	195.0
150.0	30	253	11.3	81.0	910.6	10.2	768.4	13	165.5
125.0	25	218	9.1	79.8	857.1	9.0	725.6	11	152.7
100.0	20	182	7.0	78.6	795.3	8.0	674.7	9	140.6
50.0	10	109	3.3	76.2	639.0	6.1	542.9	5	118.5

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
500.0	100	762	1,347.7	3,869.5	6,001.8	6,255.3	1,314.2	1,190.7
450.0	90	683	1,345.2	3,807.0	5,981.4	6,219.2	1,305.8	1,188.3
400.0	80	607	1,283.7	3,578.0	5,686.7	5,904.2	1,242.2	1,133.6
375.0	75	570	1,219.4	3,368.7	5,381.2	5,585.8	1,176.8	1,074.2
350.0	70	534	1,139.2	3,114.4	5,001.5	5,191.7	1,095.3	999.6
300.0	60	462	965.5	2,567.9	4,183.5	4,344.1	918.0	837.4
250.0	50	392	799.0	2,042.2	3,407.8	3,539.6	745.1	680.1
200.0	40	323	697.8	1,709.3	2,959.9	3,069.2	647.6	593.2
150.0	30	253	615.8	1,417.7	2,601.3	2,689.1	567.6	523.1
125.0	25	218	581.8	1,286.6	2,454.7	2,532.1	533.7	493.8
100.0	20	182	551.1	1,160.5	2,322.2	2,389.2	503.0	467.8
50.0	10	109	497.4	916.4	2,088.6	2,134.4	449.4	423.6

## Heat Rejection Data [Top](#)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
500.0	100	762	10,375	5,182	28,039	17,119	4,138	6,860	32,301	77,688	82,757
450.0	90	683	9,686	4,904	27,298	16,583	3,881	6,775	28,958	72,867	77,622
400.0	80	607	8,796	4,826	25,540	15,270	3,549	6,061	25,750	66,626	70,974
375.0	75	570	8,322	4,716	24,127	14,230	3,337	5,388	24,187	62,652	66,740
350.0	70	534	7,911	4,524	22,387	13,011	3,104	4,610	22,642	58,272	62,074
300.0	60	462	7,240	4,038	18,412	10,458	2,621	3,127	19,611	49,217	52,428
250.0	50	392	6,630	3,455	14,380	8,084	2,153	1,957	16,633	40,417	43,054
200.0	40	323	5,924	2,968	11,812	6,328	1,786	1,321	13,687	33,524	35,712
150.0	30	253	5,187	2,459	9,434	4,713	1,435	880	10,732	26,935	28,692
125.0	25	218	4,807	2,196	8,319	3,963	1,264	716	9,239	23,729	25,277
100.0	20	182	4,414	1,924	7,227	3,212	1,093	577	7,727	20,530	21,869
50.0	10	109	3,615	1,370	5,008	1,677	749	353	4,629	14,057	14,974

## Emissions Data [Top](#)

Units Filter All Units ▼

### DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

<b>GENSET POWER WITH FAN ENGINE POWER PERCENT LOAD</b>	<b>EKW BHP</b>	<b>500.0 762</b>	<b>375.0 570</b>	<b>250.0 392</b>	<b>125.0 218</b>	<b>50.0 109</b>
TOTAL NOX (AS NO2)	G/HR	3,432	1,558	1,793	1,266	743
TOTAL CO	G/HR	469	528	298	170	202
TOTAL HC	G/HR	16	24	17	17	20
TOTAL CO2	KG/HR	357	287	186	110	65
PART MATTER	G/HR	19.6	30.6	40.7	25.0	16.1
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	2,129.1	1,257.7	2,193.7	2,567.9	2,459.9
TOTAL CO	(CORR 5% O2) MG/NM3	301.5	410.5	362.1	354.0	751.9
TOTAL HC	(CORR 5% O2) MG/NM3	8.8	15.9	18.0	29.7	64.2
PART MATTER	(CORR 5% O2) MG/NM3	9.5	21.1	41.1	43.4	48.7
TOTAL NOX (AS NO2)	(CORR 15% O2) MG/NM3	790.1	466.7	814.0	952.9	912.8
TOTAL CO	(CORR 15% O2) MG/NM3	111.9	152.3	134.4	131.3	279.0
TOTAL HC	(CORR 15% O2) MG/NM3	3.3	5.9	6.7	11.0	23.8
PART MATTER	(CORR 15% O2) MG/NM3	3.5	7.8	15.3	16.1	18.1
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	1,037	613	1,068	1,251	1,198
TOTAL CO	(CORR 5% O2) PPM	241	328	290	283	602
TOTAL HC	(CORR 5% O2) PPM	16	30	34	55	120
TOTAL NOX (AS NO2)	(CORR 15% O2) PPM	385	227	396	464	445
TOTAL CO	(CORR 15% O2) PPM	89	122	107	105	223
TOTAL HC	(CORR 15% O2) PPM	6	11	12	21	44
TOTAL NOX (AS NO2)	G/HP-HR	4.58	2.76	4.60	5.83	6.82
TOTAL CO	G/HP-HR	0.63	0.93	0.76	0.78	1.85
TOTAL HC	G/HP-HR	0.02	0.04	0.04	0.08	0.19
PART MATTER	G/HP-HR	0.03	0.05	0.10	0.12	0.15
TOTAL NOX (AS NO2)	G/KW-HR	6.22	3.75	6.25	7.92	9.28
TOTAL CO	G/KW-HR	0.85	1.27	1.04	1.06	2.52
TOTAL HC	G/KW-HR	0.03	0.06	0.06	0.10	0.25
PART MATTER	G/KW-HR	0.04	0.07	0.14	0.16	0.20
TOTAL NOX (AS NO2)	LB/HR	7.57	3.43	3.95	2.79	1.64
TOTAL CO	LB/HR	1.03	1.16	0.66	0.37	0.44
TOTAL HC	LB/HR	0.04	0.05	0.04	0.04	0.05
TOTAL CO2	LB/HR	786	633	410	243	144
PART MATTER	LB/HR	0.04	0.07	0.09	0.06	0.04
OXYGEN IN EXH	%	8.3	9.6	9.4	11.4	14.3
DRY SMOKE OPACITY	%	0.6	1.3	2.3	2.0	1.5
BOSCH SMOKE NUMBER		0.75	0.93	1.21	1.12	0.99

#### RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

<b>GENSET POWER WITH FAN ENGINE POWER PERCENT LOAD</b>	<b>EKW BHP</b>	<b>500.0 762</b>	<b>375.0 570</b>	<b>250.0 392</b>	<b>125.0 218</b>	<b>50.0 109</b>
TOTAL NOX (AS NO2)	G/HR	4,153	1,885	2,170	1,532	899
TOTAL CO	G/HR	877	987	558	317	377
TOTAL HC	G/HR	30	45	33	31	39
PART MATTER	G/HR	38.1	59.8	79.3	48.8	31.4
TOTAL NOX (AS NO2)	(CORR 5% O2) MG/NM3	2,576.3	1,521.8	2,654.4	3,107.2	2,976.4
TOTAL CO	(CORR 5% O2) MG/NM3	563.8	767.7	677.2	661.9	1,406.0
TOTAL HC	(CORR 5% O2) MG/NM3	16.6	30.0	34.1	56.2	121.3
PART MATTER	(CORR 5% O2) MG/NM3	18.5	41.0	80.1	84.7	94.9
TOTAL NOX (AS NO2)	(CORR 15% O2) MG/NM3	956.0	564.7	984.9	1,153.0	1,104.5
TOTAL CO	(CORR 15% O2) MG/NM3	209.2	284.9	251.3	245.6	521.7
TOTAL HC	(CORR 15% O2) MG/NM3	6.2	11.1	12.6	20.8	45.0
PART MATTER	(CORR 15% O2) MG/NM3	6.9	15.2	29.7	31.4	35.2
TOTAL NOX (AS NO2)	(CORR 5% O2) PPM	1,255	741	1,293	1,513	1,450
TOTAL CO	(CORR 5% O2) PPM	451	614	542	530	1,125
TOTAL HC	(CORR 5% O2) PPM	31	56	64	105	226
TOTAL NOX (AS NO2)	(CORR 15% O2) PPM	466	275	480	562	538
TOTAL CO	(CORR 15% O2) PPM	167	228	201	196	417
TOTAL HC	(CORR 15% O2) PPM	12	21	24	39	84
TOTAL NOX (AS NO2)	G/HP-HR	5.54	3.33	5.56	7.05	8.25
TOTAL CO	G/HP-HR	1.17	1.75	1.43	1.46	3.46
TOTAL HC	G/HP-HR	0.04	0.08	0.08	0.14	0.35
PART MATTER	G/HP-HR	0.05	0.11	0.20	0.22	0.29
TOTAL NOX (AS NO2)	G/KW-HR	7.53	4.53	7.57	9.59	11.22
TOTAL CO	G/KW-HR	1.59	2.37	1.94	1.98	4.71
TOTAL HC	G/KW-HR	0.05	0.11	0.11	0.20	0.48
PART MATTER	G/KW-HR	0.07	0.14	0.28	0.31	0.39
TOTAL NOX (AS NO2)	LB/HR	9.15	4.16	4.78	3.38	1.98
TOTAL CO	LB/HR	1.93	2.18	1.23	0.70	0.83
TOTAL HC	LB/HR	0.07	0.10	0.07	0.07	0.09
PART MATTER	LB/HR	0.08	0.13	0.17	0.11	0.07

## Regulatory Information [Top](#)

**EPA TIER 2****2006 - 2010**

GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.

<b>Locality</b> U.S. (INCL CALIF)	<b>Agency</b> EPA	<b>Regulation</b> NON-ROAD	<b>Tier/Stage</b> TIER 2	<b>Max Limits - G/BKW - HR</b> CO: 3.5 NOx + HC: 6.4 PM: 0.20
--------------------------------------	----------------------	-------------------------------	-----------------------------	--

**EPA EMERGENCY STATIONARY****2011 - ----**

GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.

<b>Locality</b> U.S. (INCL CALIF)	<b>Agency</b> EPA	<b>Regulation</b> STATIONARY	<b>Tier/Stage</b> EMERGENCY STATIONARY	<b>Max Limits - G/BKW - HR</b> CO: 3.5 NOx + HC: 6.4 PM: 0.20
--------------------------------------	----------------------	---------------------------------	---	--

## Altitude Derate Data [Top](#)

### STANDARD

**ALTITUDE CORRECTED POWER CAPABILITY (BHP)**

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	762	762	762	762	762	762	762	762	762	762	762	762	762
1,000	762	762	762	762	762	762	762	762	762	762	757	744	762
2,000	762	762	762	762	762	762	762	762	754	741	728	716	762
3,000	762	762	762	762	762	762	752	739	726	713	701	689	762
4,000	762	762	762	762	751	737	724	711	698	686	674	663	759
5,000	762	762	750	736	722	709	696	683	671	660	649	638	735
6,000	751	736	722	708	694	681	669	657	646	634	624	613	712
7,000	722	707	694	680	667	655	643	632	620	610	599	589	689
8,000	693	680	666	653	641	629	618	607	596	586	576	566	666
9,000	666	653	640	628	616	604	593	583	572	563	553	544	644
10,000	639	626	614	602	591	580	570	559	550	540	531	522	623
11,000	614	601	589	578	567	557	546	537	527	518	510	501	602
12,000	588	577	565	554	544	534	524	515	506	497	489	480	582
13,000	564	553	542	532	522	512	503	494	485	477	469	461	562
14,000	541	530	520	510	500	491	482	473	465	457	449	442	542
15,000	518	508	498	488	479	470	462	453	445	438	430	423	523

## Cross Reference [Top](#)

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
OK6281	PP5612	2864923	GS282	-	FTE02794	
OK6281	PP5612	2864924	GS282	-	FTE02794	

## Performance Parameter Reference [Top](#)

Parameters Reference: **DM9600 - 15****PERFORMANCE DEFINITIONS****PERFORMANCE DEFINITIONS DM9600**

**APPLICATION:** Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

**PERFORMANCE PARAMETER TOLERANCE FACTORS:** Power +/- 3% Torque +/- 3% Exhaust stack temperature +/- 8% Inlet airflow +/- 5% Intake manifold pressure-gage +/- 10% Exhaust flow +/- 6% Specific fuel consumption +/- 3% Specific fuel consumption (C7-C18) +/- 4% Fuel rate +/- 5% Specific DEF consumption +/- 3% DEF rate +/- 5% Heat rejection +/- 5% Heat rejection exhaust only +/- 10% Heat rejection CEM only +/- 10% Heat Rejection values based on using treated water.

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.

On 3500 and C175 engines, at speeds below Peak Torque these values are provided for reference only, and may not meet the tolerance listed.

These values do not apply to C280/3600. For these models, see the tolerances listed below.

**C280/3600 HEAT REJECTION TOLERANCE FACTORS:** Heat rejection +/- 10% Heat rejection to Atmosphere +/- 50% Heat rejection to Lube Oil +/- 20% Heat rejection to Aftercooler +/- 5%

**TEST CELL TRANSDUCER TOLERANCE FACTORS:** Torque +/- 0.5% Speed +/- 0.2% Fuel flow +/- 1.0% Temperature +/- 2.0 C degrees Intake manifold pressure +/- 0.1 kPa  
OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

**REFERENCE ATMOSPHERIC INLET AIR FOR 3500 ENGINES AND SMALLER** SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.

**FOR 3600 ENGINES** Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

**MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE** Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

**REFERENCE EXHAUST STACK DIAMETER** The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

**REFERENCE FUEL DIESEL** Reference fuel is #2 distillate diesel with a 35API gravity; A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 Lbs/Gal).

**GAS** Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

**ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD** Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

**ALTITUDE CAPABILITY** Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set. Standard temperature values versus altitude could be seen on TM2001.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.

Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

**REGULATIONS AND PRODUCT COMPLIANCE** TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.

Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

**EMISSION CYCLE LIMITS:** Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.

**WET & DRY EXHAUST/EMISSIONS DESCRIPTION:** Wet - Total exhaust flow or concentration of total exhaust flow Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded

**EMISSIONS DEFINITIONS:** Emissions : DM1176

#### **EMISSION CYCLE DEFINITIONS**

1. For constant-speed marine engines for ship main propulsion, including, diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

**HEAT REJECTION DEFINITIONS:** Diesel Circuit Type and HHV Balance : DM9500

**HIGH DISPLACEMENT (HD) DEFINITIONS:** 3500: EM1500

**RATING DEFINITIONS:** Agriculture : TM6008  
Fire Pump : TM6009

Generator Set : TM6035  
Generator (Gas) : TM6041  
Industrial Diesel : TM6010  
Industrial (Gas) : TM6040  
Irrigation : TM5749  
Locomotive : TM6037  
Marine Auxiliary : TM6036  
Marine Prop (Except 3600) : TM5747  
Marine Prop (3600 only) : TM5748  
MSHA : TM6042  
Oil Field (Petroleum) : TM6011  
Off-Highway Truck : TM6039  
On-Highway Truck : TM6038

**SOUND DEFINITIONS:** Sound Power : DM8702  
Sound Pressure : TM7080

**Date Released : 03/12/24**

---

Caterpillar Confidential: **Green**

Content Owner: Commercial Processes Division

Web Master(s): [PSG Web Based Systems Support](#)

Current Date: 4/15/2025, 9:29:45 AM

© Caterpillar Inc. 2025 All Rights Reserved.

[Data Privacy Statement](#).

[Cookie Settings](#)

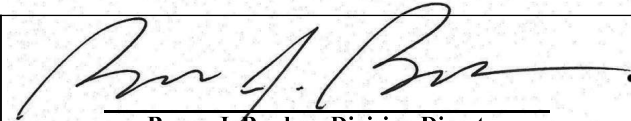


**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2025 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT**

**OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105**

**Certificate Issued To: Caterpillar Inc.**  
(U.S. Manufacturer or Importer)  
**Certificate Number: SCPXL15.2NYS-025-R01**

**Effective Date:**  
**06/03/2025**  
**Expiration Date:**  
**12/31/2025**

  
\_\_\_\_\_  
**Byron J. Bunker, Division Director**  
**Compliance Division**

**Issue Date:**  
**06/03/2025**  
**Revision Date:**  
**06/03/2025**

**Model Year:** 2025  
**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** SCPXL15.2NYS

**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** 450<=kW<=560  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** Electronic Control, Engine Design Modification

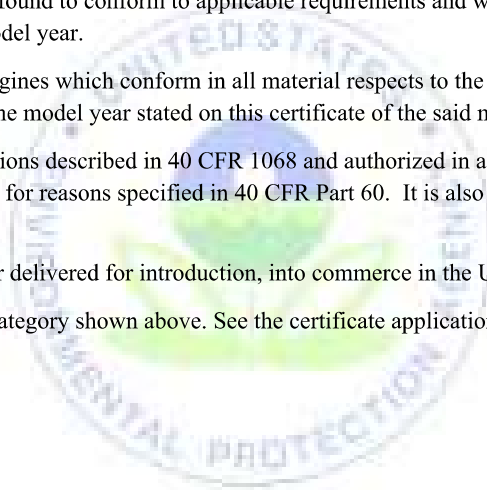
Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

The actual engine power may lie outside the limits of the Emissions Power Category shown above. See the certificate application for details.



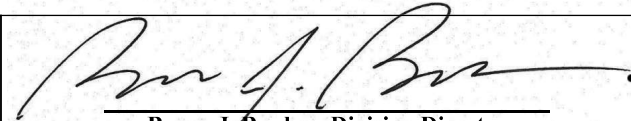


**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
2025 MODEL YEAR  
CERTIFICATE OF CONFORMITY  
WITH THE CLEAN AIR ACT**

**OFFICE OF TRANSPORTATION  
AND AIR QUALITY  
ANN ARBOR, MICHIGAN 48105**

**Certificate Issued To:** Caterpillar Inc.  
(U.S. Manufacturer or Importer)  
**Certificate Number:** SCPXL15.2NZS-026

**Effective Date:**  
08/05/2024  
**Expiration Date:**  
12/31/2025

  
Byron J. Bunker, Division Director  
Compliance Division

**Issue Date:**  
08/05/2024  
**Revision Date:**  
N/A

**Model Year:** 2025  
**Manufacturer Type:** Original Engine Manufacturer  
**Engine Family:** SCPXL15.2NZS

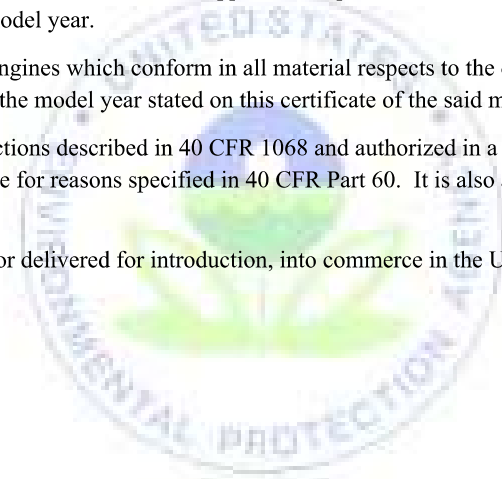
**Mobile/Stationary Indicator:** Stationary  
**Emissions Power Category:** 560<kW<=2237  
**Fuel Type:** Diesel  
**After Treatment Devices:** No After Treatment Devices Installed  
**Non-after Treatment Devices:** Electronic Control, Engine Design Modification

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.



## Plant 1 – SMT-130 Turbines (16 x 17.8 MW)

# 5.0 PERFORMANCE AND EMISSIONS

## 5.1 GUARANTEED PERFORMANCE

### 5.1.1 GAS TURBINE PERFORMANCE DATA

#### Performance Conditions (See Note a)

Elevation	164	feet
Design Ambient Temperature		Fahrenheit
Design Relative Humidity		%
Inlet Pressure Drop	4.0	in W.C.
Exhaust Pressure Drop	4.0	in W.C.
Turbine Operating Level	100%; Continuous Duty	

#### Power Output and Heat Rate (See Note b)

Gas Fuel		
Output Power	15,124	kW
Heat Rate	10,359	Btu/kW-hr (LHV)

#### Notes:

- (a) Generator set performance is guaranteed on the basis of the pressure drops indicated for the inlet and exhaust systems. These are assumed values. Losses through the Turbine Air Inlet System are based on the configuration described and a clean filter, but do not account for additional losses in site ducting -- particularly where the equipment will be installed in an existing building. Losses through the exhaust system are based on the known configuration of downstream waste heat recovery equipment. Deviations from these values will have a corresponding impact on performance observed at the project site. Intake air quality, gas fuel, and liquid fuel shall meet ES 9-98. Natural Gas fuel sulfur content shall be no greater than 0.1%.

- Output Power and Heat Rate is guaranteed on the basis of the referenced Performance Conditions listed above, by the Fuel Component Analysis section of this proposal (as applicable), and on the basis of the equipment being in new and clean condition as defined in this proposal;  
Guarantee Performance is demonstrated based on a standard San Diego factory test, corrected to:
- (b) > 0 feet above sea level  
> 60% Relative Humidity  
> 0 inlet duct loss; 0 exhaust duct loss  
> 59° F, 80° F, or 100° F, depending on the local ambient temperature when the test is conducted

Electric Output Power (and power used to determine Heat Rate) is referenced to the generator terminals, and is based on the generator operating at unity Power Factor (PF = 1.0). For multiple unit applications, it will be based on the average over the total number of units, not on an individual basis;

### 5.1.2 EMISSIONS OUTPUT (GAS FUEL)

The following turbine output emissions are warranted by Solar Turbines subject to the conditions indicated below, and through the warranty period indicated in Commercial Highlights.

**Gas Fuel Operation** (per the Gas Fuel Component Analysis):

NOx	15 ppmvd
CO	25 ppmvd
UHC	25 ppmvd

Operating Conditions for the above emissions are as follows:

Ambient Temperature range: -4 to 120°F ( -20 to 49°C)  
Operating Range: 50-100%

*(Must meet or exceed ES9-98 for air, fuel, and water quality. Emissions corrected to 15% O<sub>2</sub> dry basis, steady-state operation.)*

---

**Notes/Clarifications:**

The emissions cited above are applicable only for steady-state conditions and does not apply during start-up, shutdown, malfunction, or during transient events.

Any gas turbine fuels that do not meet or exceed Solar Specification ES 9-98 will impact emissions performance. As the SMT unit is moved from site to site, deviations from approved fuels will adversely affect emission performance and may impact any emissions warranty and/or performance guarantee. Site specific fuel samples require review by Solar Engineering.

Due to the mobility of the SMT product, the unit is not equipped with an exhaust stack therefore Solar cannot demonstrate / test / verify emissions at site or during package test. Factory testing is with Natural Gas and Emissions testing is available during the gas turbine engine acceptance test.

---

## 5.2 EXPECTED PERFORMANCE

### 5.2.1 GAS TURBINE PERFORMANCE DATA

The following gas turbine package performance is expected, but not guaranteed. The "Run" numbers correspond to different operating points and/or ambient conditions.

Customer <b>Carter CAT</b>	
Job ID <b>PG-DC25-00730</b>	
Run By <b>Soltani Mason M</b>	Date Run <b>21-Mar-25</b>
Engine Performance Code <b>REV. 4.20.2.28.14</b>	Engine Performance Data <b>REV. 1.0</b>

Model <b>TITAN 130-23001S Radial</b>
Package Type <b>GSC</b>
Match <b>STANDARD</b>
Fuel System <b>GAS</b>
Fuel Type <b>SD NATURAL GAS</b>

**DATA FOR NOMINAL PERFORMANCE**

Elevation	feet	164
Inlet Loss	in H2O	4.0
Exhaust Loss	in H2O	4.0

		1	2	3	4	5	6
Engine Inlet Temperature	deg F	0	32.0	59.0	77.0	95.0	104.0
Relative Humidity	%	60.0	60.0	60.0	60.0	60.0	60.0
Gearbox Efficiency		0.9850	0.9850	0.9850	0.9850	0.9850	0.9850
Generator Efficiency		0.9800	0.9800	0.9800	0.9800	0.9800	0.9800

Based On 1.0 Power Factor

		FULL	FULL	FULL	FULL	FULL	FULL
Specified Load*	kW	FULL	FULL	FULL	FULL	FULL	FULL
Net Output Power*	kW	17846	16626	15592	14607	13542	12930
Fuel Flow	mmBtu/hr	175.78	165.21	156.67	149.41	141.73	137.40
Heat Rate*	Btu/kW-hr	9850	9937	10048	10228	10466	10627
Therm Eff*	%	34.641	34.338	33.958	33.360	32.604	32.109

		469338	453740	439460	422200	401550	388680
Engine Exhaust Flow	lbm/hr	469338	453740	439460	422200	401550	388680
PT Exit Temperature	deg F	915	923	932	948	966	977
Exhaust Temperature	deg F	915	923	932	948	966	977

Fuel Gas Composition (Volume Percent)	
Methane (CH4)	92.79
Ethane (C2H6)	4.16
Propane (C3H8)	0.84
N-Butane (C4H10)	0.18
N-Pentane (C5H12)	0.04
Hexane (C6H14)	0.04
Carbon Dioxide (CO2)	0.44
Hydrogen Sulfide (H2S)	0.0001
Nitrogen (N2)	1.51

Fuel Gas Properties	LHV (Btu/Scf)	939.2	Specific Gravity	0.5970	Wobbe Index at 60F	1215.6
---------------------	---------------	-------	------------------	--------	--------------------	--------

\*Electric power measured at the generator terminals.

This performance was calculated with a basic inlet and exhaust system. Special equipment such as low noise silencers, special filters, heat recovery systems or cooling devices will affect engine performance. Performance shown is "Expected" performance at the pressure drops stated, not guaranteed.

## 1.0 Stack Emissions and System Pressure Drop

ELC guarantees the emissions at the outlet stack inclusive of the turbine, when erected, maintained, and operated in accordance with ELC's supplied documentation, will meet the emissions guarantees with values not exceeding that shown in the following table. These emission guarantees are subject to and are conditioned upon the equipment being operated at (or values adjusted to) the design conditions below:

<b>CGT Emissions:</b>	<b>Units</b>	<b>Guarantee Value</b>
NO <sub>x</sub>	ppmvd @ 15% O <sub>2</sub>	9.0
CO	ppmvd @ 15% O <sub>2</sub>	25.0

<b>ELC Stack Emissions:</b>	<b>Units</b>	<b>Guarantee Value</b>
NO <sub>x</sub>	ppmvd @ 15% O <sub>2</sub>	2.0
CO	ppmvd @ 15% O <sub>2</sub>	2.0
Ammonia Slip	ppmvd @ 15% O <sub>2</sub>	5.0

<b>Pressure Drop:</b>	<b>Units</b>	<b>Guarantee Value</b>
ELC System	InWC	12.0

### Notes:

1. The emissions are based on gas turbine data shown above
2. Stack emissions are based upon the following operating conditions:
  - a. 40% to 100% gas turbine load; and
  - b. Steady state load conditions (unless otherwise noted); and
  - c. Do not apply during start-up/shut-down, load changes and equipment cleaning.
3. The catalyst warranties are pro-rated over their respective warranty periods meaning that any repair, replace, modification or supplementing of the catalyst shall only be to the extent necessary to meet performance over the remaining applicable warranty period.

**Plant 2 – PGM-130 Turbines (19 x 18 MW)**

## **4.0 PERFORMANCE AND EMISSIONS**

## 4.1 EXPECTED GENERATOR SET PERFORMANCE

The following gas turbine package performance is expected, but not guaranteed. The "Run" numbers correspond to different operating points and/or ambient conditions.

Customer <b>PointOne</b>	
Job ID <b>DC22-63304</b>	
Run By <b>Hale Aaron</b>	Date Run <b>10-Oct-24</b>
Engine Performance Code <b>REV. 4.20.2.28.14</b>	Engine Performance Data <b>REV. 1.0</b>

Model <b>TITAN 130-23001S Axial</b>
Package Type <b>GSC</b>
Match <b>STANDARD</b>
Fuel System <b>GAS</b>
Fuel Type <b>SD NATURAL GAS</b>

**DATA FOR NOMINAL PERFORMANCE**

Elevation	feet	<b>1000</b>					
Inlet Loss	in H2O	<b>4.0</b>					
Exhaust Loss	in H2O	<b>4.0</b>					
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Engine Inlet Temperature	deg F	<b>-4.0</b>	<b>15.0</b>	<b>35.0</b>	<b>59.0</b>	<b>85.0</b>	<b>104.0</b>
Relative Humidity	%	<b>60.0</b>	<b>60.0</b>	<b>60.0</b>	<b>60.0</b>	<b>60.0</b>	<b>60.0</b>
Gearbox Efficiency		<b>0.9850</b>	<b>0.9850</b>	<b>0.9850</b>	<b>0.9850</b>	<b>0.9850</b>	<b>0.9850</b>
Generator Efficiency		<b>0.9800</b>	<b>0.9800</b>	<b>0.9800</b>	<b>0.9800</b>	<b>0.9800</b>	<b>0.9800</b>
Based On 1.0 Power Factor							
Specified Load*	kW	<b>FULL</b>	<b>FULL</b>	<b>FULL</b>	<b>FULL</b>	<b>FULL</b>	<b>FULL</b>
Net Output Power*	kW	<b>18000</b>	<b>17305</b>	<b>16513</b>	<b>15592</b>	<b>14158</b>	<b>12925</b>
Fuel Flow	mmBtu/hr	<b>171.76</b>	<b>165.90</b>	<b>159.27</b>	<b>151.95</b>	<b>141.75</b>	<b>133.29</b>
Heat Rate*	Btu/kW-hr	<b>9542</b>	<b>9586</b>	<b>9645</b>	<b>9745</b>	<b>10012</b>	<b>10312</b>
Therm Eff*	%	<b>35.757</b>	<b>35.594</b>	<b>35.378</b>	<b>35.013</b>	<b>34.081</b>	<b>33.089</b>
Engine Exhaust Flow	lbm/hr	<b>457060</b>	<b>449147</b>	<b>438437</b>	<b>426121</b>	<b>401038</b>	<b>376610</b>
PT Exit Temperature	deg F	<b>899</b>	<b>903</b>	<b>909</b>	<b>917</b>	<b>941</b>	<b>963</b>
Exhaust Temperature	deg F	<b>899</b>	<b>903</b>	<b>909</b>	<b>917</b>	<b>941</b>	<b>963</b>

Fuel Gas Composition (Volume Percent)	<b>Methane (CH4)</b>	<b>92.79</b>
	<b>Ethane (C2H6)</b>	<b>4.16</b>
	<b>Propane (C3H8)</b>	<b>0.84</b>
	<b>N-Butane (C4H10)</b>	<b>0.18</b>
	<b>N-Pentane (C5H12)</b>	<b>0.04</b>
	<b>Hexane (C6H14)</b>	<b>0.04</b>
	<b>Carbon Dioxide (CO2)</b>	<b>0.44</b>
	<b>Hydrogen Sulfide (H2S)</b>	<b>0.0001</b>
	<b>Nitrogen (N2)</b>	<b>1.51</b>

Fuel Gas Properties	<b>LHV (Btu/Scf)</b>	<b>939.2</b>	<b>Specific Gravity</b>	<b>0.5970</b>	<b>Wobbe Index at 60F</b>	<b>1215.6</b>
---------------------	----------------------	--------------	-------------------------	---------------	---------------------------	---------------

\*Electric power measured at the generator terminals.

This performance was calculated with a basic inlet and exhaust system. Special equipment such as low noise silencers, special filters, heat recovery systems or cooling devices will affect engine performance. Performance shown is "Expected" performance at the pressure drops stated, not guaranteed.

### 4.3 EMISSIONS OUTPUT (GAS FUEL)

The following turbine output emissions are expected:

**Gas Fuel Operation** (per the [Gas Fuel Component Analysis](#)):

NOx	9 ppmvd
CO	15 ppmvd
UHC	15 ppmvd

Operating Conditions for the above emissions are as follows:

Ambient Temperature range: -4 to 120°F (-20 to 49°C)

Operating Range: 50-100%

*(Must meet or exceed ES9-98 for air, fuel, and water quality. Emissions corrected to 15% O<sub>2</sub> dry basis, steady-state operation.)*

#### Notes/Clarifications:

The emissions cited above are applicable only for steady-state conditions and does not apply during start-up, shutdown, malfunction, or during transient events.

#### 4.4 PARTICULATE MATTER

The following PM<sub>10/2.5</sub> particulate matter emission factors can be used to estimate PM<sub>10/2.5</sub> emissions at the same operating conditions referenced in the Site Conditions and Performance sections of the proposal, inclusive of ambient temperature and load range.

Pipeline Natural Gas Fuel Operation ( <b>See Note a</b> ):	0.010 lb/MMBtu (HHV)
Landfill Gas Fuel Operation ( <b>See Note b</b> ):	0.030 lb/MMBtu (HHV)
Liquid Fuel Operation ( <b>See Note c</b> ):	0.020 lb/MMBtu (HHV)

#### Notes:

- The pipeline natural gas emissions factor assumes <1 grains of Sulfur per 100 standard cubic feet.
- The landfill gas emissions factor assumes <0.15 lb SO<sub>2</sub>/MMBtu heat input.
- The liquid fuel emission factor assumes fuel sulfur content is <500 ppm and ash content is <0.005% by wt.

**Test Method Recommendation.** Solar recommends the following:

- EPA Methods 201/201A be used to measure the "front half". "Front half" represents filterable particulate matter.
- EPA Method 202 (with nitrogen purge and field blanks) should be used to measure the "back half". "Back half" measurements represent the condensable portion of particulate matter.
- EPA Method 5, which measures the front and back halves may be substituted (e.g. where exhaust temperatures do not allow the use of Method 202).
- The turbine should have a minimum of 300 operating hours prior to conducting particulate matter source testing. In addition, the turbine should be running for 3-4 hours prior to conducting a particulate matter source test so that the turbine and auxiliary equipment is in a sustained "typical" operating mode prior to gathering sample
- Testing shall include three test runs for a minimum of four hours each

#### Scope Exclusion:

The PM emission ratings shown apply to all models except the Mercury 50. Refer to PIL 205 for Mercury 50 emissions.

#### Scope Exclusion:

Solar does not conduct PM<sub>10/2.5</sub> testing. Any required testing is to be conducted by Others at the project site.

Please reference Product Information Letter (PIL) 171 for additional information describing Solar's position on PM<sub>10/2.5</sub> emission factors.

Titan 130

Case	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
Load	%	0.50	0.60	0.70	0.80	0.90	FULL	0.50	0.60	0.70	0.80	0.90	FULL	0.50	0.60	0.70	0.80	0.90	FULL	0.50	0.60	0.70	0.80	0.90	FULL	0.50	0.60	0.70	0.80	0.90	FULL	0.50	0.60	0.70	0.80	0.90	FULL
Ambient Temperature	°F	4	4	4	4	4	4	20	20	20	20	20	20	40	40	40	40	40	40	40	59	59	59	59	59	80	80	80	80	80	80	104	104	104	104	104	104
Relative Humidity	%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
Duct Pressure	psia	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	14.53	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390	6.390
Stack Exhaust Flow, wet	SCFH	4,850,575	5,196,852	5,460,391	5,890,476	6,568,190	6,726,513	4,826,964	5,153,002	5,419,025	5,813,067	6,484,638	6,631,398	4,785,426	5,100,234	5,360,638	5,712,059	6,390,034	6,494,698	4,789,221	5,078,708	5,323,058	5,645,445	6,342,342	6,432,160	4,696,691	4,860,768	5,217,037	5,456,470	6,118,090	6,323,466	4,557,262	4,835,554	5,060,151	5,278,039	5,785,592	6,153,774
Stack Exhaust Flow, wet	ACFH	12,219,717	13,066,877	13,765,984	14,633,407	15,935,980	16,894,721	12,160,287	12,981,602	13,651,774	14,463,200	15,780,152	16,699,003	12,115,776	12,912,808	13,572,101	14,323,169	15,664,696	16,443,094	12,102,768	12,888,148	13,508,229	14,222,438	15,626,593	16,322,773	12,056,415	12,813,166	13,420,974	14,035,222	15,431,967	16,267,296	11,844,204	12,673,584	13,282,236	13,833,302	15,068,061	16,128,531
Stack Exhaust Velocity	ft/s	53.36	57.06	60.06	63.90	69.58	73.77	53.10	56.68	59.61	63.15	68.90	72.91	52.90	56.38	59.26	62.54	68.40	71.60	62.85	66.27	68.98	72.10	78.23	82.64	55.95	58.60	61.28	67.38	71.03	52.15	55.34	57.91	60.40	65.79	70.42	

Stack Diameter	ft	9
Stack Height	ft	50.00
Mixed Exhaust Temp	F	850.00

EXHAUST COMPOSITION (with Tempering Air) VOL%

Ar	%	0.008996	0.0089724	0.0087953	0.0087900	0.0089819	0.0086162	0.0085588	0.0089572	0.00875	0.0087863	0.0089889	0.0086117	0.0085368	0.0089377	0.0087298	0.008761	0.0086044	0.0089962	0.008597	0.0086977	0.0087069	0.0087698	0.0087268	0.008776	0.008278	0.0084776	0.0085712	0.008666	0.0086990	0.0086237	0.0081256	0.0082221	0.0083119	0.0084928	0.0084724	0.0083424
N2	%	0.7634824	0.7633663	0.761779	0.7615795	0.7616717	0.7603666	0.7645751	0.7629911	0.7614256	0.7610297	0.7611418	0.759724	0.7631386	0.7614678	0.7599784	0.7593965	0.7595934	0.761038	0.759642	0.757277	0.7553282	0.7553352	0.7556138	0.7546537	0.7516563	0.7594018	0.7499684	0.7478932	0.749067	0.7476391	0.7335146	0.7325773	0.7318931	0.730945	0.7307953	0.7306076
O2	%	0.1498061	0.1481436	0.1471884	0.1479597	0.1487844	0.1490464	0.1500188	0.1490631	0.1481373	0.1483436	0.1496367	0.1457977	0.1508234	0.1499647	0.1491244	0.1491013	0.1504061	0.1469099	0.1511612	0.1500355	0.1495647	0.1494195	0.1508274	0.1469653	0.150781	0.1500453	0.1493351	0.1487364	0.1499582	0.1468391	0.1481487	0.1475895	0.1469569	0.1464533	0.1469529	0.1446086
H2O	%	0.0513598	0.0528431	0.0544215	0.0542612	0.0533407	0.0567714	0.0513128	0.0529036	0.0544331	0.0545322	0.0535246	0.0570239	0.0526735	0.0542189	0.0556519	0.0560757	0.0550677	0.0568229	0.057119	0.0584668	0.0597602	0.0603238	0.059129	0.0624527	0.066084	0.0672571	0.0684721	0.0694586	0.068564	0.0709723	0.0684863	0.0682049	0.0693761	0.0690716	0.0697816	0.0921175
CO2	%	0.0262547	0.0269798	0.0278091	0.0276843	0.0272428	0.0289601	0.0255091	0.0263589	0.0271768	0.0272011	0.026755	0.0285529	0.0248037	0.0256378	0.026411	0.026608	0.0260617	0.0279428	0.0240178	0.0248056	0.0253668	0.0259281	0.0254128	0.0270922	0.0230356	0.0237944	0.0245222	0.0251928	0.0246792	0.025863	0.0217244	0.0224102	0.0230629	0.0237702	0.0239566	0.0242664

SCR CATALYST	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	
Stack NOx Limit	ppmvd	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Stack NOx Limit	lb/hr	1.1529444	1.2321570	1.2963193	1.3965131	1.5592639	<b>1.5951682</b>	1.1473827	1.2240983	1.2865052	1.3800026	1.540033	1.5728238	1.1369091	1.2109522	1.2720496	1.3552047	1.5166503	1.5302996	1.1310726	1.2036517	1.2611094	1.3371806	1.5020586	1.5222272	1.1076293	1.1765873	1.2317899	1.2877818	1.4444711	1.4915269	1.0676183	1.1324653	1.1846779	1.2352942	1.3403747	1.4394202
Ammonia Slip Limit	ppmvd	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Ammonia Slip Limit	lb/hr	1.0663344	1.1399974	1.198939	1.2934569	1.447131	<b>1.4753381</b>	1.0611909	1.1321432	1.1896921	1.2793368	1.4243448	1.4546724	1.0515038	1.1199847	1.1764924	1.2534068	1.4077187	1.4293664	1.0461057	1.1134170	1.166374	1.2367300	1.3800552	1.4078765	1.0244235	1.0882018	1.1392571	1.1910429	1.3399619	1.3794824	0.9874181	1.0473907	1.0956841	1.1424981	1.2480088	1.33129
CO DESIGN PARAMETERS																																					
Stack CO Limit	ppmvd	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Stack CO Limit	lb/hr	0.7019786	0.7502059	0.789271	0.8514922	0.9493962	<b>0.9712267</b>	0.6989901	0.7452968	0.7832959	0.8402219	0.9376974	0.9576223	0.6922132	0.7372948	0.7744942	0.8251236	0.9234208	0.9372108	0.6886596	0.7329719	0.7678332	0.8141496	0.9150844	0.9268162	0.674386	0.7163715	0.7499819	0.7840729	0.878474	0.9061241	0.6390251	0.6895075	0.7212975	0.7521155	0.821874	0.8763987

**APPENDIX 4  
POTENTIAL EMISSIONS CALCULATIONS**

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

**Facility-Wide Potential Emissions**

Pollutant	Potential Annual Emissions (tpy)			Facility-Wide Potential Emissions <sup>1</sup> (tpy)	Title V Thresholds (tpy)	PSD Major Source Threshold (tpy)	Above Title V Major Source Thresholds?	Above PSD Major Source Thresholds?
	Emergency Generators	Diesel Belly Tanks	Turbines					
NO <sub>x</sub>	86.15	--	158.85	245.00	100	250	Yes	No
CO	148.31	--	96.69	245.00	100	250	Yes	No
VOC	4.41	1.01	45.13	50.55	100	250	No	No
PM <sub>10</sub> / PM <sub>2.5</sub>	11.39	--	141.85	153.24	100	250	Yes	No
SO <sub>2</sub>	0.25	--	73.08	73.32	100	250	No	No
Max. Individual HAP (formaldehyde)	0.01	--	4.34	4.35	10	--	No	No
Total HAP	0.26	--	11.16	11.42	25	--	No	No
CO <sub>2</sub> e	26,737	--	2,386,455	2,413,192	--	100,000	--	-- <sup>1</sup>

Notes:

(1) On June 23, 2014, the Supreme Court of the United States issued an opinion in Utility Air Regulatory Group v. EPA. The court determined that a source cannot be considered a major facility for PSD permitting based solely on emissions of GHGs above major source thresholds. In other words, a source is subject to PSD permitting for its GHG emissions only when emissions of non-GHGs are above major source thresholds, as well.

**POTENTIAL EMISSIONS - NATURAL GAS TURBINES**

**Number of Turbines (Site-Wide)**

Plant 1 - Solar Titan SMT-130 Turbines	16
Plant 2 - Solar Titan PGM-130 Turbines	19
<b>Total</b>	<b>35</b>

**SMT-130 Assumptions<sup>1</sup>**

Maximum Annual Hours of Operation per Turbine	8,760	hr/yr/turbine
Maximum Total Fuel Gas Demand Across All SMT-130 Turbines	2,177	MMBtu/hr
Proposed Combined Annual Fuel Consumption Limit Across All SMT-130 Turbines	19,070,520	MMBtu/yr
SMT-130 Maximum Capacity	175.78	MMBtu/hr/turbine
Turbine Startup/Shutdown Duration	20	mins/event
Number of Startup/Shutdowns	6	events/year

Notes:

(1) Turbine performance provided by PointOne and Solar Turbines.

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

**SMT-130 Potential Emissions**

Pollutant	Uncontrolled Emission Factor	Units	Controlled Emission Factor	Emission Factor Footnote Reference	Units	Maximum Potential Emissions per Turbine (lb/yr/turbine)	Maximum Potential Emissions per Turbine (ton/yr/turbine)	Total Emissions - All SMT-130 Turbines (ton/yr)
NO <sub>x</sub>	0.10	lb/MMBtu	7.39E-03	1, 2, 5	lb/MMBtu	11,411	5.71	70.48
CO	0.02	lb/MMBtu	4.50E-03	1, 2, 5	lb/MMBtu	6,931	3.47	42.90
VOC	2.10E-03	lb/MMBtu	--	2	--	3,234	1.62	20.02
PM/PM <sub>2.5</sub> /PM <sub>10</sub>	6.60E-03	lb/MMBtu	--	2	--	10,163	5.08	62.93
SO <sub>2</sub>	3.40E-03	lb/MMBtu	--	2	--	5,235	2.62	32.42
Benzene	1.20E-05	lb/MMBtu	--	2	--	18.48	9.24E-03	0.11
Toluene	1.30E-04	lb/MMBtu	--	2	--	200.18	0.10	1.24
Xylenes	6.40E-05	lb/MMBtu	--	2	--	98.55	0.05	0.61
Formaldehyde	2.02E-04	lb/MMBtu	--	3	--	311.05	0.16	1.93
Acetaldehyde	4.00E-05	lb/MMBtu	--	2	--	61.59	0.03	0.38
Acrolein	6.40E-06	lb/MMBtu	--	2	--	9.85	4.93E-03	0.06
PAH	2.20E-06	lb/MMBtu	--	2	--	3.39	1.69E-03	0.02
1,3-Butadiene	4.30E-07	lb/MMBtu	--	2	--	0.66	3.31E-04	4.10E-03
Ethylbenzene	3.20E-05	lb/MMBtu	--	2	--	49.27	0.02	0.31
Naphthalene	1.30E-06	lb/MMBtu	--	2	--	2.00	1.00E-03	0.01
Propylene Oxide	2.90E-05	lb/MMBtu	--	2	--	44.66	0.02	0.28
CO <sub>2</sub>	110.00	lb/MMBtu	--	2	--	169,381,608	84,691	1,048,879
CH <sub>4</sub>	8.60E-03	lb/MMBtu	--	2	--	13,243	6.62	82.00
N <sub>2</sub> O	3.00E-03	lb/MMBtu	--	2	--	4,619	2.31	28.61
CO <sub>2</sub> e	111.04	lb/MMBtu	--	4	--	170,976,567	85,488	1,058,755

**Notes:**

(1) Manufacturer provided NO<sub>x</sub> and CO emissions guarantees in ppmvd at 15% O<sub>2</sub> when the SCR is operating were converted to units of lb/MMBtu using the following formula:

$$\frac{\text{lb}}{\text{MMBtu}} = \text{ppm} * 10^{-6} * \frac{1}{\text{molar volume}} * \text{Molar Weight} * F_d * \frac{20.9}{(20.9 - \%O_2)}$$

where,

Manufacturer NOx Stack Emissions Guarantee: 2 ppmvd @ 15% O<sub>2</sub>

Manufacturer CO Stack Emissions Guarantee: 2 ppmvd @ 15% O<sub>2</sub>

CO Molar Weight: 28.01 g/mol

NOx Molar Weight (as NO<sub>2</sub>): 46.01 g/mol

Molar Volume: 379.73 dscf/lb-mol at 1 atm and 60 °F

Fd Factor: 8,608 dscf/MMBtu (for 1,050 Btu/scf natural Gas at 60 °F)

Corrected Oxygen: 15 percent

(2) Emission factors from AP-42, Tables 3.1-1, 3.1-2a, and 3.1-3 (April 2000). Uncontrolled emissions for NO<sub>x</sub> and CO use the lean-premix emissions factors from AP-42, Table 3.1-1 (April 2000).

(3) Emission factor from U.S. EPA's August 2001 memo, *Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines* for turbines utilizing lean premix combustion technology. In accordance with the memo, the 95th upper percentile emission factor was used to be conservative as it accounts for test result variability.

(4) The CO<sub>2</sub>e emission factor is calculated as the sum of each GHG pollutant multiplied by its global warming potential, per 40 CFR 98, Subpart A, Table A-1:

CO<sub>2</sub>: 1  
CH<sub>4</sub>: 28  
N<sub>2</sub>O: 265

(5) Start up and shut down emissions are uncontrolled.

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

**PGM-130 Assumptions<sup>1</sup>**

Annual Hours of Operation	8,760	hr/yr/turbine
Maximum Total Fuel Gas Demand Across All PGM-130 Turbines	2,730	MMBtu/hr
Proposed Combined Annual Fuel Consumption Limit Across All PGM-130 Turbines	23,914,800	MMBtu/yr
PGM-130 Maximum Capacity	171.76	MMBtu/hr/turbine
Turbine Startup/Shutdown Duration	20	mins/event
Number of Startup/Shutdowns	6	events/year

Notes:

(1) Turbine performance provided by PointOne and Solar Turbines.

**PGM-130 Potential Emissions**

Pollutant	Uncontrolled Emission Factor	Units	Controlled Emission Factor	Emission Factor Footnote Reference	Units	Maximum Potential Emissions per Turbine (lb/yr/turbine)	Maximum Potential Emissions per Turbine (ton/yr/turbine)	Total Emissions - All PGM-130 Turbines (ton/yr)
NO <sub>x</sub>	0.10	lb/MMBtu	7.39E-03	1, 2, 5	lb/MMBtu	11,150	5.57	88.37
CO	0.02	lb/MMBtu	4.50E-03	1, 2, 5	lb/MMBtu	6,772	3.39	53.79
VOC	2.10E-03	lb/MMBtu	--	2	--	3,160	1.58	25.11
PM/PM <sub>2.5</sub> /PM <sub>10</sub>	6.60E-03	lb/MMBtu	--	2	--	9,930	4.97	78.92
SO <sub>2</sub>	3.40E-03	lb/MMBtu	--	2	--	5,116	2.56	40.66
Benzene	1.20E-05	lb/MMBtu	--	2	--	18.06	9.03E-03	0.14
Toluene	1.30E-04	lb/MMBtu	--	2	--	195.60	0.10	1.55
Xylenes	6.40E-05	lb/MMBtu	--	2	--	96.30	0.05	0.77
Formaldehyde	2.02E-04	lb/MMBtu	--	3	--	303.93	0.15	2.42
Acetaldehyde	4.00E-05	lb/MMBtu	--	2	--	60.18	0.03	0.48
Acrolein	6.40E-06	lb/MMBtu	--	2	--	9.63	4.81E-03	0.08
PAH	2.20E-06	lb/MMBtu	--	2	--	3.31	1.66E-03	0.03
1,3-Butadiene	4.30E-07	lb/MMBtu	--	2	--	0.65	3.23E-04	5.14E-03
Ethylbenzene	3.20E-05	lb/MMBtu	--	2	--	48.15	0.02	0.38
Naphthalene	1.30E-06	lb/MMBtu	--	2	--	1.96	9.78E-04	0.02
Propylene Oxide	2.90E-05	lb/MMBtu	--	2	--	43.63	0.02	0.35
CO <sub>2</sub>	110.00	lb/MMBtu	--	2	--	165,507,936	82,754	1,315,314
CH <sub>4</sub>	8.60E-03	lb/MMBtu	--	2	--	12,940	6.47	102.83
N <sub>2</sub> O	3.00E-03	lb/MMBtu	--	2	--	4,514	2.26	35.87
CO <sub>2</sub> e	111.04	lb/MMBtu	--	4	--	167,066,419	83,533	1,327,699

Notes:

(1) Manufacturer provided NO<sub>x</sub> and CO emissions guarantees in ppmvd at 15% O<sub>2</sub> when the SCR is operating were converted to units of lb/MMBtu using the following formula:

$$\frac{lb}{MMBtu} = ppm * 10^{-6} * \frac{1}{molar\ volume} * Molar\ Weight * F_d * \frac{20.9}{(20.9 - \%O_2)}$$

where,

Manufacturer NO <sub>x</sub> Stack Emissions Guarantee:	2	ppm
Manufacturer CO Stack Emissions Guarantee:	2	ppm
CO Molar Weight:	28.01	g/mol
NO <sub>x</sub> Molar Weight (as NO <sub>2</sub> ):	46.01	g/mol
Molar Volume:	379.73	dscf/lb-mol at 1 atm and 60 °F
F <sub>d</sub> Factor:	8,608	dscf/MMBtu (for 1,050 Btu/scf natural Gas at 60 °F)
Corrected Oxygen:	15	percent

(2) Emission factors from AP-42, Tables 3.1-1, 3.1-2a, and 3.1-3 (April 2000). Uncontrolled emissions for NO<sub>x</sub> and CO use the lean-premix emissions factors from AP-42, Table 3.1-1 (April 2000).

(3) Emissions factor from U.S. EPA's August 2001 memo, *Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines* for turbines utilizing lean premix combustion technology. In accordance with the memo, the 95th upper percentile emission factor was used to be conservative as it accounts for test result variability.

(4) The CO<sub>2</sub>e emission factor is calculated as the sum of each GHG pollutant multiplied by its global warming potential, per 40 CFR 98, Subpart A, Table A-1:

CO <sub>2</sub> :	1
CH <sub>4</sub> :	28
N <sub>2</sub> O:	265

(5) Start up and shut down emissions are uncontrolled.

**Combined Plant 1 and Plant 2 Turbine Potential Emissions**

<b>Pollutant</b>	<b>Total Emissions All Turbines (ton/yr)</b>
NO <sub>x</sub>	158.85
CO	96.69
VOC	45.13
PM/PM <sub>2.5</sub> /PM <sub>10</sub>	141.85
SO <sub>2</sub>	73.08
Benzene	0.26
Toluene	2.79
Xylenes	1.38
Formaldehyde	4.34
Acetaldehyde	0.86
Acrolein	0.14
PAH	0.05
1,3-Butadiene	9.24E-03
Ethylbenzene	0.69
Naphthalene	0.03
Propylene Oxide	0.62
Total HAP	11.16
CO <sub>2</sub>	2,364,193
CH <sub>4</sub>	184.84
N <sub>2</sub> O	64.48
CO <sub>2</sub> e	2,386,455

**POTENTIAL EMISSIONS - DIESEL-FIRED GENERATORS**

**Number of Generator Engines (Site-Wide)**

CAT 3516E Engines	252
CAT 3516C Engines	4
CAT C27 Engines	18
CAT C15 Fire Pump Engine	1
<b>Total</b>	<b>275</b>

**Power Output by Load**

Engine Group	Power Output (bhp/gen) <sup>1</sup>			
	25% Load	50% Load	75% Load	Full Standby
CAT 3516E	1,236	2,294	3,347	4,393
Black Start (CAT 3516C)	839	1,521	2,212	2,937
CAT C27	337	615	900	1,190
CAT C15	218	392	570	762

Notes:  
(1) Per the manufacturer specification sheet and performance data.

Engine Group	Diesel Fuel Consumption (gal/hr/engine) <sup>1</sup>				Heat Input (MMBtu/hr/engine) <sup>2</sup>			
	25% Load	50% Load	75% Load	Full Standby	25% Load	50% Load	75% Load	Full Standby
CAT 3516E	66.4	125.9	168.1	209.0	9.10	17.25	23.03	28.64
Black Start (CAT 3516C)	44.2	76.5	106.1	136.2	6.06	10.48	14.54	18.66
CAT C27	17.3	30.0	43.4	55.6	2.37	4.11	5.95	7.62
CAT C15	10.9	18.6	28.8	35.7	1.49	2.55	3.95	4.89

Notes:  
(1) Refer to enclosed manufacturer specification sheet and performance data.  
(2) Diesel fuel consumption was converted to heat input based on the diesel high heating value from the USEPA's AP-42, Section 3.4, Large Stationary Diesel and All Stationary Dual-fuel Engines, Table 3.4-1, footnote a (April 2025):

Diesel HHV = 0.137 MMBtu/gal

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

Pollutant	Uncontrolled Emission Factors for CAT 3516E Engines (g/bhp-hr) <sup>1</sup>				Controlled Emission Factors for CAT 3516E Engines (g/bhp-hr) <sup>2</sup>			
	25% Load	50% Load	75% Load	Full Standby	25% Load	50% Load	75% Load	Full Standby
NO <sub>x</sub> <sup>5</sup>	6.00	3.64	4.38	6.00	0.60	0.36	0.44	0.60
CO	3.03	1.32	1.33	0.99	3.03	1.32	1.33	0.99
VOC <sup>3</sup>	0.09	0.07	0.06	0.06	0.09	0.07	0.06	0.06
Filterable PM <sup>4,6</sup>	--	--	--	--	--	--	--	--

Pollutant	Uncontrolled Emission Factors for Black Start Engines (g/bhp-hr) <sup>1</sup>			
	25% Load	50% Load	75% Load	Full Standby
NO <sub>x</sub> <sup>5</sup>	5.03	3.82	4.67	6.00
CO	2.11	0.59	0.39	0.54
VOC <sup>3</sup>	0.49	0.34	0.23	0.14
Filterable PM <sup>4</sup>	0.31	0.08	0.04	0.04

Pollutant	Uncontrolled Emission Factors for CAT C27 Engines (g/bhp-hr) <sup>1</sup>			
	25% Load	50% Load	75% Load	Full Standby
NO <sub>x</sub> <sup>5</sup>	5.48	4.40	4.77	6.00
CO	1.52	1.01	0.73	0.44
VOC <sup>3</sup>	0.21	0.15	0.10	0.05
Filterable PM <sup>4</sup>	0.30	0.15	0.06	0.04

Pollutant	Uncontrolled Emission Factors for CAT C15 Engines (g/bhp-hr) <sup>1</sup>			
	25% Load	50% Load	75% Load	Full Standby
NO <sub>x</sub> <sup>5</sup>	6.00	5.56	3.33	5.54
CO	1.46	1.43	1.75	1.17
VOC <sup>3</sup>	0.14	0.08	0.08	0.04
Filterable PM <sup>4</sup>	0.22	0.20	0.11	0.05

Notes:

- (1) Refer to enclosed manufacturer performance data. Emission factors are conservatively based on the manufacturer's "Rated Speed Potential Site Variation" (i.e., not-to-exceed) emissions data.
- (2) 3516E engines will be equipped with SCR controls with the following efficiency:  
90%
- (3) Assumes that all hydrocarbons (HC) are VOC.
- (4) Assumes that all filterable PM is less than 2.5 microns in diameter (i.e., PM<sub>10</sub> = PM<sub>2.5</sub>).
- (5) The diesel-fired emergency generators will comply with VDEQ's presumptive BACT limit for NO<sub>x</sub> emissions from diesel-fired emergency generators of 6.0 g/bhp-hr; ([http://townhall.virginia.gov/L/GetFile.cfm?File=C:%5CTownHall%5Cdocroot%5CGuidanceDocs%5C440%5CGDoc\\_DEQ\\_5121\\_v1.pdf](http://townhall.virginia.gov/L/GetFile.cfm?File=C:%5CTownHall%5Cdocroot%5CGuidanceDocs%5C440%5CGDoc_DEQ_5121_v1.pdf)).
- (6) Spec sheet for 3516Es indicates that PM was not measured.



**POTENTIAL EMISSIONS - DIESEL-FIRED GENERATORS**

**Hourly Emission Rate**

Pollutant	CAT 3516E Engines - Hourly Uncontrolled Emission Factors (lb/hr/gen) <sup>1,2</sup>					CAT 3516E Engines - Hourly Controlled Emission Factors (lb/hr/gen) <sup>1,2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>										
NO <sub>x</sub>	16.35	18.41	32.32	58.11	<b>58.11</b>	1.63	1.84	3.23	5.81	<b>5.81</b>
CO	8.26	6.68	9.81	9.59	<b>9.81</b>	8.26	6.68	9.81	9.59	<b>9.81</b>
VOC	0.25	0.35	0.44	0.58	<b>0.58</b>	0.25	0.35	0.44	0.58	<b>0.58</b>
Filt. PM <sup>3</sup>	0.56	1.07	1.43	1.78	<b>1.78</b>	0.56	1.07	1.43	1.78	<b>1.78</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	0.63	1.20	1.61	2.00	<b>2.00</b>	0.63	1.20	1.61	2.00	<b>2.00</b>
SO <sub>2</sub>	0.01	0.03	0.03	0.04	<b>0.04</b>	0.01	0.03	0.03	0.04	<b>0.04</b>
<i>Hazardous Air Pollutants</i>										
Benzene	7.06E-03	0.01	0.02	0.02	<b>0.02</b>	7.06E-03	0.01	0.02	0.02	<b>0.02</b>
Toluene	2.56E-03	4.85E-03	6.47E-03	8.05E-03	<b>8.05E-03</b>	2.56E-03	4.85E-03	6.47E-03	8.05E-03	<b>8.05E-03</b>
Xylenes	1.76E-03	3.33E-03	4.45E-03	5.53E-03	<b>5.53E-03</b>	1.76E-03	3.33E-03	4.45E-03	5.53E-03	<b>5.53E-03</b>
Formaldehyde	7.18E-04	1.36E-03	1.82E-03	2.26E-03	<b>2.26E-03</b>	7.18E-04	1.36E-03	1.82E-03	2.26E-03	<b>2.26E-03</b>
Acetaldehyde	2.29E-04	4.35E-04	5.80E-04	7.22E-04	<b>7.22E-04</b>	2.29E-04	4.35E-04	5.80E-04	7.22E-04	<b>7.22E-04</b>
Acrolein	7.17E-05	1.36E-04	1.82E-04	2.26E-04	<b>2.26E-04</b>	7.17E-05	1.36E-04	1.82E-04	2.26E-04	<b>2.26E-04</b>
Total PAH	1.93E-03	3.66E-03	4.88E-03	6.07E-03	<b>6.07E-03</b>	1.93E-03	3.66E-03	4.88E-03	6.07E-03	<b>6.07E-03</b>
Total HAP	0.01	0.03	0.04	0.05	<b>0.05</b>	0.01	0.03	0.04	0.05	<b>0.05</b>
<i>Greenhouse Gases</i>										
CO <sub>2</sub>	1,484	2,813	3,756	4,670	<b>4,670</b>	1,484	2,813	3,756	4,670	<b>4,670</b>
CH <sub>4</sub>	0.06	0.11	0.15	0.19	<b>0.19</b>	0.06	0.11	0.15	0.19	<b>0.19</b>
N <sub>2</sub> O	0.01	0.02	0.03	0.04	<b>0.04</b>	0.01	0.02	0.03	0.04	<b>0.04</b>
CO <sub>2</sub> e	1,488	2,822	3,768	4,685	<b>4,685</b>	1,488	2,822	3,768	4,685	<b>4,685</b>

Pollutant	Black Start Engines - Hourly Uncontrolled Emission Factors (lb/hr/gen) <sup>1,2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>					
NO <sub>x</sub>	9.30	12.81	22.77	38.85	<b>38.85</b>
CO	3.90	1.98	1.90	3.50	<b>3.90</b>
VOC	0.91	1.14	1.12	0.91	<b>1.14</b>
Filt. PM <sup>3</sup>	0.57	0.27	0.20	0.26	<b>0.57</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	0.62	0.35	0.31	0.40	<b>0.62</b>
SO <sub>2</sub>	9.18E-03	0.02	0.02	0.03	<b>0.03</b>
<i>Hazardous Air Pollutants</i>					
Benzene	4.70E-03	8.13E-03	0.01	0.01	<b>0.01</b>
Toluene	1.70E-03	2.95E-03	4.09E-03	5.24E-03	<b>5.24E-03</b>
Xylenes	1.17E-03	2.02E-03	2.81E-03	3.60E-03	<b>3.60E-03</b>
Formaldehyde	4.78E-04	8.27E-04	1.15E-03	1.47E-03	<b>1.47E-03</b>
Acetaldehyde	1.53E-04	2.64E-04	3.66E-04	4.70E-04	<b>4.70E-04</b>
Acrolein	4.77E-05	8.26E-05	1.15E-04	1.47E-04	<b>1.47E-04</b>
Total PAH	1.28E-03	2.22E-03	3.08E-03	3.96E-03	<b>3.96E-03</b>
Total HAP	9.53E-03	0.02	0.02	0.03	<b>0.03</b>
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	987.57	1,709	2,371	3,043	<b>3,043</b>
CH <sub>4</sub>	0.04	0.07	0.10	0.12	<b>0.12</b>
N <sub>2</sub> O	8.01E-03	0.01	0.02	0.02	<b>0.02</b>
CO <sub>2</sub> e	990.82	1,715	2,378	3,053	<b>3,053</b>

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

Pollutant	CAT C27 - Hourly Uncontrolled Emission Factors (lb/hr/gen) <sup>1, 2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>					
NO <sub>x</sub>	4.07	5.97	9.46	15.74	<b>15.74</b>
CO	1.13	1.37	1.45	1.15	<b>1.45</b>
VOC	0.16	0.20	0.20	0.13	<b>0.20</b>
Filt. PM <sub>3</sub>	0.22	0.20	0.12	0.10	<b>0.22</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	0.24	0.24	0.16	0.16	<b>0.24</b>
SO <sub>2</sub>	3.59E-03	6.23E-03	9.01E-03	0.01	<b>0.01</b>
<i>Hazardous Air Pollutants</i>					
Benzene	1.84E-03	3.19E-03	4.61E-03	5.91E-03	<b>5.91E-03</b>
Toluene	6.66E-04	1.16E-03	1.67E-03	2.14E-03	<b>2.14E-03</b>
Xylenes	4.58E-04	7.93E-04	1.15E-03	1.47E-03	<b>1.47E-03</b>
Formaldehyde	1.87E-04	3.24E-04	4.69E-04	6.01E-04	<b>6.01E-04</b>
Acetaldehyde	5.97E-05	1.04E-04	1.50E-04	1.92E-04	<b>1.92E-04</b>
Acrolein	1.87E-05	3.24E-05	4.69E-05	6.00E-05	<b>6.00E-05</b>
Total PAH	5.03E-04	8.72E-04	1.26E-03	1.62E-03	<b>1.62E-03</b>
Total HAP	3.73E-03	6.47E-03	9.36E-03	0.01	<b>0.01</b>
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	386.54	670.30	969.70	1,242	<b>1,242</b>
CH <sub>4</sub>	0.02	0.03	0.04	0.05	<b>0.05</b>
N <sub>2</sub> O	3.14E-03	5.44E-03	7.87E-03	0.01	<b>0.01</b>
CO <sub>2</sub> e	387.81	672.50	972.88	1,246	<b>1,246</b>

Pollutant	CAT C15 Engines - Hourly Uncontrolled Emission Factors (lb/hr/gen) <sup>1, 2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>					
NO <sub>x</sub>	2.88	4.81	4.18	9.31	<b>9.31</b>
CO	0.70	1.24	2.20	1.97	<b>2.20</b>
VOC	0.07	0.07	0.10	0.07	<b>0.10</b>
Filt. PM <sub>3</sub>	0.11	0.17	0.14	0.08	<b>0.17</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	0.12	0.19	0.17	0.12	<b>0.19</b>
SO <sub>2</sub>	2.26E-03	3.86E-03	5.98E-03	7.41E-03	<b>7.41E-03</b>
<i>Hazardous Air Pollutants</i>					
Benzene	1.16E-03	1.98E-03	3.06E-03	3.80E-03	<b>3.80E-03</b>
Toluene	4.20E-04	7.16E-04	1.11E-03	1.37E-03	<b>1.37E-03</b>
Xylenes	2.88E-04	4.92E-04	7.62E-04	9.44E-04	<b>9.44E-04</b>
Formaldehyde	1.18E-04	2.01E-04	3.11E-04	3.86E-04	<b>3.86E-04</b>
Acetaldehyde	3.76E-05	6.42E-05	9.95E-05	1.23E-04	<b>1.23E-04</b>
Acrolein	1.18E-05	2.01E-05	3.11E-05	3.85E-05	<b>3.85E-05</b>
Total PAH	3.17E-04	5.40E-04	8.37E-04	1.04E-03	<b>1.04E-03</b>
Total HAP	2.35E-03	4.01E-03	6.21E-03	7.70E-03	<b>7.70E-03</b>
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	243.54	415.58	643.49	797.65	<b>797.65</b>
CH <sub>4</sub>	9.88E-03	0.02	0.03	0.03	<b>0.03</b>
N <sub>2</sub> O	1.98E-03	3.37E-03	5.22E-03	6.47E-03	<b>6.47E-03</b>
CO <sub>2</sub> e	244.34	416.95	645.60	800.28	<b>800.28</b>

**Notes:**

- (1) For engine-specific emission factors:  
Hourly Emissions at Load X (lb/hr/gen) = Emission Factor at Load X (g/hp-hr) x Engine Power at Load X (bhp/gen) / (453.6 g/lb)
- (2) For AP-42 & GHG emission factors:  
Hourly Emissions at Load X (lb/hr/gen) = Emission Factor (lb/MMBtu) x Heat Input at Load X (MMBtu/hr/gen)
- (3) Total PM/PM<sub>10</sub>/PM<sub>2.5</sub> is the sum of filterable PM/PM<sub>10</sub>/PM<sub>2.5</sub> and condensable PM.

POTENTIAL EMISSIONS - DIESEL-FIRED GENERATORS

Fuel Usage-Based Emission Rate

Pollutant	CAT 3516E Engines - Fuel Usage-Based Uncontrolled Emission Factors (lb/gal) <sup>1,2</sup>					CAT 3516E Engines - Fuel Usage-Based Controlled Emission Factors (lb/gal) <sup>1,2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>										
NO <sub>x</sub>	0.25	0.15	0.19	0.28	<b>0.28</b>	0.02	0.01	0.02	0.03	<b>0.03</b>
CO	0.12	0.05	0.06	0.05	<b>0.12</b>	0.12	0.05	0.06	0.05	<b>0.12</b>
VOC	3.69E-03	2.81E-03	2.63E-03	2.78E-03	<b>3.69E-03</b>	3.69E-03	2.81E-03	2.63E-03	2.78E-03	<b>3.69E-03</b>
Filt. PM <sup>3</sup>	8.50E-03	8.50E-03	8.50E-03	8.50E-03	<b>8.50E-03</b>	8.50E-03	8.50E-03	8.50E-03	8.50E-03	<b>8.50E-03</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	9.55E-03	9.55E-03	9.55E-03	9.55E-03	<b>9.55E-03</b>	9.55E-03	9.55E-03	9.55E-03	9.55E-03	<b>9.55E-03</b>
SO <sub>2</sub>	2.08E-04	2.08E-04	2.08E-04	2.08E-04	<b>2.08E-04</b>	2.08E-04	2.08E-04	2.08E-04	2.08E-04	<b>2.08E-04</b>
<i>Hazardous Air Pollutants</i>										
Benzene	1.06E-04	1.06E-04	1.06E-04	1.06E-04	<b>1.06E-04</b>	1.06E-04	1.06E-04	1.06E-04	1.06E-04	<b>1.06E-04</b>
Toluene	3.85E-05	3.85E-05	3.85E-05	3.85E-05	<b>3.85E-05</b>	3.85E-05	3.85E-05	3.85E-05	3.85E-05	<b>3.85E-05</b>
Xylenes	2.64E-05	2.64E-05	2.64E-05	2.64E-05	<b>2.64E-05</b>	2.64E-05	2.64E-05	2.64E-05	2.64E-05	<b>2.64E-05</b>
Formaldehyde	1.08E-05	1.08E-05	1.08E-05	1.08E-05	<b>1.08E-05</b>	1.08E-05	1.08E-05	1.08E-05	1.08E-05	<b>1.08E-05</b>
Acetaldehyde	3.45E-06	3.45E-06	3.45E-06	3.45E-06	<b>3.45E-06</b>	3.45E-06	3.45E-06	3.45E-06	3.45E-06	<b>3.45E-06</b>
Acrolein	1.08E-06	1.08E-06	1.08E-06	1.08E-06	<b>1.08E-06</b>	1.08E-06	1.08E-06	1.08E-06	1.08E-06	<b>1.08E-06</b>
Total PAH	2.91E-05	2.91E-05	2.91E-05	2.91E-05	<b>2.91E-05</b>	2.91E-05	2.91E-05	2.91E-05	2.91E-05	<b>2.91E-05</b>
Total HAP	2.16E-04	2.16E-04	2.16E-04	2.16E-04	<b>2.16E-04</b>	2.16E-04	2.16E-04	2.16E-04	2.16E-04	<b>2.16E-04</b>
<i>Greenhouse Gases</i>										
CO <sub>2</sub>	22.34	22.34	22.34	22.34	<b>22.34</b>	22.34	22.34	22.34	22.34	<b>22.34</b>
CH <sub>4</sub>	9.06E-04	9.06E-04	9.06E-04	9.06E-04	<b>9.06E-04</b>	9.06E-04	9.06E-04	9.06E-04	9.06E-04	<b>9.06E-04</b>
N <sub>2</sub> O	1.81E-04	1.81E-04	1.81E-04	1.81E-04	<b>1.81E-04</b>	1.81E-04	1.81E-04	1.81E-04	1.81E-04	<b>1.81E-04</b>
CO <sub>2</sub> e	22.42	22.42	22.42	22.42	<b>22.42</b>	22.42	22.42	22.42	22.42	<b>22.42</b>

Pollutant	Black Start Engines - Fuel Usage-Based Uncontrolled Emission Factors (lb/gal) <sup>1,2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>					
NO <sub>x</sub>	0.21	0.17	0.21	0.29	<b>0.29</b>
CO	0.09	0.03	0.02	0.03	<b>0.09</b>
VOC	0.02	0.01	0.01	6.66E-03	<b>0.02</b>
Filt. PM <sup>3</sup>	0.01	3.51E-03	1.84E-03	1.90E-03	<b>0.01</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	0.01	4.56E-03	2.89E-03	2.96E-03	<b>0.01</b>
SO <sub>2</sub>	2.08E-04	2.08E-04	2.08E-04	2.08E-04	<b>2.08E-04</b>
<i>Hazardous Air Pollutants</i>					
Benzene	1.06E-04	1.06E-04	1.06E-04	1.06E-04	<b>1.06E-04</b>
Toluene	3.85E-05	3.85E-05	3.85E-05	3.85E-05	<b>3.85E-05</b>
Xylenes	2.64E-05	2.64E-05	2.64E-05	2.64E-05	<b>2.64E-05</b>
Formaldehyde	1.08E-05	1.08E-05	1.08E-05	1.08E-05	<b>1.08E-05</b>
Acetaldehyde	3.45E-06	3.45E-06	3.45E-06	3.45E-06	<b>3.45E-06</b>
Acrolein	1.08E-06	1.08E-06	1.08E-06	1.08E-06	<b>1.08E-06</b>
Total PAH	2.91E-05	2.91E-05	2.91E-05	2.91E-05	<b>2.91E-05</b>
Total HAP	2.16E-04	2.16E-04	2.16E-04	2.16E-04	<b>2.16E-04</b>
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	22.34	22.34	22.34	22.34	<b>22.34</b>
CH <sub>4</sub>	9.06E-04	9.06E-04	9.06E-04	9.06E-04	<b>9.06E-04</b>
N <sub>2</sub> O	1.81E-04	1.81E-04	1.81E-04	1.81E-04	<b>1.81E-04</b>
CO <sub>2</sub> e	22.42	22.42	22.42	22.42	<b>22.42</b>

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

Pollutant	CAT C27 Engines - Fuel Usage-Based Uncontrolled Emission Factors (lb/gal) <sup>1, 2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>					
NO <sub>x</sub>	0.24	0.20	0.22	0.28	<b>0.28</b>
CO	0.07	0.05	0.03	0.02	<b>0.07</b>
VOC	9.02E-03	6.78E-03	4.57E-03	2.36E-03	<b>9.02E-03</b>
Filt. PM <sup>3</sup>	0.01	6.78E-03	2.74E-03	1.89E-03	<b>0.01</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	0.01	7.83E-03	3.80E-03	2.94E-03	<b>0.01</b>
SO <sub>2</sub>	2.08E-04	2.08E-04	2.08E-04	2.08E-04	<b>2.08E-04</b>
<i>Hazardous Air Pollutants</i>					
Benzene	1.06E-04	1.06E-04	1.06E-04	1.06E-04	<b>1.06E-04</b>
Toluene	3.85E-05	3.85E-05	3.85E-05	3.85E-05	<b>3.85E-05</b>
Xylenes	2.64E-05	2.64E-05	2.64E-05	2.64E-05	<b>2.64E-05</b>
Formaldehyde	1.08E-05	1.08E-05	1.08E-05	1.08E-05	<b>1.08E-05</b>
Acetaldehyde	3.45E-06	3.45E-06	3.45E-06	3.45E-06	<b>3.45E-06</b>
Acrolein	1.08E-06	1.08E-06	1.08E-06	1.08E-06	<b>1.08E-06</b>
Total PAH	2.91E-05	2.91E-05	2.91E-05	2.91E-05	<b>2.91E-05</b>
Total HAP	2.16E-04	2.16E-04	2.16E-04	2.16E-04	<b>2.16E-04</b>
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	22.34	22.34	22.34	22.34	<b>22.34</b>
CH <sub>4</sub>	9.06E-04	9.06E-04	9.06E-04	9.06E-04	<b>9.06E-04</b>
N <sub>2</sub> O	1.81E-04	1.81E-04	1.81E-04	1.81E-04	<b>1.81E-04</b>
CO <sub>2</sub> e	22.42	22.42	22.42	22.42	<b>22.42</b>

Pollutant	CAT C15 Engines - Fuel Usage-Based Uncontrolled Emission Factors (lb/gal) <sup>1, 2</sup>				
	25% Load	50% Load	75% Load	Full Standby	Maximum
<i>Criteria Pollutants</i>					
NO <sub>x</sub>	0.26	0.26	0.15	0.26	<b>0.26</b>
CO	0.06	0.07	0.08	0.06	<b>0.08</b>
VOC	6.17E-03	3.72E-03	3.49E-03	1.88E-03	<b>6.17E-03</b>
Filt. PM <sup>3</sup>	9.70E-03	9.29E-03	4.80E-03	2.35E-03	<b>9.70E-03</b>
PM/PM <sub>10</sub> /PM <sub>2.5</sub> <sup>3</sup>	0.01	0.01	5.85E-03	3.41E-03	<b>0.01</b>
SO <sub>2</sub>	2.08E-04	2.08E-04	2.08E-04	2.08E-04	<b>2.08E-04</b>
<i>Hazardous Air Pollutants</i>					
Benzene	1.06E-04	1.06E-04	1.06E-04	1.06E-04	<b>1.06E-04</b>
Toluene	3.85E-05	3.85E-05	3.85E-05	3.85E-05	<b>3.85E-05</b>
Xylenes	2.64E-05	2.64E-05	2.64E-05	2.64E-05	<b>2.64E-05</b>
Formaldehyde	1.08E-05	1.08E-05	1.08E-05	1.08E-05	<b>1.08E-05</b>
Acetaldehyde	3.45E-06	3.45E-06	3.45E-06	3.45E-06	<b>3.45E-06</b>
Acrolein	1.08E-06	1.08E-06	1.08E-06	1.08E-06	<b>1.08E-06</b>
Total PAH	2.91E-05	2.91E-05	2.91E-05	2.91E-05	<b>2.91E-05</b>
Total HAP	2.16E-04	2.16E-04	2.16E-04	2.16E-04	<b>2.16E-04</b>
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	22.34	22.34	22.34	22.34	<b>22.34</b>
CH <sub>4</sub>	9.06E-04	9.06E-04	9.06E-04	9.06E-04	<b>9.06E-04</b>
N <sub>2</sub> O	1.81E-04	1.81E-04	1.81E-04	1.81E-04	<b>1.81E-04</b>
CO <sub>2</sub> e	22.42	22.42	22.42	22.42	<b>22.42</b>

**Notes:**

- (1) For engine-specific emission factors:  
Per-Gallon Emissions at Load X (lb/gal/gen) = {Emission Factor at Load X (g/hp-hr) x Engine Power at Load X (bhp/gen) / (453.6 g/lb)} / {Engine-Specific Fuel Usage at Load X (gal/hr)}
- (2) For AP-42 & GHG emission factors:  
Per-Gallon Emissions at Load X (lb/gal/gen) = {Emission Factor (lb/MMBtu) x Heat Input at Load X (MMBtu/hr/gen)} / {Engine-Specific Fuel Usage at Load X (gal/hr)}
- (3) Total PM/PM<sub>10</sub>/PM<sub>2.5</sub> is the sum of filterable PM/PM<sub>10</sub>/PM<sub>2.5</sub> and condensable PM.

## Emissions Data and Calculations

### PointOne Richmond, LLC - Charles City County, VA

#### Summary of Generator Potential Emissions

Emission Units		Potential Annual Emissions (tpy)							
		NO <sub>x</sub>	CO	VOC	PM <sub>10</sub> /PM <sub>2.5</sub>	SO <sub>2</sub>	Single HAP (Formaldehyde)	Total HAP	CO <sub>2e</sub>
CAT 3516E Engines	Uncontrolled Operations (SCR)	86.15	38.53	1.14	2.96	0.06	3.35E-03	0.07	6,946
	Controlled Operations	33.16	148.31	4.41	11.39	0.25	0.01	0.26	26,737
CAT 3516C Engines	All Operations	38.85	12.03	2.79	1.91	0.03	1.47E-03	0.03	3,053
CAT C27 Engines	All Operations	70.83	16.33	2.26	3.49	0.05	2.71E-03	0.05	5,609
CAT C15 Fire Pump Engine	All Operations	2.36	0.68	0.06	0.10	1.85E-03	9.65E-05	1.92E-03	200.07
<b>Total Combined Generator Potential Emissions:</b>		<b>86.15</b>	<b>148.31</b>	<b>4.41</b>	<b>11.39</b>	<b>0.25</b>	<b>0.01</b>	<b>0.26</b>	<b>26,737</b>

Notes:

(1) Potential emissions are calculated based on individual engine group potential fuel usage. The facility is proposing to limit facility-wide generator usage as follows:

$$\begin{aligned}
 1 \geq & \frac{\text{CAT 3516E Fuel Usage, Uncontrolled (gal/yr)}}{619,700} + \frac{\text{CAT 3516E Fuel Usage, Controlled (gal/yr)}}{2,385,477} + \frac{\text{CAT 3516C Fuel Usage (gal/yr)}}{604,045} \\
 & + \frac{\text{CAT C27 Fuel Usage (gal/yr)}}{608,589} + \frac{\text{CAT C15 Fuel Usage (gal/yr)}}{651,278}
 \end{aligned}$$

**Summary of Generator Potential Fuel Consumption**

**Proposed Generator Maximum Emissions Factors**

Emission Unit	Units	Pollutant							
		NO <sub>x</sub>	CO	VOC	PM <sub>10</sub> /PM <sub>2.5</sub>	SO <sub>2</sub>	Single HAP (Formaldehyde)	Total HAP	CO <sub>2e</sub>
CAT 3516E Engines - Uncontrolled	lb/gal	0.28	0.12	3.69E-03	9.55E-03	2.08E-04	1.08E-05	2.16E-04	22.42
CAT 3516E Engines - Controlled	lb/gal	0.03	0.12	3.69E-03	9.55E-03	2.08E-04	1.08E-05	2.16E-04	22.42
CAT 3516C Engines - All Operation	lb/gal	0.29	0.09	0.02	0.01	2.08E-04	1.08E-05	2.16E-04	22.42
CAT C27 Engines - All Operation	lb/gal	0.28	0.07	9.02E-03	0.01	2.08E-04	1.08E-05	2.16E-04	22.42
CAT C15 Engine - All Operation	lb/gal	0.26	0.08	6.17E-03	0.01	2.08E-04	1.08E-05	2.16E-04	22.42

**Potential Fuel Throughput Calculations**

Emission Unit Group	Maximum Fuel Consumption Rate (gal/hr/engine)	Number of Engines	Maximum NO <sub>x</sub> Emission Factor (lb/gal)	Annual Fuel Usage at Max Operating Hours hr/yr/engine (gal/yr total) <sup>1</sup>	Annual Fuel Usage for NO <sub>x</sub> Major Source Threshold Accounting for Threshold Buffer (gal/yr total) <sup>2</sup>	Annual Fuel Usage for CO Major Source Threshold Accounting for Threshold Buffer (gal/yr total) <sup>2</sup>	Fuel Consumption to Use in Potential to Emit Calculations (gal/yr total) <sup>3</sup>
CAT 3516E Engines - Uncontrolled	209.0	252	0.28	26,334,000	619,700	2,385,477	619,700
CAT 3516E Engines - Controlled	209.0	252	0.03	26,334,000	6,196,996	2,385,477	2,385,477
CAT 3516C Engines - All Operation	136.2	4	0.29	272,400	604,045	3,359,280	272,400
CAT C27 Engines - All Operation	55.6	18	0.28	500,400	608,589	4,544,027	500,400
CAT C15 Engine - All Operation	35.7	1	0.26	17,850	651,278	3,884,614	17,850

Notes:

- (1) Maximum Fuel Usage is calculated assuming 500 hours of operation per generator.
- (2) Annual Fuel Usage for Major Source Threshold is calculated using the following equation: [NSR Major Source Threshold (250 tpy) - Emissions Buffer (5 tpy) - Emissions from Turbines (tpy)] \* 2,000 lb/ton / Max Emission Factor per Engine (lb/gal)
- (3) Potential emissions are calculated based on either the fuel usage at max engine hours or major source threshold, whichever is lower.

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

**Number of Generator Engines**

CAT 3516E (3 MW) Engines	252
Black Start Engines	4
CAT C27 (800 kW) Engines	18
CAT C15 (500 kW) Fire Pump	1
<b>Site-Wide Total</b>	<b>275</b>

**Maximum Annual Fuel Consumption**

Engine Group	Hourly Diesel Fuel Consumption per Engine <sup>1</sup> (gal/hr/engine)	Potential Hours of Operation per Engine <sup>2</sup> (hrs/yr/engine)	Potential Fuel Usage per Engine <sup>3</sup> (gal/yr/engine)	Potential Fuel Usage per Engine <sup>3</sup> (gal/yr/engine)
CAT 3516E (3 MW) Engines	209.0	500	104,500	26,334,000
Black Start Engines	136.2	500	68,100	272,400
CAT C27 (800 kW) Engines	55.6	500	27,800	500,400
CAT C15 (500 kW) Fire Pump	35.7	500	17,850	17,850
<b>Total Site-wide Fuel Consumption:</b>				27,124,650

Notes:

- (1) Per the manufacturer's Equipment Specification Sheet and Performance Data.
- (2) Conservatively assumes no individual emergency engine at the site will operate at greater than 500 hours/year.
- (3) Potential Fuel Usage per Engine (gal/yr/engine) = Maximum Diesel Fuel Consumption at Any Load (gal/hr/engine) x Potential Hours of Operation per Engine (hrs/yr/engine)

**Potential VOC Emissions from the Diesel Belly Tanks**

Tank Parameters		CAT 3516E (3 MW) Engines	Black Start Engines	CAT C27 (800 kW) Engines	CAT C15 (500 kW) Fire Pump
Belly Tank Dimensions <sup>1</sup>	Length (ft)	50.0	51.0	27.17	16.23
	Width (ft)	13.3	13.0	6.38	6.74
	Height (ft)	2.8	1.7	4.86	9.69
Belly Tank Capacity <sup>1</sup>	(ft <sup>3</sup> )	1,838	1,103	842	317
	(gal)	13,750	8,250	6,302	2,375
Tank Diameter <sup>2</sup>	(ft)	6.84	5.25	6.28	9.12
Working Volume <sup>3</sup>	(gal)	11,000	6,600	5,520	1,900
Potential VOC Emissions (per Tank) <sup>4</sup>	(lb/yr)	7.74	4.81	2.94	3.17
<b>Potential VOC Emissions (all Tanks)<sup>5</sup></b>	<b>(tpy)</b>	<b>0.98</b>	<b>0.01</b>	<b>0.03</b>	<b>1.58E-03</b>
<b>Total Potential Diesel Belly Tank VOC Emissions (tpy)</b>		<b>1.01</b>			

Notes:

- (1) Tank specification taken from tank specification diagram provided by the engine vendor.
- (2) Tank Diameter (ft) =  $\sqrt{[\text{Width (ft)} * \text{Height (ft)}] / \pi * 4}$
- (3) Tank working volume assumed to be 80% of the storage capacity of the tank.
- (4) Belly Tank VOC emissions estimated using USEPA's TANKS 4.0.9.d program.
- (5) VOC Emissions for All Tanks (tpy) = Potential VOC Emissions per Tank (lb/yr/tank) x Number of Engines / (2,000 lb/ton)

**Emissions Data and Calculations**  
PointOne Richmond, LLC - Charles City County, VA

**Diesel Tank Emissions Calculations**

Parameter Description <sup>1</sup>	Source/Equation	CAT 3516E (3 MW) Engines	Black Start Engines	CAT C27 (800 kW) Engines	CAT C15 (500 kW) Fire Pump
Tank Contents	Facility Information	Diesel Fuel	Diesel Fuel	Diesel Fuel	Diesel Fuel
Location	Facility Information	Outdoors	Outdoors	Outdoors	Outdoors
Tank Type	Facility Information	Horizontal	Horizontal	Horizontal	Horizontal
Tank Diameter (D), ft	Facility Information	N/A	N/A	N/A	N/A
Tank Width (W), ft	Facility Information	13.25	13.00	6.38	6.74
Tank Length (L), ft	Facility Information	50.04	51.00	27.17	16.23
Tank Shell Radius (R <sub>S</sub> ), ft	$R_S = D/2$				
Effective Diameter (D <sub>E</sub> ), ft	Rectangular Tank: N/A Horizontal tank: $DE = (LD/(n/4))^{1/2}$	Not needed for rectangular tank	Not needed for rectangular tank	Not needed for rectangular tank	Not needed for rectangular tank
Tank Dome Roof Radius (R <sub>R</sub> ), ft	Dome Roofs: Assumed R <sub>R</sub> = D Flat Roofs: N/A				
Tank Shell Height (H <sub>S</sub> ), ft	Facility Information	2.8	1.7	4.9	9.7
Effective Height (H <sub>E</sub> ), ft	Rectangular tank: H <sub>E</sub> = H <sub>S</sub> Horizontal tank: H <sub>E</sub> = (n/4)D	2.8	1.7	4.9	9.7
Nominal Capacity, ft <sup>3</sup>	Facility Information	1,838.1	1,102.9	842.5	317.5
Nominal Capacity (gal)	Facility Information	13,750	8,250	6,302	2,375
Liquid Height (H <sub>L</sub> ), ft	Assumed = 0.5H <sub>S</sub>	1.4	0.8	2.4	4.8
Tank Cone Roof Slope (S <sub>R</sub> ), ft/ft	Flat Roof: S <sub>R</sub> = 0	0	0	0	0
Tank Roof Height (H <sub>R</sub> ), ft	Flat Roof: H <sub>R</sub> = S <sub>R</sub> R <sub>S</sub>	0	0	0	0
Roof Outage (H <sub>RO</sub> ), ft	Dome Roofs: H <sub>RO</sub> = H <sub>R</sub> [(1/2)+(1/6)(H <sub>R</sub> /R <sub>S</sub> ) <sup>2</sup> ] Cone Roofs: H <sub>RO</sub> = 1/3H <sub>R</sub> Flat Roofs: H <sub>RO</sub> = 0	0	0	0	0
Vapor Space Outage (H <sub>VO</sub> ), ft	Vertical tanks (used for rectangular tank): H <sub>VO</sub> = H <sub>S</sub> - H <sub>L</sub> + H <sub>RO</sub> Horizontal tanks: H <sub>VO</sub> = H <sub>E</sub> /2	1.4	0.8	2.4	4.8
Vapor Space Volume (V <sub>V</sub> ), ft <sup>3</sup>	Horizontal tank: $V_V = n/4(D_E^2 H_{VO})$ Rectangular tank: H <sub>VO</sub> WL	919.1	551.4	421.2	530.0
Ideal Gas Constant (R), psia ft <sup>3</sup> /lb-mole R	Constant	10.731	10.731	10.731	10.731
Daily Maximum Ambient Temperature (T <sub>AX</sub> ), R <sup>2</sup>	AP-42, Table 7.1-7 for Richmond, VA	528.4	528.4	528.4	528.4
Daily Minimum Ambient Temperature (T <sub>AN</sub> ), R <sup>2</sup>	AP-42, Table 7.1-7 for Richmond, VA	508.7	508.7	508.7	508.7
Daily Average Ambient Temperature (T <sub>AA</sub> ), R	$T_{AA} = (T_{AX} + T_{AN})/2$	518.5	518.5	518.5	518.5
Paint Solar Absorptance (α), dimensionless <sup>3</sup>	AP-42, Table 7.1-6	0.97	0.97	0.97	0.97
Liquid Bulk Temperature (T <sub>B</sub> ), R	$T_B = T_{AA} + 0.003αI$	522.4	522.4	522.4	522.4
Daily Total Solar Insolation Factor (I), Btu/ft <sup>2</sup> d <sup>2</sup>	AP-42, Table 7.1-7 for Richmond, VA	1,341.0	1,341.0	1,341.0	1,341.0
Daily Average Liquid Surface Temperature (T <sub>LA</sub> ), R	$T_{LA} = 0.4T_{AA} + 0.6T_B + 0.005 α I$	527.4	527.4	527.4	527.4
Vapor Molecular Weight (M <sub>V</sub> ), lb/lb-mole	Vapor Molecular weight of diesel fuel	130	130	130	130
Vapor Pressure Constant, A	AP-42, Table 7.1-2, No 2 Fuel Oil	12	12	12	12
Vapor Pressure Constant, B	AP-42, Table 7.1-2, No 2 Fuel Oil	8907	8907	8907	8907
Vapor Pressure at T <sub>LA</sub> (P <sub>VA</sub> ), psia	Raoult's Law or Antoine Equation	0.0083	0.0083	0.0083	0.0083
Avg Vapor Temperature T <sub>V</sub> , R	$T_V = 0.7T_{AA} + 0.3T_B + 0.009 α I$	531.4	531.4	531.4	531.4
Vapor Density (W <sub>V</sub> ), lb/ft <sup>3</sup>	$W_V = M_V P_{VA} / RT_V$	0.00019	0.00019	0.00019	0.00019
Daily Ambient Temperature Range (ΔT <sub>A</sub> ), R	$ΔT_A = T_{AX} - T_{AN}$	19.7	19.7	19.7	19.7
Daily Vapor Temperature Range (ΔT <sub>V</sub> ), R	$ΔT_V = 0.7ΔT_A + 0.02 α I$	39.8	39.8	39.8	39.8
Vapor Pressure at T <sub>AN</sub> (P <sub>VN</sub> ), psia	Raoult's Law or Antoine Equation	0.0045	0.0045	0.0045	0.0045
Vapor Pressure at T <sub>AX</sub> (P <sub>VX</sub> ), psia	Raoult's Law or Antoine Equation	0.0086	0.0086	0.0086	0.0086
Daily Vapor Pressure Range (ΔP <sub>V</sub> ), psia	$ΔP_V = P_{VX} - P_{VN}$	0.0041	0.0041	0.0041	0.0041
Breather Vent Pressure Setting Range (ΔP <sub>B</sub> ), psig	$ΔP_B = P_{BP} - P_{BV}$ (Assumed = 0.06)	0.06	0.06	0.06	0.06
Atmospheric Pressure (P <sub>A</sub> ), psia	Constant	14.7	14.7	14.7	14.7
Vapor Space Expansion Factor (K <sub>E</sub> ), dimensionless	$K_E = Δ T_V / T_{LA} + (Δ P_V - Δ P_B) / (P_A - P_{VA})$	0.07	0.07	0.07	0.07
Vented Vapor Saturation Factor (K <sub>S</sub> ), dimensionless	$K_S = 1 / (1 + 0.053 P_{VA} H_{VO})$	1.0	1.0	1.0	1.0
Number of Days/Year in Operation	Constant	365	365	365	365
<b>Standing Storage Losses (L<sub>S</sub>), lb/year/tank</b>	<b><math>L_S = 365 W_V V_V K_E K_S</math></b>	<b>4.56</b>	<b>2.74</b>	<b>2.09</b>	<b>2.63</b>
Liquid Density (lb/gal)	Density of diesel fuel	7.10	7.10	7.10	7.10
Potential Throughput (Q), gal <sup>4</sup>	500 hours of operation at 100% load	125,400	81,720	33,360	21,420
Potential Throughput (Q), bbl	Throughput is in bbls (42 gal/bbl)	2,985.7	1,945.7	794.3	510.0
Maximum Liquid Height (H <sub>LX</sub> ), ft	Assumed = 0.9H <sub>S</sub>	2.5	1.5	4.4	8.7
Tank Maximum Liquid Volume (V <sub>LX</sub> ), ft <sup>3</sup>	Assumed = 0.9*Nominal Capacity	1,654.3	992.6	758.2	285.7
Turnovers (N), dimensionless	$N = 5.614Q/V_{LX}$	10.1	11.0	5.9	10.0
Turnover Factor (K <sub>N</sub> ), dimensionless	For N ≤ 36 K <sub>N</sub> = 1, For N > 36 K <sub>N</sub> = (180 + N)/6N	1.0	1.0	1.0	1.0
Working Loss Factor (K <sub>P</sub> ), dimensionless	For Organic Liquids, K <sub>P</sub> = 1	1.0	1.0	1.0	1.0
Vent setting correction factor, K <sub>B</sub>	For vent setting range ± 0.03 psig, K <sub>B</sub> = 1	1.0	1.0	1.0	1.0
<b>Working Losses (L<sub>W</sub>), lb/year/tank</b>	<b><math>L_W = 5.614Q K_N K_P W_V K_B</math></b>	<b>3.18</b>	<b>2.07</b>	<b>0.85</b>	<b>0.54</b>
Total Uncontrolled Losses (L <sub>T</sub> ), lb/year/tank	$L_T = L_S + L_W$	7.74	4.81	2.94	3.17
Total Uncontrolled Losses (L <sub>T</sub> ), ton/year/tank	2,000 lb/ton	0.0039	0.0024	0.0015	0.0016
Total Uncontrolled Losses (L <sub>T</sub> ), lb/hr/tank	8,760 hr/yr	0.0009	0.0005	0.0003	0.0004

**Notes:**

- (1) Emissions calculated according to the methodology presented in AP-42, Section 7.1 for fixed-roof tanks.
- (2) Meteorological data from AP-42, Table 7.1-7 for Richmond, VA was used.
- (3) Paint solar absorptance is from AP-42, Table 7.1-6 and is assumed for black tanks in good condition.
- (4) An additional 20% safety factor is applied to each maximum annual throughput for a conservative estimate of tank emissions.

**APPENDIX 5  
MODELING PROTOCOL**

Intended for  
**Virginia Department of Environmental Quality**

Date  
**December 2025**

# **MODELING PROTOCOL**

## CONTENTS

<b>1.</b>	<b>Project Overview</b>	<b>3</b>
1.1	Site Location and Land Use	3
1.2	Source and Emissions Characterization	3
1.3	Formation of Secondary PM <sub>2.5</sub> and Ozone	6
1.4	NO <sub>x</sub> to NO <sub>2</sub> Conversion	7
<b>2.</b>	<b>Proposed Modeling Approach</b>	<b>7</b>
2.1	Model Versions and Options	7
2.2	Good Engineering Practice Stack Height Analysis	7
2.3	Meteorological Data	7
2.4	Receptor Locations	7
2.5	Proposed Analyses	8
2.6	Background Concentrations	8
2.7	Nearby Sources	8
<b>3.</b>	<b>Modeling Results</b>	<b>8</b>

## LIST OF TABLES

Table 1.	Emission Inventory and IDs
Table 2.	Facility-Wide Potential Emissions
Table 3.	Proposed Emission Rate Basis by Air Quality Standard
Table 4.	Summary of the SIL and NAAQS

## LIST OF FIGURES

1	Site Location
---	---------------

## 1. Project Overview

The applicant is submitting a state major (federal minor) air permit application for a new data center (the facility) located at 2840 Roxbury Rd, Charles City, Virginia in Charles City County. The facility will also include two onsite power plants that will provide primary power for data center operations. As a part of the application process, the facility has been asked by the Virginia Department of Environmental Quality (VDEQ) to complete an air quality modeling assessment for criteria pollutants, and potentially air toxics. Following review of the air permit application and this modeling protocol, VDEQ will make a final decision as to the scope of the required compliance demonstration, i.e., which pollutants and averaging periods need a compliance demonstration.

The contents of this modeling protocol are intended to provide information about the proposed project for VDEQ's review, and provide an outline of the proposed modeling approach and relevant assumptions. The proposed approach described in this protocol is based on preliminary discussions with VDEQ and procedures contained in the Environmental Protection Agency's (EPA) Guideline on Air Quality Models (GAQM, 40 CFR 60, Appendix W) and other relevant guidance, as applicable. Air quality modeling will be performed using the most recent version of the AERMOD (version 24142) modeling platform.

### 1.1 Site Location and Land Use

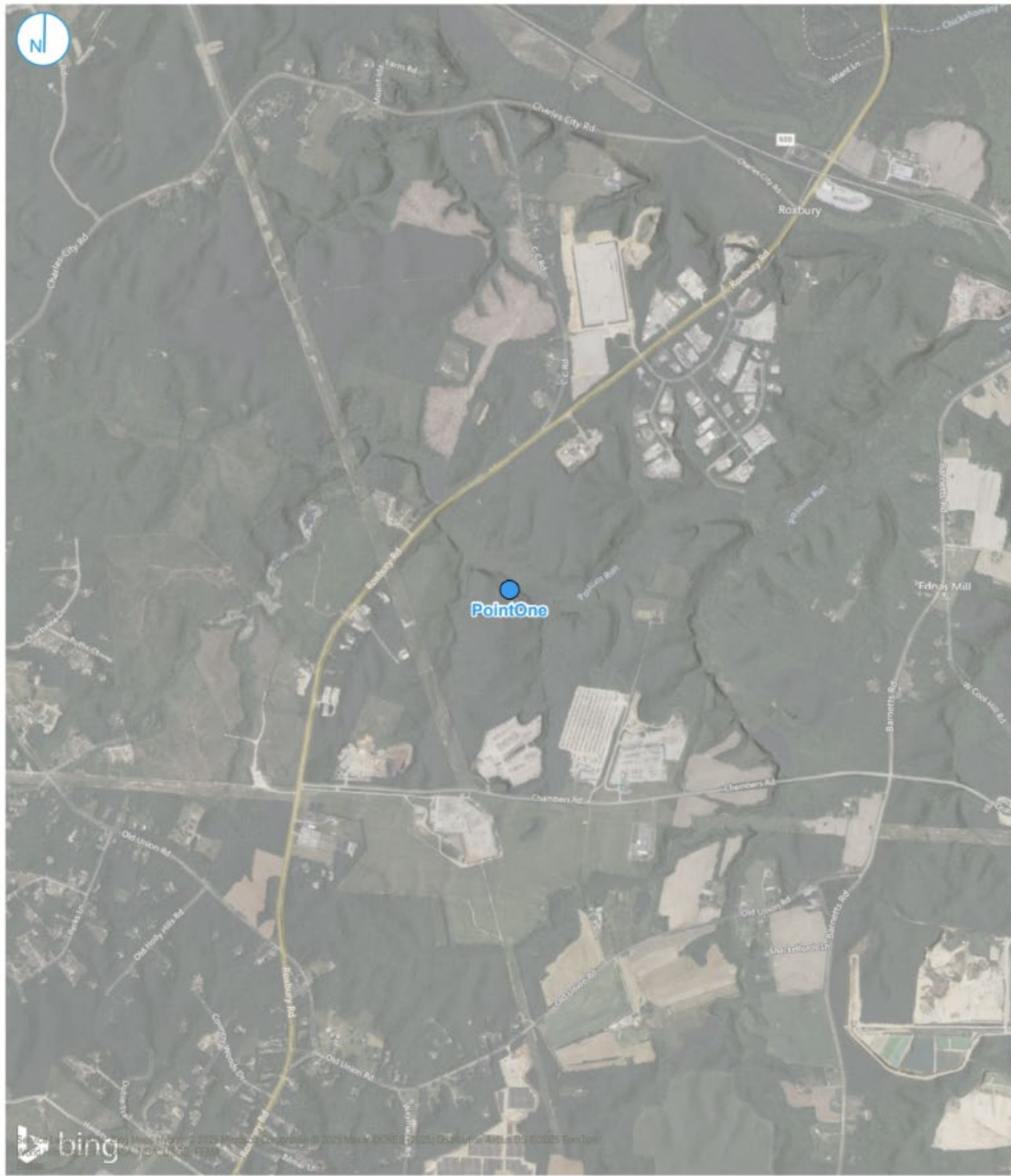
The facility is located at 2840 Roxbury Rd, Charles City, Charles City County, Virginia. A site location map is provided as **Figure 1**. The site is surrounded mostly by either open woods or other industrial buildings. The terrain surrounding the facility can be characterized as low, rolling hills.

### 1.2 Source and Emissions Characterization

The proposed project will include thirty-five (35) simple cycle combustion natural gas-fired turbines that will provide primary power for data center operations. The applicant is also requesting authorization to construct and operate four (4) diesel-fired generator engines located at two onsite power plants that are associated with turbine start up procedures, as well as two hundred and seventy-one (271) additional diesel-fired generators. These generators will burn ultra-low sulfur diesel (ULSD) conforming to ASTM D975 specifications for petroleum during periods of time when the turbines experience operational issues. Of the 271 generators, two hundred and fifty-two (252) generators are for critical operation of the IT equipment; these generators are Tier 2 certified and equipped with selective catalytic reduction (SCR) control devices. Eighteen (18) are emergency house generators, and one (1) is a diesel-fired emergency fire water pump. The fire water pump engine will provide power to convey water for fire suppression.

These emission units are summarized in **Table 1**, which is duplicated from Table 1 in the permit application. Similarly, the proposed criteria and hazardous air pollutant (HAP) emissions on a ton per year basis are provided in **Table 2**, which is duplicated from Table 2 in the permit application. The proposed emissions are based on the emission control, fuel type, and operating assumptions for each source discussed in the air quality permit application.

Based on the required operating scenario for the facility, Ramboll will develop emission operating scenarios that define the sources that will be operating concurrently in a given regulatory averaging period, i.e., 1-hour, 24-hour, and annual. For instance, concurrent operation of both power plants and the routine maintenance and testing (M&T) of the critical generators is a likely scenario. Other scenarios will also be evaluated such as black starts, and routine M&T of the house generators and fire water pump.



Map Scale: 1:24,000 | Map Center: 77°9'24"W 37°26'48"N



KEY MAP

0 2,000 Feet

### SITE LOCATION STATE MAJOR MODELING

**PointOne Richmond, LLC**  
2840 ROXBURY ROAD  
CHARLES CITY, VIRGINIA

### FIGURE 01

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.  
A RAMBOLL COMPANY



The routine M&T operations include testing that will occur on a weekly, monthly, quarterly, and annual schedule. Each test is based on different operating loads, and each test will occur for up to 30 minutes. The exception is the annual test, which will occur once per year for up to four hours. The source parameters and emission rates for these modeled scenarios will be based on information provided in the final air permit application.

The M&T schedule is expected to require less than 50 hours of operation per year for each generator. EPA has issued limited guidance on the treatment of intermittent emissions, and AERMOD is not designed to address this kind of source operation, i.e., a periodic operating schedule (e.g., weekly), but the exact hour of that operation is not known. The emission characterization of intermittent sources is an important model input due to this AERMOD limitation, and needs to be considered for each air quality standard and averaging period:

- for short-term air quality standards that are deterministic, the model emissions will be based on maximum hourly emissions;
- for short-term air quality standards that are probabilistic, the model emissions will be based on hourly-averaged emissions; and
- for annual air quality standards, the modeled emissions will be based on the ton per year emissions converted to an hourly rate.

The proposed emission approach is summarized in **Table 3**. The sources will be modeled assuming continuous operation. However, if time-of-day limits are needed for the M&T operations, then this will be addressed by using the AERMOD EMISFACT keyword and updating the average emissions by the number of hours operated in a year.

**Table 1. Emission Inventory and IDs**

Engine Group	Proposed Emission Unit ID Numbers
<b>Group 1 - Critical Generators</b> (252 X 3 MW Engines - CAT model 3516E)	EG-01 through EG-252
<b>Group 2 - Black Start Generators for Turbine Startup</b> (4 X 2 MW - CAT model 3516C)	BSDG-P1-01 and BSDG-P1-02 BSDG-P2-01 and BSDG-P2-02
<b>Group 3 - House Generators</b> (18 x 800 kW - CAT model C27)	HS-01 through HS-18
<b>Group 4 - Diesel Fire Pump</b> (1 x 500 kW - CAT model C15)	FP-01
<b>Plant 1 - SMT-130 Turbines</b> (16 x 17.8 MW)	CTG-P1-1 through CTG-P1-16
<b>Plant 2 - PGM-130 Turbines</b> (19 x 18 MW)	CTG-P2-1 through CTG-P2-19

**Table 2. Facility-Wide Potential Emissions**

Pollutant	Potential Annual Emissions (tpy)			Facility-Wide Potential Emissions (tpy)	PSD Major Source Threshold (tpy)	Above Thresholds?
	Emergency Generators	Diesel Tanks	Turbines			
NO <sub>x</sub>	86.15	--	158.85	245.00	250	No
CO	148.31	--	96.69	245.00	250	No
VOC	4.41	1.01	45.13	50.55	250	No
PM <sub>10</sub> /PM <sub>2.5</sub>	11.39	--	141.85	153.24	250	No
SO <sub>2</sub>	0.25	--	73.08	73.32	250	No
Max. Individual HAP (formaldehyde)	0.01	--	4.34	4.35	--	--
Total HAP	0.26	--	11.16	11.42	--	--

**Table 3. Proposed Emission Rate Basis by Air Quality Standard**

Pollutant	Averaging Period	Proposed Emission Rate
CO	1-hour	maximum hourly
	8-hour	maximum hourly
NO <sub>2</sub>	1-hour	hourly average
	Annual	ton per year
PM <sub>2.5</sub>	24-hour	hourly average
	Annual	ton per year
PM <sub>10</sub>	24-hour	maximum hourly
SO <sub>2</sub>	1-hour	hourly average

### 1.3 Formation of Secondary PM<sub>2.5</sub> and Ozone

An assessment of project-related secondary ozone and PM<sub>2.5</sub> impacts will be conducted using the Modeled Emission Rates for Precursors (MERPs) database, consistent with EPA's Guidance on the Development of MERPs as a Tier I Demonstration Tool for Ozone and PM<sub>2.5</sub> under the PSD Permitting Program. The project emissions and MERPs database will be used to estimate the secondary formation of ozone and PM<sub>2.5</sub> using a representative source modeled by EPA.

The estimated secondary PM<sub>2.5</sub> will be added to the direct PM<sub>2.5</sub> impacts modeled by AERMOD. The estimated ozone impacts will be compared to the significant impact level of 1 ppb. If ozone impacts are above the SIL, the impacts will be added to the 8-hour ozone design value from a nearby monitor and compared to the NAAQS.

#### **1.4 NO<sub>x</sub> to NO<sub>2</sub> Conversion**

The modeling will be performed using an AERMOD Tier 3 method, such as the ozone limiting method (OLM) or the plume volume molar ratio method (PVMRM) approach for conversion of nitrogen oxide (NO<sub>x</sub>) emissions to ambient NO<sub>2</sub>. The tier 3 methods require the use of in-stack ratios (ISRs) of NO<sub>2</sub>/NO<sub>x</sub>, maximum equilibrium ratios, and ozone background data. It is proposed to use the default value of 0.9 for the equilibrium ratio, an ISR representative of the equipment and fuel type, and representative background ozone data. It is anticipated that an hourly ozone file, contemporaneous with the meteorological data will be used. Missing data will be filled in using interpolation or substitution. The final processing will be documented in the final modeling report.

## **2. Proposed Modeling Approach**

### **2.1 Model Versions and Options**

The air quality modeling platform to be used for this analysis is the most recent version of the AERMOD modeling system (Version 24142). The model versions used in the analysis are:

- AERMAP 24142
- AERMET 24142
- AERSURFACE 24142
- BPIP 04274
- AERMOD 24142

The AERMOD regulatory default options will be selected. Based on the facility location and surrounding land cover, AERMOD will be run in the default rural mode.

### **2.2 Good Engineering Practice Stack Height Analysis**

The Building Profile Input Program (BPIP) will be used to characterize the downwash effects that can influence the point sources, as well as confirm that the stacks meet the Good Engineering Practice (GEP) stack height requirements. The facility layout will be digitized for emission source locations and structures, buildings, and generator enclosures that may influence the sources.

### **2.3 Meteorological Data**

Ramboll will work with VDEQ to obtain a representative meteorological dataset for use in the analysis.

### **2.4 Receptor Locations**

Receptors will be placed along the facility's ambient air boundary (fenceline). From the fenceline, a nested grid of receptors will be generated to ensure the maximum impacts from the project's emissions will be captured:

- 50-meter spacing from the ambient air boundary;
- 100-meter spacing extending from the ambient air boundary to 1 km from the facility;
- 250-meter spacing extending 1 km to 3 km from the facility;
- 500-meter spacing extending 3 km to 10 km from the facility; and
- 1-km spacing 10 km to 25 km from the facility.

The receptors will be processed with local terrain data using AERMAP and 10-meter resolution National Elevation Dataset (NED) data will be used in the analysis.

## 2.5 Proposed Analyses

Using the modeling scenarios and inputs described above, along with direction from VDEQ about which pollutants to model, the facility impacts will be compared to the significant impact levels (SILs). If predicted project impacts are less than the SILs, then compliance with the National Ambient Air Quality Standards (NAAQS) is demonstrated and no additional modeling is necessary. If predicted project impacts exceed the SILs, then cumulative modeling will be conducted, including additional nearby emissions sources and background concentrations, and compared against the NAAQS.

The value and form of the SILs and NAAQS are provided in **Table 4**. The form of the SILs (e.g., maximum by year or multiyear average) will follow the form of the NAAQS.

**Table 4. Summary of the SIL and NAAQS**

Pollutant	Averaging Period	SIL	NAAQS
		( $\mu\text{g}/\text{m}^3$ )	( $\mu\text{g}/\text{m}^3$ )
CO	1-hour	2,000	40,000 <sup>(a)</sup>
	8-hour	500	10,000 <sup>(a)</sup>
NO <sub>2</sub>	1-hour	7.5	188 <sup>(b)</sup>
	Annual	1	100
PM <sub>2.5</sub>	24-hour	1.2	35 <sup>(c)</sup>
	Annual	0.13	9 <sup>(d)</sup>
PM <sub>10</sub>	24-hour	5	150 <sup>(e)</sup>
SO <sub>2</sub>	1-hour	7.8	196 <sup>(f)</sup>

**Notes:**

- (a) Not to be exceeded more than once per year, or maximum H2H by year.
- (b) Maximum 98th percentile of 1-hr daily maximum concentration averaged over 5 years.
- (c) Maximum 98th percentile, averaged over 5 years.
- (d) Maximum Annual mean, averaged over 5 years.
- (e) Not to be exceeded more than once per year on average over 3 years, or maximum H2H by year or Hn+1H over n years.
- (f) Maximum 99th percentile of 1-hr daily maximum concentration averaged over 5 years.

## 2.6 Background Concentrations

Ramboll will work with VDEQ to obtain a representative meteorological dataset for use in the analysis.

## 2.7 Nearby Sources

If Ramboll will work with VDEQ to obtain a nearby source inventory for use in the analysis.

## 3. Modeling Results

The modeling report will summarize the final model inputs, assumptions, and provide a summary of the SIL and NAAQS analyses. The results will be presented in a tabular format. Electronic copies of AERMOD input and output files, BPIP input and output files, AERMAP input and output files, and meteorological data files will be submitted with the modeling report.