

Prepared for:

**Amazon Data Services, Inc.**

Submitted to:

**Missouri Department of Natural Resources  
Air Pollution Control Program**

Prepared by:

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Date

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Project Number

**1940116499**

## **APPLICATION FOR FEDERALLY ENFORCEABLE SECTION (6) CONSTRUCTION PERMIT**

### **AMAZON DATA SERVICES, INC. NEW DATA CENTER FACILITY IN NEW FLORENCE, MISSOURI**

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## 1. PERMIT APPLICATION SUMMARY

Amazon Data Services, Inc. ("Amazon") is proposing to build a data center facility in New Florence, Montgomery County, Missouri ("Amazon Data Centers" or "the facility"). This site is a greenfield facility, referred to as STL100. The project will include four hundred and seventy-six (476) 2.75 megawatt (MW) generators, four (4) 1.6 MW generators, one (1) 400 kW generator, and two (2) 250 kW generators. The diesel-fired or renewable diesel-fired emergency generators have the potential to emit air contaminants regulated under the Missouri Department of Natural Resources (MDNR) Air Pollution Control Program. The facility will commence construction once authorized under a Section (6) construction permit.

As described in this application, Amazon is requesting a site-wide NO<sub>x</sub> limitation of 99 tons per year in order to remain below the Title V threshold permit threshold of 100 tons per year. As such, Amazon is applying for a minor construction permit in accordance with procedures specified in Missouri Code of State Regulations (CSR), 10 CSR 10-6.060. This application includes all information for an administratively complete Section (6) construction permit application. Appendix A includes an area map of the location of the proposed facility modifications. Appendix B includes facility-wide potential emission calculations. Appendix C includes engine manufacturer's technical data sheets. Appendix D includes required MDNR permit application forms. Appendix E includes the required air dispersion modeling analysis. Appendix F includes a process flow diagram for the emergency generators.

## 2. PROCESS DESCRIPTION

### 2.1 Diesel-Fired Emergency Generators

The proposed facility is located near the cross section of Hudson Road and Ellis Road in New Florence, Montgomery County, Missouri. Operations at the facility include data processing, hosting and related services and is thus classified under NAICS Category 518210 for Data Processing, Hosting and Related Services and SIC Code 7374 for Computer Processing and Data Preparation and Processing Services. With this application, Amazon is applying for authorization to construct the identified diesel-fired or renewable diesel-fired emergency generators. Table 1 summarizes the technical specifications of the proposed emergency generators. Manufacturer technical specifications for the generators are provided in Appendix C.

Amazon is requesting approval for the use of both ULSD and renewable diesel conforming to EN15940 and ASTM D975 specifications for petroleum, including renewable diesel like hydrotreated vegetable oil (HVO), in the generators already permitted to burn diesel fuel. 40 CFR 63 Subpart ZZZZ indicates diesel fuel includes non-distillate fuel with comparable physical and chemical properties (e.g. biodiesel). Engine manufacturer guidance indicates all engines are compatible with renewable diesel and results in the reduction of carbon emissions. As such, the facility emissions will not increase as a result of burning renewable diesel.

### 2.2 Miscellaneous Activities

Other sources of emissions at the facility will include 17 (one per building) 12,000-gallon storage tanks with the potential to emit Volatile Organic Compounds (VOCs), diesel belly storage tanks for each emergency generator with the potential to emit VOCs, and truck and employee traffic on paved roads with the potential to emit particulate matter (PM), particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM<sub>10</sub>) and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns (PM<sub>2.5</sub>). Paved haul roads for diesel delivery have been assumed to be insignificant. Cooling equipment at the site consists of closed-loop, non-contact chillers and are not expected to generate air emissions via drift loss.

Table 1 Technical Specifications for Proposed Emergency Generators				
	Group 1: Critical Generators	Group 2: AWB Generators	Group 3: CAB Generator	Group 4: ACB Generators
Number of Generators	476	4	1	2
Fuel Type	Diesel, Renewable Diesel	Diesel, Renewable Diesel	Diesel, Renewable Diesel	Diesel, Renewable Diesel
Engine Manufacturer	CAT	CAT	CAT	CAT
Generator Model	3516E	3516C	C13	C9
Engine Manufacture Year	TBD	TBD	TBD	TBD
Genset Power Rating (kW)	2,750	1,600	400	250
Maximum Engine Power Output (bhp)	4,043	2,360	609	398
Engine Speed (rpm)	1,800	1,800	1,800	1,800
EPA Certification	Stationary Emergency Tier 2 with Tier 4 equivalent controls	Stationary Emergency Tier 2	Stationary Emergency Tier 2	Stationary Emergency Tier 2

### 3. POTENTIAL EMISSION CALCULATIONS

This section describes the methodology used to estimate the potential emissions from the proposed Amazon Data Center. Detailed emission calculations are provided in Appendix B.

#### 3.1 Overview of Emission Factors

To facilitate calculating emissions from the emission units at the facility, Amazon determined the appropriate emission factors and process or fuel usage potential throughputs. Control efficiencies for the Tier 4 equivalent generators were obtained from various manufacturer outlet emission concentrations that are being considered for use. Emission factors were obtained using various methodologies and sources. The sources include:

- Requested permit limitations;
- Manufacturer’s technical specifications and emission guarantees;
- U.S. EPA’s AP-42 Compilation of Air Emission Factors (5th Edition, Revised); and
- U.S. EPA’s Mandatory Greenhouse Gas Reporting Rule

The sources and calculation methodologies are discussed in greater detail in the following sections.

##### 3.1.1 Requested Permit Limitations

Amazon is requesting a permit limitation that restricts facility-wide NO<sub>x</sub> emissions, the highest-emitted pollutant, to 99 tons per year to avoid triggering the Title V permitting requirements. As seen in Table 2, only controlled emission factors are considered for Group 1 engines. The PTE was calculated assuming the Group 1 engines will have no uncontrolled runtime. All run time for Group 1 engines will be considered controlled. Annual NO<sub>x</sub> emissions are calculated using the following equation:

$$99 \text{ tttttt } 0000 \text{ NNNN}_{xx} = \sum_{ii=1}^m \left( \frac{EEEE \text{ NNN}_{xx,ii} QQ_{ii}}{2000 \text{ ttoott}} \right) + \sum_{jj=1}^m \text{NNNN}_{xx,jj}$$

Where:

EF<sub>NO<sub>x</sub>,i</sub> = the pollutant-specific emission factor for the engine type, in lb/hr, for each emission unit, i, based on the manufacturer’s technical specifications. The NO<sub>x</sub> emission factors for each genset and the number of generators in each genset group are shown in Table 2.

Genset Group	Maximum NO <sub>x</sub> Emission Factor (lb/hr)	Number of Generators
Group 1 Genset – Controlled	4.39	476
Group 2 Genset	30.66	4
Group 3 Genset	6.56	1
Group 4 Genset	2.74	2

Q<sub>i</sub> = the number of operating hours during the rolling 12-month period

Table 3 Control Efficiencies for Group 1 Generators	
Pollutant	Worse Case Control Efficiency
NO <sub>x</sub>	91.7%
CO	69.8%
HC	40.0%
PM	68.6%

NO<sub>x,j</sub> = the rolling, 12-month NO<sub>x</sub> emissions, in tons, for each de minimis, permit exempt and permit-by-rule emission unit, j

There are no proposed emission units at the facility that have the potential to emit NO<sub>x</sub> other than the generators; as such, NO<sub>x,j</sub> is zero in the above-reference equation.

$$99 \text{ tttttt } 0000 \text{ NNNN}_{xx} = 476 \left( \frac{4.39 \text{ lb}_{xx} \text{ QQii}}{2000 \text{ hr}_{ttt}} \right) + 4 \left( \frac{30.66 \text{ lb}_{xx} \text{ QQii}}{2000 \text{ hr}_{ttt}} \right) + 1 \left( \frac{6.56 \text{ lb}_{xx} \text{ QQii}}{2000 \text{ hr}_{ttt}} \right) + 2 \left( \frac{2.74 \text{ lb}_{xx} \text{ QQii}}{2000 \text{ hr}_{ttt}} \right)$$

**3.1.2 Manufacturer’s Technical Specifications**

The engine-specific emission factors provided by the manufacturer for NO<sub>x</sub>, VOC (hydrocarbons), CO, and filterable PM were used to estimate the emissions of those pollutants for each engine model. The potential emissions were conservatively calculated based on the manufacturer’s potential site variation (i.e., not to exceed) emissions data at 100% load. It was conservatively assumed that filterable PM is equal to filterable PM with an aerodynamic diameter of less than or equal to 10 microns (PM<sub>10</sub>).

**3.1.3 U.S. EPA AP-42 Emission Factors**

Diesel fuel emission factors in the US EPA’s AP-42, Section 3.4 were used for SO<sub>2</sub>, HAP, and condensable PM for engines greater than 600 horsepower. For engines less than 600 horsepower, US EPA’s AP-42 Section 3.3 was used for HAP emissions from diesel fuel combustion. 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.

**3.1.4 Diesel Belly Tanks**

Emissions of VOC from the diesel belly tanks will result from breathing and working losses.<sup>1</sup> These emissions were estimated using emission factors from WebFIRE, which provides emission factors in pounds VOC per 1,000 gallons storage or throughput. Breathing losses were calculated by multiplying the emission factor by the total belly tank capacity of each group of generators. Working losses were found by multiplying the emission factor by the maximum annual diesel throughput for each generator group.

**3.2 U.S. EPA’s Mandatory Greenhouse Gas Reporting Rule**

Emission factors from U.S. EPA’s Mandatory Greenhouse Gas Reporting Rule (40 CFR 98) were used to estimate greenhouse gas (GHG) emissions from the diesel-fired emergency generators.

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

**3.2.1 Facility-Wide Potential Emissions**

A summary of facility-wide potential emissions at the greenfield facility are shown in Table 4.

<b>Table 4 Facility wide Potential Emissions</b>	
<b>Pollutant</b>	<b>Total Emissions (tpy)</b>
Filterable PM	4.35
Total PM <sub>10</sub>	8.73
Total PM <sub>2.5</sub>	8.73
VOC	11.61
CO	66.60
NO <sub>x</sub>	99.0
SO <sub>2</sub>	0.86
CO <sub>2e</sub>	92,949
Total HAP	8.54E-01

**4. REGULATORY REVIEW**

This section of the application summarizes the applicability and non-applicability of state and federal regulations to the Amazon Data Center.

**4.1 Federal Regulatory Requirements**

Federal air quality regulations reviewed include New Source Performance Standards (NSPS) (40 CFR Part 60), pollutant- and category-specific National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR Parts 61 and 63), stratospheric ozone protection (40 CFR Part 82), and GHG Reporting (40 CFR Part 98).

**4.1.1 New Source Review**

The current Section 107 attainment status designations for areas within the State of Missouri are summarized in 40 CFR Section 81.326. The facility is located in Montgomery County, Missouri, which is classified as “attainment” or “unclassifiable/attainment” for all criteria pollutants. Therefore, the federal construction permitting program potentially applicable to the Amazon Data Center is the Prevention of Significant Deterioration (PSD) program.

Under the PSD permitting program, the major source emission threshold is 250 tpy of a regulated pollutant unless the source belongs to one of 28 specifically defined industrial source categories, in which case the major source threshold is 100 tpy. Data processing facilities are not one of the listed source categories and thus, the applicable major source threshold to the Amazon Data Center is 250 tpy. As shown in Table 4, the facility is a minor source with respect to the PSD program, as emissions of criteria pollutants are less than the major source thresholds of 250 tpy. Any future “modifications” at the facility will be examined with regard to PSD permitting applicability.

**4.1.2 Title V Operating Permits**

The Title V operating permit program, promulgated in 40 CFR 70, requires a facility to obtain a Title V operating permit if it has potential emissions of a regulated criteria pollutant exceeding 100 tpy, of any single HAP exceeding 10 tpy, or of the aggregate of all HAPs exceeding 25 tpy. As shown in **Table 4**, the facility’s estimated emissions for NO<sub>x</sub> will not exceed the Title V thresholds for NO<sub>x</sub>. As such, the proposed facility will be classified as a minor source with respect to the Title V operating permit program.

#### 4.1.3 New Source Performance Standards (NSPS)

NSPS require new, modified, or reconstructed sources to control emissions to the level achievable by the best-demonstrated technology as specified in the applicable provisions. Any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, unless specifically excluded.

##### 4.1.3.1 NSPS Subpart A – General Provisions

Subpart A requires initial notification and performance testing, recordkeeping, and monitoring and provides reference methods and mandates general control device requirements for all other subparts as applicable.

##### 4.1.3.2 NSPS Subpart IIII – Stationary Compression Ignition Internal Combustion Engines

NSPS IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, applies to owners or operators of stationary compression ignition (CI) internal combustion engines (ICE) manufactured after April 1, 2006, and installed after July 11, 2005.

Emergency stationary internal combustion engines are defined in 40 CFR 60.4219 as:

*...Emergency stationary internal combustion engine means any stationary reciprocating internal combustion engine that meets all of the criteria in paragraphs (1) through (3) of this definition. All emergency stationary ICE must comply with the requirements specified in § 60.4211(f) in order to be considered emergency stationary ICE. If the engine does not comply with the requirements specified in § 60.4211(f), then it is not considered to be an emergency stationary ICE under this subpart.*

*(1) The stationary ICE is operated to provide electrical power or mechanical work during an emergency situation. Examples include stationary ICE used to produce power for critical networks or equipment (including power supplied to portions of a facility) when electric power from the local utility (or the normal power source, if the facility runs on its own power production) is interrupted, or stationary ICE used to pump water in the case of fire or flood, etc.*

*(2) The stationary ICE is operated under limited circumstances for situations not included in paragraph (1) of this definition, as specified in § 60.4211(f).*

*(3) The stationary ICE operates as part of a financial arrangement with another entity in situations not included in paragraph (1) of this definition only as allowed in § 60.4211(f)(2)(ii) or (iii) and §60.4211(f)(3)(i)...*

The engines that Amazon is proposing to install through this permit application meet all of the above criteria, as follows:

- The engines will be used to provide electrical power during emergency situations, and
- The engines will be used under limited circumstances for non-emergency situations, namely maintenance and testing activities

Because the diesel engines qualify as emergency stationary ICE, Amazon will comply with the applicable emergency engine standards specified under 40 CFR 60.4205.

#### **4.1.3.3 Non-Applicability of Other NSPS**

NSPS standards are developed for particular industrial source categories. Applicable and potentially applicable NSPS subparts have been identified in the sections above. All other NSPS are categorically not applicable to the operations at the Amazon Data Center.

#### **4.1.4 National Emission Standards for Hazardous Air Pollutants (NESHAP)**

NESHAP, federal regulations found in Title 40 Parts 61 and 63 of the CFR, are emission standards for hazardous air pollutants (HAP) that apply to major sources of HAP (facilities that exceed the major source thresholds of 10 tpy of a single HAP or 25 tpy of any combination of HAP) or specifically designated area sources (minor sources of HAP emissions) under Part 63. The Part 63 NESHAPs apply to sources in specifically regulated industrial source classifications (Clean Air Act Section 112(d)) or on a case-by-case basis (Clean Air Act Sections 112(g) and 112(j)) where U.S. EPA has failed to promulgate a 112(d) standard by the applicable deadline. The greenfield facility is an area source of HAPs because potential emissions of a single HAP are less than 10 tpy and total combined HAP potential emissions are less than 25 tpy. There are no specific NESHAP applicable to data processing facilities. However, NESHAP that apply to specific processes, rather than specific industries, have been reviewed for applicability for area sources.

##### **4.1.4.1 40 CFR Subpart 63 Subpart A – General Provisions**

All affected sources subject to a source-specific subpart under 40 CFR Part 63 are subject to the general provisions of Subpart A as specified in the source-specific NESHAP. Subpart A requires initial notification and performance testing, recordkeeping, monitoring, provides reference methods, and mandates general control device requirements for all other subparts as applicable. Because 40 CFR Part 63 Subpart ZZZZ is applicable to the facility, the provisions of Subpart A also apply.

##### **4.1.4.2 40 CFR Part 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines**

40 CFR Part 63 Subpart ZZZZ regulates HAP emissions from RICE located at major and area sources of HAP. The definition provided for emergency stationary ICE in 40 CFR 63.6675 is functionally equivalent to the definition provided for stationary internal combustion engines in NSPS IIII. Furthermore, in accordance with 40 CFR 63.6590(c)(1), new or reconstructed RICE that are located at an area source of HAP must meet the 40 CFR 63 Subpart ZZZZ requirements by meeting the requirements prescribed by 40 CFR 60 Subpart IIII. As described in Section 5.2.1, ADS will comply with the emergency engine requirements applicable to each engine under 40 CFR 60, Subpart IIII.

##### **4.1.4.3 Non-Applicability of other NESHAP**

As with the NSPS standards, NESHAP are primarily developed for particular industrial source categories. Therefore, the applicability of a particular NESHAP to a facility can be readily ascertained based on the industrial source category covered. All NESHAP regulations, both in 40 CFR Part 61 and 40 CFR Part 63, besides those specifically discussed above are not applicable to sources at data centers.

#### **4.2 Missouri Regulatory Requirements**

In addition to federal regulations, the MDNR rules establish regulations applicable at the emission unit level and at the facility level. The regulations also include general requirements for facilities, such as the requirement to obtain permits.

**4.2.1 10 CSR 10-6.060(1) – Construction Permitting Applicability**

Construction permitting is required in Missouri for any new installation with a potential to emit any pollutant in an amount equal to or greater than the *De Minimis* Emission Levels outlined in 10 CSR 10-6.020(3)(A) Table 1. As shown in **Table 5**, NO<sub>x</sub>, PM<sub>2.5</sub>, and CO exceed the *De Minimis* Emission Levels. As discussed in Section 4.1.2, the facility is taking an enforceable NO<sub>x</sub> limit to stay a minor source. Because the facility is taking a voluntary limit to be a minor source, a Section (6) general permit is required.

**4.2.2 10 CSR 10-6.060(5)(D) – Ambient Air Quality Impact Analysis (AAQIA)**

As presented in the regulation and based on discussions with MDNR, an ambient air quality assessment is required for any pollutant that exceeds the *De Minimis* Emission Levels outlined in 10 CSR 10-6.020(3)(A) Table 1. As shown in **Table 5**, NO<sub>x</sub> is the only pollutant that exceeds the *De Minimis* Emission Levels. As such, the applicant is conducting an air dispersion modeling assessment to demonstrate compliance with the nitrogen dioxide (NO<sub>2</sub>) National Ambient Air Quality Standards (NAAQS). The modeling protocol was already provided to MDNR and the modeling report is provided in Appendix E.

**4.2.3 10 CSR 10-6.070 – New Source Performance Regulations**

This rule applies to sources subject to 40 CFR 60 subparts incorporated by reference in subsection 10 CSR 10-6.070(3)(A). The facility's CI ICE are subject to 40 CFR 60 Subpart IIII and will comply with all requirements of the federal regulations as outlined in Section 4.1.3.2.

**4.2.4 10 CSR 10-6.075 – Maximum Achievable Control Technology Regulations**

This rule applies to sources subject to 40 CFR 63 subparts incorporated by reference in subsection 10 CSR 10-6.075(3)(A). The facility's CI ICE are subject to 40 CFR 63 Subpart ZZZZ and will comply with all requirements of the federal regulations as outlined in Section 4.1.4.2.

**4.2.5 10 CSR 10-6.220 – Restriction of Emission of Visible Air Contaminants**

Per 10 CSR 10-6.220(1)(A), internal combustion engines are exempt from this rule; therefore, this rule does not apply to this facility.

**4.2.6 10 CSR 10-6.261 – Control of Sulfur Dioxide Emissions**

This rule applies to any source that emits SO<sub>2</sub>. The CI ICE are sources of SO<sub>2</sub> emissions; however, these units will be fueled by ultra-low sulfur distillate fuel oil and/or paraffinic fuels conforming to EN15940 including HVO with a maximum sulfur content of 15 ppm. As such, the CI ICE's are not subject to the requirements of 10 CSR 10-6.261.

**4.2.7 10 CSR 10-6.390 – Control of NO<sub>x</sub> Emissions from Large Stationary Internal Combustion Engines**

10 CSR 10-6.390 limits NO<sub>x</sub> emissions from stationary RICE located in certain counties. Engines located in Montgomery County are subject to this rule, however, 10 SCR 10-6.390 (1)(C) states that any stationary internal combustion that meets the definition of an emergency standby engine is exempt. Thus, by qualifying as an emergency standby engine, the engines at this facility are not subject to the requirements of 10 CSR 10-6.390.

**4.2.8 10 CSR 10-6.405 – Restriction of Particulate Matter Emissions from Fuel Burning Equipment Used for Indirect Heating**

This rule applies to installations in which fuel is burned for the primary purpose of producing steam, hot water, or hot air or other indirect heating of liquids, gases, or solids and, in the course of doing so, the products of combustion do not come into direct contact with process materials. The CI ICE will not be used for indirect heating. As such, the CI ICE are not subject to the requirements of 10 CSR 10-6.405.

## 5. REGULATED NSR POLLUTANT MODELING ANALYSIS

Per MDNR guidance, an ambient air quality assessment is required for any pollutant that exceeds the *De Minimis* Emission Levels outlined in 10 CSR 10-6.020 (3)(A) Table 1. The de minimis emission level is exceeded for NO<sub>x</sub>, meaning an ambient air quality assessment was completed for this pollutant. Additionally, hazardous air pollutant emissions must be compared to the screening model action levels (SMALs) provided by MDNR. As shown in the emission calculations presented in Appendix B, no SMALs were exceeded.

Table 5 Missouri De Minimis Emission Levels				
Pollutant	De Minimis Emission Levels (tpy)	Project PTE (tpy)	Significant Impact Levels (µg/m <sup>3</sup> )	NAAQS (µg/m <sup>3</sup> )
PM <sub>10</sub>	15	8.73	5.0 – 24-hr	150 – 24-hr
PM <sub>2.5</sub>	10	8.73	0.2 – Annual 1.2 – 24-hr	9.0 – Annual 35 – 24-hr
NO <sub>x</sub>	40	99.0	1.0 – Annual 7.5 – 1-hr	99.7 – Annual 188.2 – 1-hr
SO <sub>2</sub>	40	0.86	1.0 – Annual 5.0 – 24-hr 25.0 – 3-hr 7.9 – 1-hr	26.2 – Annual - - 196.5 – 1-hr
CO	100	66.60	500 – 8-hr 2,000 – 1-hr	10,310 – 8-hr 40,096 – 1-hr

The air dispersion modeling analysis was conducted using U.S. EPA’s AERMOD version 24142. Meteorological data was provided by MDNR’s Construction Permit Unit for calendar years 2020 through 2024. The modeled emission rates were determined based on U.S. EPA’s guidance on intermittent sources which allows for annual emission rates to be averaged over 8,760 hours in a year. The emission rate for each engine was calculated based on the emissions for each generator type and the engine hours. Tables 6 summarizes the maximum predicted single source NO<sub>2</sub> concentrations. Seeing as the significant impact level was exceeded for both averaging periods, a cumulative NAAQS analysis was performed. The results of the cumulative analysis are seen below in Table 7.

Table 6. Significant Impact Analysis Results					
Pollutant	Averaging Period	Significant Impact Level (ug/m <sup>3</sup> )	Form of the Standard	Modeled Impact (µg/m <sup>3</sup> )	Above SIL? (Yes/No)
NO <sub>2</sub>	Annual	1	High	1.71	Yes
	1-hour	7.5	Avg-1H	127.69 (LLT Scenario, AWB_GEN2 Source Group)	Yes

Table 7. Cumulative NAAQS Analysis Results					
Pollutant	Averaging Period	NAAQS (ug/m <sup>3</sup> )	Form of the Standard	Total Modeled Impact (µg/m <sup>3</sup> )	Above NAAQS? (Yes/No)
NO <sub>2</sub>	Annual	100	High	11.27	No
	1-hour	188	Avg-8H	182.19 (CT6 Scenario, B100B Source Group)	No

## **APPENDIX A**

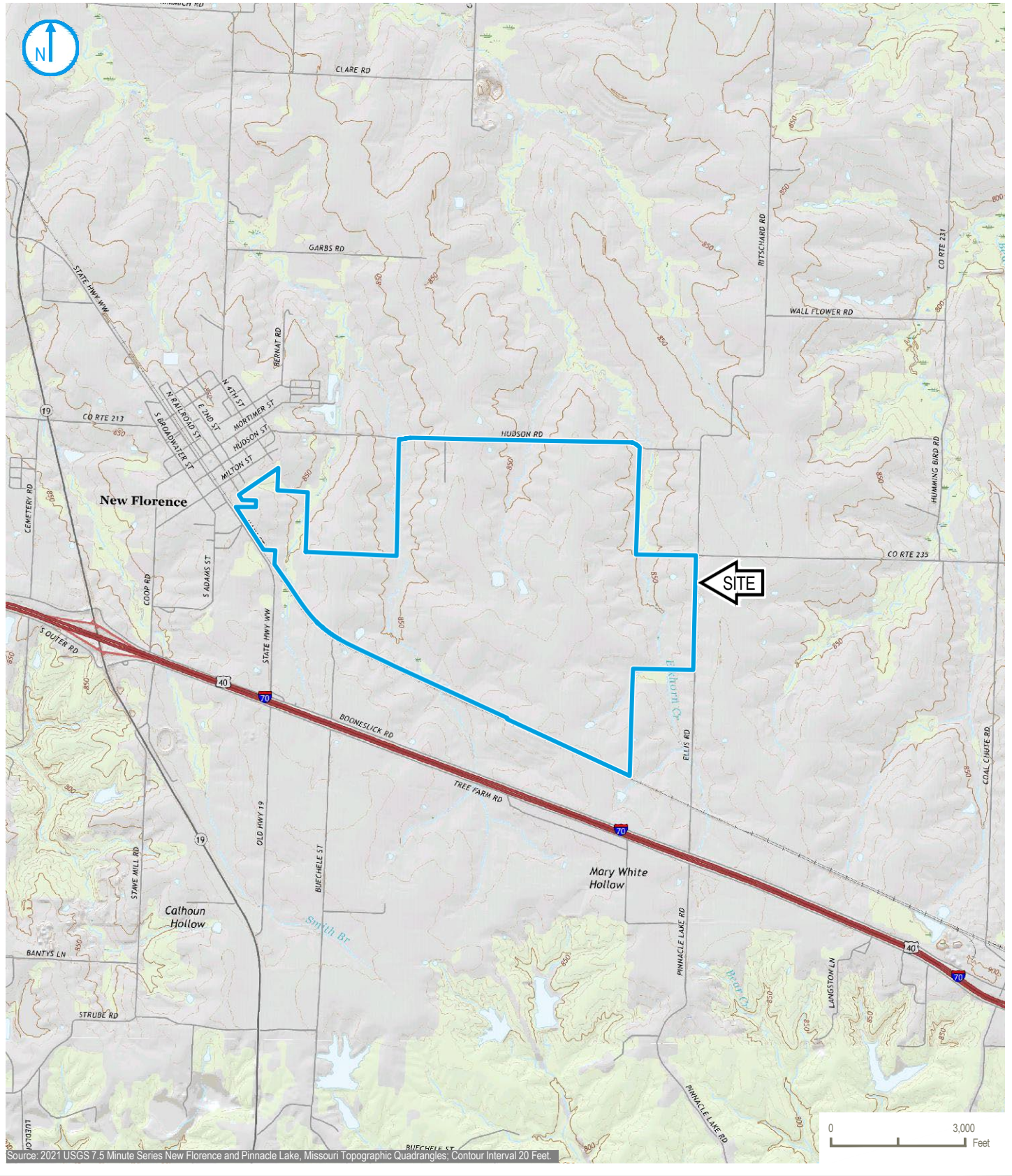
### **AREA MAP**

L:\Loop Project Files\CAD\194011940111262\_AWS\_CMH98A\_Jefferson\_Township\_OH1\_Const\_Permit01\_Site Location Map (New Florence MO).dwg

DESIGNER: CKLAI

DATED: 11/20/2025

PROJECT: 1940111262



### SITE LOCATION MAP

FIGURE 01

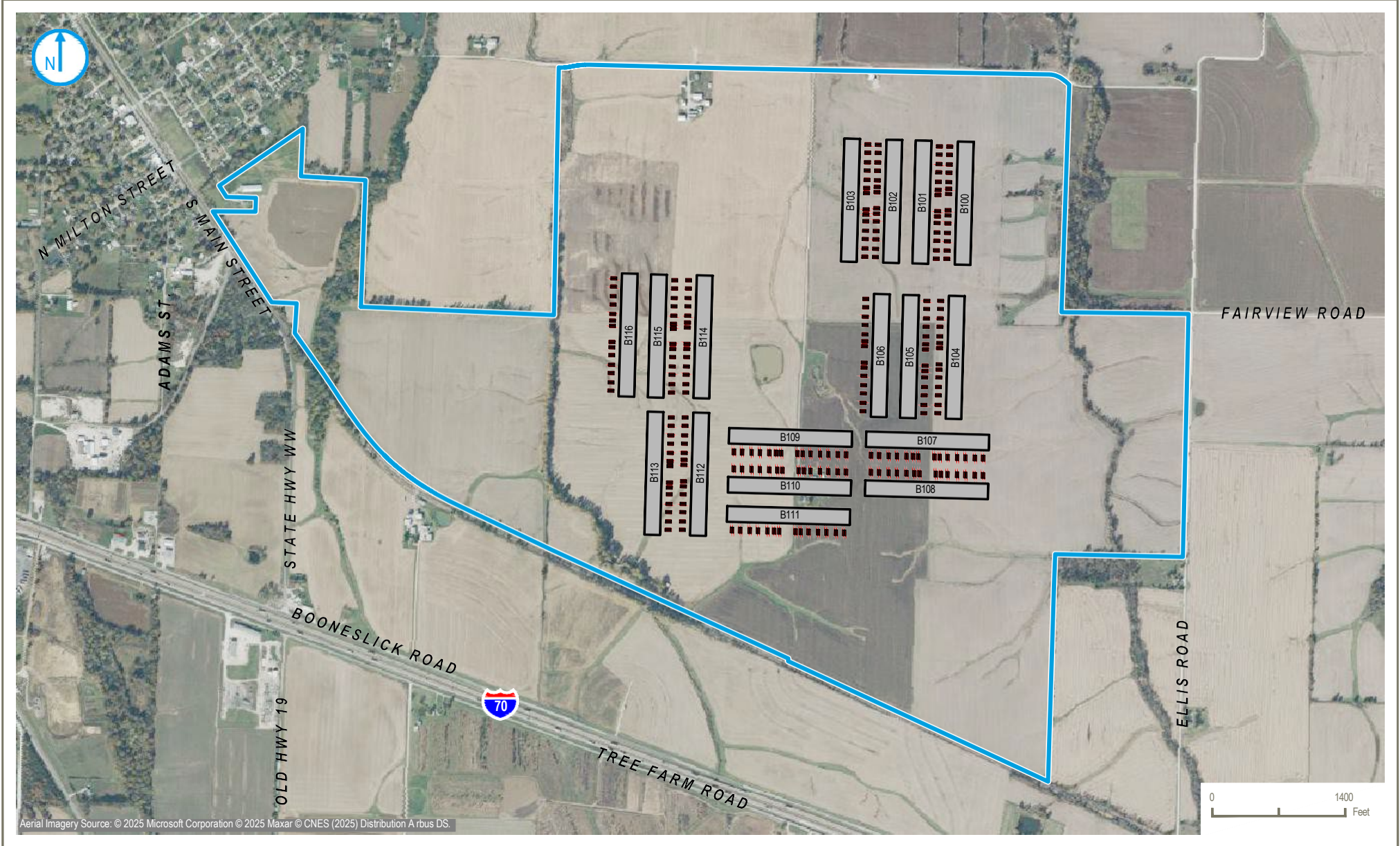


KEY MAP

**PROJECT ELKHORN**  
 MONTGOMERY COUNTY & CITY OF NEW FLORENCE  
 MISSOURI

RAMBOLL AMERICAS  
 ENGINEERING SOLUTIONS, INC.  
 A RAMBOLL COMPANY





- PROPERTY BOUNDARY
- BUILDING
- GENERATOR

Note  
All locations are approximate.

### SITE LAYOUT

FIGURE 02

**PROJECT ELKHORN**  
MONTGOMERY COUNTY & CITY OF NEW FLORENCE  
MISSOURI

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.  
A RAMBOLL COMPANY



## **APPENDIX B**

### **POTENTIAL EMISSION CALCULATIONS**

**Amazon Data Services - STL100**  
**Facility-Wide Emissions Summary**

Pollutant	Facility-Wide Potential Emissions (tpy) <sup>1</sup>				Total Emissions <sup>2</sup> (tpy)
	Group 1	Group 2	Group 3	Group 4	
<i>Criteria Pollutants</i>					
NO <sub>x</sub>	93.01	5.46	0.29	0.24	99.00
CO	65.38	1.02	0.14	0.06	66.60
VOC	11.43	0.16	8.28E-03	0.02	11.61
Filterable PM	4.25	0.08	6.44E-03	0.01	4.35
Condensable PM	4.37	2.07E-02	1.32E-03	1.81E-03	4.39
SO <sub>2</sub>	0.86	4.07E-03	2.60E-04	3.55E-04	0.86
Total PM <sub>10</sub> <sup>1</sup>	8.61	9.95E-02	7.77E-03	1.48E-02	8.73
Total PM <sub>2.5</sub> <sup>1</sup>	8.61	0.10	0.01	0.01	8.73
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	92,444	438	28	38.24	92,949
CH <sub>4</sub>	4	1.78E-02	1.14E-03	1.55E-03	3.77
N <sub>2</sub> O	1	3.55E-03	2.27E-04	3.10E-04	0.75
Total GHG	92,449	438	28	38.24	92,953
Total CO <sub>2</sub> e	92,748	440	28	38.37	93,254

1. Potential emissions for all generators in each genset calculated as 100% Load Emission Factor (lb/hr) \* Annual Hour Limit (hr/yr) / 2000 lb/ton.
2. Total potential emissions are the sum of potential emissions for each genset.

**Amazon Data Services - STL100**  
**Potential Criteria and GHG Emissions from Gensets**

**Table 1. Number of Generator Engines (Site-Wide)**

Generator Group	Group	Number of Engines	Notes
2.75 MW CAT 3516E - Critical Generators	Group 1	TBD	476
1.6 MW CAT 3512C - AWB Generators	Group 2	TBD	4
400 kW CAT C13 - CAB Generator	Group 3	TBD	1
250 kW CAT C9 - ACB Generators	Group 4	TBD	2

**Table 2. Power Output by Load**

Genset Group	Engine Power Output (bhp/gen) <sup>1,2</sup>				
	100% Load	75% Load	50% Load	25% Load	10% Load
Group 1	4,043	3,072	2,102	1,131	549
Group 2	2,360	1,799	1,237	676	339
Group 3	609	457	316	178	91
Group 4	398	302	211	124	69

1. Per the manufacturer specification sheets and performance data for each engine model.

**Table 3. Emission Factors by Load**

Engines Group	Diesel Fuel Consumption (gal/hr/engine) <sup>1</sup>					Heat Input (MMBtu/hr/engine) <sup>2</sup>				
	100% Load	75% Load	50% Load	25% Load	10% Load	100% Load	75% Load	50% Load	25% Load	10% Load
Group 1	194.00	148.00	108.20	63.30	36.90	26.77	20.42	14.93	8.74	5.09
Group 2	109.40	86.10	63.80	39.00	22.30	15.10	11.88	8.80	5.38	3.08
Group 3	28.00	23.60	17.30	9.80	5.50	3.86	3.26	2.39	1.35	0.76
Group 4	19.10	15.30	11.40	7.20	4.30	2.64	2.11	1.57	0.99	0.59

1. Per the manufacturer specification sheets and performance data for each engine model.

2. Diesel fuel consumption was converted to heat input based on the diesel high heating value (HHV) from the Greenhouse Gas Mandatory Reporting Rule 40 CFR 98, Subpart C, Table C-2.

Diesel HHV = 0.138 MMBtu/gal

Table 4. Uncontrolled Emission Factors Based on Manufacturer's Emissions Guarantees

Pollutant	Uncontrolled Emission Factors for Group 1 Engines (g/hr) <sup>1</sup>					Controlled Emission Factors for Group 1 Engines (g/hr) <sup>1,2</sup>					Uncontrolled Emission Factors for Group 2 Engines (g/hr) <sup>1</sup>					Uncontrolled Emission Factors for Group 3 Engines (g/hr) <sup>1</sup>					Uncontrolled Emission Factors for Group 4 Engines (g/hr) <sup>1,2</sup>					
	100% Load	75% Load	50% Load	25% Load	10% Load	100% Load	75% Load	50% Load	25% Load	10% Load	100% Load	75% Load	50% Load	25% Load	10% Load	100% Load	75% Load	50% Load	25% Load	10% Load	100% Load	75% Load	50% Load	25% Load	10% Load	
NOx	24,002	14,715	7,618	4,207	4,659	1,992	1,211	632	349	13,907	9,059	4,642	2,193	2,053	2,577	1,068	585	577	371	1,242	734	452	281	222		
CO	4,637	1,698	1,187	1,894	1,876	1,400	513	358	572	2,612	2,528	1,823	1,466	1,702	1,386	852	1,107	1,159	773	270	271	211	284	268		
VOC	405	379	352	324	251	243	227	211	194	374	323	308	323	392	11	34	57	58	82	69	88	92	71	71		
Filterable PM	290	160	156	167	115	91	50	49	53	186	196	201	117	106	61	66	38	32	44	63	66	49	49	34		

1. Per the manufacturer specification sheets and performance data for each engine model.

2. The 10% load data was not considered for the controlled emissions because the generators cannot be operated at 10% load long enough to achieve catalyst bed temperature for emissions control without affecting generator integrity.

**Table 5. Emission Factors for Criteria Pollutants and GHG**

Pollutant	Emission Factor	
	(lb/MMBtu)	Reference
<i>Criteria Pollutants</i>		
Condensable PM	7.70E-03	1
SO <sub>2</sub>	1.52E-03	2
<i>Greenhouse Gases</i>		
CO <sub>2</sub>	163.05	3
CH <sub>4</sub>	6.61E-03	3
N <sub>2</sub> O	1.32E-03	3
Total GHG	163.06	3
Total CO <sub>2</sub> e	163.59	3

1. Condensable PM emission factor is from AP-42, Section 3.4, Large Stationary Diesel And All Stationary Dual-fuel Engines (October 1996), Table 3.4-2.

2. The SO<sub>2</sub> emission factor are from AP-42, Section 3.4, Large Stationary Diesel And All Stationary Dual-fuel Engines (October 1996), Table 3.4-1.

The factor was calculated based on the maximum allowable diesel fuel sulfur content under NSPS Subpart IIII:

$$\text{Diesel Sulfur Content} = 0.0015 \text{ wt.\% Sulfur}$$

3. Greenhouse gas emission factors from the Greenhouse Gas Mandatory Reporting Rule 40 CFR 98, Subpart C, Table C-2.

Total GHG emission factor is the sum of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emission factors.

The Total 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

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

Table 6. Maximum Hourly Emission Rates per Generator

Pollutant	Union Feed Group 1 Engines Fuel Usage Based Emission Factors (lb/hr/gal)						Concatted Group 1 Engines Fuel Usage Based Emission Factors (lb/hr/gal)						Union Feed Group 2 Engines Fuel Usage Based Emission Factors (lb/hr/gal)						Union Feed Group 3 Engines Fuel Usage Based Emission Factors (lb/hr/gal)						Union Feed Group 4 Engines Fuel Usage Based Emission Factors (lb/hr/gal)							
	100% Load	75% Load	50% Load	25% Load	10% Load	Maximum	100% Load	75% Load	50% Load	25% Load	10% Load	Maximum	100% Load	75% Load	50% Load	25% Load	10% Load	Maximum	100% Load	75% Load	50% Load	25% Load	10% Load	Maximum	100% Load	75% Load	50% Load	25% Load	10% Load	Maximum		
<b>Criteria Pollutants</b>																																
NOx	52.92	32.44	16.79	9.27	10.27	<b>52.92</b>	4.39	2.69	1.39	0.77		<b>4.39</b>	30.66	19.97	10.23	4.83	4.53	<b>30.66</b>	6.56	2.35	1.30	1.27	0.82		<b>6.56</b>	2.74	1.57	1.00	0.62	0.49		<b>2.74</b>
CO	10.22	3.94	2.62	4.18	4.14	<b>10.22</b>	3.09	1.13	0.79	1.26		<b>3.09</b>	5.76	5.97	4.02	3.23	3.75	<b>5.76</b>	3.06	1.88	2.44	2.56	1.70		<b>3.06</b>	0.60	0.60	0.47	0.63	0.59		<b>0.63</b>
VOC	0.99	0.84	0.78	0.71	0.55	<b>0.99</b>	0.54	0.50	0.47	0.43		<b>0.54</b>	0.82	0.71	0.68	0.71	0.86	<b>0.86</b>	0.02	0.07	0.13	0.13	0.18		<b>0.18</b>	0.15	0.15	0.20	0.16	0.16		<b>0.20</b>
Filterable PM	0.64	0.35	0.34	0.37	0.25	<b>0.64</b>	0.20	0.11	0.11	0.12		<b>0.20</b>	0.41	0.43	0.44	0.26	0.23	<b>0.44</b>	0.1351	0.1448	0.08	0.07	0.10		<b>0.14</b>	0.14	0.15	0.11	0.11	0.08		<b>0.15</b>
Condensable PM	2.06E-01	1.57E-01	1.15E-01	6.73E-02	3.02E-02	<b>2.06E-01</b>	2.06E-01	1.57E-01	1.15E-01	6.73E-02		<b>2.06E-01</b>	1.16E-01	9.15E-02	6.78E-02	4.14E-02	2.37E-02	<b>1.16E-01</b>	2.98E-02	2.51E-02	1.84E-02	1.04E-02	5.84E-03		<b>2.98E-02</b>	2.03E-02	1.63E-02	1.21E-02	7.65E-03	4.57E-03		<b>2.03E-02</b>
SOx	4.06E-02	3.09E-02	2.28E-02	1.32E-02	7.71E-03	<b>4.06E-02</b>	4.06E-02	3.09E-02	2.28E-02	1.32E-02		<b>4.06E-02</b>	2.29E-02	1.80E-02	1.33E-02	8.15E-03	4.66E-03	<b>2.29E-02</b>	5.85E-03	4.93E-03	3.62E-03	2.05E-03	1.12E-03		<b>5.85E-03</b>	3.99E-03	3.20E-03	2.38E-03	1.51E-03	8.99E-04		<b>3.99E-03</b>
<b>Greenhouse Gases</b>																																
CO <sub>2</sub>	4,365	3,330	2,435	1,424	830	<b>4,365</b>	4,365	3,330	2,435	1,424		<b>4,365</b>	2,462	1,937	1,438	878	502	<b>2,462</b>	630	531	399	221	124		<b>630</b>	430	344	257	163	97		<b>430</b>
CH <sub>4</sub>	1.77E-01	1.35E-01	9.88E-02	5.78E-02	3.37E-02	<b>1.77E-01</b>	1.77E-01	1.35E-01	9.88E-02	5.78E-02		<b>1.77E-01</b>	9.99E-02	7.86E-02	5.82E-02	3.56E-02	2.04E-02	<b>9.99E-02</b>	2.56E-02	2.15E-02	1.58E-02	8.94E-03	5.02E-03		<b>2.56E-02</b>	1.74E-02	1.40E-02	1.04E-02	6.57E-03	3.92E-03		<b>1.74E-02</b>
N <sub>2</sub> O	3.94E-02	2.70E-02	1.98E-02	1.16E-02	6.74E-03	<b>3.94E-02</b>	3.94E-02	2.70E-02	1.98E-02	1.16E-02		<b>3.94E-02</b>	2.00E-02	1.57E-02	1.16E-02	7.12E-03	4.07E-03	<b>2.00E-02</b>	5.11E-03	4.31E-03	3.16E-03	1.79E-03	1.02E-03		<b>5.11E-03</b>	3.49E-03	2.79E-03	2.08E-03	1.31E-03	7.85E-04		<b>3.49E-03</b>
Total GHG	4,365	3,330	2,435	1,424	830	<b>4,365</b>	4,365	3,330	2,435	1,424		<b>4,365</b>	2,462	1,937	1,438	878	502	<b>2,462</b>	630	531	399	221	124		<b>630</b>	430	344	257	163	97		<b>430</b>
Total CO <sub>2</sub> e	4,380	3,343	2,443	1,429	833	<b>4,380</b>	4,380	3,343	2,443	1,429		<b>4,380</b>	2,470	1,944	1,440	880	503	<b>2,470</b>	632	533	391	221	124		<b>632</b>	431	345	257	163	97		<b>431</b>

1. Hourly Emissions at Load for NOx, CO, VOC and Filterable PM calculated as (lb/hr/gal) = Emission Factor at Load X (gal/hr/gal) / (453.6/gal)  
 2. Hourly Emissions at Load for condensable PM, SO<sub>x</sub>, GHG and HAP calculated as (lb/hr/gal) = Emission Factor (lb/MMBtu) x Engine Heat Input at Load X (MMBtu/hr/gal)  
 3. The diesel particulate filters will not be turned off during the 10 hours of "uncontrolled" time and therefore, control efficiencies from Table 7 have been applied to filterable PM emissions for uncontrolled emissions from Group 1.

**Table 7. SCR Manufacturer Specifications for Outlet Emissions**

Control System Manufacturer	Safety Power	Miratech	CAT	Minimum
	% Control Efficiency			
NOx	91.7%	91.7%	91.70%	91.7%
CO	80.0%	69.8%	75.0%	69.8%
HC	40.0%	50.0%	45.0%	40.0%
PM	75.6%	68.6%	68.6%	68.6%

1. The control efficiencies were provided via manufacturer specification sheets.

**Annual Operating Hours per Generator**

88.98

1. The estimated total hours of operation is found via the Excel Goal Seek function, which provides the maximum number of operational hours while keeping NOx emissions below the Title V threshold of 100 tpy. The emergency generators will be limited to 500 hours per year.

**Table 8. Annual Generator Potential Emissions**

Pollutant	Potential Emissions All Generators (tpy) <sup>1</sup>				Total Emissions <sup>2</sup> (tpy)
	Group 1	Group 2	Group 3	Group 4	
<i>Criteria Pollutants</i>					
NOx	93.01	5.46	0.29	0.24	99.00
CO	65.38	1.02	0.14	0.06	66.60
VOC	11.35	0.15	8.04E-03	0.02	11.53
Filterable PM	4.25	0.08	6.44E-03	0.01	4.35
Condensable PM	4.37	2.07E-02	1.32E-03	1.81E-03	4.39
SO <sub>2</sub>	0.86	4.07E-03	2.60E-04	3.55E-04	0.86
Total PM <sub>10</sub> <sup>1</sup>	8.61	9.95E-02	7.77E-03	1.48E-02	8.73
Total PM <sub>2.5</sub> <sup>1</sup>	8.61	9.95E-02	0.01	0.01	8.73
<i>Greenhouse Gases</i>					
CO <sub>2</sub>	92,444	438	28	38.24	92,949
CH <sub>4</sub>	3.75	1.78E-02	1.14E-03	1.55E-03	3.77
N <sub>2</sub> O	0.75	3.55E-03	2.27E-04	3.10E-04	0.75
Total GHG	92,449	438	28	38.24	92,953
Total CO <sub>2</sub> e	92,748	440	28	38.37	93,254

1. Potential emissions for all generators in each genset calculated as 100% Load Emission Factor (lb/hr) \* Annual Hours(hr/yr) / 2000 lb/ton.

2. Total potential emissions are the sum of potential emissions for each genset.

**Amazon Data Services - STL100  
Potential HAP Emissions from Gensets**

**Table 1. Emission Factors for Hazardous Air Pollutants (HAPs)**

Pollutant	Emission Factors (lb/MMBtu)	
	Engine > 600 hp <sup>1</sup>	Engine < 600 hp <sup>2</sup>
<i>Hazardous Air Pollutants</i>		
Benzene	7.76E-04	9.33E-04
Toluene	2.81E-04	4.09E-04
Xylenes	1.93E-04	2.85E-04
Formaldehyde	7.89E-05	1.18E-03
Acetaldehyde	2.52E-05	7.67E-04
Acrolein	7.88E-06	9.25E-05
Naphthalene	1.30E-04	8.48E-05
Anthracene	1.23E-06	1.87E-06
Benzo(a)anthracene	6.22E-07	1.68E-06
Chrysene	1.53E-06	3.53E-07
Benzo(b)fluoranthene	1.11E-06	9.91E-08
Benzo(k)fluoranthene	2.18E-07	1.55E-07
Benzo(a)pyrene	2.57E-07	1.88E-07
Indeno(1,2,3-cd)pyrene	4.14E-07	3.75E-07
Dibenz(a,h)anthracene	3.46E-07	5.83E-07

Group 1	26.77	476
Group 2	15.10	4
Group 3	3.86	1
Group 4	2.64	2

1. Emission factors for HAPs are from AP-42, Section 3.4, Large Stationary Diesel And All Stationary Dual-fuel Engines (October 1996), Table 3.4-3 and Table 3.4-4.

**Table 2. Hazardous Air Pollutants Compared to Modeling SMAL Thresholds**

Pollutant	Group 1	Group 2	Group 3	Group 4	Total	SMAL	Exceeds SMAL?
	tpy						
Benzene	4.40E-01	2.08E-03	1.33E-04	2.19E-04	4.42E-01	2	NO
Toluene	1.59E-01	7.55E-04	4.83E-05	9.59E-05	1.60E-01	10	NO
Xylenes	1.09E-01	5.19E-04	3.32E-05	6.68E-05	1.10E-01	10	NO
Formaldehyde	4.47E-02	2.12E-04	1.36E-05	2.77E-04	4.52E-02	2	NO
Acetaldehyde	1.43E-02	6.77E-05	4.33E-06	1.80E-04	1.45E-02	9	NO
Acrolein	4.47E-03	2.12E-05	1.35E-06	2.17E-05	4.51E-03	0.04	NO
Naphthalene	7.37E-02	3.49E-04	2.23E-05	1.99E-05	7.41E-02	10	NO
Anthracene	6.97E-04	3.30E-06	2.11E-07	4.39E-07	7.01E-04	0.01	NO
Benz(a)anthracene	3.53E-04	1.67E-06	1.07E-07	3.94E-07	3.55E-04	0.01	NO
Chrysene	8.67E-04	4.11E-06	2.63E-07	8.28E-08	8.72E-04	0.01	NO
Benzo(b)fluoranthene	6.29E-04	2.98E-06	1.91E-07	2.32E-08	6.33E-04	0.01	NO
Benzo(k)fluoranthene	1.24E-04	5.86E-07	3.75E-08	3.64E-08	1.24E-04	0.01	NO
Benzo(a)pyrene	1.46E-04	6.90E-07	4.42E-08	4.41E-08	1.46E-04	0.01	NO
Indeno(1,2,3-cd)pyrene	2.35E-04	1.11E-06	7.12E-08	8.80E-08	2.36E-04	0.01	NO
Dibenz(a,h)anthracene	1.96E-04	9.30E-07	5.95E-08	1.37E-07	1.97E-04	0.01	NO
Total HAP	0.8491	4.02E-03	2.57E-04	8.81E-04	8.54E-01		

**Amazon Data Services - STL100**  
**Potential Emissions from Generator Belly Tanks**

**Table 1: Breathing Losses from Diesel Belly Tanks**

Group	Number of Generators	Tank Capacity (gal)	Emission Factor <sup>1</sup> (lb/1000 gal)	VOC Emissions (tpy)	VOC Emissions (lb/hr)
1	476	6555	4.00E-01	1.31E-03	2.99E-04
2	4	5250		1.05E-03	2.40E-04
3	1	1041		2.08E-04	4.75E-05
4	2	660		1.32E-04	3.01E-05
<b>Total</b>				2.70E-03	6.17E-04

1. Emission factor was pulled from WebFIRE SCC 40301019. The emission factor for Petroleum Product Storage at Refineries; Fixed Roof Tanks (Varying Sizes); Distillate Fuel #2: Breathing Loss: 67000 Bbl. Size was used.

**Table 2: Working Losses from Diesel Belly Tanks**

Group	Number of Generators	Maximum Throughput per Group (gal/yr)	Emission Factor <sup>1</sup> (lb/1000 gal)	VOC Emissions (tpy)	VOC Emissions <sup>2</sup> (lb/hr/group)
1	476	8,216,769	2.00E-02	8.22E-02	1.85
2	4	38,938		3.89E-04	8.75E-03
3	1	2,491		2.49E-05	5.60E-04
4	2	3,399		3.40E-05	7.64E-04
<b>Total</b>				8.26E-02	1.86

1. Emission factor was pulled from WebFIRE SCC 40301019. The emission factor for Petroleum Product Storage at Refineries; Fixed Roof Tanks (Varying Sizes); Distillate Fuel #2: Working Loss

2. Estimated annual operating hours per generator 89 hours

**Table 3: Total Losses from Diesel Belly Tanks**

Group	VOC Emissions (tpy)	VOC Emissions <sup>2</sup> (lb/hr/group)
1	8.35E-02	1.88
2	1.44E-03	3.24E-02
3	2.33E-04	5.24E-03
4	1.66E-04	3.73E-03
<b>Total</b>	8.53E-02	1.92

## **APPENDIX C**

### **ENGINE MANUFACTURERS' TECHNICAL DATA SHEETS**

# PERFORMANCE DATA[EM5402]

Performance Number: EM5402

Change Level: 02

SALES MODEL:	3516E	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,800
MACHINE SALES MODEL:		HERTZ:	60
ENGINE POWER (BHP):	4,043	FAN POWER (HP):	160.9
GEN POWER WITH FAN (EKW):	2,750.0	ASPIRATION:	TA
COMPRESSION RATIO:	14.7	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	1ACKET WATER TEMP (F):	219.2
MANIFOLD TYPE:	DRY	TURBO CONFIGURATION:	PARALLEL
GOVERNOR TYPE:	ADEM5	TURBO QUANTITY:	4
ELECTRONICS TYPE:	ADEM5	TURBOCHARGER MODEL:	GTB6051N-44T-1.25
IGNITION TYPE:	CI	CERTIFICATION YEAR:	2017
INJECTOR TYPE:	EUI	CRANKCASE BLOWBY RATE (FT23HR):	4,039.5
FUEL INJECTOR:	3920221	FUEL RATE (RATED RPM) NO LOAD (GAL3HR):	15.6
UNIT INJECTOR TIMING (IN):	64.34	PISTON SPD 4 RATED ENG SPD (FT3MIN):	2,539.4
REF EXH STACK DIAMETER (IN):	12		
MAX OPERATING ALTITUDE (FT):	2,461		

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
2,750.0	100	4,043	373	0.340	0.334	194.0	190.3	0.500	0.491
2,475.0	90	3,655	337	0.336	0.330	173.2	169.9	0.497	0.487
2,200.0	80	3,266	302	0.339	0.333	156.3	153.3	0.504	0.494
2,062.5	75	3,072	284	0.342	0.335	148.0	145.2	0.509	0.499
1,925.0	70	2,878	266	0.345	0.338	139.9	137.2	0.516	0.506
1,650.0	60	2,490	230	0.354	0.347	124.1	121.7	0.534	0.523
1,375.0	50	2,102	194	0.365	0.358	108.2	106.1	0.558	0.548
1,100.0	40	1,714	158	0.375	0.368	90.5	88.8	0.584	0.573
825.0	30	1,325	122	0.387	0.380	72.3	70.9	0.622	0.610
687.5	25	1,131	104	0.397	0.389	63.3	62.1	0.653	0.641
550.0	20	937	87	0.412	0.404	54.5	53.4	0.702	0.689
275.0	10	549	51	0.476	0.467	36.9	36.2	0.951	0.933

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
2,750.0	100	4,043	88.8	122.8	1,271.4	69.2	919.3	96	468.5
2,475.0	90	3,655	78.6	104.1	1,202.7	60.8	881.4	85	431.2
2,200.0	80	3,266	70.6	100.7	1,170.5	54.1	872.8	77	402.8
2,062.5	75	3,072	66.7	99.5	1,156.5	50.9	870.2	73	389.5
1,925.0	70	2,878	62.7	98.4	1,142.8	47.7	867.7	68	376.4
1,650.0	60	2,490	54.6	96.0	1,115.7	41.7	862.5	60	349.1
1,375.0	50	2,102	46.2	93.2	1,089.7	35.5	860.3	51	317.9
1,100.0	40	1,714	35.8	92.1	1,053.4	28.3	853.8	40	275.4
825.0	30	1,325	25.0	90.4	993.3	21.0	830.1	28	228.2
687.5	25	1,131	20.0	89.5	944.6	17.8	802.8	23	205.3
550.0	20	937	15.6	88.8	887.7	15.0	768.3	18	184.3
275.0	10	549	7.8	82.1	862.4	8.1	763.0	10	157.4

## General Performance Data (Continued)

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**PERFORMANCE DATA[EM5402]**

WITH FAN		FLOW RATE		WET EXH GAS VOL FLOW RATE	MASS FLOW RATE	MASS FLOW RATE	FLOW RATE (22 DEG F AND 29.98 IN HG)	FLOW RATE (22 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
2,750.0	100	4,043	8,093.3	22,081.8	35,955.3	37,408.9	7,873.1	7,193.7
2,475.0	90	3,655	7,572.0	19,968.3	33,543.4	34,770.8	7,320.6	6,710.0
2,200.0	80	3,266	7,091.5	18,457.9	31,248.7	32,358.1	6,811.0	6,258.1
2,062.5	75	3,072	6,835.3	17,696.5	30,034.4	31,084.7	6,542.4	6,016.4
1,925.0	70	2,878	6,572.7	16,933.8	28,808.0	29,800.5	6,272.5	5,773.0
1,650.0	60	2,490	6,034.1	15,406.2	26,338.7	27,218.0	5,728.9	5,285.6
1,375.0	50	2,102	5,457.5	13,815.0	23,689.8	24,456.7	5,145.8	4,755.4
1,100.0	40	1,714	4,738.0	11,818.0	20,353.0	20,995.1	4,423.9	4,095.3
825.0	30	1,325	3,962.0	9,612.2	16,930.3	17,443.3	3,664.3	3,400.9
687.5	25	1,131	3,597.8	8,539.5	15,298.9	15,747.7	3,325.6	3,092.0
550.0	20	937	3,273.1	7,553.6	13,892.0	14,278.0	3,024.3	2,819.0
275.0	10	549	2,768.1	6,269.8	11,737.8	11,999.5	2,521.3	2,374.7

**Heat Rejection Data**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 250F	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
2,750.0	100	4,043	50,827	9,124	162,025	90,586	22,342	53,492	171,445	419,468	446,839
2,475.0	90	3,655	46,700	8,321	141,538	78,262	19,956	47,423	154,983	374,677	399,125
2,200.0	80	3,266	43,252	7,985	129,537	71,516	18,018	40,903	138,521	338,278	360,350
2,062.5	75	3,072	41,519	7,846	123,724	68,322	17,061	37,707	130,290	320,314	341,215

**Emissions Data**

DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN	EKW	2,850.0	2,062.5	1,285.0	688.5	285.0
PERCENT LOAD	D	100	B5	50	25	10
ENGINE POWER	BHP	4,042	2,082	2,102	1,121	549
TOTAL NOX (AS NO2)	G/HR	20,001	12,263	6,348	3,506	3,883
TOTAL CO	G/HR	2,776	1,017	711	1,134	1,123
TOTAL HC	G/HR	305	285	264	243	189
TOTAL CO2	KG/HR	1,954	1,489	1,082	626	359
PART MATTER	G/HR	206.9	114.2	111.5	119.5	82.4
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,319.2	1,872.1	1,335.4	1,271.3	2,728.6
TOTAL CO (CORR 5% O2)	MG/NM3	321.4	155.3	149.5	421.2	689.5
TOTAL HC (CORR 5% O2)	MG/NM3	30.7	37.7	48.2	77.4	97.9
PART MATTER (CORR 5% O2)	MG/NM3	20.0	14.8	20.1	37.3	44.3
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	860.6	694.7	495.5	471.7	1,012.5
TOTAL CO (CORR 15% O2)	MG/NM3	119.3	57.6	55.5	156.3	255.9
TOTAL HC (CORR 15% O2)	MG/NM3	11.4	14.0	17.9	28.7	36.3
PART MATTER (CORR 15% O2)	MG/NM3	7.4	5.5	7.5	13.8	16.4
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,130	912	650	619	1,329
TOTAL CO (CORR 5% O2)	PPM	257	124	120	337	552
TOTAL HC (CORR 5% O2)	PPM	57	70	90	144	183
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	419	338	241	230	493
TOTAL CO (CORR 15% O2)	PPM	95	46	44	125	205
TOTAL HC (CORR 15% O2)	PPM	21	26	33	54	68
TOTAL NOX (AS NO2)	G/HP-HR	5.00	4.03	3.04	3.11	7.09
TOTAL CO	G/HP-HR	0.69	0.33	0.34	1.01	2.05
TOTAL HC	G/HP-HR	0.08	0.09	0.13	0.22	0.34
PART MATTER	G/HP-HR	0.05	0.04	0.05	0.11	0.15
TOTAL NOX (AS NO2)	G/KW-HR	6.70	5.40	4.08	4.17	9.51
TOTAL CO	G/KW-HR	0.93	0.45	0.46	1.35	2.75
TOTAL HC	G/KW-HR	0.10	0.13	0.17	0.29	0.46

**PERFORMANCE DATA[EM5402]**

PART MATTER	G/KW-HR	0.07	0.05	0.07	0.14	0.20
TOTAL NOX (AS NO2)	LB/HR	44.09	27.03	13.99	7.73	8.56
TOTAL CO	LB/HR	6.12	2.24	1.57	2.50	2.48
TOTAL HC	LB/HR	0.67	0.63	0.58	0.54	0.42
TOTAL CO2	LB/HR	4,307	3,282	2,386	1,381	792
PART MATTER	LB/HR	0.46	0.25	0.25	0.26	0.18
OXYGEN IN EXH	%	9.7	10.7	11.5	12.4	14.4
DRY SMOKE OPACITY	%	2.7	1.8	2.1	3.0	2.3
BOSCH SMOKE NUMBER		1.00	0.83	0.88	1.04	0.90

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

GENSET POWER WITH FAN	EKW	2,850.0	2,062.5	1,285.0	688.5	285.0
PERCENT LOAD	D	100	B5	50	25	10
ENGINE POWER	BHP	4,042	2,082	2,102	1,121	549
TOTAL NOX (AS NO2)	G/HR	24,002	14,715	7,618	4,207	4,659
TOTAL CO	G/HR	4,637	1,698	1,187	1,894	1,876
TOTAL HC	G/HR	405	379	352	324	251
PART MATTER	G/HR	289.7	159.8	156.1	167.3	115.3
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,783.0	2,246.6	1,602.5	1,525.6	3,274.4
TOTAL CO (CORR 5% O2)	MG/NM3	536.7	259.4	249.6	703.4	1,151.5
TOTAL HC (CORR 5% O2)	MG/NM3	40.8	50.1	64.1	102.9	130.2
PART MATTER (CORR 5% O2)	MG/NM3	28.1	20.7	28.2	52.2	62.0
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	1,032.7	833.6	594.6	566.1	1,215.0
TOTAL CO (CORR 15% O2)	MG/NM3	199.2	96.3	92.6	261.0	427.3
TOTAL HC (CORR 15% O2)	MG/NM3	15.1	18.6	23.8	38.2	48.3
PART MATTER (CORR 15% O2)	MG/NM3	10.4	7.7	10.5	19.4	23.0
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,356	1,094	781	743	1,595
TOTAL CO (CORR 5% O2)	PPM	429	208	200	563	921
TOTAL HC (CORR 5% O2)	PPM	76	94	120	192	243
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	503	406	290	276	592
TOTAL CO (CORR 15% O2)	PPM	159	77	74	209	342
TOTAL HC (CORR 15% O2)	PPM	28	35	44	71	90
TOTAL NOX (AS NO2)	G/HP-HR	6.00	4.83	3.65	3.73	8.51
TOTAL CO	G/HP-HR	1.16	0.56	0.57	1.68	3.43
TOTAL HC	G/HP-HR	0.10	0.12	0.17	0.29	0.46
PART MATTER	G/HP-HR	0.07	0.05	0.07	0.15	0.21
TOTAL NOX (AS NO2)	G/KW-HR	8.05	6.48	4.89	5.01	11.42
TOTAL CO	G/KW-HR	1.55	0.75	0.76	2.25	4.60
TOTAL HC	G/KW-HR	0.14	0.17	0.23	0.39	0.62
PART MATTER	G/KW-HR	0.10	0.07	0.10	0.20	0.28
TOTAL NOX (AS NO2)	LB/HR	52.91	32.44	16.79	9.27	10.27
TOTAL CO	LB/HR	10.22	3.74	2.62	4.17	4.13
TOTAL HC	LB/HR	0.89	0.84	0.78	0.71	0.55
PART MATTER	LB/HR	0.64	0.35	0.34	0.37	0.25

**Regulatory Information**

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 3MAX LIMITS3 SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.				
Locality U.S. (INCL CALIF)	Agency EPA	Regulation STATIONARY	Tier3Stage EMERGENCY STATIONARY	MaG Limits - G3BKW - HR CO: 3.5 NOx + HC: 6.4 PM: 0.20

**Altitude Derate Data**

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)**

**PERFORMANCE DATA[EM5402]**

AMBIENT OPERATING TEMP (F)	20	40	50	60	B0	80	90	100	110	120	120	140	NORMAL
ALTITUDE (FT)													
0	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,002	3,807	4,043
1,000	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,043	3,921	3,726	4,043
2,000	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,043	4,035	3,953	3,820	3,622	4,043
3,000	3,915	3,915	3,914	3,913	3,912	3,904	3,808	3,672	3,534	3,399	3,256	3,130	3,912
4,000	3,802	3,800	3,799	3,797	3,795	3,758	3,648	3,496	3,363	3,221	3,083	3,003	3,796
5,000	3,706	3,704	3,702	3,700	3,698	3,661	3,543	3,386	3,252	3,115	2,976	2,891	3,700
6,000	3,611	3,609	3,606	3,604	3,601	3,560	3,438	3,280	3,149	3,014	2,868	2,783	3,605
7,000	3,484	3,481	3,479	3,476	3,473	3,430	3,306	3,151	3,022	2,878	2,731	2,643	3,478
8,000	3,350	3,347	3,344	3,341	3,338	3,294	3,172	3,019	2,882	2,736	2,581	2,485	3,344
9,000	3,222	3,219	3,216	3,213	3,210	3,167	3,046	2,884	2,746	2,590	2,430	2,333	3,217
10,000	3,116	3,112	3,109	3,106	3,102	3,058	2,929	2,765	2,619	2,459	2,293	2,194	3,112
11,000	3,037	3,033	3,030	3,027	3,023	2,975	2,846	2,677	2,526	2,365	2,196	2,100	3,034
12,000	2,959	2,956	2,953	2,949	2,945	2,896	2,765	2,586	2,438	2,269	2,105	2,011	2,958
13,000	2,884	2,881	2,877	2,873	2,870	2,818	2,680	2,499	2,345	2,178	2,018	1,942	2,884
14,000	2,789	2,785	2,781	2,778	2,774	2,718	2,573	2,389	2,233	2,071	1,933	1,854	2,789
15,000	2,653	2,649	2,645	2,641	2,637	2,583	2,439	2,248	2,095	1,956	1,819	1,728	2,654

**Cross Reference**

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
5644208	LL2333	5898066	PG266	-	JD700379	
6351348	GG3123	6316330	PG571	XJ	JC700001	
5644208	LL2333	6390340	PG266	-	JD700001	
5644208	LL2333	6607570	PG266	-	JD700001	
5644208	LL2333	6655945	PG266	-	JD700001	

**Supplementary Data**

Type	Classification	Performance Number
ALTITUDE DATA	HIGH RESOLUTION	EM7712

**Performance Parameter Reference**

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

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%

**PERFORMANCE DATA[EM5402]**

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 JAN/JAN2014 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

**PERFORMANCE DATA[EM5402]**

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

# PERFORMANCE DATA[EM5857]

Performance Number: EM5857

Change Level: 00

SALES MODEL:	3512C	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,800
MACHINE SALES MODEL:		HERTZ:	60
ENGINE POWER (BHP):	2,360	FAN POWER (HP):	114.0
GEN POWER WITH FAN (EKW):	1,600.0	ASPIRATION:	TA
COMPRESSION RATIO:	14.7	AFTERCOOLER TYPE:	ATAAC
RATING LEVEL:	PRIME-DCP	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
PUMP QUANTITY:	1	INLET MANIFOLD AIR TEMP (F):	122
FUEL TYPE:	DIESEL	JACKET WATER TEMP (F):	210.2
MANIFOLD TYPE:	DRY	TURBO CONFIGURATION:	PARALLEL
GOVERNOR TYPE:	ADEM3	TURBO QUANTITY:	4
ELECTRONICS TYPE:	ADEM3	TURBOCHARGER MODEL:	GTB5518BN-52T-1.12
CAMSHAFT TYPE:	STANDARD	CERTIFICATION YEAR:	2016
IGNITION TYPE:	CI	CRANKCASE BLOWBY RATE (FT23HR):	2,358.8
INJECTOR TYPE:	EUI	FUEL RATE (RATED RPM) NO LOAD (GAL3HR):	8.3
FUEL INJECTOR:	3920221	PISTON SPD 4 RATED ENG SPD (FT3MIN):	2,539.4
UNIT INJECTOR TIMING (IN):	64.34		
REF EXH STACK DIAMETER (IN):	10		
MAX OPERATING ALTITUDE (FT):	2,789		

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

## General Performance Data

FOR DATA CENTER APPLICATIONS ONLY. RATING IS AVAILABLE THROUGH DESIGN TO ORDER (DTO) WITH AN APPROVED SPECIAL RATING RE+UEST. DCP POWER OUTPUT AVAILABLE WITH VARYING LOAD FOR UNLIMITED TIME. AVERAGE POWER OUTPUT IS NOT TO EXCEED 100% ADVERTISED POWER. TYPICAL PEAK DEMAND FOR DATA CENTER APPLICATION IS 100% OF THE DCP RATED EKW WITH 10% OVERLOAD CAPABILITY FOR EMERGENCY USE FOR A MAXIMUM OF 1 HOUR IN 12. OVERLOAD OPERATION CANNOT EXCEED 25 HOURS PER YEAR.

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
1,760.0	110	2,584	318	0.334	0.328	121.8	119.5
1,600.0	100	2,360	291	0.329	0.322	109.4	107.3
1,440.0	90	2,136	263	0.332	0.326	100.0	98.1
1,280.0	80	1,911	235	0.337	0.330	90.7	89.0
1,200.0	75	1,799	221	0.340	0.333	86.1	84.5
1,120.0	70	1,686	208	0.343	0.336	81.5	79.9
960.0	60	1,462	180	0.352	0.345	72.5	71.1
800.0	50	1,237	152	0.366	0.359	63.8	62.6
640.0	40	1,012	125	0.382	0.375	54.6	53.5
480.0	30	788	97	0.401	0.394	44.6	43.7
400.0	25	676	83	0.410	0.402	39.0	38.3
320.0	20	563	69	0.419	0.411	33.3	32.7
160.0	10	339	42	0.467	0.458	22.3	21.9

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
1,760.0	110	2,584	77.0	121.0	1,175.8	59.3	848.4	82	431.4
1,600.0	100	2,360	68.4	114.3	1,119.4	51.5	820.4	73	388.3
1,440.0	90	2,136	61.9	111.6	1,095.1	46.3	811.3	66	365.8
1,280.0	80	1,911	54.8	111.8	1,085.8	40.9	816.6	59	346.7
1,200.0	75	1,799	50.9	111.2	1,080.1	38.1	819.4	55	335.8
1,120.0	70	1,686	47.2	108.3	1,068.4	35.5	817.6	51	321.9
960.0	60	1,462	40.6	104.5	1,046.5	30.9	814.7	44	295.7
800.0	50	1,237	34.7	103.1	1,026.1	26.8	813.5	38	269.7
640.0	40	1,012	27.7	101.8	993.4	22.1	805.6	30	236.0
480.0	30	788	20.1	101.3	945.6	17.1	788.8	22	204.3
400.0	25	676	16.0	99.4	895.6	14.6	753.7	18	185.6
320.0	20	563	12.0	97.1	827.6	12.0	703.4	14	166.2
160.0	10	339	6.1	92.9	636.6	8.2	569.1	8	130.1

## General Performance Data (Continued)

# PERFORMANCE DATA[EM5857]

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 (22 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (22 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
1,760.0	110	2,584	5,708.5	14,298.4	24,662.6	25,527.3	5,374.6	4,942.3
1,600.0	100	2,360	5,365.1	12,943.5	22,818.8	23,594.8	4,971.4	4,580.6
1,440.0	90	2,136	5,047.9	12,019.6	21,384.8	22,093.1	4,649.8	4,290.3
1,280.0	80	1,911	4,612.0	11,078.3	19,636.5	20,280.2	4,267.8	3,942.3
1,200.0	75	1,799	4,384.2	10,575.9	18,701.8	19,312.4	4,065.4	3,757.5
1,120.0	70	1,686	4,199.0	10,092.5	17,867.4	18,444.7	3,885.0	3,593.3
960.0	60	1,462	3,872.1	9,222.7	16,392.6	16,906.7	3,558.3	3,297.0
800.0	50	1,237	3,557.6	8,410.0	14,978.0	15,430.9	3,247.8	3,015.2
640.0	40	1,012	3,182.9	7,410.8	13,285.9	13,673.1	2,879.7	2,677.5
480.0	30	788	2,725.0	6,273.0	11,415.7	11,731.8	2,470.4	2,303.7
400.0	25	676	2,492.6	5,564.3	10,466.9	10,744.4	2,254.7	2,107.0
320.0	20	563	2,258.2	4,837.2	9,509.9	9,746.7	2,044.9	1,916.4
160.0	10	339	1,944.2	3,649.8	8,128.3	8,285.9	1,744.3	1,653.6

## Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 250F	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
1,760.0	110	2,584	33,967	7,341	99,767	53,671	14,105	31,452	109,585	264,829	282,110
1,600.0	100	2,360	32,243	6,802	88,304	46,689	12,668	25,895	100,092	237,840	253,359
1,440.0	90	2,136	30,057	6,587	81,865	42,801	11,580	22,356	90,566	217,408	231,595
1,280.0	80	1,911	27,002	6,484	76,728	39,743	10,510	18,926	81,040	197,323	210,199
1,200.0	75	1,799	25,598	6,422	73,884	38,074	9,973	17,238	76,277	187,237	199,455
1,120.0	70	1,686	24,788	6,308	70,277	36,208	9,435	15,647	71,514	177,146	188,704
960.0	60	1,462	22,990	6,099	63,830	32,943	8,393	12,867	61,989	157,583	167,865
800.0	50	1,237	21,377	5,936	57,638	29,952	7,394	10,237	52,463	138,815	147,873
640.0	40	1,012	20,852	5,758	49,609	26,048	6,318	7,178	42,937	118,624	126,364
480.0	30	788	17,896	5,332	41,802	21,469	5,161	4,700	33,411	96,892	103,215
400.0	25	676	17,053	5,018	36,012	18,024	4,518	3,611	28,648	84,829	90,364
320.0	20	563	16,307	4,673	29,628	14,237	3,858	2,649	23,886	72,430	77,156
160.0	10	339	13,712	3,892	18,473	7,393	2,584	1,200	14,359	48,505	51,670

## Sound Data

SOUND PRESSURE DATA FOR THIS RATING CAN BE FOUND IN PERFORMANCE NUMBER - DM8779.

## Emissions Data

DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN	EKW	1,760.0	1,600.0	1,200.0	800.0	000.0	160.0
PERCENT LOAD	D	110	100	75	50	25	10
ENGINE POWER	BHP	2,584	2,260	1,799	1,227	676	229
TOTAL NOX (AS NO2)	G/HR	13,263	11,589	7,549	3,869	1,827	1,711
TOTAL CO	G/HR	1,339	1,451	1,404	1,013	815	946
TOTAL HC	G/HR	305	281	243	232	243	295
TOTAL CO2	KG/HR	1,283	1,169	906	666	405	233
PART MATTER	G/HR	133.8	132.9	140.3	143.5	83.4	75.4

**PERFORMANCE DATA[EM5857]**

TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,390.8	2,307.7	1,912.1	1,341.9	1,040.9	1,844.0
TOTAL CO	(CORR 5% O2)	MG/NM3	242.2	293.7	354.1	356.2	464.0	1,013.5
TOTAL HC	(CORR 5% O2)	MG/NM3	47.7	47.8	53.7	69.5	119.0	272.7
PART MATTER	(CORR 5% O2)	MG/NM3	20.3	21.9	30.9	41.4	40.0	71.9
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,165	1,124	931	654	507	898
TOTAL CO	(CORR 5% O2)	PPM	194	235	283	285	371	811
TOTAL HC	(CORR 5% O2)	PPM	89	89	100	130	222	509
TOTAL NOX (AS NO2)		G/HP-HR	5.15	4.92	4.20	3.13	2.71	5.05
TOTAL CO		G/HP-HR	0.52	0.62	0.78	0.82	1.21	2.79
TOTAL HC		G/HP-HR	0.12	0.12	0.14	0.19	0.36	0.87
PART MATTER		G/HP-HR	0.05	0.06	0.08	0.12	0.12	0.22
TOTAL NOX (AS NO2)		LB/HR	29.24	25.55	16.64	8.53	4.03	3.77
TOTAL CO		LB/HR	2.95	3.20	3.10	2.23	1.80	2.08
TOTAL HC		LB/HR	0.67	0.62	0.54	0.51	0.53	0.65
TOTAL CO2		LB/HR	2,829	2,578	1,998	1,467	893	514
PART MATTER		LB/HR	0.30	0.29	0.31	0.32	0.18	0.17
OXYGEN IN EXH		%	10.0	10.3	10.9	11.6	12.9	15.2
DRY SMOKE OPACITY		%	2.1	2.4	3.0	3.6	2.8	3.0
BOSCH SMOKE NUMBER			0.73	0.84	1.10	1.32	1.04	1.11

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

GENSET POWER WITH FAN	EKW	1,760.0	1,600.0	1,200.0	800.0	C00.0	160.0	
PERCENT LOAD	D	110	100	75	50	25	10	
ENGINE POWER	BHP	2,58C	2,260	1,799	1,227	676	229	
TOTAL NOX (AS NO2)	G/HR	15,916	13,907	9,059	4,642	2,193	2,053	
TOTAL CO	G/HR	2,411	2,612	2,528	1,823	1,466	1,702	
TOTAL HC	G/HR	406	374	323	308	323	392	
PART MATTER	G/HR	187.3	186.0	196.4	200.9	116.7	105.6	
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	2,869.0	2,769.3	2,294.5	1,610.3	1,249.1	2,212.8
TOTAL CO	(CORR 5% O2)	MG/NM3	436.0	528.6	637.4	641.2	835.1	1,824.3
TOTAL HC	(CORR 5% O2)	MG/NM3	63.4	63.6	71.4	92.5	158.3	362.7
PART MATTER	(CORR 5% O2)	MG/NM3	28.4	30.6	43.3	58.0	55.9	100.6
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	1,397	1,349	1,118	784	608	1,078
TOTAL CO	(CORR 5% O2)	PPM	349	423	510	513	668	1,459
TOTAL HC	(CORR 5% O2)	PPM	118	119	133	173	296	677
TOTAL NOX (AS NO2)		G/HP-HR	6.18	5.91	5.04	3.76	3.25	6.06
TOTAL CO		G/HP-HR	0.94	1.11	1.41	1.48	2.17	5.03
TOTAL HC		G/HP-HR	0.16	0.16	0.18	0.25	0.48	1.16
PART MATTER		G/HP-HR	0.07	0.08	0.11	0.16	0.17	0.31
TOTAL NOX (AS NO2)		LB/HR	35.09	30.66	19.97	10.23	4.83	4.53
TOTAL CO		LB/HR	5.31	5.76	5.57	4.02	3.23	3.75
TOTAL HC		LB/HR	0.89	0.83	0.71	0.68	0.71	0.87
PART MATTER		LB/HR	0.41	0.41	0.43	0.44	0.26	0.23

**Regulatory Information**

<b>EPA EMERGENCY STATIONARY</b>		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 4MAX LIMITS4 SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.			
Locality U.S. (INCL CALIF)	Agency EPA	Regulation STATIONARY	Tier3Stage EMERGENCY STATIONARY
		MaG Limits - G3BKW - HR CO: 3.5 NOx + HC: 6.4 PM: 0.20	

**Altitude Derate Data**

# PERFORMANCE DATA[EM5857]

## STANDARD

### ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	20	C0	50	60	70	80	90	100	110	120	120	1C0	NORMAL
ALTITUDE (FT)													
0	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,338	2,360
1,000	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,332	2,293	2,255	2,360
2,000	2,360	2,360	2,360	2,360	2,360	2,360	2,360	2,329	2,288	2,249	2,210	2,174	2,360
3,000	2,343	2,343	2,343	2,343	2,343	2,328	2,286	2,245	2,205	2,167	2,131	2,095	2,343
4,000	2,262	2,262	2,262	2,262	2,262	2,243	2,203	2,163	2,125	2,089	2,053	2,019	2,262
5,000	2,184	2,184	2,184	2,184	2,184	2,161	2,122	2,084	2,047	2,012	1,978	1,746	2,184
6,000	2,110	2,110	2,110	2,110	2,110	2,081	2,044	2,007	1,972	1,935	1,676	1,463	2,110
7,000	2,038	2,038	2,038	2,038	2,038	2,004	1,968	1,933	1,770	1,581	1,369	1,204	2,038
8,000	1,969	1,969	1,969	1,969	1,966	1,929	1,894	1,676	1,487	1,274	1,133	1,015	1,969
9,000	1,902	1,902	1,902	1,902	1,891	1,794	1,605	1,392	1,204	1,086	968	897	1,902
10,000	1,838	1,838	1,838	1,838	1,699	1,510	1,298	1,156	1,038	920	850	779	1,838
11,000	1,776	1,776	1,776	1,605	1,416	1,227	1,086	991	897	826	755	708	1,776
12,000	1,717	1,717	1,534	1,322	1,156	1,038	944	850	779	732	684	661	1,628
13,000	1,628	1,416	1,227	1,109	991	897	826	755	708	684	637	614	1,416
14,000	1,322	1,180	1,062	944	873	779	732	708	661	637	590		1,204
15,000	1,109	991	897	826	755	708	684	637	614	590			1,086

## Cross Reference

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
5957806	LL8925	5157730	PG041	-	LYP00001	

## Supplementary Data

Type	Classification	Performance Number
SOUND	SOUND PRESSURE	DM8779

## Performance Parameter Reference

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

### 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%

**PERFORMANCE DATA[EM5857]**

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

# PERFORMANCE DATA[EM5857]

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

TM 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

# PERFORMANCE DATA[EM1694]

Performance Number: EM1694

Change Level: 03

SALES MODEL:	C13	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,800
MACHINE SALES MODEL:		HERTZ:	60
ENGINE POWER (BHP):	609	FAN POWER (HP):	20.1
GEN POWER WITH FAN (EKW):	400.0	ADDITIONAL PARASITICS (HP):	10.4
COMPRESSION RATIO:	16.3	ASPIRATION:	TA
RATING LEVEL:	STANDBY	AFTERCOOLER TYPE:	ATAAC
PUMP QUANTITY:	1	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
FUEL TYPE:	DIESEL	INLET MANIFOLD AIR TEMP (F):	120
MANIFOLD TYPE:	DRY	3ACKET WATER TEMP (F):	192.2
GOVERNOR TYPE:	ELEC	TURBO CONFIGURATION:	SINGLE
ELECTRONICS TYPE:	ADEM4	TURBO QUANTITY:	1
CAMSHAFT TYPE:	STANDARD	TURBOCHARGER MODEL:	GTA5002BS 1.60A/R
IGNITION TYPE:	CI	CERTIFICATION YEAR:	2015
INJECTOR TYPE:	EUI	PISTON SPD 4 RATED ENG SPD (FT5MIN):	1,854.3
REF EXH STACK DIAMETER (IN):	5		
MAX OPERATING ALTITUDE (FT):	1,640		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET

## General Performance Data

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
400.0	100	609	351	0.326	0.323	28.0	27.7	0.497	0.492
360.0	90	546	315	0.326	0.323	25.1	24.8	0.494	0.489
320.0	80	486	280	0.355	0.351	24.3	24.0	0.538	0.533
300.0	75	457	263	0.367	0.364	23.6	23.4	0.559	0.554
280.0	70	428	247	0.373	0.369	22.5	22.3	0.570	0.564
240.0	60	372	214	0.381	0.378	20.0	19.8	0.591	0.585
200.0	50	316	182	0.387	0.383	17.3	17.1	0.612	0.606
160.0	40	261	151	0.389	0.385	14.3	14.2	0.635	0.629
120.0	30	206	119	0.390	0.387	11.3	11.2	0.669	0.663
100.0	25	178	102	0.392	0.388	9.8	9.7	0.696	0.690
80.0	20	149	86	0.396	0.392	8.3	8.3	0.739	0.732
40.0	10	90.8	52	0.427	0.423	5.5	5.4	0.971	0.961

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
400.0	100	609	56.6	117.0	1,287.5	38.0	1,058.8	61	357.2
360.0	90	546	50.2	112.8	1,239.3	32.8	1,026.2	54	330.0
320.0	80	486	53.7	115.3	1,243.0	36.2	1,014.2	58	344.8
300.0	75	457	54.1	115.3	1,242.2	36.6	1,006.9	59	347.3
280.0	70	428	51.8	113.2	1,230.3	34.6	994.7	56	338.9
240.0	60	372	45.8	108.4	1,193.6	30.2	964.8	50	314.6
200.0	50	316	37.8	103.0	1,140.2	25.0	927.6	41	280.3
160.0	40	261	27.4	96.5	1,080.7	18.9	889.3	30	234.0
120.0	30	206	17.1	90.3	998.9	12.9	840.0	19	186.1
100.0	25	178	12.4	87.5	948.6	10.3	810.6	14	163.5
80.0	20	149	8.5	85.3	886.6	8.2	770.9	10	143.6
40.0	10	90.8	3.6	82.6	689.5	5.6	609.6	5	114.6

## 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
400.0	100	609						
360.0	90	546						
320.0	80	486						
300.0	75	457						
280.0	70	428						
240.0	60	372						
200.0	50	316						
160.0	40	261						
120.0	30	206						
100.0	25	178						
80.0	20	149						
40.0	10	90.8						

**PERFORMANCE DATA[EM1694]**

400.0	100	609	978.1	2,936.2	4,292.2	4,490.4	950.7	854.7
360.0	90	546	915.9	2,656.6	3,998.8	4,176.7	879.0	792.5
320.0	80	486	970.5	2,788.5	4,248.8	4,421.0	930.2	846.5
300.0	75	457	982.7	2,801.1	4,301.0	4,468.6	939.1	857.4
280.0	70	428	963.1	2,705.2	4,203.1	4,362.5	914.6	836.0
240.0	60	372	901.9	2,463.5	3,915.9	4,057.6	850.3	779.2
200.0	50	316	812.5	2,156.6	3,510.3	3,632.6	764.3	702.0
160.0	40	261	687.0	1,781.4	2,955.8	3,057.3	649.3	597.7
120.0	30	206	559.5	1,398.1	2,396.3	2,476.6	528.9	488.0
100.0	25	178	501.9	1,216.0	2,144.3	2,213.9	470.7	434.8
80.0	20	149	454.1	1,050.9	1,934.8	1,994.0	419.9	388.7
40.0	10	90.8	397.9	789.9	1,686.8	1,725.7	363.2	341.4

**Heat Rejection Data**

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO 3ACKET 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
400.0	100	609	8,952	2,925	23,022	13,776	3,243	4,130	25,831	60,887	64,860
360.0	90	546	8,186	2,654	20,622	12,177	2,905	3,479	23,152	54,534	58,093
320.0	80	486	7,906	2,618	21,212	12,600	2,812	3,904	20,601	52,796	56,241
300.0	75	457	7,710	2,546	21,145	12,570	2,738	3,995	19,365	51,406	54,761
280.0	70	428	7,378	2,442	20,304	12,022	2,604	3,800	18,150	48,885	52,075
240.0	60	372	6,706	2,418	18,182	10,623	2,315	3,233	15,765	43,469	46,305
200.0	50	316	6,033	2,483	15,558	8,900	1,999	2,492	13,418	37,535	39,984
160.0	40	261	5,465	2,508	12,515	6,965	1,660	1,628	11,079	31,161	33,194
120.0	30	206	4,843	2,208	9,534	5,102	1,312	920	8,725	24,624	26,230
100.0	25	178	4,472	1,897	8,187	4,276	1,137	653	7,535	21,350	22,743
80.0	20	149	4,040	1,542	6,945	3,504	965	452	6,327	18,124	19,307
40.0	10	90.8	2,963	1,112	4,536	1,834	634	216	3,852	11,904	12,681

**Emissions Data**

**DIESEL**

**RATED SPEED NOMINAL DATA: 1800 RPM**

GENSET POWER WITH FAN		EKW	400.0	300.0	200.0	100.0	40.0
PERCENT LOAD	C	100	D5	50	25	10	
ENGINE POWER	BHP	609	450	316	108	90.8	
TOTAL NOX (AS NO2)	G/HR	2,757	989	544	534	343	
TOTAL CO	G/HR	741	456	592	620	414	
TOTAL HC	G/HR	6	18	30	30	43	
TOTAL CO2	KG/HR	275	236	172	98	55	
PART MATTER	G/HR	31.4	33.7	19.4	16.5	22.7	
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,297.5	963.2	721.7	1,293.0	1,373.1	
TOTAL CO (CORR 5% O2)	MG/NM3	615.3	450.6	793.8	1,542.8	1,663.2	
TOTAL HC (CORR 5% O2)	MG/NM3	4.0	15.1	34.9	67.5	179.3	
PART MATTER (CORR 5% O2)	MG/NM3	21.1	27.1	21.7	34.3	97.2	
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	852.5	357.4	267.8	479.8	509.5	
TOTAL CO (CORR 15% O2)	MG/NM3	228.3	167.2	294.5	572.5	617.1	
TOTAL HC (CORR 15% O2)	MG/NM3	1.5	5.6	13.0	25.1	66.5	
PART MATTER (CORR 15% O2)	MG/NM3	7.8	10.1	8.0	12.7	36.1	
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,119	469	352	630	669	
TOTAL CO (CORR 5% O2)	PPM	492	361	635	1,234	1,331	
TOTAL HC (CORR 5% O2)	PPM	7	28	65	126	335	
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	415	174	130	234	248	
TOTAL CO (CORR 15% O2)	PPM	183	134	236	458	494	
TOTAL HC (CORR 15% O2)	PPM	3	10	24	47	124	
TOTAL NOX (AS NO2)	G/HP-HR	4.61	2.19	1.73	3.02	3.80	
TOTAL CO	G/HP-HR	1.24	1.01	1.88	3.50	4.57	
TOTAL HC	G/HP-HR	0.01	0.04	0.10	0.17	0.48	

**PERFORMANCE DATA[EM1694]**

PART MATTER	G/HP-HR	0.05	0.07	0.06	0.09	0.25
TOTAL NOX (AS NO2)	G/KW-HR	6.18	2.93	2.32	4.05	5.09
TOTAL CO	G/KW-HR	1.66	1.35	2.53	4.70	6.13
TOTAL HC	G/KW-HR	0.01	0.05	0.13	0.23	0.64
PART MATTER	G/KW-HR	0.07	0.10	0.08	0.12	0.34
TOTAL NOX (AS NO2)	LB/HR	6.08	2.18	1.20	1.18	0.76
TOTAL CO	LB/HR	1.63	1.00	1.31	1.37	0.91
TOTAL HC	LB/HR	0.01	0.04	0.07	0.07	0.10
TOTAL CO2	LB/HR	605	520	378	215	121
PART MATTER	LB/HR	0.07	0.07	0.04	0.04	0.05
OXYGEN IN EXH	%	7.4	9.6	10.8	11.8	14.4
DRY SMOKE OPACITY	%	1.7	1.1	1.1	3.0	2.0
BOSCH SMOKE NUMBER		1.06	0.90	0.88	1.38	1.13

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

<b>GENSET POWER WITH FAN</b>	<b>EKW</b>	<b>400.0</b>	<b>300.0</b>	<b>200.0</b>	<b>100.0</b>	<b>40.0</b>
<b>PERCENT LOAD</b>	<b>C</b>	<b>100</b>	<b>D5</b>	<b>50</b>	<b>25</b>	<b>10</b>
<b>ENGINE POWER</b>	<b>BHP</b>	<b>609</b>	<b>45D</b>	<b>316</b>	<b>1D8</b>	<b>90.8</b>
TOTAL NOX (AS NO2)	G/HR	2,977	1,068	588	577	371
TOTAL CO	G/HR	1,386	852	1,107	1,159	773
TOTAL HC	G/HR	11	34	57	58	82
PART MATTER	G/HR	61.3	65.7	37.7	32.1	44.3
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	2,481.2	1,040.3	779.4	1,396.4	1,483.0
TOTAL CO (CORR 5% O2)	MG/NM3	1,150.6	842.7	1,484.4	2,885.1	3,110.1
TOTAL HC (CORR 5% O2)	MG/NM3	7.5	28.5	66.0	127.6	338.9
PART MATTER (CORR 5% O2)	MG/NM3	41.1	52.9	42.2	66.9	189.6
TOTAL NOX (AS NO2) (CORR 15% O2)	MG/NM3	920.7	386.0	289.2	518.2	550.3
TOTAL CO (CORR 15% O2)	MG/NM3	427.0	312.7	550.8	1,070.6	1,154.1
TOTAL HC (CORR 15% O2)	MG/NM3	2.8	10.6	24.5	47.4	125.7
PART MATTER (CORR 15% O2)	MG/NM3	15.2	19.6	15.7	24.8	70.3
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	1,209	507	380	680	722
TOTAL CO (CORR 5% O2)	PPM	920	674	1,188	2,308	2,488
TOTAL HC (CORR 5% O2)	PPM	14	53	123	238	633
TOTAL NOX (AS NO2) (CORR 15% O2)	PPM	448	188	141	252	268
TOTAL CO (CORR 15% O2)	PPM	342	250	441	856	923
TOTAL HC (CORR 15% O2)	PPM	5	20	46	88	235
TOTAL NOX (AS NO2)	G/HP-HR	4.98	2.36	1.87	3.26	4.10
TOTAL CO	G/HP-HR	2.32	1.88	3.52	6.55	8.55
TOTAL HC	G/HP-HR	0.02	0.08	0.18	0.33	0.90
PART MATTER	G/HP-HR	0.10	0.15	0.12	0.18	0.49
TOTAL NOX (AS NO2)	G/KW-HR	6.68	3.17	2.51	4.37	5.50
TOTAL CO	G/KW-HR	3.11	2.53	4.72	8.79	11.46
TOTAL HC	G/KW-HR	0.02	0.10	0.24	0.44	1.21
PART MATTER	G/KW-HR	0.14	0.19	0.16	0.24	0.66
TOTAL NOX (AS NO2)	LB/HR	6.56	2.36	1.30	1.27	0.82
TOTAL CO	LB/HR	3.05	1.88	2.44	2.55	1.71
TOTAL HC	LB/HR	0.02	0.07	0.13	0.13	0.18
PART MATTER	LB/HR	0.14	0.14	0.08	0.07	0.10

**Regulatory Information**

<b>EPA EMERGENCY STATIONARY</b>	<b>2011 - ---</b>	<b>CYCLE :D2</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 3MAX LIMITS3 SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.		
Locality U.S. (INCL CALIF)	Agency EPA	Regulation STATIONARY
		Tier5Stage EMERGENCY STATIONARY
		MaG Limits - G5BKW - HR CO: 3.5 NOx + HC: 4.0 PM: 0.20

**Altitude Derate Data**

**STANDARD**

# PERFORMANCE DATA[EM1694)

## ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	30	40	50	60	D0	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	609	609	609	609	609	609	609	609	609	600	590	580	609
1,000	609	609	609	609	609	609	609	598	588	578	568	558	609
2,000	609	609	609	609	609	597	587	576	566	556	547	538	607
3,000	609	609	609	597	586	575	564	554	545	535	526	517	588
4,000	609	597	586	574	564	553	543	533	524	515	506	498	570
5,000	586	575	563	552	542	532	522	513	504	495	487	479	552
6,000	564	552	542	531	521	511	502	493	484	476	468	460	534
7,000	542	531	520	510	501	492	483	474	466	458	450	442	517
8,000	520	510	500	490	481	472	464	455	447	440	432	425	500
9,000	500	490	480	471	462	454	445	437	430	422	415	408	484
10,000	480	470	461	452	444	435	427	420	412	405	398	392	467
11,000	460	451	442	434	426	418	410	403	396	389	382	376	452
12,000	442	433	424	416	408	401	393	386	380	373	367	361	437
13,000	424	415	407	399	392	384	377	371	364	358	352	346	422
14,000	406	398	390	382	375	368	362	355	349	343	337	331	407
15,000	389	381	374	366	359	353	346	340	334	328	323	318	393

## Cross Reference

Test SHec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
OK9333	PP7710	4343726	PG045	LS	PW300001	

## 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 (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%

**PERFORMANCE DATA[EM1694)**

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.

**PERFORMANCE DATA[EM1694)**

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

# PERFORMANCE DATA[DM8501]

Performance Number: DM8501

Change Level: 03

SALES MODEL:	C9	COMBUSTION:	DIRECT INJECTION
BRAND:	CAT	ENGINE SPEED (RPM):	1,800
MACHINE SALES MODEL:		HERTZ:	60
ENGINE POWER (BHP):	398	FAN POWER (HP):	30.2
GEN POWER W/O FAN (EKW):	265.0	ASPIRATION:	TA
GEN POWER WITH FAN (EKW):	250.0	AFTERCOOLER TYPE:	ATAAC
COMPRESSION RATIO:	16.1	AFTERCOOLER CIRCUIT TYPE:	JW+OC, ATAAC
RATING LEVEL:	STANDBY	INLET MANIFOLD AIR TEMP (F):	122
PUMP QUANTITY:	1	JACKET WATER TEMP (F):	192.2
FUEL TYPE:	DIESEL	TURBO CONFIGURATION:	SINGLE
MANIFOLD TYPE:	DRY	TURBO QUANTITY:	1
GOVERNOR TYPE:	ELEC	TURBOCHARGER MODEL:	S310-1.25
CAMSHAFT TYPE:	STANDARD	CERTIFICATION YEAR:	2005
IGNITION TYPE:	CI	PISTON SPD 4 RATED ENG SPD (FT/MIN):	1,759.8
INJECTOR TYPE:	EUI		
REF EXH STACK DIAMETER (IN):	4		
MAX OPERATING ALTITUDE (FT):	3,281		

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

## General Performance Data

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
250.0	100	398	326	0.341	0.337	19.1	18.9
225.0	90	359	294	0.346	0.343	17.5	17.3
200.0	80	321	263	0.355	0.351	16.0	15.9
187.5	75	302	247	0.360	0.356	15.3	15.2
175.0	70	284	232	0.364	0.361	14.6	14.4
150.0	60	247	202	0.374	0.371	13.0	12.9
125.0	50	211	172	0.385	0.381	11.4	11.3
100.0	40	176	144	0.394	0.390	9.8	9.7
75.0	30	141	116	0.404	0.400	8.0	8.0
62.5	25	124	101	0.410	0.406	7.2	7.1
50.0	20	106	87	0.418	0.414	6.2	6.2
25.0	10	68.9	56	0.445	0.441	4.3	4.3

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
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
250.0	100	398	77.7	122.3	1,142.4	55.4	852.0	79	425.2
225.0	90	359	74.1	121.6	1,094.4	51.6	823.5	75	407.9
200.0	80	321	70.7	122.1	1,050.1	48.2	800.5	72	390.0
187.5	75	302	69.0	122.5	1,029.4	46.4	790.7	70	380.5
175.0	70	284	66.6	122.4	1,010.3	44.2	782.4	67	370.2
150.0	60	247	60.6	122.2	973.8	39.4	768.3	61	346.6
125.0	50	211	53.2	121.8	937.9	33.9	755.8	54	318.8
100.0	40	176	43.3	121.2	899.4	27.4	742.4	44	280.7
75.0	30	141	32.2	120.7	857.9	20.5	727.9	33	236.6
62.5	25	124	26.7	120.5	835.9	17.2	720.5	27	214.1
50.0	20	106	21.3	120.3	812.9	14.1	712.7	22	191.5
25.0	10	68.9	12.1	120.5	671.3	9.1	612.1	13	150.2

## 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	
250.0	100	398	77.7	122.3	1,142.4	55.4	852.0	79	425.2
225.0	90	359	74.1	121.6	1,094.4	51.6	823.5	75	407.9
200.0	80	321	70.7	122.1	1,050.1	48.2	800.5	72	390.0
187.5	75	302	69.0	122.5	1,029.4	46.4	790.7	70	380.5
175.0	70	284	66.6	122.4	1,010.3	44.2	782.4	67	370.2
150.0	60	247	60.6	122.2	973.8	39.4	768.3	61	346.6
125.0	50	211	53.2	121.8	937.9	33.9	755.8	54	318.8
100.0	40	176	43.3	121.2	899.4	27.4	742.4	44	280.7
75.0	30	141	32.2	120.7	857.9	20.5	727.9	33	236.6
62.5	25	124	26.7	120.5	835.9	17.2	720.5	27	214.1
50.0	20	106	21.3	120.3	812.9	14.1	712.7	22	191.5
25.0	10	68.9	12.1	120.5	671.3	9.1	612.1	13	150.2

**PERFORMANCE DATA[DM8501]**

250.0	100	398	889.8	2,245.6	3,863.5	3,999.1	841.8	776.8
225.0	90	359	866.1	2,131.2	3,753.5	3,877.8	816.6	756.7
200.0	80	321	845.5	2,029.1	3,641.7	3,755.4	791.7	736.4
187.5	75	302	833.2	1,976.5	3,583.9	3,692.5	777.2	724.2
175.0	70	284	815.6	1,915.7	3,500.2	3,603.4	758.3	707.7
150.0	60	247	770.3	1,777.1	3,290.5	3,382.8	711.5	666.0
125.0	50	211	711.6	1,616.1	3,025.9	3,107.0	653.7	613.6
100.0	40	176	631.2	1,409.7	2,668.7	2,738.1	576.6	542.5
75.0	30	141	539.6	1,189.0	2,266.0	2,323.1	492.3	464.1
62.5	25	124	493.0	1,076.6	2,063.6	2,114.4	448.5	423.3
50.0	20	106	447.1	961.4	1,865.3	1,909.6	403.2	380.9
25.0	10	68.9	365.7	720.7	1,521.7	1,552.4	330.6	314.7

**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
250.0	100	398	5,928	1,004	15,772	8,470	2,214	4,686	16,886	41,564	44,276
225.0	90	359	5,517	890	14,624	7,716	2,028	4,305	15,231	38,081	40,566
200.0	80	321	5,156	844	13,650	7,085	1,859	3,906	13,615	34,894	37,171
187.5	75	302	4,986	796	13,203	6,804	1,775	3,702	12,819	33,332	35,507
175.0	70	284	4,811	750	12,693	6,507	1,688	3,474	12,026	31,686	33,754
150.0	60	247	4,487	657	11,600	5,894	1,508	2,957	10,466	28,319	30,167
125.0	50	211	4,177	565	10,395	5,241	1,323	2,387	8,931	24,835	26,456
100.0	40	176	3,834	664	8,956	4,456	1,131	1,704	7,458	21,230	22,615
75.0	30	141	3,407	764	7,418	3,634	932	1,052	5,989	17,489	18,630
62.5	25	124	3,174	722	6,658	3,239	829	773	5,246	15,560	16,575
50.0	20	106	2,926	591	5,915	2,861	723	532	4,490	13,570	14,455
25.0	10	68.9	2,390	520	4,011	1,661	501	182	2,923	9,412	10,026

**Emissions Data**

DIESEL

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN		EKW	250.0	18A.5	125.0	62.5	25.0
PERCENT LOAD	C	100	A5	50	25	10	
ENGINE POWER	BHP	398	302	211	12D	68.9	
TOTAL NOX (AS NO2)	G/HR	1,150	661	419	260	205	
TOTAL CO	G/HR	144	145	113	152	144	
TOTAL HC	G/HR	36	47	48	37	38	
TOTAL CO2	KG/HR	193	155	115	71	43	
PART MATTER	G/HR	32.1	33.9	25.1	25.1	17.5	
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	1,516.2	1,083.8	918.3	939.9	1,312.7	
TOTAL CO (CORR 5% O2)	MG/NM3	172.8	215.5	229.8	496.4	785.9	
TOTAL HC (CORR 5% O2)	MG/NM3	37.7	59.9	83.6	111.9	195.8	
PART MATTER (CORR 5% O2)	MG/NM3	32.6	43.3	43.2	76.0	79.5	
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	739	528	447	458	639	
TOTAL CO (CORR 5% O2)	PPM	138	172	184	397	629	
TOTAL HC (CORR 5% O2)	PPM	70	112	156	209	365	
TOTAL NOX (AS NO2)	G/HP-HR	2.91	2.20	2.00	2.11	2.98	
TOTAL CO	G/HP-HR	0.36	0.48	0.54	1.23	2.08	
TOTAL HC	G/HP-HR	0.09	0.15	0.23	0.30	0.55	
PART MATTER	G/HP-HR	0.08	0.11	0.12	0.20	0.25	
TOTAL NOX (AS NO2)	LB/HR	2.54	1.46	0.92	0.57	0.45	
TOTAL CO	LB/HR	0.32	0.32	0.25	0.34	0.32	
TOTAL HC	LB/HR	0.08	0.10	0.11	0.08	0.08	
TOTAL CO2	LB/HR	425	342	255	156	94	
PART MATTER	LB/HR	0.07	0.07	0.06	0.06	0.04	
OXYGEN IN EXH	%	10.2	11.6	12.7	13.7	15.0	

**PERFORMANCE DATA[DM8501]**

DRY SMOKE OPACITY	%	0.5	0.8	0.8	1.4	0.9
BOSCH SMOKE NUMBER		0.39	0.67	0.66	1.21	0.84

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

GENSET POWER WITH FAN	EKW	250.0	18A.5	125.0	62.5	25.0
PERCENT LOAD	C	100	A5	50	25	10
ENGINE POWER	BHP	398	302	211	12D	68.9
TOTAL NOX (AS NO2)	G/HR	1,242	714	452	281	222
TOTAL CO	G/HR	270	271	211	284	268
TOTAL HC	G/HR	69	88	92	70	71
PART MATTER	G/HR	62.6	66.0	49.0	49.0	34.1
TOTAL NOX (AS NO2) (CORR 5% O2)	MG/NM3	1,637.5	1,170.5	991.8	1,015.1	1,417.8
TOTAL CO (CORR 5% O2)	MG/NM3	323.2	403.0	429.8	928.3	1,469.7
TOTAL HC (CORR 5% O2)	MG/NM3	71.2	113.1	157.9	211.5	370.0
PART MATTER (CORR 5% O2)	MG/NM3	63.7	84.4	84.3	148.3	155.0
TOTAL NOX (AS NO2) (CORR 5% O2)	PPM	798	570	483	494	691
TOTAL CO (CORR 5% O2)	PPM	259	322	344	743	1,176
TOTAL HC (CORR 5% O2)	PPM	133	211	295	395	691
TOTAL NOX (AS NO2)	G/HP-HR	3.14	2.38	2.16	2.27	3.22
TOTAL CO	G/HP-HR	0.68	0.90	1.01	2.30	3.89
TOTAL HC	G/HP-HR	0.17	0.29	0.44	0.57	1.03
PART MATTER	G/HP-HR	0.16	0.22	0.23	0.40	0.49
TOTAL NOX (AS NO2)	LB/HR	2.74	1.57	1.00	0.62	0.49
TOTAL CO	LB/HR	0.59	0.60	0.47	0.63	0.59
TOTAL HC	LB/HR	0.15	0.19	0.20	0.15	0.16
PART MATTER	LB/HR	0.14	0.15	0.11	0.11	0.08

**Regulatory Information**

EPA TIER 3		2005 - 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 3MAX LIMITS3 SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.					
Locality	Agency	Regulation	Tier/Stage	MaG Limits - G/BKW - HR	
U.S. (INCL CALIF)	EPA	NON-ROAD	TIER 3	CO: 3.5 NOx + HC: 4.0 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 3MAX LIMITS3 SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.					
Locality	Agency	Regulation	Tier/Stage	MaG Limits - G/BKW - HR	
U.S. (INCL CALIF)	EPA	STATIONARY	EMERGENCY STATIONARY	CO: 3.5 NOx + HC: 4.0 PM: 0.20	

**Altitude Derate Data**

**STANDARD**

**ALTITUDE CORRECTED POWER CAPABILITY (BHP)**

AMBIENT OPERATING TEMP (F)	30	D0	50	60	A0	80	90	100	110	120	130	1D0	NORMAL
ALTITUDE (FT)													
0	398	398	398	398	398	398	398	398	398	398	398	398	398
1,000	398	398	398	398	398	398	398	398	398	398	395	389	398
2,000	398	398	398	398	398	398	398	398	394	387	380	374	398
3,000	398	398	398	398	398	398	393	386	379	372	366	360	398
4,000	398	398	398	398	392	385	378	371	365	358	352	346	396
5,000	398	398	392	384	377	370	363	357	351	345	339	333	384
6,000	392	384	377	370	363	356	349	343	337	331	326	320	372
7,000	377	369	362	355	349	342	336	330	324	318	313	308	360

## PERFORMANCE DATA[DM8501]

8,000	362	355	348	341	335	329	323	317	311	306	301	296	348
9,000	348	341	334	328	322	316	310	304	299	294	289	284	337
10,000	334	327	321	315	309	303	297	292	287	282	277	273	325
11,000	320	314	308	302	296	291	285	280	275	271	266	262	314
12,000	307	301	295	290	284	279	274	269	264	260	255	251	304
13,000	295	289	283	278	272	267	263	258	253	249	245	241	293
14,000	282	277	271	266	261	256	252	247	243	239	235	231	283
15,000	271	265	260	255	250	246	241	237	233	229	225	221	273

## Cross Reference

Test SHec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
OK6612	NAP	2575707	GS279	-	S9L00001	
OK6612	NAP	3950368	GS279	-	S9P00001	
4150078	PP5548	3950368	GS279	-	S9P00001	
4150078	PP5548	4529865	GS857	LS	S9P00001	
4150078	PP5548	5664658	PG350	G	RG300001	
4150078	PP5548	5664658	PG375	G	RE300001	

## 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 (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.

# PERFORMANCE DATA[DM8501]

**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

## PERFORMANCE DATA[DM8501]

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

**Application & Performance Warranty Data**

**Project Information**

Site Location: USA  
 Project Name: AWS 2026 Units (Titus)  
 Application: Standby Power  
 Number Of Engines: 400  
 Operating Hours per Year: 100

**Engine Specifications**

Engine Manufacturer: Caterpillar  
 Model Number: 3516E  
 Rated Speed: 1800 RPM  
 Type of Fuel: Ultra-Low Sulfur Diesel (ULSD)  
 Type of Lube Oil: 1 wt% sulfated ash or less  
 Lube Oil Consumption: 0.1 % Fuel Consumption  
 Number of Exhaust Manifolds: 1

**Engine Cycle Data**

Load	Speed	Power	Exhaust Flow	Exhaust Temp.	Fuel Cons.	NO <sub>x</sub>	CO	NMHC	NMNEHC	PM <sub>10</sub>	O <sub>2</sub>	H <sub>2</sub> O
%		bhp	acfm (cfm)	° F	gal/hr	g/bhp-hr	g/bhp-hr	g/bhp-hr	g/bhp-hr	g/bhp-hr	%	%
100	Rated	4,043	22,081.8	919.3	194.0	6	1.16	0.1	0.1	0.07	9.7	10

**Emission Data (100% Load)**

Emission	Raw Engine Emissions						Target Outlet Emissions						Calculated Reduction
	g/bhp-hr	tons/yr	ppmvd @ 15% O <sub>2</sub>	ppmvd	g/kW-hr	lb/MW-hr	g/bhp-hr	tons/yr	ppmvd @ 15% O <sub>2</sub>	ppmvd	g/kW-hr	lb/MW-hr	
NO <sub>x</sub> *	6	2.67	503	981	8.046	17.74	0.5	0.22	42	82	0.671	1.48	91.7%
CO	1.16	0.52	160	311	1.556	3.43	0.35	0.16	48	94	0.469	1.03	69.8%
NMHC**	0.1	0.04	24	47	0.134	0.3	0.05	0.02	12	23	0.067	0.15	50%
PM <sub>10</sub>	0.07	0.03	23	44	0.094	0.21	0.02	0.01	7	14	0.03	0.07	68.6%
NH <sub>3</sub>							0.04	0.02	10	19	0.059	0.13	

\* MW referenced as NO<sub>2</sub>

\*\* MW referenced as CH<sub>4</sub>. Propane in the exhaust shall not exceed 15% by volume of the NMHC compounds in the exhaust, excluding aldehydes. The 15% (vol.) shall be established on a wet basis, reported on a methane molecular weight basis. The measurement of exhaust NMHC composition shall be based upon EPA method 320 (FTIR), and shall exclude formaldehyde.

**DESIGN PARAMETERS**

The design of the Safety Power emissions reduction system is based on the following conditions.  
 Note: NOx is calculated as NO<sub>2</sub>.

**Table 1 – Engine Data**

<b>Engine Type:</b>	<b>CAT 3516E*</b>
<b>Application</b>	Stand-by
<b>Engine Power</b>	2,750 ekW
<b>Exhaust Temperature</b>	919 °F
<b>Design Exhaust Flow Rate</b>	22,082 (CFM)
<b>Fuel Type</b>	Diesel

*\* CAT Performance Data EM5402*

**Table 2 – Emissions Data at Full Engine Load**

Engine Option	Emissions	Not to Exceed Catalyst Inlet (g/bhp h)	Emissions Requirement (g/bhp h)	Catalyst Outlet (g/bhp hr)	Catalyst Outlet (g/kwh)	Catalyst Outlet (lbs/MW h)	Catalyst Outlet (ppmvd at @15%O2)	Catalyst Outlet (% reduction)
CAT 3516E (2,750 ekW)	NOx	6.0	0.50	0.50	0.67	1.62	40	91.7
	CO *	1.16	2.60	0.23	0.31	0.75	31	80.0
	VOC *	0.10	0.14	0.06	0.08	0.18	5	40.0
	PM	0.07	0.022	0.022	0.03	0.07	***	75.6

\* Reductions assume an exhaust temp of 662 degF (350 degC) or more.

\*\*\* Particulate matter is a mass quantity and must be determined and reported gravimetrically. As per EPA Method 5 measurement method, PM emissions should not be reported in ppmvd. We would always advise that PM measurements to be taken with front half as this is the most appropriate for this application.

\*Please note that any % reductions used for air permitting purposes should be based off of NTE values.

Notes: (1) The EPA does not treat methane and ethane as VOC's. Safety Power can achieve a stated reduction of VOC's based on the EPA definition assuming that the VOC's manifest themselves as propene. (2) all emissions reductions are based on an average at steady state using SCAQMD method 100.1 for NOx and SCAQMD/EPA methods 25.1/25.3 for CO and VOC's or mutually agreed test method approved in writing. (3) if NMHC/VOC data isn't provided 0.6 g/hp-hr is to be assumed (unless otherwise stated).

**Table 3 – SCR System Data**

<b>Engine Option</b>	<b>CAT 3516E (2,750 ekW)</b>
<b>Max. Ammonia Slip @ 15% O2</b>	8 ppm
<b>Urea Consumption - 32.5% solution (+/- 15%)</b>	10.3 USG/hr
<b>System Pressure Loss</b>	**
<b>System Inlet/Outlet ANSI Flange Inches</b>	**

\*\*please refer to shop drawing package for pressure loss and inlet/outlet size.

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# Renewable and Alternative Fuels For Use in Diesel Engines

## ABSTRACT

A number of renewable and alternative fuels can be used as drop-in replacements for diesel fuel. These fuels must meet the specifications and characteristics described below in order to be used in Cat® engines and reduce the risk of downtime.

## INTRODUCTION

Renewable fuels are derived from renewable resources such as planted crops (soy, palm, rapeseed, etc.), used cooking oil, animal fat, biomass, algae, and others. Renewable fuels reduce the carbon footprint of diesel engines on a Life Cycle Analysis basis. Renewable fuels that are derived from fats and oils may be processed through hydrotreating. The result is a high paraffinic renewable diesel (RD), also called hydrotreated vegetable oil (HVO), that can be used in diesel engines.

Biomass and syn gas, which can be produced from methane gas and gas-to-liquid (GTL), can be converted into renewable fuel through various processes and is typically called biomass-to-liquid (BTL). BTL, GTL and HVO have the same chemistry and performance specifications, and all can be used in diesel engines.

## Guidelines

Note that alternative and renewable fuels covered in this paper are different than biodiesel fuel, which is covered in other publications.

In order to be applicable for Cat® diesel engines, Caterpillar recommends that renewable and alternative fuels meet the latest version of any of the following specifications:

- EN15940, which defines quality requirements for BTL, GTL and HVO. This is the preferred specification for renewable and alternative fuels covered in this paper.
- ASTM D975, which is the specification for diesel fuel in the United States.
- EN 590, except for its density provisions. This is the specification for diesel fuel in Europe.
- The Cat Diesel Fuel Specification, except for its density provisions.

Renewable and alternative fuels that meet the requirements listed above can be used at:

- 100 percent (may be called RD100, HVO100, or GTL 100);
- Any blend level with diesel fuel;
- Any blend level with biodiesel fuel; and
- Any blend level with a combination of biodiesel and diesel fuels.

Renewable and alternative fuels are typically paraffinic hydrocarbons, which are included in a subset of diesel fuel composition. Hence these fuels, whether at 100% or blended, can be used as drop-in replacements for diesel fuel. These fuels have many benefits:

- HVO / RD fuels are renewable, which can reduce the carbon footprint or Greenhouse Gas (GHG) impact of the engine.
- They have a high cetane number.
- They can be formulated to provide low temperature capability. Consult with your supplier to ensure the fuel meets the ambient temperature requirements of the application.
- They can reduce the emissions of certain products of incomplete combustion, such as unburned hydrocarbons (UHC), soot, and carbon monoxide (CO). They may also reduce NOx emissions under certain engine loads and cycles.

Here are Caterpillar's guidance and potential impacts for the use of renewable and alternative fuels according to the specifications detailed above:

- No specific engine conversion process is needed when these fuels are used for the first time or thereafter.
- These fuels may reduce the power output of engines due to their low density. Up to a 5% reduction may be noted at 100%.
- They are compatible with aftertreatment technologies such as DPF, DOC and SCR, and they can be used on engines that meet Tier4, Stage V, and similar advanced emission standards.
- They are compatible with filters and engine oils used with typical diesel fuels. No impact on maintenance intervals is expected. In general, it is recommended that oil drain intervals are based on oil analysis.
- They are compatible with elastomeric materials and hoses used on most modern engines. Certain elastomers used in older engines, such as those manufactured prior to the early 1990s, may not be compatible with the new alternative fuels. Refer to your Cat dealer for guidance.
- They can be stored in the same tanks used for diesel fuel, and they have a similar aging life as diesel fuel.
- As with all fuels, renewable and alternative fuels have to be managed to reduce contamination and water ingress.
- Standard warranty is not impacted with the use of renewable and alternative fuels that meet recommended specifications.
- EPA emissions certifications are not impacted with the use of renewable and alternative fuels that meet recommended specifications; refer to your local and state regulations for site requirements.

## Summary

The use of fuels with low carbon footprints supports Caterpillar's sustainability initiatives. Caterpillar is continuously following the development of renewable and alternative fuels, and is involved in the development of appropriate specifications to ensure the successful application of these fuels in Cat engines.

**LET'S DO THE WORK.™**

LEXE20433-01 August 2021

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**CATERPILLAR®**



## SAFETY DATA SHEET

### Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

#### SECTION 1: Identification of the substance/mixture and of the company/undertaking

##### 1.1. Product identifier

Product name	Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel
Chemical name	Renewable hydrocarbons (diesel type fraction)
Product number	ID 13898
REACH registration number	01-2119450077-42-0000
REACH registration notes	01-2119450077-42-0000 / -0001 / -0002

##### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Formulation & (re)packing of substances and mixtures (ES 02) Distribution of substance (ES 04) Use as an intermediate (ES 05) Use as a fuel (ES 06, 14, 23)
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##### 1.3. Details of the supplier of the safety data sheet

Supplier	Neste Oyj Keilaranta 21, Espoo, P.O.B. 95, FIN-00095 NESTE, FINLAND Tel. +358 10 45811 SDS@neste.com (chemical safety)
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##### 1.4. Emergency telephone number

National emergency telephone +358 800 147 111, +358 9 471 977, Poison Information Centre number

#### SECTION 2: Hazards identification

##### 2.1. Classification of the substance or mixture

###### Classification (EC 1272/2008)

Physical hazards	Not Classified
Health hazards	Asp. Tox. 1 - H304
Environmental hazards	Not Classified

##### 2.2. Label elements

###### Hazard pictograms



Signal word	Danger
Hazard statements	H304 May be fatal if swallowed and enters airways.
Precautionary statements	P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor. P331 Do NOT induce vomiting. P501 Dispose of contents/ container in accordance with national regulations.

## Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

**Supplemental label information** EUH066 Repeated exposure may cause skin dryness or cracking.

**Contains** Renewable hydrocarbons (diesel type fraction)

### 2.3. Other hazards

**Other hazards** Combustible liquid. Risk of soil and ground water contamination.

## SECTION 3: Composition/information on ingredients

### 3.2. Mixtures

<b>Renewable hydrocarbons (diesel type fraction)</b>	<b>ca. 100%</b>
CAS number: —	REACH registration number: 01-2119450077-42-XXXX
<b>Classification</b>	
Asp. Tox. 1 - H304	

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

**Other information** Mixture of renewable raw material fuel and additives., Contains middle distillate-range iso- and n-paraffinic hydrocarbons., Total aromatics at maximum 1,0 Weight %., Renewable hydrocarbons (diesel type fraction);, REACH Nr: 01-2119450077-42-0000 / -0001 / -0002., Identity outside the EU (CAS number and name of the substance);, Alkanes, C10-20-branched and linear, CAS 928771-01-1.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

**Inhalation** Unlikely to be hazardous by inhalation because of the low vapour pressure of the product at ambient temperature. If spray/mist has been inhaled, proceed as follows. Remove person to fresh air and keep comfortable for breathing. Get medical attention if symptoms are severe or persist.

**Ingestion** Do not induce vomiting. Get medical attention immediately.

**Skin contact** Remove contaminated clothing immediately and wash skin with soap and water. Get medical attention if irritation persists after washing.

**Eye contact** Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation persists after washing.

### 4.2. Most important symptoms and effects, both acute and delayed

**General information** Repeated exposure may cause skin dryness or cracking. Spray/mists may cause respiratory tract irritation. Entry into the lungs following ingestion or vomiting may cause chemical pneumonitis.

### 4.3. Indication of any immediate medical attention and special treatment needed

**Notes for the doctor** Treat symptomatically.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

**Suitable extinguishing media** Water spray, foam, dry powder or carbon dioxide.

**Unsuitable extinguishing media** Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters

### 5.2. Special hazards arising from the substance or mixture

## Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

<b>Specific hazards</b>	Combustible liquid. Containers can burst violently or explode when heated, due to excessive pressure build-up.
<b>Hazardous combustion products</b>	Carbon dioxide (CO <sub>2</sub> ). Carbon monoxide (CO).
<b>5.3. Advice for firefighters</b>	
<b>Protective actions during firefighting</b>	Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk.
<b>Special protective equipment for firefighters</b>	Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

<b>Personal precautions</b>	Wear adequate protective equipment at all operations.
<b>For emergency responders</b>	Prevent unauthorized access. Eliminate all ignition sources if safe to do so. Take precautionary measures against static discharge.

#### 6.2. Environmental precautions

<b>Environmental precautions</b>	Avoid release to the environment. Stop leak if safe to do so. Avoid the spillage or runoff entering drains, sewers or watercourses. Inform the relevant authorities if environmental pollution occurs (sewers, waterways, soil or air). Risk of soil and ground water contamination.
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#### 6.3. Methods and material for containment and cleaning up

<b>Methods for cleaning up</b>	Immediately start clean-up of the liquid and contaminated soil. Contain spillage with sand, earth or other suitable non-combustible material. Pay attention to the fire and health hazards caused by the product.
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#### 6.4. Reference to other sections

<b>Reference to other sections</b>	For personal protection, see Section 8.
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### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

<b>Usage precautions</b>	Avoid heat, flames and other sources of ignition. Take precautionary measures against static discharges. Use only outdoors or in a well-ventilated area. Avoid inhalation of vapours and contact with skin and eyes. Use personal protective equipment and/or local ventilation when needed. Do not eat, drink or smoke when using this product. Wash hands and any other contaminated areas of the body with soap and water before leaving the work site. During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons).
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#### 7.2. Conditions for safe storage, including any incompatibilities

<b>Storage precautions</b>	Flammable liquid storage. Store in accordance with local regulations. Store in a demarcated bunded area to prevent release to drains and/or watercourses. Only store in correctly labelled containers. Use containers made of the following materials: Carbon steel. Stainless steel.
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#### 7.3. Specific end use(s)

<b>Specific end use(s)</b>	Not known.
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### SECTION 8: Exposure controls/Personal protection

#### 8.1. Control parameters

<b>Ingredient comments</b>	The individual limit values can be applied for the hydrocarbons. Diesel fuel as total hydrocarbons; ACGIH TLV®-TWA (8h) 100 mg/m <sup>3</sup> (IFV).
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## Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

**PNEC** Not available.

### Renewable hydrocarbons (diesel type fraction)

**DNEL** Workers - Inhalation; Long term systemic effects: 147 mg/m<sup>3</sup>  
 Workers - Dermal; Long term systemic effects: 42 mg/kg/day  
 Consumer - Inhalation; Long term systemic effects: 94 mg/m<sup>3</sup>  
 Consumer - Dermal; Long term systemic effects: 18 mg/kg/day

### 8.2. Exposure controls

<b>Appropriate engineering controls</b>	Provide adequate ventilation. Use personal protective equipment and/or local ventilation when needed. Handle in accordance with good industrial hygiene and safety practice. During tank operations follow special instructions (risk of oxygen displacement and hydrocarbons).
<b>Eye/face protection</b>	Spectacles.
<b>Hand protection</b>	Wear protective gloves. It is recommended that gloves are made of the following material: Nitrile rubber. Neoprene. Polyvinyl chloride (PVC). The breakthrough time for any glove material may be different for different glove manufacturers. Protective gloves according to standard EN 374. Change protective gloves regularly.
<b>Other skin and body protection</b>	Protective clothing when needed. Wear anti-static protective clothing if there is a risk of ignition from static electricity.
<b>Respiratory protection</b>	Respiratory protection must be used if the airborne contamination exceeds the recommended occupational exposure limit. Wear a respirator fitted with the following cartridge: Combination filter, type A2/P2. Filter must be changed often enough. Gas and combination filter cartridges should comply with European Standard EN14387. At high concentrations a breathing apparatus must be used (self-contained or fresh air hose breathing apparatus).
<b>Environmental exposure controls</b>	Store in a demarcated bunded area to prevent release to drains and/or watercourses.

## **SECTION 9: Physical and chemical properties**

### 9.1. Information on basic physical and chemical properties

<b>Appearance</b>	Liquid.
<b>Colour</b>	Clear.
<b>Odour</b>	Mild.
<b>Odour threshold</b>	-
<b>pH</b>	-
<b>Melting point</b>	Pour point < -20°C @ 1013 hPa (BS4633, EC A1)
<b>Initial boiling point and range</b>	180-320°C (EN ISO 3405)
<b>Flash point</b>	> 61°C (EN ISO 2719, EC A9)
<b>Upper/lower flammability or explosive limits</b>	-
<b>Vapour pressure</b>	0,087 kPa @ 25°C (EC A4)
<b>Vapour density</b>	-
<b>Relative density</b>	0,77 - 0,79 @ 15/4°C (EN ISO 12185, EC A3)
<b>Solubility(ies)</b>	Insoluble in water. ~ 0,075 mg/l water @ 25°C (calculated) Soluble in the following materials: Methanol. Hydrocarbons.

## Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

<b>Partition coefficient</b>	log Kow: > 6,5 (EC A8)
<b>Auto-ignition temperature</b>	204°C (EC A15)
<b>Decomposition Temperature</b>	-
<b>Viscosity</b>	Kinematic viscosity 4.0 mm <sup>2</sup> /s @ 20°C 2.6 mm <sup>2</sup> /s @ 40°C (OECD 114) Dynamic viscosity ≤ 5 mPa s @ 20°C
<b>Explosive properties</b>	Not considered to be explosive. (EC A14)
<b>Oxidising properties</b>	Does not meet the criteria for classification as oxidising.

### 9.2. Other information

**Other information** Not known.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

**Reactivity** There are no known reactivity hazards associated with this product.

### 10.2. Chemical stability

**Stability** Stable at normal ambient temperatures and when used as recommended.

### 10.3. Possibility of hazardous reactions

**Possibility of hazardous reactions** No potentially hazardous reactions known.

### 10.4. Conditions to avoid

**Conditions to avoid** Keep away from heat, sparks and open flame.

### 10.5. Incompatible materials

**Materials to avoid** Oxidising agents.

### 10.6. Hazardous decomposition products

**Hazardous decomposition products** Does not decompose when used and stored as recommended.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

**Toxicological effects** Based on available data the classification criteria are not met.

#### Skin corrosion/irritation

**Skin corrosion/irritation** Based on available data the classification criteria are not met. (EC B4) Repeated exposure may cause skin dryness or cracking. The product irritates mucous membranes and may cause abdominal discomfort if swallowed. May cause respiratory system irritation.

#### Serious eye damage/irritation

**Serious eye damage/irritation** Based on available data the classification criteria are not met. (EC B5)

#### Skin sensitisation

**Skin sensitisation** Based on available data the classification criteria are not met. (EC B6)

#### Germ cell mutagenicity

**Genotoxicity - in vitro** Based on available data the classification criteria are not met. (EC B10, B13/14 & B17).

#### Carcinogenicity

**Carcinogenicity** Based on available data the classification criteria are not met.

## Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

### Reproductive toxicity

**Reproductive toxicity - fertility** Based on available data the classification criteria are not met. (OECD 416)

### Specific target organ toxicity - single exposure

**STOT - single exposure** Not classified as a specific target organ toxicant after a single exposure.

### Specific target organ toxicity - repeated exposure

**STOT - repeated exposure** Based on available data the classification criteria are not met. (OECD 408)

### Aspiration hazard

**Aspiration hazard** May be fatal if swallowed and enters airways. Entry into the lungs following ingestion or vomiting may cause chemical pneumonitis.

### Toxicological information on ingredients.

#### Renewable hydrocarbons (diesel type fraction)

##### Acute toxicity - oral

**Notes (oral LD<sub>50</sub>)** LD<sub>50</sub> >2000 mg/kg, Oral, Rat (EC B1 tris)

##### Acute toxicity - dermal

**Notes (dermal LD<sub>50</sub>)** LD<sub>50</sub> > 2000 mg/kg, Dermal, Rat (EC B3)

## SECTION 12: Ecological information

### 12.1. Toxicity

**Toxicity** Based on available data the classification criteria are not met.

### Ecological information on ingredients.

#### Renewable hydrocarbons (diesel type fraction)

##### Acute aquatic toxicity

**Acute toxicity - fish** LL<sub>50</sub>, 96 hours: > 1000 mg/l,  
WAF (OECD 203)

**Acute toxicity - aquatic invertebrates** EL50, 48 hours: > 100 mg/l,  
WAF (OECD 202)

**Acute toxicity - aquatic plants** EL50, 72 hours: > 100 mg/l, Algae  
WAF (OECD 201)

**Acute toxicity - microorganisms** EC<sub>50</sub>, 30-180 minutes: > 1000 mg/l, Micro-organisms (wastewater sludge)  
(OECD 209)

##### Chronic aquatic toxicity

**Chronic toxicity - aquatic invertebrates** NOEC, 21 days: 1 mg/l,  
LOEC, 21 days: 3,2 mg/l,  
WAF (OECD 211)  
Sediment organisms  
NOEC, 10 days: 373 mg/kg,  
LOEC, 10 days: 1165 mg/kg,  
LC<sub>50</sub>, 10 days: 1200 mg/kg,  
(OSPAR Protocols, Part A: Sediment Bioassay, 2005)

### 12.2. Persistence and degradability

**Stability (hydrolysis)** No significant reaction in water.

## Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

**Biodegradation** Rapidly degradable  
(OECD 301B).

### Ecological information on ingredients.

#### Renewable hydrocarbons (diesel type fraction)

**Biodegradation** Rapidly degradable  
(OECD 301B).

### 12.3. Bioaccumulative potential

**Bioaccumulative potential** Possibly bioaccumulative.

**Partition coefficient** log Kow: > 6,5 (EC A8)

### 12.4. Mobility in soil

**Mobility** Evaporates slowly. The product has poor water-solubility. The product contains substances which are bound to particulate matter and are retained in soil. Log Koc > 5.6 (EC C19).

### 12.5. Results of PBT and vPvB assessment

**Results of PBT and vPvB assessment** This product does not contain any substances classified as PBT or vPvB.

### 12.6. Other adverse effects

**Other adverse effects** Not known.

## **SECTION 13: Disposal considerations**

### 13.1. Waste treatment methods

**Disposal methods** Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. Product residues retained in emptied containers can be hazardous. Waste packaging should be collected for reuse or recycling.

## **SECTION 14: Transport information**

**Sea transport notes** This cargo is considered an Energy-rich fuel and effective 1 January 2019 should be carried subject to Annex I of MARPOL, see Annex 12 of MEPC.2/Circ.24. Please also refer to MEPC.1/Circ.879 - GUIDELINES FOR THE CARRIAGE OF ENERGY-RICH FUELS AND THEIR BLENDS

### 14.1. UN number

**UN No. (ADR/RID)** 1202

**UN No. (IMDG)** Not classified under IMDG.

### 14.2. UN proper shipping name

**Proper shipping name (ADR/RID)** UN 1202 DIESEL FUEL

### 14.3. Transport hazard class(es)

**ADR/RID class** 3

**ADN subsidiary risk** F (floater)

### 14.4. Packing group

## Neste Renewable Diesel; Neste Renewable Diesel 100 %; Neste MY Renewable Diesel

ADR/RID packing group III

### 14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant

No.

### 14.6. Special precautions for user

Hazard Identification Number 30  
(ADR/RID)

Tunnel restriction code (D/E)

### 14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Transport in bulk according to Not applicable.

Annex II of MARPOL 73/78  
and the IBC Code

## SECTION 15: Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

**National regulations** UK REACH Registration number: UK-01-9638319484-0-XXXX.  
Only Representative UK: Penman Consulting Limited 41, Aspect House, Waylands Avenue, Grove Business Park, Wantage, Oxon, OX12 9FF, United Kingdom; Telephone: 01367 718474, Email: pcltd41@penmanconsulting.com.

Location of manufacture: Neste Rotterdam Refinery, the Netherlands.

**EU legislation** Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).

Commission Regulation (EU) No 2015/830 of 28 May 2015.

Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

### 15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

## SECTION 16: Other information

**Abbreviations and acronyms used in the safety data sheet** DNEL = Derived No-Effect Level  
PNEC = Predicted No-Effect Concentration  
WAF = Water Accommodated Fraction

**Key literature references and sources for data** Regulations, databases, literature, own research. Chemical Safety Report Renewable hydrocarbons (diesel type fraction), 2017.

**Revision comments** Updated, sections: 15.1. NOTE: Lines within the margin indicate significant changes from the previous revision.

**Revision date** 17/12/2021

**Supersedes date** 12/11/2021

**SDS number** 5359

**Hazard statements in full** H304 May be fatal if swallowed and enters airways.

## Exposure scenario

### Distribution of Substance - Industrial

#### Identification

<b>Product name</b>	Renewable hydrocarbons (diesel type fraction)
<b>REACH registration number</b>	01-2119450077-42-XXXX
<b>Version number</b>	2017
<b>Es reference</b>	04

#### 1. Title of exposure scenario

<b>Main title</b>	Distribution of Substance - Industrial
<b>Process scope</b>	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading distribution and associated laboratory activities.
<b>Main sector</b>	SU3 Industrial uses
<b>Environment</b>	
<b>Environmental release category</b>	ERC7 Use of functional fluid at industrial site
<b>SPERC</b>	ESVOC SPERC 1.1b.v1
<b>Worker</b>	
<b>Process category</b>	PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing) PROC15 Use as laboratory reagent.

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Amounts used

Fraction of EU tonnage used in region: 1  
Daily amount per site: ≤ 5000 t  
Annual amount per site: ≤ 1 500 000 t

##### Frequency and duration of use

Emission days: 300 days/year

##### Other given operational conditions affecting environmental exposure

<b>Emission factor - air</b>	0,001%
<b>Emission factor - water</b>	4E-7%.
<b>Emission factor - soil</b>	0,001%

##### Environmental factors not influenced by risk management measures

## Distribution of Substance - Industrial

**Dilution** Local freshwater dilution factor: 10  
Local marine water dilution factor: 100

### Risk management measures

**STP type** Aerobic biological treatment

**STP details** Assumed domestic sewage treatment plant flow (m<sup>3</sup>/day):  
2000.

### Conditions and measures related to external treatment of waste for disposal

**Waste treatment** Dispose of waste in accordance with environmental legislation.

### Conditions and measures related to external recovery of waste

**Recovery method** All waste product is assumed to be collected and returned for re-processing or use as a fuel.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers percentage substance in the product up to 100% (unless stated differently).

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

**Potentially exposed body parts** PROC 3, PROC 15: Covers skin contact area up to 240 cm<sup>2</sup>. Palm of one hand.  
PROC 2, PROC 9: Covers skin contact area up to 480 cm<sup>2</sup>. Palm of both hands.  
PROC 8a, 8b: Covers skin contact area up to 960 cm<sup>2</sup>. Both hands.

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** ≤ 40°C

**Ventilation rate** 1 -3 air changes per hour Unless otherwise stated.

Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

## Distribution of Substance - Industrial

General exposures (closed systems)  
 With occasional controlled exposure  
 (PROC 3)  
 No specific measures identified.

Process sampling  
 (PROC 3)  
 Wear suitable gloves tested to EN374.

Laboratory activities  
 (PROC 15)  
 Provide adequate general and local exhaust ventilation.  
 Wear suitable gloves tested to EN374.  
 Recommendation:  
 Handle in a fume cupboard or under extract ventilation.

Bulk transfers  
 Road tanker/rail car loading.  
 (closed systems)  
 (PROC 8b)  
 Recommendation:  
 Use vapour recovery units when necessary.  
 Wear suitable gloves tested to EN374.

Bulk transfers  
 Marine vessel/barge (un)loading.  
 (closed systems)  
 (PROC 8b)  
 Recommendation:  
 Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance  
 (PROC 8a)  
 Provide adequate general and local exhaust ventilation.  
 Recommendation:  
 Drain down and flush system prior to equipment break-in or maintenance.  
 Wear suitable gloves tested to EN374.

Storage  
 With occasional controlled exposure  
 (PROC 2)  
 No specific measures identified.

Drum and small package filling  
 (PROC 9)  
 Recommendation:  
 Wear suitable gloves tested to EN374.

### 3. Exposure estimation (Environment 1)

**Assessment method**                      Used Petrorisk model.

### 3. Exposure estimation (Health 1)

**Assessment method**                      Used CHESAR model.

## Exposure scenario

### Formulation & (re)packing - Industrial

#### Identification

<b>Product name</b>	Renewable hydrocarbons (diesel type fraction)
<b>REACH registration number</b>	01-2119450077-42-XXXX
<b>Version number</b>	2017
<b>Es reference</b>	02

#### 1. Title of exposure scenario

<b>Main title</b>	Formulation & (re)packing - Industrial
<b>Process scope</b>	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.
<b>Main sector</b>	SU3 Industrial uses
<b>Environment</b>	
<b>Environmental release category</b>	ERC2 Formulation into mixture
<b>SPERC</b>	ESVOC SPERC 2.2.v1
<b>Worker</b>	
<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC5 Mixing or blending in batch processes</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC9 Transfer of substance or mixture into small containers (dedicated filling line, including weighing)</p> <p>PROC15 Use as laboratory reagent.</p>

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Amounts used

Fraction of EU tonnage used in region: 1  
Daily amount per site: ≤ 100 t  
Annual amount per site: ≤ 1 500 000 t

##### Frequency and duration of use

Emission days: 300 days/year

##### Other given operational conditions affecting environmental exposure

<b>Emission factor - air</b>	0,25%
<b>Emission factor - water</b>	0,005%

## Formulation & (re)packing - Industrial

**Emission factor - soil** 0.01%

### Environmental factors not influenced by risk management measures

**Dilution** Local freshwater dilution factor: 10  
Local marine water dilution factor: 100

### Risk management measures

**STP type** Aerobic biological treatment

**STP details** Assumed domestic sewage treatment plant flow (m<sup>3</sup>/day):  
2000.

### Conditions and measures related to external treatment of waste for disposal

**Disposal method** Dispose of waste in accordance with environmental legislation.

### Conditions and measures related to external recovery of waste

**Recovery method** All waste product is assumed to be collected and returned for re-processing or use as a fuel.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers percentage substance in the product up to 100% (unless stated differently).

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

**Potentially exposed body parts** PROC 1, PROC 3, PROC 15: Covers skin contact area up to 240 cm<sup>2</sup>. Palm of one hand.  
PROC 2, PROC 5, PROC 9: Covers skin contact area up to 480 cm<sup>2</sup>. Palm of both hands.  
PROC 8a, 8b: Covers skin contact area up to 960 cm<sup>2</sup>. Both hands.

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** ≤ 40 °C

**Ventilation rate** 1 - 3 air changes per hour Unless otherwise stated.

Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

## Formulation & (re)packing - Industrial

Mixing operations

(PROC 3)

No specific measures identified.

Batch processes at elevated temperatures

(PROC 3)

No specific measures identified.

Process sampling

(PROC 3)

Wear suitable gloves tested to EN374.

Laboratory activities

(PROC 15)

Provide adequate general and local exhaust ventilation.

Wear suitable gloves tested to EN374.

Recommendation:

Handle in a fume cupboard or under extract ventilation.

Bulk transfers

(PROC 8b)

No specific measures identified.

Mixing operations

(open systems)

With potential for aerosol generation

(PROC 5)

Recommendation:

Wear suitable gloves tested to EN374.

Transfer from/pouring from containers

Manual

(PROC 8a)

Wear suitable gloves tested to EN374.

Drum/batch transfers

(PROC 8b)

No specific measures identified.

Drum and small package filling

(PROC 9)

Provide adequate general and local exhaust ventilation.

Recommendation:

Fill containers/cans at dedicated fill points supplied with local extract ventilation.

Equipment cleaning and maintenance

(PROC 8a)

Provide adequate general and local exhaust ventilation.

Recommendation:

Drain down and flush system prior to equipment break-in or maintenance.

Wear suitable gloves tested to EN374.

Storage

(PROC 1, PROC 2)

No specific measures identified.

## Formulation & (re)packing - Industrial

### 3. Exposure estimation (Environment 1)

**Assessment method**            Used Petrorisk model.

### 3. Exposure estimation (Health 1)

**Assessment method**            Used CHESAR model.

## Exposure scenario

### Use as a fuel - Industrial

#### Identification

<b>Product name</b>	Renewable hydrocarbons (diesel type fraction)
<b>REACH registration number</b>	01-2119450077-42-XXXX
<b>Version number</b>	2017
<b>Es reference</b>	06

#### 1. Title of exposure scenario

<b>Main title</b>	Use as a fuel - Industrial
<b>Process scope</b>	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
<b>Main sector</b>	SU3 Industrial uses
<b>Environment</b>	
<b>Environmental release category</b>	ERC7 Use of functional fluid at industrial site
<b>SPERC</b>	ESVOC SPERC 7.12a.v1
<b>Worker</b>	
<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC15 Use as laboratory reagent.</p> <p>PROC16 Use of fuels</p>

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Amounts used

Fraction of EU tonnage used in region: 1  
Daily amount per site: ≤ 5000 t  
Annual amount per site: ≤ 10 000 t

##### Frequency and duration of use

Emission days: 300 days/year

##### Other given operational conditions affecting environmental exposure

<b>Emission factor - air</b>	0.025%
<b>Emission factor - water</b>	0,001%
<b>Emission factor - soil</b>	0%

##### Environmental factors not influenced by risk management measures

## Use as a fuel - Industrial

**Dilution** Local freshwater dilution factor: 10  
Local marine water dilution factor: 100

### Risk management measures

**STP type** Aerobic biological treatment

**STP details** Assumed domestic sewage treatment plant flow (m<sup>3</sup>/day):  
2000.

### Conditions and measures related to external treatment of waste for disposal

**Disposal method** Dispose of waste in accordance with environmental legislation.

### Conditions and measures related to external recovery of waste

**Recovery method** Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers percentage substance in the product up to 100% (unless stated differently).

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

**Potentially exposed body parts** PROC 1, PROC 3, PROC 15, PROC 16: Covers skin contact area up to 240 cm<sup>2</sup>. Palm of one hand.  
PROC 2, PROC 4: Covers skin contact area up to 480 cm<sup>2</sup>. Palm of both hands.  
PROC 8a, 8b: Covers skin contact area up to 960 cm<sup>2</sup>. Both hands.

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** ≤ 40 °C

**Ventilation rate** 1 - 3 air changes per hour Unless otherwise stated.

Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

## Use as a fuel - Industrial

Bulk transfers

(PROC 4)

Recommendation:

Wear suitable gloves tested to EN374.

Drum/batch transfers

(PROC 8b)

Provide adequate general and local exhaust ventilation.

Recommendation:

Use drum pumps or carefully pour from container.

Wear suitable gloves tested to EN374.

Bulk transfers

(PROC 8b)

Recommendation:

Use drum pumps or carefully pour from container.

Wear suitable gloves tested to EN374.

General exposures (closed systems)

Continuous process

(PROC 1)

No specific measures identified.

General exposures (closed systems)

Continuous process

With sample collection

(PROC 2)

Recommendation:

Ensure material transfers are under containment or extract ventilation.

General exposures (closed systems)

Batch process

(PROC 3)

Recommendation:

Ensure material transfers are under containment or extract ventilation.

General exposures (open systems)

(PROC 16)

Recommendation:

Ensure material transfers are under containment or extract ventilation.

Process sampling

(PROC 3)

Recommendation:

Wear suitable gloves tested to EN374.

Equipment cleaning and maintenance

(PROC 8a)

Provide adequate general and local exhaust ventilation.

Recommendation:

Drain down and flush system prior to equipment break-in or maintenance.

Wear suitable gloves tested to EN374.

Vessel and container cleaning

(PROC 8a)

## Use as a fuel - Industrial

Provide adequate general and local exhaust ventilation.

Recommendation:

Drain down and flush system prior to equipment break-in or maintenance.

Provide enhanced general ventilation by mechanical means.

If above technical/organisational control measures are not feasible, then adopt following PPE:

Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

Wear suitable gloves tested to EN374.

Wear suitable coveralls to prevent exposure to the skin.

Storage

(PROC 1, PROC 2)

No specific measures identified.

Refuelling

(PROC 8b)

Recommendation:

Use drum pumps or carefully pour from container.

Use vapour recovery units when necessary.

Wear suitable gloves tested to EN374.

Laboratory activities

(PROC 15)

Recommendation:

Handle in a fume cupboard or under extract ventilation.

Wear suitable gloves (tested to EN374), coverall and eye protection.

### 3. Exposure estimation (Environment 1)

**Assessment method**                      Used Petrorisk model.

### 3. Exposure estimation (Health 1)

**Assessment method**                      Used CHESAR model.

## Exposure scenario

### Use as a fuel - Professional

#### Identification

<b>Product name</b>	Renewable hydrocarbons (diesel type fraction)
<b>REACH registration number</b>	01-2119450077-42-XXXX
<b>Version number</b>	2017
<b>Es reference</b>	14

#### 1. Title of exposure scenario

<b>Main title</b>	Use as a fuel - Professional
<b>Process scope</b>	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
<b>Main sector</b>	SU22 Professional uses
<b>Environment</b>	
<b>Environmental release category</b>	ERC9a Widespread use of functional fluid (indoor) ERC9b Widespread use of functional fluid (outdoor)
<b>SPERC</b>	ESVOC SPERC 9.12b.v1
<b>Worker</b>	
<b>Process category</b>	PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities PROC16 Use of fuels

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Amounts used

Fraction of EU tonnage used in region: 0.1  
Daily amount per site: ≤ 160 kg

##### Frequency and duration of use

Emission days: 365 days/year

##### Other given operational conditions affecting environmental exposure

<b>Emission factor - air</b>	0,01 %
<b>Emission factor - water</b>	0,001 %
<b>Emission factor - soil</b>	0,001 %

##### Environmental factors not influenced by risk management measures

<b>Dilution</b>	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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## Use as a fuel - Professional

### Risk management measures

<b>STP type</b>	Aerobic biological treatment
<b>STP details</b>	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /day): 2000.

### Conditions and measures related to external treatment of waste for disposal

<b>Disposal method</b>	Dispose of waste in accordance with environmental legislation.
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## 2. Conditions of use affecting exposure (Workers - Health 1)

### Product characteristics

<b>Physical state</b>	Liquid
<b>Concentration details</b>	Covers percentage substance in the product up to 100% (unless stated differently).

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

<b>Potentially exposed body parts</b>	PROC 1, PROC 3, PROC 16: Covers skin contact area up to 240 cm <sup>2</sup> . Palm of one hand. PROC 2: Covers skin contact area up to 480 cm <sup>2</sup> . Palm of both hands. PROC 8a, 8b: Covers skin contact area up to 960 cm <sup>2</sup> . Both hands.
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### Other given operational conditions affecting workers exposure

<b>Setting</b>	Indoor use.
<b>Temperature</b>	≤ 40 °C
<b>Ventilation rate</b>	1 - 3 air changes per hour Unless otherwise stated.

### Risk management measures

## Use as a fuel - Professional

Bulk transfers

Heating oil and diesel deliveries

(PROC 8b)

Provide adequate general and local exhaust ventilation.

Recommendation:

Handle substance within a closed system.

Wear suitable gloves tested to EN374.

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Drum/batch transfers

(PROC 8b)

Provide adequate general and local exhaust ventilation.

Recommendation:

Use drum pumps or carefully pour from container.

Wear suitable gloves tested to EN374.

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Refuelling

(PROC 8b)

Provide adequate general and local exhaust ventilation.

Recommendation:

Use drum pumps or carefully pour from container.

Wear suitable gloves tested to EN374.

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Dipping, immersion and pouring

(PROC 8b)

Wear suitable gloves tested to EN374.

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General exposures

(PROC 1, PROC 2, PROC 3, PROC 16)

No specific measures identified.

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Equipment cleaning and maintenance

(PROC 8a)

Provide adequate general and local exhaust ventilation.

Recommendation:

Drain down and flush system prior to equipment break-in or maintenance.

Wear suitable gloves tested to EN374.

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Vessel and container cleaning

(PROC 8a)

Provide adequate general and local exhaust ventilation.

Recommendation:

Drain down and flush system prior to equipment break-in or maintenance.

Wear suitable gloves tested to EN374.

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Storage

(PROC 1, PROC 2)

No specific measures identified.

### 3. Exposure estimation (Environment 1)

**Assessment method**                      Used Petrorisk model.

### 3. Exposure estimation (Health 1)

**Assessment method**                      Used CHESAR model.

## Exposure scenario

### Use as a fuel - Consumer

#### Identification

<b>Product name</b>	Renewable hydrocarbons (diesel type fraction)
<b>REACH registration number</b>	01-2119450077-42-XXXX
<b>Version number</b>	2017
<b>Es reference</b>	23

#### 1. Title of exposure scenario

<b>Main title</b>	Use as a fuel - Consumer
<b>Process scope</b>	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
<b>Product category</b>	PC13 Fuels.
<b>Main sector</b>	SU21 Consumer uses
<b>Environment</b>	
<b>Environmental release category</b>	ERC9a Widespread use of functional fluid (indoor) ERC9b Widespread use of functional fluid (outdoor)
<b>SPERC</b>	ESVOC SPERC 9.12c.v1
<b>Non-industrial</b>	
<b>Product sub-category</b>	PC13_1 Liquid: automotive refuelling PC13_2 Liquid: scooter refuelling PC13_3 Liquid: garden equipment - use PC13_4 Liquid: Garden equipment - Refuelling PC13_5 Liquid: lamp oil PC13_6 Liquid: home space heater fuel PC13_n Liquid: refuelling of boats

#### 2. Conditions of use affecting exposure (Non-industrial - Environment 1)

##### Amounts used

Fraction of EU tonnage used in region: 0,1  
Daily amount per site: ≤ 550 kg

##### Frequency and duration of use

Emission days: 365 days/year

##### Other given operational conditions affecting environmental exposure

<b>Emission factor - air</b>	0,01 %
<b>Emission factor - water</b>	0,001 %
<b>Emission factor - soil</b>	0,001 %

##### Environmental factors not influenced by risk management measures

<b>Dilution</b>	Local freshwater dilution factor: 10 Local marine water dilution factor: 100
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##### Risk management measures

## Use as a fuel - Consumer

<b>Technical measures</b>	Indoor/outdoor use.
<b>STP type</b>	Aerobic biological treatment
<b>STP details</b>	Assumed domestic sewage treatment plant flow (m <sup>3</sup> /day): 2000.

### Conditions and measures related to external treatment of waste for disposal

<b>Disposal method</b>	Dispose of waste in accordance with environmental legislation.
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## 2. Conditions of use affecting exposure (Non-industrial - Health 1)

### Product characteristics

<b>Concentration details</b>	Covers percentage substance in the product up to 100% (unless stated differently).
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### Amounts used

PC13\_1 Liquid: automotive refuelling  
For each use event, covers use amounts up to 38,6 kg.  
PC13\_2 Liquid: scooter refuelling  
For each use event, covers use amounts up to 7,5 kg.  
PC13\_3 Liquid: garden equipment - use  
For each use event, covers use amounts up to 772 g.  
PC13\_4 Liquid: Garden equipment - Refuelling  
For each use event, covers use amounts up to 772 g.  
PC13\_5 Liquid: lamp oil  
For each use event, covers use amounts up to 100 g.  
PC13\_6 Liquid: home space heater fuel  
For each use event, covers use amounts up to 3320 g.  
PC13\_n Liquid: refuelling of boats  
For each use event, covers use amounts up to 156,0 kg.

### Frequency and duration of use

## Use as a fuel - Consumer

Covers use up to 1 time(s)/day.

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 PC13\_1 Liquid: automotive refuelling  
 Covers exposure up to 0,05 hours per event.  
 (occasional use over a year)

.  
 PC13\_2 Liquid: scooter refuelling  
 Covers exposure up to 0,02 hours per event.  
 (frequent use over a year)

.  
 PC13\_3 Liquid: garden equipment - use  
 Covers exposure up to 2,00 hours per event.  
 (occasional use over a year)

.  
 PC13\_4 Liquid: Garden equipment - Refuelling  
 Covers exposure up to 0,03 hours per event.  
 (occasional use over a year)

.  
 PC13\_5 Liquid: lamp oil  
 Covers exposure up to 0,01 hours per event.  
 (occasional use over a year)

.  
 PC13\_6 Liquid: home space heater fuel  
 Covers exposure up to 0,1 hours per event.  
 (frequent use over a year)

.  
 PC13\_n Liquid: refuelling of boats  
 Covers exposure up to 0,25 hours per event.  
 (infrequent use over a year)

### Human factors not influenced by risk management

**Potentially exposed body parts**      Palm of one hand. Unless otherwise stated.  
 PC13\_4 Liquid: Garden equipment - Refuelling : Palm of both hands.

### Other given operational conditions affecting Non-industrial exposure

**Setting**      Outdoor use. Unless otherwise stated.  
 PC13\_5 Liquid: lamp oil : Indoor/outdoor use.

### Other given operational conditions affecting Non-industrial exposure

Avoid contact with skin, eyes and clothing. Wash promptly if skin becomes contaminated. All handling should only take place in well-ventilated areas. Do not ingest. If swallowed, then seek immediate medical assistance.

### 3. Exposure estimation (Environment 1)

**Assessment method**      Used Petrorisk model.

### 3. Exposure estimation (Health 1)

**Assessment method**      Used CHESAR model.

## Exposure scenario

### Use as Intermediate - Industrial

#### Identification

<b>Product name</b>	Renewable hydrocarbons (diesel type fraction)
<b>REACH registration number</b>	01-2119450077-42-XXXX
<b>Version number</b>	2017
<b>Es reference</b>	05

#### 1. Title of exposure scenario

<b>Main title</b>	Use as Intermediate - Industrial
<b>Process scope</b>	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
<b>Main sector</b>	SU3 Industrial uses
<b>Environment</b>	
<b>Environmental release category</b>	ERC6a Use of intermediate
<b>SPERC</b>	ESVOC SPERC 6.1a.v1
<b>Worker</b>	
<b>Process category</b>	<p>PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions</p> <p>PROC3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4 Chemical production where opportunity for exposure arises</p> <p>PROC8a Transfer of substance or mixture (charging and discharging) at non-dedicated facilities</p> <p>PROC8b Transfer of substance or mixture (charging and discharging) at dedicated facilities</p> <p>PROC15 Use as laboratory reagent.</p>

#### 2. Conditions of use affecting exposure (Industrial - Environment 1)

##### Amounts used

Fraction of EU tonnage used in region: 1  
 Daily amount per site: ≤ 50 t  
 Annual amount per site: ≤ 15 000 t

##### Frequency and duration of use

Emission days: 300 days/year

##### Other given operational conditions affecting environmental exposure

<b>Emission factor - air</b>	0,002%
<b>Emission factor - water</b>	0,001%
<b>Emission factor - soil</b>	0.1%

##### Environmental factors not influenced by risk management measures

## Use as Intermediate - Industrial

**Dilution** Local freshwater dilution factor: 10  
Local marine water dilution factor: 100

### Risk management measures

**STP type** Aerobic biological treatment

**STP details** Assumed domestic sewage treatment plant flow (m<sup>3</sup>/day):  
2000.

### Conditions and measures related to external treatment of waste for disposal

**Disposal method** Dispose of waste in accordance with environmental legislation.

### Conditions and measures related to external recovery of waste

**Recovery method** Retain drain-downs in sealed storage pending disposal or for subsequent recycle.

## 2. Conditions of use affecting exposure (Workers - Health 1)

### Product characteristics

**Physical state** Liquid

**Concentration details** Covers percentage substance in the product up to 100% (unless stated differently).

### Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

### Human factors not influenced by risk management

**Potentially exposed body parts** PROC 1, PROC 3, PROC 15: Covers skin contact area up to 240 cm<sup>2</sup>. Palm of one hand.  
PROC 2, PROC 4: Covers skin contact area up to 480 cm<sup>2</sup>. Palm of both hands.  
PROC 8a, 8b: Covers skin contact area up to 960 cm<sup>2</sup>. Both hands.

### Other given operational conditions affecting workers exposure

**Setting** Indoor use.

**Temperature** ≤ 40 °C

**Ventilation rate** 1 - 3 air changes per hour Unless otherwise stated.

Assumes a good basic standard of occupational hygiene is implemented.

### Risk management measures

## Use as Intermediate - Industrial

General exposures (closed systems)  
(PROC 1)

No specific measures identified.

General exposures (closed systems)  
With sample collection  
With occasional controlled exposure  
(PROC 2)

No specific measures identified.

General exposures (closed systems)  
Batch process  
(PROC 3)

No specific measures identified.

General exposures (open systems)  
Batch process  
With sample collection  
(PROC 4)

No specific measures identified.

Sampling  
(PROC 8b)

No specific measures identified.

Laboratory activities  
(PROC 15)

Provide adequate general and local exhaust ventilation.

Wear suitable gloves tested to EN374.

Recommendation:

Handle in a fume cupboard or under extract ventilation.

Bulk transfers  
(closed systems)  
(PROC 8b)

No specific measures identified.

Equipment cleaning and maintenance  
(PROC 8a)

Provide adequate general and local exhaust ventilation.

Recommendation:

Drain down and flush system prior to equipment break-in or maintenance.

Wear suitable gloves tested to EN374.

Storage  
(PROC 1, PROC 2)

No specific measures identified.

### 3. Exposure estimation (Environment 1)

**Assessment method**                      Used Petrorisk model.

### 3. Exposure estimation (Health 1)

**Assessment method**                      Used CHESAR model.



# Technical Data Sheet

## Neste MY Renewable Diesel

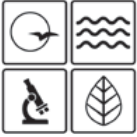
Neste Renewable Diesel is a bio-based paraffinic diesel fuel defined in ASTM D975 and EN 15940 specifications.

Properties	Unit	Neste MY Renewable Diesel		ASTM D975 Diesel limits			EN 15940 Paraffinic Diesel limits		
		min	max	min	max	Test Method	min	max	Test Method
Cetane number		70		40		ASTM D6890	70		EN 15195
Sulfur content	mg/kg		5		15	ASTM D5453		5	EN ISO 20846
Flash point	°C	61		52		ASTM D93	55		EN ISO 2719
Carbon residue (on 10% distillation residue)	%(m/m)		0.1		0.35	ASTM D4530		0.3	EN ISO 10370
Ash content	%(m/m)		0.001		0.01	ASTM D482		0.01	EN ISO 6245
Water and sediment	%(m/m)		0.02		0.05	ASTM D2709		0.02	EN ISO 12937
Copper strip corrosion (3h at 50°C)	rating	Class 1		Class 3		ASTM D130	Class 1		EN ISO 2160
Oxidation stability	g/m <sup>2</sup>		25		25	ASTM D2274		25	EN ISO 12205
Lubricity, corrected wear scar diameter (wsd 1.4) at 60°C	µm		460		520	ASTM D6079		460	EN ISO 12156-1
Viscosity at 40°C	mm <sup>2</sup> /s	2	4	1.9	4.1	ASTM D445	2	4.5	EN ISO 3104
Distillation 90% (VN) recovered at	°C	282	338	282	338	ASTM D86			
Distillation 95% (VN) recovered at	°C		360					360	EN ISO 3405
Cloud Point	°C	-20°C Winter/ -12°C Summer				ASTM D7689			EN 23015 & EN 116
Appearance		Clear and bright				Visual			Visual
Total aromatics content	%(m/m)		1.1		35	ASTM D1319		1.1	EN 12916
Conductivity	pS/m	50		25		ASTM D2624			
Total acid number	mg KOH/g								
Oxidation stability	mg KOH/g								

The supplier guarantees no FAME is added in the product.

## **APPENDIX D**

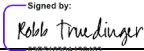
### **MDNR PERMIT APPLICATION FORMS**



MISSOURI DEPARTMENT OF NATURAL RESOURCES  
 AIR POLLUTION CONTROL PROGRAM  
**APPLICATION FOR AUTHORITY TO CONSTRUCT**

APCP USE ONLY	
CHECK NO.:	CHECK RECEIVED:
CHECK AMOUNT: \$	CHECK DATE:
PROJECT NUMBER:	

Submit applications with the filing fee that is appropriate for the project: No filing fee for an amendment; **\$250** for Sections (4), (5) and (10) Permits; **\$5,000** for Sections (7), (8) and (9) Permits; and **\$2,500** for PAL renewal. The department will assess a **\$75-per-hour** processing fee at the end of the review. **PLEASE PRINT OR TYPE**

1. INSTALLATION NAME <b>STL100</b>			
2. INSTALLATION STREET ADDRESS <b>101 Hudson Rd</b>	CITY <b>New Florence</b>	STATE <b>MO</b>	ZIP CODE <b>63363</b>
3. INSTALLATION MAILING ADDRESS <b>410 Terry Ave N</b>	CITY <b>Seattle</b>	STATE <b>WA</b>	ZIP CODE <b>98109</b>
4. COUNTY <b>Montgomery</b>	5. SECTION, TOWNSHIP, RANGE OR GPS LOCATION <b>38.901823, -91.422932°</b>		
6. FIPS COUNTY ID NUMBER <b>29139</b>	7. PLANT ID NUMBER <b>TBD</b>		
8. FINAL PRODUCT / PRINCIPAL ACTIVITY <b>Data Center</b>	9. SIC CODE <b>7374</b>		
10. OWNER/OPERATOR NAME (IF DIFFERENT) <b>Amazon Web Services, Inc.</b>			
11. OWNER/OPERATOR MAILING ADDRESS <b>410 Terry Ave N</b>	CITY <b>Seattle</b>	STATE <b>WA</b>	ZIP CODE <b>98109</b>
12. CONTACT PERSON <b>Alfred Dumauval</b>	CONTACT PERSON'S TITLE <b>Air Quality Engineer</b>		
13. CONTACT PERSON'S MAILING ADDRESS <b>410 Terry Ave N</b>	CITY <b>Seattle</b>	STATE <b>WA</b>	ZIP CODE <b>98109</b>
14. CONTACT PERSON'S TELEPHONE NUMBER WITH AREA CODE <b>(317) 829-4222</b>	15. CONTACT PERSON'S EMAIL ADDRESS <b>adumauval@amazon.com</b>		
16. UNIFIED REVIEW Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			
17. THIS APPLICATION IS FOR (CHECK THE APPROPRIATE BOX) <input checked="" type="checkbox"/> New Installation <input type="checkbox"/> Modification or Addition to an Existing Installation <input type="checkbox"/> Temporary / Pilot Plant <input type="checkbox"/> Amendment to Existing Permit: Permit No. _____			
18. PROJECTED DATE TO COMMENCE CONSTRUCTION <b>TBD</b>		19. PROJECTED DATE OF OPERATION STARTUP <b>TBD</b>	
<b>APPLICANT'S CERTIFICATION STATEMENT</b>			
I certify I have personally examined and am familiar with the information in this application and believe the information submitted is true, accurate and complete. I am aware that making a false statement or misrepresentation in this application is grounds for denying or revoking the construction permit. I may also be guilty of a misdemeanor and upon conviction, may be punished by fine or imprisonment.			
20. SIGNATURE OF RESPONSIBLE OFFICIAL Signed by: 			
21. TYPE OR PRINT NAME OF RESPONSIBLE OFFICIAL <b>Robb Truedinger</b>		22. DATE <b>April 29, 2026</b>	
23. OFFICIAL TITLE OF RESPONSIBLE OFFICIAL <b>Environmental Director</b>		24. RESPONSIBLE OFFICIAL'S TELEPHONE NUMBER WITH AREA CODE <b>(317) 829-4222</b>	

**25. OPTIONAL QUESTIONS REGARDING MILITARY SERVICE**

Pursuant to Missouri Senate Bill 912 (SB912) section 42.051, RSMo requires all state agencies to provide information to veterans regarding available services and benefits as requested.

1. Have you ever served on active duty in the Armed Forces of the United States and separated from such service under conditions other than dishonorable? Yes  No
  
2. Would you like to receive information and assistance regarding veterans benefits and services? Yes  No   
 Missouri Benefits and Resource Portal for Veterans and Military: [veteranbenefits.mo.gov](http://veteranbenefits.mo.gov), and MoDNR provided veteran's services page: [mostateparks.com/page/83631/missouri-state-parks-honors-veterans](http://mostateparks.com/page/83631/missouri-state-parks-honors-veterans)
  
3. May the agency share your contact information with the Missouri Veterans Commission to provide such information? Yes  No  (If Yes, please complete the portion below.)

MAILING ADDRESS	CITY	STATE	ZIP CODE
CONTACT PERSON	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	

**26. PROJECT DESCRIPTION AND NARRATIVE**

The applicant is proposing to build a data center facility in New Florence, Montgomery County, Missouri. This site is a greenfield facility, referred to as STL100. The project will include four hundred and seventy-six (476) 2.75 megawatt (MW) generators, four (4) 1.6 MW generators, one (1) 400 kW generator, and two (2) 250 kW generators. The diesel-fired or renewable diesel-fired emergency generators have the potential to emit air contaminants regulated under the Missouri Department of Natural Resources (MDNR) Air Pollution Control Program.

For further information please see the attached application narrative.

**Form 1.1 Emission Information for Air Construction Permit Application**  
Process Flow Diagram for the Project

INSTALLATION NAME (A.) <b>STL100</b>	FIPS COUNTY NO. (B.) <b>TBD</b>	PLANT NO. (C.) <b>TBD</b>
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For a new installation, show the entire installation. For an addition to an existing installation, show only the new processes, equipment, or emission units and begin the ID numbering where the existing emission unit numbers leave off. If the application is for a modification or an addition to an existing emission point or unit, show the upstream and downstream emit unit(s) and emission point(s) that this modification will affect.

Process Flow Diagram provided in Appendix F.



**Form 1.3 Emission Information for Air Construction Permit Application**

**Plant Layout Diagram**

INSTALLATION NAME (A) <b>STL100</b>	FIPS COUNTY NO. (B.) <b>TBD</b>	PLANT NO. (C.) <b>TBD</b>
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Use this page or a separate sheet to provide a Plant Layout Diagram. **Refer to the Permits Instruction Packet for details.**

Plant Layout Diagram provided in Appendix A.

Form 2.0 Emission Information for Air Construction Permit Application								
Emission Unit Information (duplicate this form as needed)								
INSTALLATION NAME (A.) <b>STL100</b>		FIPS COUNTY NO. (B.) <b>TBD</b>		PLANT NO. (C.) <b>TBD</b>				
UNIT IDENTIFICATION								
EMISSION UNIT NO. (D.) <b>P001-P476</b>		EMISSION UNIT DESCRIPTION (E.) <b>Group 1 Critical Generators</b>						
SOURCE CLASSIFICATION CODE (SCC) (F.) <b>20300101</b>		MAKE (G.) <b>CAT</b>		MODEL (H.) <b>3516E</b>	YEAR (I.) <b>TBD</b>			
RELEASE PARAMETERS								
EMISSION RELEASE CHARACTERISTICS (CHECK THE APPROPRIATE BOX) (J.)								
<input type="checkbox"/> STACK <input checked="" type="checkbox"/> VENT <input type="checkbox"/> FUGITIVE								
STACK OR VENT NO. (K.) <b>S001-S476</b>		HEIGHT (FT) (L.) <b>39.67</b>		DIAMETER (FT) OR WIDTH X LENGTH (IN) (M.) <b>2.00</b>				
TEMPERATURE (F) (N.) <b>762.998</b>		VELOCITY (FT/MIN) (O.) <b>1,122.05</b>		FLOW RATE (STANDARD CUBIC FT/MIN) (P.) <b>161,213</b>				
OPERATING RATE/SCHEDULE								
EXPECTED ANNUAL THROUGHPUT (Q.) <b>8,216,769</b>		UNITS (R.) <b>gal/yr</b>	MAXIMUM HOURLY DESIGN RATE (S.) <b>194</b>		UNITS/HR (T.) <b>gal/hr</b>			
EXPECTED HOURS/DAY (U.) <b>1.71</b>		EXPECTED DAYS/WEEK <b>1</b>		EXPECTED WEEKS/YEAR <b>52</b>				
AIR POLLUTION CAPTURE AND CONTROL DEVICES								
DEVICE NO. (V.)	CAPTURE DEVICE DESCRIPTION (W.)		CAPTURE DEVICE CAPTURE EFFICIENCY % (X.)					
			PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs
DPF001-DPF476	<b>Diesel Particulate Filter (DPF)</b>		<b>68.6%</b>					
DEVICE NO. (Y.)	CONTROL DEVICE DESCRIPTION (Z.)		CONTROL DEVICE DESTRUCTION/REMOVAL EFFICIENCY % (AA.)					
			PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs
SCR001-SCR476	<b>Selective Catalytic Reduction (SCR)</b>				<b>91.7%</b>			
DOC001-DOC476	<b>Diesel Oxidation Catalyst (DOC)</b>					<b>40.0%</b>	<b>69.8%</b>	
CALCULATION SECTION (BB.)								
POLLUTANT	EMISSION FACTOR	EMISSION FACTOR UNITS	OVERALL CONTROL EFFICIENCY	EMISSION RATE (LB/HR)	POTENTIAL EMISSIONS (TONS/YR)			
See Appendix B								

<b>Form 2.0 Emission Information for Air Construction Permit Application</b>								
Emission Unit Information (duplicate this form as needed)								
INSTALLATION NAME (A.)		FIPS COUNTY NO. (B.)		PLANT NO. (C.)				
STL100		TBD		TBD				
<b>UNIT IDENTIFICATION</b>								
EMISSION UNIT NO. (D.)		EMISSION UNIT DESCRIPTION (E.)						
P479-P482		Group 2 House Generators						
SOURCE CLASSIFICATION CODE (SCC) (F.)		MAKE (G.)		MODEL (H.)	YEAR (I.)			
20300101		CAT		3516C	TBD			
<b>RELEASE PARAMETERS</b>								
EMISSION RELEASE CHARACTERISTICS (CHECK THE APPROPRIATE BOX) (J.)								
<input type="checkbox"/> STACK <input type="checkbox"/> VENT <input type="checkbox"/> FUGITIVE								
STACK OR VENT NO. (K.)		HEIGHT (FT) (L.)		DIAMETER (FT) OR WIDTH X LENGTH (IN) (M.)				
S479-S482		17.08		1.17				
TEMPERATURE (F) (N.)		VELOCITY (FT/MIN) (O.)		FLOW RATE (STANDARD CUBIC FT/MIN) (P.)				
562.604		4,141.73		140,580				
<b>OPERATING RATE/SCHEDULE</b>								
EXPECTED ANNUAL THROUGHPUT (Q.)		UNITS (R.)	MAXIMUM HOURLY DESIGN RATE (S.)		UNITS/HR (T.)			
38,938		gal/yr	109.4		gal/hr			
EXPECTED HOURS/DAY (U.)		EXPECTED DAYS/WEEK		EXPECTED WEEKS/YEAR				
1.71		1		52				
<b>AIR POLLUTION CAPTURE AND CONTROL DEVICES</b>								
DEVICE NO. (V.)	CAPTURE DEVICE DESCRIPTION (W.)		CAPTURE DEVICE CAPTURE EFFICIENCY % (X.)					
			PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs
DEVICE NO. (Y.)	CONTROL DEVICE DESCRIPTION (Z.)		CONTROL DEVICE DESTRUCTION/REMOVAL EFFICIENCY % (AA.)					
			PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs
<b>CALCULATION SECTION (BB.)</b>								
POLLUTANT	EMISSION FACTOR	EMISSION FACTOR UNITS	OVERALL CONTROL EFFICIENCY	EMISSION RATE (LB/HR)	FOTENTIAL EMISSIONS (TONS/YR)			
See Appendix B								

Form 2.0 Emission Information for Air Construction Permit Application								
Emission Unit Information (duplicate this form as needed)								
INSTALLATION NAME (A.) <b>STL100</b>		FIPS COUNTY NO. (B.) <b>TBD</b>		PLANT NO. (C.) <b>TBD</b>				
UNIT IDENTIFICATION								
EMISSION UNIT NO. (D.) <b>P483</b>		EMISSION UNIT DESCRIPTION (E.) <b>Group 3 CAB Generators</b>						
SOURCE CLASSIFICATION CODE (SCC) (F.) <b>20300101</b>		MAKE (G.) <b>CAT</b>		MODEL (H.) <b>C13</b>	YEAR (I.) <b>TBD</b>			
RELEASE PARAMETERS								
EMISSION RELEASE CHARACTERISTICS (CHECK THE APPROPRIATE BOX) (J.)								
<input checked="" type="checkbox"/> STACK <input type="checkbox"/> VENT <input type="checkbox"/> FUGITIVE								
STACK OR VENT NO. (K.) <b>S483</b>		HEIGHT (FT) (L.) <b>11.0</b>		DIAMETER (FT) OR WIDTH X LENGTH (IN) (M.) <b>1.17</b>				
TEMPERATURE (F) (N.) <b>609.602</b>		VELOCITY (FT/MIN) (O.) <b>738.19</b>		FLOW RATE (STANDARD CUBIC FT/MIN) (P.) <b>23,955</b>				
OPERATING RATE/SCHEDULE								
EXPECTED ANNUAL THROUGHPUT (Q.) <b>2,491</b>		UNITS (R.) <b>gal/yr</b>	MAXIMUM HOURLY DESIGN RATE (S.) <b>28</b>		UNITS/HR (T.) <b>gal/hr</b>			
EXPECTED HOURS/DAY (U.) <b>1.71</b>		EXPECTED DAYS/WEEK <b>1</b>		EXPECTED WEEKS/YEAR <b>52</b>				
AIR POLLUTION CAPTURE AND CONTROL DEVICES								
DEVICE NO. (V.)	CAPTURE DEVICE DESCRIPTION (W.)		CAPTURE DEVICE CAPTURE EFFICIENCY % (X.)					
			PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs
DEVICE NO. (Y.)	CONTROL DEVICE DESCRIPTION (Z.)		CONTROL DEVICE DESTRUCTION/REMOVAL EFFICIENCY % (AA.)					
			PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs
CALCULATION SECTION (BB.)								
POLLUTANT	EMISSION FACTOR	EMISSION FACTOR UNITS	OVERALL CONTROL EFFICIENCY	EMISSION RATE (LB/HR)	FOTENTIAL EMISSIONS (TONS/YR)			
See Appendix B								

**Form 2.0 Emission Information for Air Construction Permit Application**  
 Emission Unit Information (duplicate this form as needed)

INSTALLATION NAME (A.) <b>STL100</b>	FIPS COUNTY NO. (B.) <b>TBD</b>	PLANT NO. (C.) <b>TBD</b>
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**UNIT IDENTIFICATION**

EMISSION UNIT NO. (D.) <b>P477-P478</b>	EMISSION UNIT DESCRIPTION (E.) <b>Group 4 ACB Generators</b>
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SOURCE CLASSIFICATION CODE (SCC) (F.) <b>20300101</b>	MAKE (G.) <b>CAT</b>	MODEL (H.) <b>C9</b>	YEAR (I.) <b>TBD</b>
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**RELEASE PARAMETERS**

EMISSION RELEASE CHARACTERISTICS (CHECK THE APPROPRIATE BOX) (J.)

STACK       VENT       FUGITIVE

STACK OR VENT NO. (K.) <b>S477-S478</b>	HEIGHT (FT) (L.) <b>11.0</b>	DIAMETER (FT) OR WIDTH X LENGTH (IN) (M.) <b>1.17</b>
--	---------------------------------	--

TEMPERATURE (F) (N.) <b>612.104</b>	VELOCITY (FT/MIN) (O.) <b>673.23</b>	FLOW RATE (STANDARD CUBIC FT/MIN) (P.) <b>21,796</b>
--	---	---

**OPERATING RATE/SCHEDULE**

EXPECTED ANNUAL THROUGHPUT (Q.) <b>3,399</b>	UNITS (R.) <b>gal/yr</b>	MAXIMUM HOURLY DESIGN RATE (S.) <b>19.1</b>	UNITS/HR (T.) <b>gal/hr</b>
---	-----------------------------	--	--------------------------------

EXPECTED HOURS/DAY (U.) <b>1.71</b>	EXPECTED DAYS/WEEK <b>1</b>	EXPECTED WEEKS/YEAR <b>52</b>
--	--------------------------------	----------------------------------

**AIR POLLUTION CAPTURE AND CONTROL DEVICES**

DEVICE NO. (V.)	CAPTURE DEVICE DESCRIPTION (W.)	CAPTURE DEVICE CAPTURE EFFICIENCY % (X.)					
		PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs

DEVICE NO. (Y.)	CONTROL DEVICE DESCRIPTION (Z.)	CONTROL DEVICE DESTRUCTION/REMOVAL EFFICIENCY % (AA.)					
		PM <sub>10</sub>	SO <sub>x</sub>	NO <sub>x</sub>	VOC	CO	HAPs

**CALCULATION SECTION (BB.)**

POLLUTANT	EMISSION FACTOR	EMISSION FACTOR UNITS	OVERALL CONTROL EFFICIENCY	EMISSION RATE (LB/HR)	POTENTIAL EMISSIONS (TONS/YR)
See Appendix B					

**Form 2.1 Emission Information for Air Construction Permit Application**  
 Fuel Combustion Information (duplicate this form as needed)

INSTALLATION NAME (A.) <b>STL100</b>	FIPS COUNTY NO. (B.) <b>TBD</b>	PLANT NO. (C.) <b>TBD</b>
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**COMBUSTION EQUIPMENT INFORMATION**

EMISSION UNIT NO. (D.) <b>P001-P476</b>	SCC (E.) <b>20300101</b>
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(F.) EQUIPMENT DESCRIPTION (MAKE/MODEL) <b>CAT 3516E</b>	(G.) YEAR PUT IN SERVICE <b>TBD</b>	(H.) MAXIMUM DESIGN RATE (MILLION BTU/HR) <b>26.77</b>
---	--	---

**FUEL INFORMATION**

(I.) FUEL TYPE

<b>Oil</b>	<b>Gas</b>	<b>Coal</b>	<b>Other</b>
<input checked="" type="checkbox"/> Distillate (Fuel Oil 1-4)	<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Anthracite	<input type="checkbox"/> Refuse
<input type="checkbox"/> Residual Fuel Oil (5-6)	<input type="checkbox"/> LPG/Propane	<input type="checkbox"/> Bituminous	<input type="checkbox"/> Trade Wastes Waste Oil
		<input type="checkbox"/> Lignite	<input checked="" type="checkbox"/> Other (specify) <b>renewable diesel</b>

FUEL (J.)	EXPECTED ANNUAL THROUGHPUT (K.)	UNITS (L.)	% SULFUR BY WEIGHT (M.)	% ASH BY WEIGHT (N.)
Ultra low sulfur/ renewable diesel	8,216,769	gal/yr	<0.0015	NA
<b>FUEL TOTALS AND WEIGHTED AVERAGES</b>				

Comments:

<b>Form 2.1 Emission Information for Air Construction Permit Application</b> Fuel Combustion Information (duplicate this form as needed)								
INSTALLATION NAME (A.) <b>STL100</b>		FIPS COUNTY NO. (B.) <b>TBD</b>	PLANT NO. (C.) <b>TBD</b>					
<b>COMBUSTION EQUIPMENT INFORMATION</b>								
EMISSION UNIT NO. (D.) <b>P479-P482</b>		SCC (E.) <b>20300101</b>						
(F.) EQUIPMENT DESCRIPTION (MAKE/MODEL) <b>CAT 3516C</b>		(G.) YEAR PUT IN SERVICE <b>TBD</b>	(H.) MAXIMUM DESIGN RATE (MILLION BTU/HR) <b>23.64</b>					
<b>FUEL INFORMATION</b>								
(I.) FUEL TYPE								
<table style="width:100%; border: none;"> <tr> <td style="width: 25%; vertical-align: top;"> <b>Oil</b>  <input checked="" type="checkbox"/> Distillate (Fuel Oil 1-4)  <input type="checkbox"/> Residual Fuel Oil (5-6)                 </td> <td style="width: 25%; vertical-align: top;"> <b>Gas</b>  <input type="checkbox"/> Natural Gas  <input type="checkbox"/> LPG/Propane                 </td> <td style="width: 25%; vertical-align: top;"> <b>Coal</b>  <input type="checkbox"/> Anthracite  <input type="checkbox"/> Bituminous  <input type="checkbox"/> Lignite                 </td> <td style="width: 25%; vertical-align: top;"> <b>Other</b>  <input type="checkbox"/> Refuse  <input type="checkbox"/> Trade Wastes Waste Oil  <input checked="" type="checkbox"/> Other (specify) <b>renewable diesel</b> </td> </tr> </table>					<b>Oil</b> <input checked="" type="checkbox"/> Distillate (Fuel Oil 1-4) <input type="checkbox"/> Residual Fuel Oil (5-6)	<b>Gas</b> <input type="checkbox"/> Natural Gas <input type="checkbox"/> LPG/Propane	<b>Coal</b> <input type="checkbox"/> Anthracite <input type="checkbox"/> Bituminous <input type="checkbox"/> Lignite	<b>Other</b> <input type="checkbox"/> Refuse <input type="checkbox"/> Trade Wastes Waste Oil <input checked="" type="checkbox"/> Other (specify) <b>renewable diesel</b>
<b>Oil</b> <input checked="" type="checkbox"/> Distillate (Fuel Oil 1-4) <input type="checkbox"/> Residual Fuel Oil (5-6)	<b>Gas</b> <input type="checkbox"/> Natural Gas <input type="checkbox"/> LPG/Propane	<b>Coal</b> <input type="checkbox"/> Anthracite <input type="checkbox"/> Bituminous <input type="checkbox"/> Lignite	<b>Other</b> <input type="checkbox"/> Refuse <input type="checkbox"/> Trade Wastes Waste Oil <input checked="" type="checkbox"/> Other (specify) <b>renewable diesel</b>					
FUEL (J.)	EXPECTED ANNUAL THROUGHPUT (K.)	UNITS (L.)	% SULFUR BY WEIGHT (M.)	% ASH BY WEIGHT (N.)				
Ultra low sulfur/ renewable diesel	<b>38,938</b>	<b>gal/yr</b>	<b>&lt;0.0015</b>	<b>NA</b>				
FUEL TOTALS AND WEIGHTED AVERAGES								
Comments:								

**Form 2.1 Emission Information for Air Construction Permit Application**  
 Fuel Combustion Information (duplicate this form as needed)

INSTALLATION NAME (A.) <b>STL100</b>	FIPS COUNTY NO. (B.) <b>TBD</b>	PLANT NO. (C.) <b>TBD</b>
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**COMBUSTION EQUIPMENT INFORMATION**

EMISSION UNIT NO. (D.) <b>P483</b>	SCC (E.) <b>20300101</b>
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(F.) EQUIPMENT DESCRIPTION (MAKE/MODEL) <b>CAT C13</b>	(G.) YEAR PUT IN SERVICE <b>TBD</b>	(H.) MAXIMUM DESIGN RATE (MILLION BTU/HR) <b>3.86</b>
---	--	--

**FUEL INFORMATION**

(I.) FUEL TYPE

<b>Oil</b>	<b>Gas</b>	<b>Coal</b>	<b>Other</b>
<input checked="" type="checkbox"/> Distillate (Fuel Oil 1-4)	<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Anthracite	<input type="checkbox"/> Refuse
<input type="checkbox"/> Residual Fuel Oil (5-6)	<input type="checkbox"/> LPG/Propane	<input type="checkbox"/> Bituminous	<input type="checkbox"/> Trade Wastes Waste Oil
		<input type="checkbox"/> Lignite	<input checked="" type="checkbox"/> Other (specify) <b>renewable diesel</b>

FUEL (J.)	EXPECTED ANNUAL THROUGHPUT (K.)	UNITS (L.)	% SULFUR BY WEIGHT (M.)	% ASH BY WEIGHT (N.)
Ultra low sulfur/renewable diesel	2,491	gal/yr	<0.0015	NA
FUEL TOTALS AND WEIGHTED AVERAGES				

Comments:

**Form 2.1 Emission Information for Air Construction Permit Application**  
 Fuel Combustion Information (duplicate this form as needed)

INSTALLATION NAME (A.) <b>STL100</b>	FIPS COUNTY NO. (B.) <b>TBD</b>	PLANT NO. (C.) <b>TBD</b>
---	------------------------------------	------------------------------

**COMBUSTION EQUIPMENT INFORMATION**

EMISSION UNIT NO. (D.) <b>P477-P478</b>	SCC (E.) <b>20300101</b>
--	-----------------------------

(F.) EQUIPMENT DESCRIPTION (MAKE/MODEL) <b>CAT C9</b>	(G.) YEAR PUT IN SERVICE <b>TBD</b>	(H.) MAXIMUM DESIGN RATE (MILLION BTU/HR) <b>2.64</b>
--	--	--

**FUEL INFORMATION**

(I.) FUEL TYPE

<b>Oil</b>	<b>Gas</b>	<b>Coal</b>	<b>Other</b>
<input checked="" type="checkbox"/> Distillate (Fuel Oil 1-4)	<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Anthracite	<input type="checkbox"/> Refuse
<input type="checkbox"/> Residual Fuel Oil (5-6)	<input type="checkbox"/> LPG/Propane	<input type="checkbox"/> Bituminous	<input type="checkbox"/> Trade Wastes Waste Oil
		<input type="checkbox"/> Lignite	<input checked="" type="checkbox"/> Other (specify) <b>renewable diesel</b>

FUEL (J.)	EXPECTED ANNUAL THROUGHPUT (K.)	UNITS (L.)	% SULFUR BY WEIGHT (M.)	% ASH BY WEIGHT (N.)
Ultra low sulfur/renewable diesel	3,399	gal/yr	<0.0015	NA
FUEL TOTALS AND WEIGHTED AVERAGES				

Comments:



## **APPENDIX E**

### **AIR DISPERSION MODELING REPORT**

Intended for

**Missouri Department of Natural Resources**

Date

**March 12, 2026**

Prepared By:

**Ramboll Americas Engineering Solutions, Inc.  
Overland Park, Kansas**

# **AIR DISPERSION MODELING REPORT**

**SECTION (6) CONSTRUCTION PERMIT**

**AMAZON STL100 SITE**

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## **APPENDICES**

### **Appendix A**

Figures

### **Appendix B**

Tables

# 1. INTRODUCTION

Amazon Data Services, Inc. (“Amazon”, “ADS”, or “the applicant”) is submitting this air dispersion modeling report to the Missouri Department of Natural Resources (MDNR) in support of the construction permit application for a data center in New Florence, Missouri. A site location map is included in **Appendix A, Figure A-1**. A detailed facility description, the quantification of emissions from facility sources, and a review of applicability to federal and state air regulations are provided in the construction permit application report.

The proposed facility will include diesel-fired emergency generators that will provide backup electricity to the facility operations in the event of a loss of power from the grid or other emergency event. As outlined in the application, the applicant is requesting a federally enforceable run-time limitation of 500 hours of annual operation for each generator. Additionally, the applicant has requested a facility-wide nitrogen oxides (NO<sub>x</sub>) emissions limitation of 99 tons per year (tpy).

As seen in Table 1, the applicant has divided the generators at the site into four groupings, based on generator power rating. The manufacturer’s specification sheets for each generator group are provided in the construction permit application report.

There will be no stationary combustion sources at the facility other than the emergency standby generators.

Table 1. Generator Groups		
Generator Group	Number of Generators	Facility ID Numbers for Generators
<p><b>Group 1</b> 2.75 MW - CAT 3516E - Tier 4 Equivalent Critical Generators</p>	476	B100_##A,B,C,M, B101_##A,B,C,M, B102_##A,B,C,M, B103_##A,B,C,M, B104_##A,B,C,M, B105_##A,B,C,M, B106_##A,B,C,M, B107_##A,B,C,M, B108_##A,B,C,M, B109_##A,B,C,M, B110_##A,B,C,M, B111_##A,B,C,M, B112_##A,B,C,M, B113_##A,B,C,M, B114_##A,B,C,M, B115_##A,B,C,M, B116_##A,B,C,M
<p><b>Group 2</b> 1.6 MW – CAT 3512C - AWB Generators</p>	4	AWB_GEN1, AWB_GEN2, AWB_GEN3, AWB_GEN4
<p><b>Group 3</b> 400 kW – CAT C13 – CAB Generator</p>	1	CAB_GEN1
<p><b>Group 4</b> 250 kW – CAT C9 - ACB Generators</p>	2	ACB_GEN1, ACB_GEN2

## 2. MDNR MODELING REQUIREMENTS

MDNR requires that emissions of regulated criteria pollutants from all new or modified sources be evaluated to determine whether those emissions exceed MDNR’s de minimis thresholds. If the emissions for a regulated pollutant exceed the de minimis threshold, an air dispersion modeling analysis is required to demonstrate that the project will not cause or contribute to an exceedance of a national ambient air quality standard (NAAQS). The analysis is performed in two phases: the significant impact analysis and the cumulative impact analysis. The purpose of the significant impact analysis is to determine whether air quality impacts from a specific project are below the significant impact level (SIL), a level that is considered trivial or de minimis in comparison to the NAAQS, thereby demonstrating that the project will not cause or contribute to an exceedance of the NAAQS without performing a cumulative impact analysis. For projects with modeled impact levels above the SIL, a full cumulative impact analysis is required which takes into consideration other existing sources at the facility, nearby sources, and background concentrations.

Additionally, air dispersion modeling for each toxic air pollutant for which the emissions exceed the screening model action level (SMAL) must be conducted. No toxic air pollutants exceeded the SMALs for this proposed project.

A comparison of the potential annual emissions from the facility to MDNR’s de minimis thresholds and the corresponding SIL levels for each pollutant are provided in **Table 2**.

Table 2. Comparison of Facility Wide Potential Emissions to MDNR De Minimis Thresholds				
Pollutant	Facility Wide Potential Emissions (tpy)	MDNR De Minimis Threshold (tpy)	Above De Minimis?	SIL (µg/m³)
Nitrogen Dioxide (NO <sub>2</sub> )	99.00 (as NO <sub>x</sub> )	40	<b>YES</b>	Annual: 1.0 1-Hour: 7.5
Carbon Monoxide (CO)	66.60	100	No	8-Hour: 500 1-Hour: 2,000
Particulate Matter Less than 10 Microns in Diameter (PM <sub>10</sub> )	8.73	15	No	24-Hour: 5.00
Particulate Matter Less than 2.5 Microns in Diameter (PM <sub>2.5</sub> )	8.73	10	No	Annual: 0.2 24-Hour: 1.2
Sulfur Dioxide (SO <sub>2</sub> )	0.86	40	No	Annual: 1.00 24-Hour: 5.0 3-Hour: 25.0 1-Hour: 7.9

Modeling is only required for pollutants with potential-to-emit (PTE) exceeding the MDNR De Minimis emission levels outlined in 10 CSR 10-6.020(3)(A). The facility-wide potential to emit of NO<sub>x</sub> exceeds the De Minimis emission levels and therefore requires modeling.

### 3. MODELING METHODOLOGY, SETTINGS, AND INPUTS

This section outlines the technical approach used in this modeling evaluation for 1-hour and annual average NO<sub>2</sub>; as well as the Figures and tables supporting this modeling evaluation and outlining the model inputs are provided in **Appendix A** and **Appendix B**, respectively.

#### 3.1 Model Selection and Settings

To estimate off-property ambient air concentrations of NO<sub>2</sub>, the applicant used the latest version (24142) of the AERMOD modeling system with Plume Rise Model Enhancements (PRIME) advanced downwash algorithms. AERMOD is the United States Environmental Protection Agency's (USEPA's) recommended air dispersion model. AERMOD is appropriate for use in estimating ground-level, short-term ambient air concentrations resulting from non-reactive buoyant emissions from sources located in simple and complex terrain.

NO<sub>2</sub> modeling was conducted using the Ambient Ratio Method version 2 (ARM2). An in-stack NO<sub>2</sub>/NO<sub>x</sub> ratio (ISR) was set to 0.1 for the diesel generators, which is representative based on EPA's ISR database.

The location of the emission sources, structures, and receptors for this modeling analysis were represented in the Universal Transverse Mercator (UTM) coordinate system using the North American Datum (NAD) 1983. Coordinates for this analysis use UTM Zone 15, consistent with MDNR requirements. The location of the proposed facility is approximately 4,305,300 meters Northing and 636,000 meters Easting.

#### 3.2 Modeled Sources and Release Parameters

This assessment included a cumulative assessment of the 1-hour and annual average NO<sub>2</sub> impacts from the facility sources (**Appendix A, Figure A-2**). The site's emission sources were modeled as point sources using manufacturer-provided and Amazon-designed stack parameters, provided in **Appendix B**. Outside source data included in this modeling analysis were provided by MDNR.

All emission estimates are based upon maximum allowable emissions and federally enforceable limits contained within the construction permit application. The diesel generator engines will be subject to federal NSPS requirements under 40 CFR 60 Subpart IIII. Each unit will be limited to 100 hours per year of operation for non-emergency usage, inclusive of testing and maintenance. Any emission limits applied to the sources are clearly described and include detailed accounts of all assumptions used in the calculation of emission estimates, including capture and control efficiency estimates. The derivation of the hourly and annualized NO<sub>x</sub> emission rates is demonstrated in **Appendix B**.

#### 3.3 Operating Hours

Testing and maintenance (T&M) on the emergency generators are necessary to ensure reliable availability of backup power in the event of loss of power. Non-emergency operation of the emergency generators is limited by federal regulations to 100 hours/year/generator. The emergency generator testing and maintenance activities will only occur during the hours of 6 am – 4 pm. These hourly limitations will be represented using the EMISFACT option in AERMOD. Hourly emission rates will be scaled to reflect the duration of each T&M event outlined below.

**Confidence Test (CT6):** Confidence tests will last 6 minutes for each generator and will be performed at 0% load (modeled at 10% load) for all units. Confidence testing will occur biweekly for each generator. NO<sub>x</sub> emissions from the Tier 4 compliant units will be uncontrolled during this test.

**Preventive Maintenance Test (PMT):** PMT will last 10 minutes for each generator and will be performed at 0% load (modeled at 10% load) for all units. The PMT will occur twice per year per generator. NOx emissions from the Tier 4 compliant units will be uncontrolled during this test.

**Annual Live Load Transfer (LLT):** Annual LLTs will last 30 minutes for each generator and will be performed at 100% load for all units. The annual LLT will occur once per year per generator. For Tier 4 compliant generators, NOx will be uncontrolled for the first 15 minutes and controlled for the remaining 15 minutes.

**Load Bank Test (LBT):** Annual LBT will last 60 minutes for each generator with varying load conditions. For Tier 4 compliant generators, NOx will be uncontrolled for the first 30 minutes and controlled for the remaining 30 minutes. Tier 2 compliant generators will be tested for 42 minutes.

### 3.4 Building Downwash

The AERMOD model incorporates Plume Rise Modeling Enhancements (PRIME) to account for downwash. The direction-specific building downwash dimensions used as inputs were determined by the latest version (04274) of the Building Profile Input Program, PRIME (BPIP PRIME). BPIP PRIME uses building downwash algorithms incorporated into AERMOD to account for the plume dispersion effects of the aerodynamic wakes and eddies produced by buildings and structures.

The applicant evaluated onsite buildings and structures at the facility for downwash effects on each modeled onsite point source. The modeled parameters for the buildings are provided in **Appendix B**.

### 3.5 Good Engineering Practice Stack Height Analysis

The USEPA has promulgated regulations that limit the maximum stack height one may use in a modeling analysis to no more than the Good Engineering Practice (GEP) stack height. The purpose of this requirement is to prevent the use of excessively tall stacks to reduce the modeled concentrations of a pollutant. GEP stack height is impacted by the heights of nearby structures. In general, the minimum value for GEP stack height is 65 meters. The stack heights for the proposed generator stacks do not exceed the GEP stack height.

### 3.6 Terrain Data and Land Use

The terrain height and hill-height scale for receptors were determined using the USGS National Elevation Dataset (NED) 1/3 arc second (approximately 10-meter resolution) data and AERMAP version 24142. Elevations for all buildings and structures were based on the final floor elevation (FFE) from the design documents.

Land use classification determines the type of area to be modeled. The different classifications, urban or rural, incorporate distinct pollutant dispersion characteristics and will affect the estimation of downwind concentrations when used in the model. Based on the land use around the facility, the urban boundary layer option in the model was not selected.

### 3.7 Meteorological Data

AERMOD requires a meteorological input file to characterize the transport and dispersion of pollutants in the atmosphere. Surface and upper air meteorological data inputs, as well as surface parameter data describing the land use and surface characteristics near the site, are processed using AERMET, the meteorological preprocessor to AERMOD. The output file generated by AERMET is the meteorological input file required by AERMOD.

The modeling analysis will use five years (2020-2024) of meteorological data as provided by MDNR's Construction Permit Modeling Unit. Initial modeling utilized surface meteorological data from Columbia Regional Airport (WBAN: 03945) and upper air data from Lincoln Airport (WBAN: 04833), processed by MDNR.

### 3.8 Receptor Grid

The approximate property boundary and fence line are illustrated in **Appendix A, Figure A-3**. Ground-level concentrations were calculated from the property boundary to 50 km using a series of nested receptor grids.

Table 3. Minimum Discrete Receptor Spacing	
Distance from Property Line	Receptor Spacing
Along fence line	25 meters
0 – 300 meters	25 meters
300 – 1,000 meters	50 meters
1,000 – 2,000 meters	100 meters
2,000 – 5,000 meters	200 meters
5,000 – 10,000 meters	500 meters
10 kilometers - 50 kilometers	1,000 meters

## 4. SUMMARY OF MODELING RESULTS

### 4.1 Significant Impact Analysis

The results of the significant impact analysis are summarized in Table 4. The significant impact analysis includes the impacts associated with the proposed project. The results of the analysis are compared to the SILs.

Table 4. Significant Impact Analysis Results					
Pollutant	Averaging Period	Significant Impact Level (ug/m <sup>3</sup> )	Form of the Standard	Modeled Impact (µg/m <sup>3</sup> )	Above SIL? (Yes/No)
NO <sub>2</sub>	Annual	1	High	1.71	Yes
	1-hour	7.5	Avg-1H	127.69 (LLT Scenario, AWB_GEN2 Source Group)	Yes

The high annual and Avg-1H 1-hour average NO<sub>2</sub> predicted concentrations for the project by itself were 1.71 µg/m<sup>3</sup> and 127.69 µg/m<sup>3</sup>, respectively. The high annual and Avg1H 1-hour average predicted concentrations are greater than the corresponding SILs, therefore, a cumulative impact analysis is required.

### 4.2 Cumulative NAAQS Analysis

The results of the NAAQS analysis have been summarized in Table 5. The modeled impact includes impacts associated with the project and applicable non-project related nearby sources. The project impact that was evaluated as part of this analysis was determined via the SIL analysis. The worst-case source group from the SIL analysis was modeled to conservatively estimate the cumulative impact on the NAAQS. A representative background concentration was then added to the modeled impact to arrive at the total modeled impact. The total modeled impact is compared to the NAAQS.

The nearby source inventories were provided by the MDNR.

Table 5. Cumulative NAAQS Analysis Results					
Pollutant	Averaging Period	NAAQS (ug/m <sup>3</sup> )	Form of the Standard	Total Modeled Impact (µg/m <sup>3</sup> )	Above NAAQS? (Yes/No)
NO <sub>2</sub>	Annual	100	High	11.27	No
	1-hour	188	Avg-8H	182.19 (CT6 Scenario, B100B Source Group)	No

The five-year average of the 1<sup>st</sup> high annual and 8<sup>th</sup> highest daily values (Avg-8H) 1-hour average NO<sub>2</sub> predicted concentrations for the total modelled impact (including background) was 11.27 µg/m<sup>3</sup> and 182.19 µg/m<sup>3</sup>, respectively. The high annual and high Avg-8H 1-hour average NO<sub>2</sub> predicted concentrations were below the NAAQS.

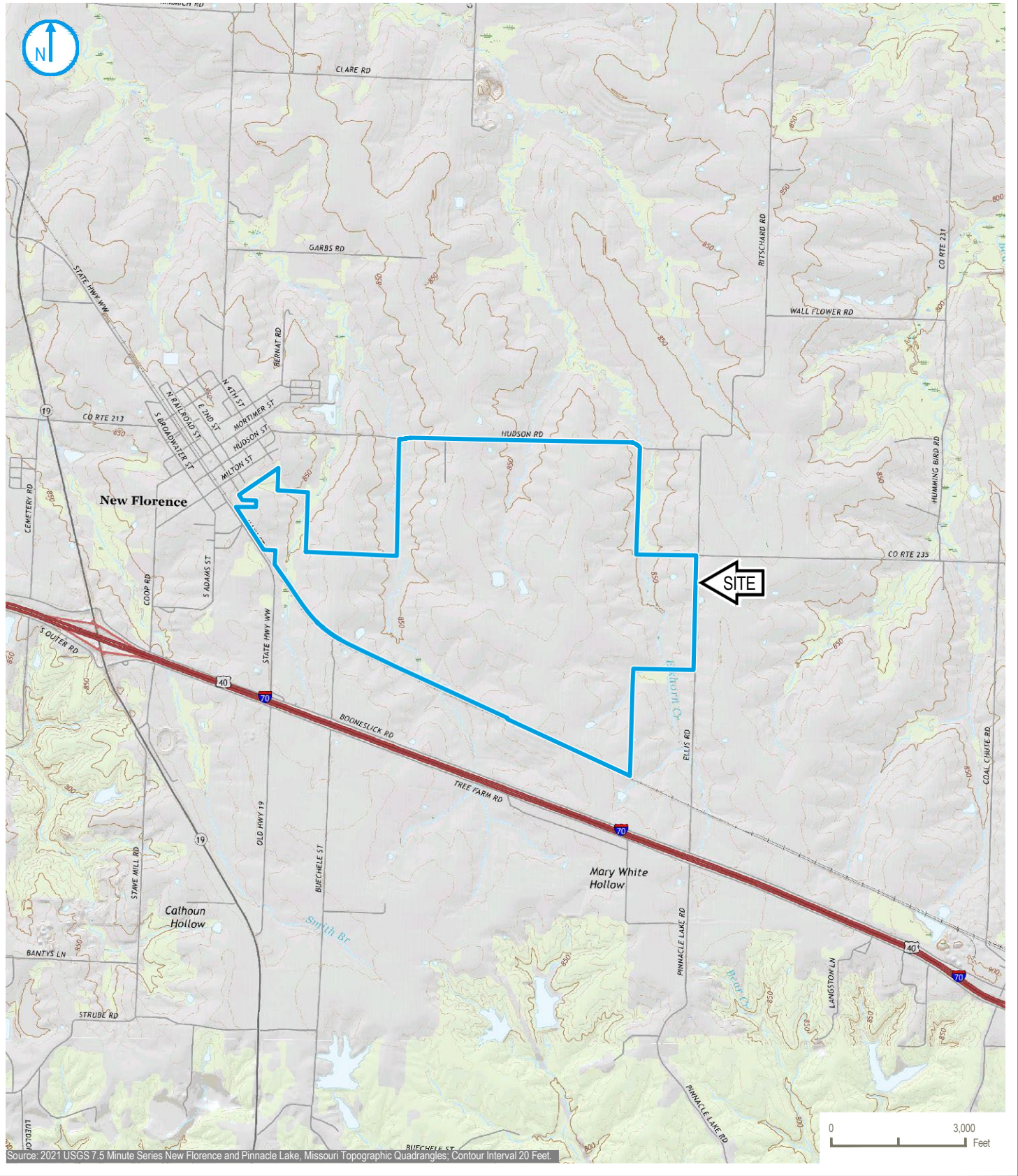
## **APPENDIX A FIGURES**

L:\Loop Project Files\CAD\194011262\_AWS\_CMH98A\_Jefferson\_Township\_OH1\_Const\_Permit01\_Site Location Map (New Florence MO).dwg

DESIGNER: CKLAI

DATED: 11/20/2025

PROJECT: 194011262



### SITE LOCATION

### FIGURE A-1

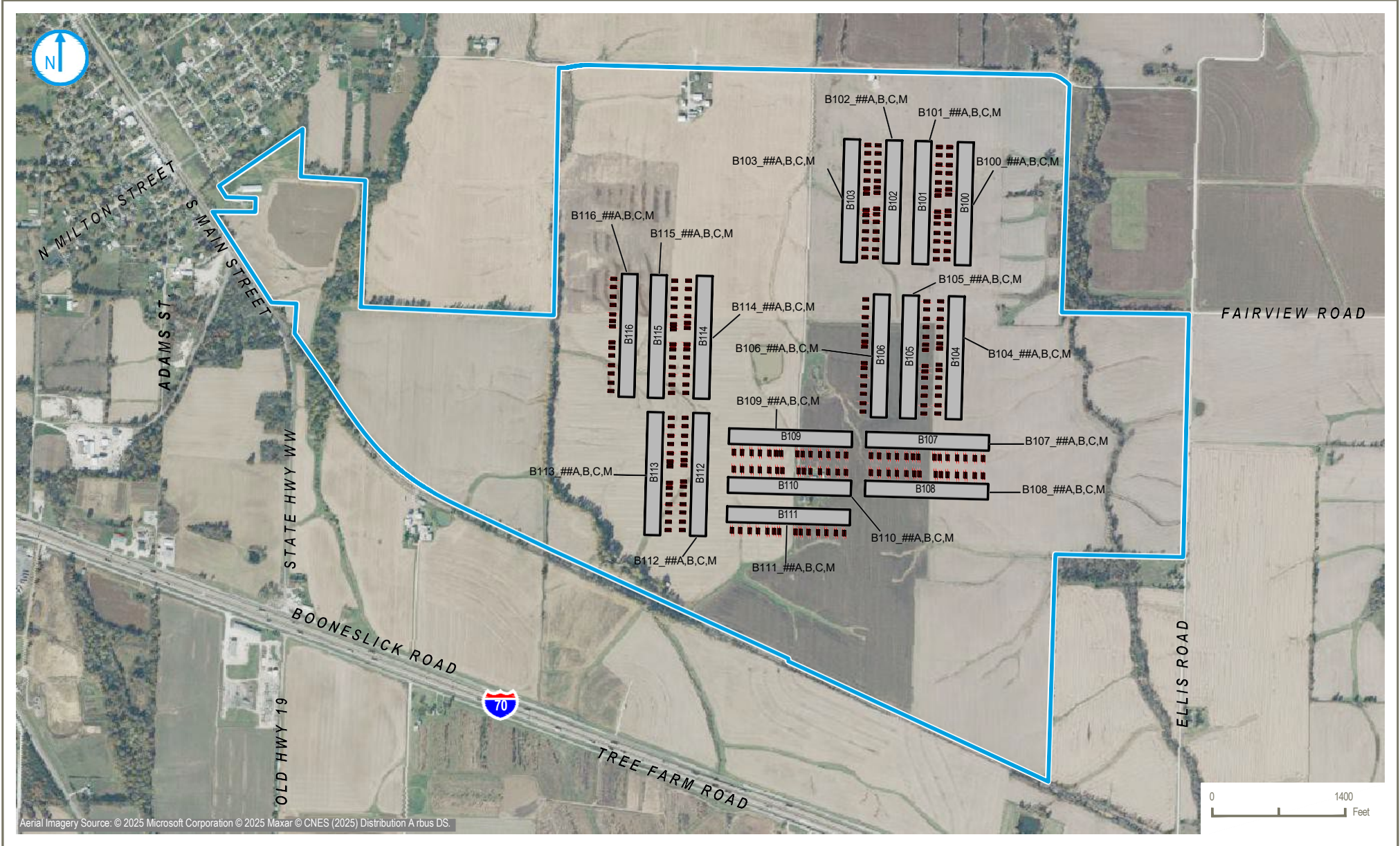


KEY MAP

STL100  
MONTGOMERY COUNTY & CITY OF NEW FLORENCE  
MISSOURI

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.  
A RAMBOLL COMPANY





- PROPERTY BOUNDARY
- BUILDING
- GENERATOR

**Note**  
All locations are approximate.

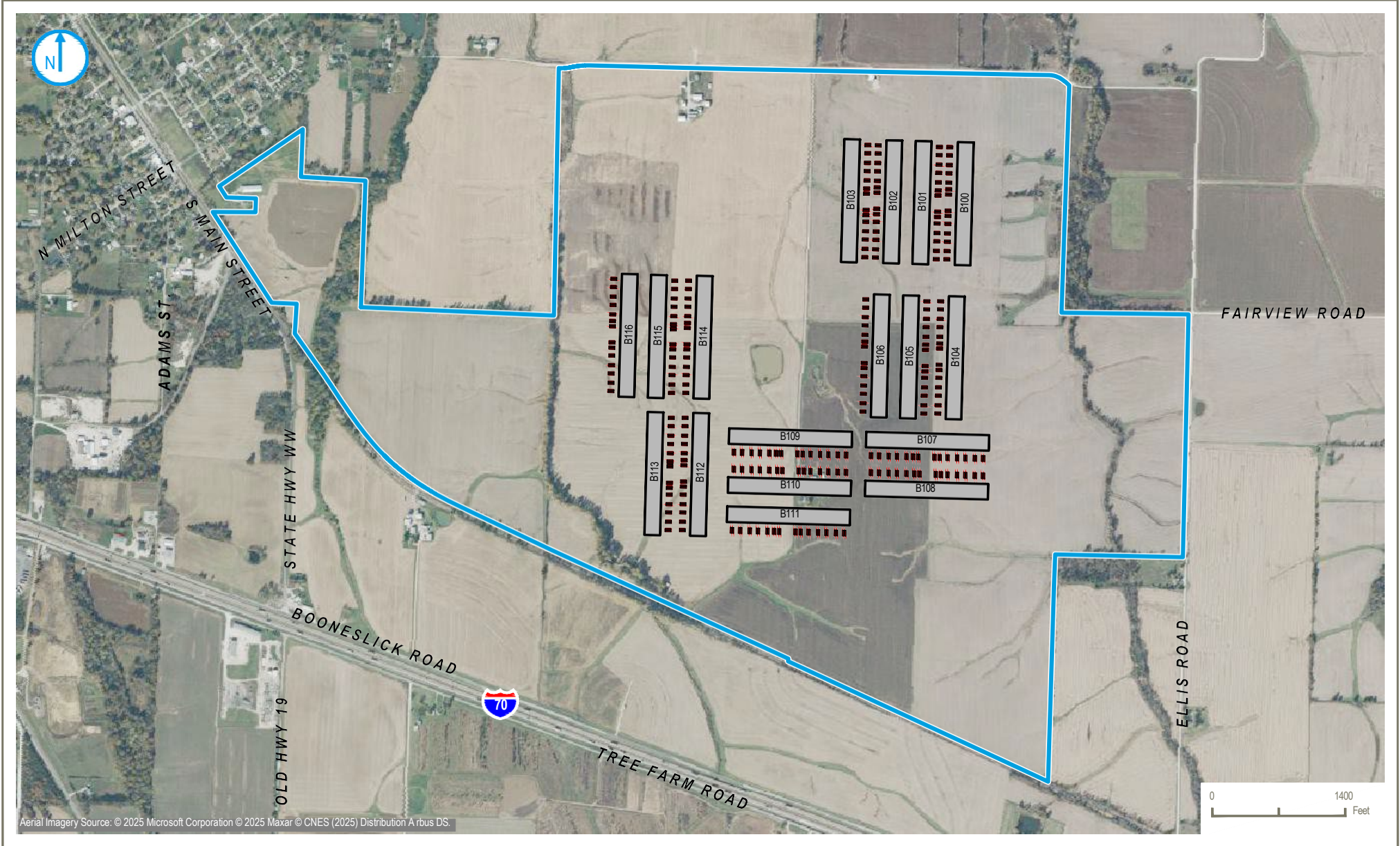
## SITE SOURCES

**STL100**  
MONTGOMERY COUNTY & CITY OF NEW FLORENCE  
MISSOURI

## FIGURE A-2

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.  
A RAMBOLL COMPANY





- PROPERTY BOUNDARY
- BUILDING
- GENERATOR

Note  
All locations are approximate.

### SITE BOUNDARY

STL100  
MONTGOMERY COUNTY & CITY OF NEW FLORENCE  
MISSOURI

FIGURE A-3

RAMBOLL AMERICAS  
ENGINEERING SOLUTIONS, INC.  
A RAMBOLL COMPANY



**APPENDIX B**  
**TABLES**

**Table B-1. Point Source Parameters, NO2, 1-Hour Average, CT6 Scenario**

Source ID	UTM Coordinates		Base Elevation (m)	NOX Emission Rate (g/s)	Stack Release Height (m)	Stack Gas Temperature (K)	Stack Gas Exit Velocity (m/s)	Inner Stack Diameter (m)
	East	North						
B100_16A	637154	4307952	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_16B	637154	4307945	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_15A	637154	4307925	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_15B	637154	4307918	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_14A	637154	4307895	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_14B	637154	4307888	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_13A	637154	4307868	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_13B	637154	4307861	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_12A	637154	4307837	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_12B	637154	4307830	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_11A	637154	4307816	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_11B	637154	4307809	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_11C	637154	4307799	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_11M	637154	4307792	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_21M	637154	4307746	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_21C	637154	4307739	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_21A	637154	4307730	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_21B	637154	4307723	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_22A	637154	4307704	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_22B	637154	4307697	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_23A	637154	4307673	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_23B	637154	4307666	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_24A	637154	4307646	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_24B	637154	4307639	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_25A	637154	4307616	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_25B	637154	4307609	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_26A	637154	4307589	264.26	1.29E+00	12.09	679.26	10.14	0.61
B100_26B	637154	4307582	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_16A	637073	4307582	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_16B	637073	4307589	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_15A	637073	4307608	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_15B	637073	4307615	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_14A	637073	4307639	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_14B	637073	4307646	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_13A	637073	4307666	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_13B	637073	4307673	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_12A	637073	4307697	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_12B	637073	4307704	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_11A	637073	4307718	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_11B	637073	4307725	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_11C	637073	4307735	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_11M	637073	4307742	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_21M	637073	4307788	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_21C	637073	4307794	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_21A	637073	4307804	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_21B	637073	4307811	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_22A	637073	4307830	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_22B	637073	4307837	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_23A	637073	4307861	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_23B	637073	4307868	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_24A	637073	4307887	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_24B	637073	4307894	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_25A	637073	4307918	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_25B	637073	4307925	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_26A	637073	4307945	264.26	1.29E+00	12.09	679.26	10.14	0.61
B101_26B	637073	4307952	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_16A	636925	4307951	264.26	1.29E+00	12.09	679.26	10.14	0.61

B102_16B	636925	4307945	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_15A	636925	4307925	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_15B	636925	4307918	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_14A	636925	4307894	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_14B	636925	4307887	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_13A	636925	4307867	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_13B	636925	4307860	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_12A	636925	4307837	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_12B	636925	4307830	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_11A	636925	4307815	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_11B	636925	4307808	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_11C	636925	4307798	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_11M	636925	4307791	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_21M	636925	4307746	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_21C	636925	4307739	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_21A	636925	4307729	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_21B	636925	4307722	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_22A	636925	4307703	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_22B	636925	4307696	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_23A	636925	4307672	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_23B	636925	4307665	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_24A	636925	4307646	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_24B	636925	4307639	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_25A	636925	4307615	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_25B	636925	4307608	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_26A	636925	4307588	264.26	1.29E+00	12.09	679.26	10.14	0.61
B102_26B	636925	4307581	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_16A	636844	4307582	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_16B	636844	4307589	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_15A	636844	4307609	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_15B	636844	4307615	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_14A	636844	4307639	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_14B	636844	4307646	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_13A	636844	4307666	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_13B	636844	4307673	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_12A	636844	4307697	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_12B	636844	4307704	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_11A	636844	4307718	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_11B	636844	4307725	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_11C	636844	4307735	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_11M	636844	4307742	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_21M	636844	4307788	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_21C	636844	4307795	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_21A	636844	4307804	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_21B	636844	4307811	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_22A	636844	4307830	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_22B	636844	4307837	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_23A	636844	4307861	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_23B	636844	4307868	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_24A	636844	4307888	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_24B	636844	4307894	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_25A	636844	4307918	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_25B	636844	4307925	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_26A	636844	4307945	264.26	1.29E+00	12.09	679.26	10.14	0.61
B103_26B	636844	4307952	264.26	1.29E+00	12.09	679.26	10.14	0.61
B104_16A	637134	4307458	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_16B	637134	4307451	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_15A	637134	4307431	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_15B	637134	4307424	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_14A	637134	4307400	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_14B	637134	4307393	267.31	1.29E+00	12.09	679.26	10.14	0.61

B104_13A	637134	4307374	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_13B	637134	4307367	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_12A	637134	4307343	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_12B	637134	4307336	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_11A	637134	4307321	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_11B	637134	4307314	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_11C	637134	4307305	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_11M	637134	4307298	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_21M	637134	4307252	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_21C	637134	4307245	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_21A	637134	4307235	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_21B	637134	4307228	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_22A	637134	4307210	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_22B	637134	4307203	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_23A	637134	4307179	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_23B	637134	4307172	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_24A	637134	4307152	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_24B	637134	4307145	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_25A	637134	4307121	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_25B	637134	4307114	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_26A	637134	4307095	267.31	1.29E+00	12.09	679.26	10.14	0.61
B104_26B	637134	4307088	267.31	1.29E+00	12.09	679.26	10.14	0.61
B105_16A	637051	4307086	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_16B	637051	4307093	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_15A	637051	4307113	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_15B	637051	4307120	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_14A	637051	4307144	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_14B	637051	4307151	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_13A	637051	4307170	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_13B	637051	4307177	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_12A	637051	4307201	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_12B	637051	4307208	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_11A	637051	4307223	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_11B	637051	4307230	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_11C	637051	4307239	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_11M	637051	4307246	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_21M	637051	4307292	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_21C	637051	4307299	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_21A	637051	4307309	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_21B	637051	4307316	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_22A	637051	4307334	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_22B	637051	4307341	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_23A	637051	4307365	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_23B	637051	4307372	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_24A	637051	4307392	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_24B	637051	4307399	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_25A	637051	4307423	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_25B	637051	4307430	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_26A	637051	4307449	267.61	1.29E+00	12.09	679.26	10.14	0.61
B105_26B	637051	4307456	267.61	1.29E+00	12.09	679.26	10.14	0.61
B106_16A	636894	4307457	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_16B	636894	4307450	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_15A	636894	4307431	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_15B	636894	4307424	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_14A	636894	4307400	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_14B	636894	4307393	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_13A	636894	4307373	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_13B	636894	4307366	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_12A	636894	4307342	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_12B	636894	4307335	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_11A	636894	4307321	267.31	1.29E+00	12.09	679.26	10.14	0.61

B106_11B	636894	4307314	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_11C	636894	4307304	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_11M	636894	4307297	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_21M	636894	4307251	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_21C	636894	4307244	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_21A	636894	4307235	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_21B	636894	4307228	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_22A	636894	4307209	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_22B	636894	4307202	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_23A	636894	4307178	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_23B	636894	4307171	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_24A	636894	4307152	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_24B	636894	4307145	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_25A	636894	4307121	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_25B	636894	4307114	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_26A	636894	4307094	267.31	1.29E+00	12.09	679.26	10.14	0.61
B106_26B	636894	4307087	267.31	1.29E+00	12.09	679.26	10.14	0.61
B107_16A	636898	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_16B	636905	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_15A	636925	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_15B	636932	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_14A	636956	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_14B	636963	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_13A	636982	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_13B	636989	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_12A	637013	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_12B	637020	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_11A	637035	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_11B	637042	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_11C	637051	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_11M	637058	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_21M	637104	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_21C	637111	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_21A	637121	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_21B	637128	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_22A	637146	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_22B	637153	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_23A	637177	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_23B	637184	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_24A	637204	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_24B	637211	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_25A	637235	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_25B	637242	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_26A	637261	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B107_26B	637268	4306970	267.61	1.29E+00	12.09	679.26	10.14	0.61
B108_16A	637270	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_16B	637263	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_15A	637243	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_15B	637236	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_14A	637212	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_14B	637205	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_13A	637186	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_13B	637179	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_12A	637155	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_12B	637148	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_11A	637133	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_11B	637126	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_11C	637116	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_11M	637109	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_21M	637064	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_21C	637057	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61

B108_21A	637047	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_21B	637040	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_22A	637021	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_22B	637014	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_23A	636991	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_23B	636984	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_24A	636964	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_24B	636957	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_25A	636933	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_25B	636926	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_26A	636907	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B108_26B	636900	4306878	267.00	1.29E+00	12.09	679.26	10.14	0.61
B109_16A	636459	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_16B	636466	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_15A	636485	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_15B	636492	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_14A	636516	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_14B	636523	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_13A	636543	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_13B	636550	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_12A	636574	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_12B	636581	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_11A	636595	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_11B	636602	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_11C	636612	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_11M	636619	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_21M	636665	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_21C	636671	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_21A	636681	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_21B	636688	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_22A	636707	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_22B	636714	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_23A	636738	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_23B	636745	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_24A	636764	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_24B	636771	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_25A	636795	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_25B	636802	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_26A	636822	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B109_26B	636829	4306969	267.61	1.29E+00	12.09	679.26	10.14	0.61
B110_16A	636830	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_16B	636823	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_15A	636803	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_15B	636796	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_14A	636772	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_14B	636765	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_13A	636746	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_13B	636739	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_12A	636715	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_12B	636708	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_11A	636693	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_11B	636686	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_11C	636676	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_11M	636669	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_21M	636624	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_21C	636617	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_21A	636607	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_21B	636600	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_22A	636581	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_22B	636575	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_23A	636551	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61

B110_23B	636544	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_24A	636524	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_24B	636517	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_25A	636493	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_25B	636486	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_26A	636467	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B110_26B	636460	4306876	267.00	1.29E+00	12.09	679.26	10.14	0.61
B111_16A	636459	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_16B	636466	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_15A	636486	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_15B	636493	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_14A	636517	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_14B	636524	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_13A	636543	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_13B	636550	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_12A	636574	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_12B	636581	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_11A	636596	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_11B	636603	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_11C	636612	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_11M	636619	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_21M	636665	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_21C	636672	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_21A	636682	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_21B	636689	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_22A	636707	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_22B	636714	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_23A	636738	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_23B	636745	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_24A	636765	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_24B	636772	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_25A	636796	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_25B	636803	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_26A	636822	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B111_26B	636829	4306720	266.70	1.29E+00	12.09	679.26	10.14	0.61
B112_16A	636324	4307060	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_16B	636324	4307053	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_15A	636324	4307033	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_15B	636324	4307026	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_14A	636324	4307003	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_14B	636324	4306996	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_13A	636324	4306976	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_13B	636324	4306969	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_12A	636324	4306945	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_12B	636324	4306938	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_11A	636324	4306924	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_11B	636324	4306917	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_11C	636324	4306907	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_11M	636324	4306900	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_21M	636324	4306854	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_21C	636324	4306847	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_21A	636324	4306838	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_21B	636324	4306831	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_22A	636324	4306812	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_22B	636324	4306805	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_23A	636324	4306781	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_23B	636324	4306774	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_24A	636324	4306754	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_24B	636324	4306747	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_25A	636324	4306724	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_25B	636324	4306717	267.00	1.29E+00	12.09	679.26	10.14	0.61

B112_26A	636324	4306697	267.00	1.29E+00	12.09	679.26	10.14	0.61
B112_26B	636324	4306690	267.00	1.29E+00	12.09	679.26	10.14	0.61
B113_16A	636242	4306690	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_16B	636242	4306697	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_15A	636242	4306717	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_15B	636242	4306724	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_14A	636242	4306748	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_14B	636242	4306755	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_13A	636242	4306774	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_13B	636242	4306781	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_12A	636242	4306805	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_12B	636242	4306812	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_11A	636242	4306827	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_11B	636242	4306834	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_11C	636242	4306844	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_11M	636242	4306850	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_21M	636242	4306896	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_21C	636242	4306903	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_21A	636242	4306913	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_21B	636242	4306920	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_22A	636242	4306939	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_22B	636242	4306945	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_23A	636242	4306969	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_23B	636242	4306976	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_24A	636242	4306996	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_24B	636242	4307003	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_25A	636242	4307027	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_25B	636242	4307034	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_26A	636242	4307053	266.40	1.29E+00	12.09	679.26	10.14	0.61
B113_26B	636242	4307060	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_16A	636323	4307501	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_16B	636323	4307494	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_15A	636323	4307474	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_15B	636323	4307467	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_14A	636323	4307443	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_14B	636323	4307437	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_13A	636323	4307417	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_13B	636323	4307410	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_12A	636323	4307386	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_12B	636323	4307379	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_11A	636323	4307364	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_11B	636323	4307357	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_11C	636323	4307348	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_11M	636323	4307341	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_21M	636323	4307295	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_21C	636323	4307288	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_21A	636323	4307279	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_21B	636323	4307272	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_22A	636323	4307253	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_22B	636323	4307246	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_23A	636323	4307222	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_23B	636323	4307215	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_24A	636323	4307195	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_24B	636323	4307188	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_25A	636323	4307165	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_25B	636323	4307158	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_26A	636323	4307138	266.40	1.29E+00	12.09	679.26	10.14	0.61
B114_26B	636323	4307131	266.40	1.29E+00	12.09	679.26	10.14	0.61
B115_16A	636240	4307130	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_16B	636240	4307137	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_15A	636240	4307157	265.79	1.29E+00	12.09	679.26	10.14	0.61

B115_15B	636240	4307164	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_14A	636240	4307187	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_14B	636240	4307194	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_13A	636240	4307214	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_13B	636240	4307221	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_12A	636240	4307245	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_12B	636240	4307252	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_11A	636240	4307267	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_11B	636240	4307273	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_11C	636240	4307283	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_11M	636240	4307290	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_21M	636240	4307336	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_21C	636240	4307343	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_21A	636240	4307352	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_21B	636240	4307359	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_22A	636240	4307378	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_22B	636240	4307385	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_23A	636240	4307409	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_23B	636240	4307416	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_24A	636240	4307436	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_24B	636240	4307443	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_25A	636240	4307466	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_25B	636240	4307473	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_26A	636240	4307493	265.79	1.29E+00	12.09	679.26	10.14	0.61
B115_26B	636240	4307500	265.79	1.29E+00	12.09	679.26	10.14	0.61
B116_16A	636146	4307130	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_16B	636146	4307137	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_15A	636146	4307157	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_15B	636146	4307164	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_14A	636146	4307188	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_14B	636146	4307195	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_13A	636146	4307214	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_13B	636146	4307221	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_12A	636146	4307245	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_12B	636146	4307252	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_11A	636146	4307267	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_11B	636146	4307274	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_11C	636146	4307283	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_11M	636146	4307290	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_21M	636146	4307336	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_21C	636146	4307343	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_21A	636146	4307353	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_21B	636146	4307359	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_22A	636146	4307378	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_22B	636146	4307385	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_23A	636146	4307409	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_23B	636146	4307416	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_24A	636146	4307436	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_24B	636146	4307443	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_25A	636146	4307467	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_25B	636146	4307474	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_26A	636146	4307493	265.48	1.29E+00	12.09	679.26	10.14	0.61
B116_26B	636146	4307500	265.48	1.29E+00	12.09	679.26	10.14	0.61
ACB_GEN1	637116	4308073	262.33	6.17E-02	3.35	595.43	3.42	0.36
ACB_GEN2	637476	4306953	267.61	6.17E-02	3.35	595.43	3.42	0.36
AWB_GEN1	637277	4307667	264.57	5.70E-01	5.21	571.54	17.34	0.36
AWB_GEN2	637287	4307667	264.57	5.70E-01	5.21	571.54	17.34	0.36
AWB_GEN3	637258	4307091	267.31	5.70E-01	5.21	571.54	17.34	0.36
AWB_GEN4	637258	4307100	267.31	5.70E-01	5.21	571.54	17.34	0.36
CAB_GEN1	637307	4307242	267.31	1.03E-01	3.35	594.04	3.75	0.36

**Table B-2. Point Source Parameters, NO<sub>2</sub>, 1-Hour Average, PMT Scenario**

Source ID	UTM Coordinates		Base Elevation (m)	NOX Emission Rate (g/s)	Stack Release Height (m)	Stack Gas Temperature (K)	Stack Gas Exit Velocity (m/s)	Inner Stack Diameter (m)
	East	North						
B100_16A	637154	4307952	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_16B	637154	4307945	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_15A	637154	4307925	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_15B	637154	4307918	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_14A	637154	4307895	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_14B	637154	4307888	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_13A	637154	4307868	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_13B	637154	4307861	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_12A	637154	4307837	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_12B	637154	4307830	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_11A	637154	4307816	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_11B	637154	4307809	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_11C	637154	4307799	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_11M	637154	4307792	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_21M	637154	4307746	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_21C	637154	4307739	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_21A	637154	4307730	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_21B	637154	4307723	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_22A	637154	4307704	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_22B	637154	4307697	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_23A	637154	4307673	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_23B	637154	4307666	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_24A	637154	4307646	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_24B	637154	4307639	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_25A	637154	4307616	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_25B	637154	4307609	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_26A	637154	4307589	264.26	3.88E+00	12.09	679.26	10.14	0.61
B100_26B	637154	4307582	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_16A	637073	4307582	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_16B	637073	4307589	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_15A	637073	4307608	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_15B	637073	4307615	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_14A	637073	4307639	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_14B	637073	4307646	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_13A	637073	4307666	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_13B	637073	4307673	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_12A	637073	4307697	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_12B	637073	4307704	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_11A	637073	4307718	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_11B	637073	4307725	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_11C	637073	4307735	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_11M	637073	4307742	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_21M	637073	4307788	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_21C	637073	4307794	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_21A	637073	4307804	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_21B	637073	4307811	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_22A	637073	4307830	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_22B	637073	4307837	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_23A	637073	4307861	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_23B	637073	4307868	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_24A	637073	4307887	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_24B	637073	4307894	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_25A	637073	4307918	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_25B	637073	4307925	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_26A	637073	4307945	264.26	3.88E+00	12.09	679.26	10.14	0.61
B101_26B	637073	4307952	264.26	3.88E+00	12.09	679.26	10.14	0.61

B102_16A	636925	4307951	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_16B	636925	4307945	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_15A	636925	4307925	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_15B	636925	4307918	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_14A	636925	4307894	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_14B	636925	4307887	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_13A	636925	4307867	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_13B	636925	4307860	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_12A	636925	4307837	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_12B	636925	4307830	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_11A	636925	4307815	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_11B	636925	4307808	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_11C	636925	4307798	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_11M	636925	4307791	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_21M	636925	4307746	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_21C	636925	4307739	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_21A	636925	4307729	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_21B	636925	4307722	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_22A	636925	4307703	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_22B	636925	4307696	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_23A	636925	4307672	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_23B	636925	4307665	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_24A	636925	4307646	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_24B	636925	4307639	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_25A	636925	4307615	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_25B	636925	4307608	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_26A	636925	4307588	264.26	3.88E+00	12.09	679.26	10.14	0.61
B102_26B	636925	4307581	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_16A	636844	4307582	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_16B	636844	4307589	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_15A	636844	4307609	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_15B	636844	4307615	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_14A	636844	4307639	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_14B	636844	4307646	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_13A	636844	4307666	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_13B	636844	4307673	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_12A	636844	4307697	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_12B	636844	4307704	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_11A	636844	4307718	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_11B	636844	4307725	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_11C	636844	4307735	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_11M	636844	4307742	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_21M	636844	4307788	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_21C	636844	4307795	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_21A	636844	4307804	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_21B	636844	4307811	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_22A	636844	4307830	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_22B	636844	4307837	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_23A	636844	4307861	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_23B	636844	4307868	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_24A	636844	4307888	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_24B	636844	4307894	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_25A	636844	4307918	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_25B	636844	4307925	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_26A	636844	4307945	264.26	3.88E+00	12.09	679.26	10.14	0.61
B103_26B	636844	4307952	264.26	3.88E+00	12.09	679.26	10.14	0.61
B104_16A	637134	4307458	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_16B	637134	4307451	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_15A	637134	4307431	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_15B	637134	4307424	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_14A	637134	4307400	267.31	3.88E+00	12.09	679.26	10.14	0.61

B104_14B	637134	4307393	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_13A	637134	4307374	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_13B	637134	4307367	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_12A	637134	4307343	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_12B	637134	4307336	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_11A	637134	4307321	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_11B	637134	4307314	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_11C	637134	4307305	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_11M	637134	4307298	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_21M	637134	4307252	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_21C	637134	4307245	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_21A	637134	4307235	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_21B	637134	4307228	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_22A	637134	4307210	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_22B	637134	4307203	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_23A	637134	4307179	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_23B	637134	4307172	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_24A	637134	4307152	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_24B	637134	4307145	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_25A	637134	4307121	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_25B	637134	4307114	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_26A	637134	4307095	267.31	3.88E+00	12.09	679.26	10.14	0.61
B104_26B	637134	4307088	267.31	3.88E+00	12.09	679.26	10.14	0.61
B105_16A	637051	4307086	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_16B	637051	4307093	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_15A	637051	4307113	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_15B	637051	4307120	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_14A	637051	4307144	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_14B	637051	4307151	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_13A	637051	4307170	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_13B	637051	4307177	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_12A	637051	4307201	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_12B	637051	4307208	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_11A	637051	4307223	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_11B	637051	4307230	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_11C	637051	4307239	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_11M	637051	4307246	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_21M	637051	4307292	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_21C	637051	4307299	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_21A	637051	4307309	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_21B	637051	4307316	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_22A	637051	4307334	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_22B	637051	4307341	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_23A	637051	4307365	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_23B	637051	4307372	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_24A	637051	4307392	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_24B	637051	4307399	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_25A	637051	4307423	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_25B	637051	4307430	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_26A	637051	4307449	267.61	3.88E+00	12.09	679.26	10.14	0.61
B105_26B	637051	4307456	267.61	3.88E+00	12.09	679.26	10.14	0.61
B106_16A	636894	4307457	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_16B	636894	4307450	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_15A	636894	4307431	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_15B	636894	4307424	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_14A	636894	4307400	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_14B	636894	4307393	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_13A	636894	4307373	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_13B	636894	4307366	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_12A	636894	4307342	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_12B	636894	4307335	267.31	3.88E+00	12.09	679.26	10.14	0.61

B106_11A	636894	4307321	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_11B	636894	4307314	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_11C	636894	4307304	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_11M	636894	4307297	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_21M	636894	4307251	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_21C	636894	4307244	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_21A	636894	4307235	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_21B	636894	4307228	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_22A	636894	4307209	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_22B	636894	4307202	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_23A	636894	4307178	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_23B	636894	4307171	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_24A	636894	4307152	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_24B	636894	4307145	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_25A	636894	4307121	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_25B	636894	4307114	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_26A	636894	4307094	267.31	3.88E+00	12.09	679.26	10.14	0.61
B106_26B	636894	4307087	267.31	3.88E+00	12.09	679.26	10.14	0.61
B107_16A	636898	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_16B	636905	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_15A	636925	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_15B	636932	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_14A	636956	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_14B	636963	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_13A	636982	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_13B	636989	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_12A	637013	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_12B	637020	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_11A	637035	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_11B	637042	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_11C	637051	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_11M	637058	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_21M	637104	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_21C	637111	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_21A	637121	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_21B	637128	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_22A	637146	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_22B	637153	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_23A	637177	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_23B	637184	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_24A	637204	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_24B	637211	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_25A	637235	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_25B	637242	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_26A	637261	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B107_26B	637268	4306970	267.61	3.88E+00	12.09	679.26	10.14	0.61
B108_16A	637270	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_16B	637263	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_15A	637243	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_15B	637236	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_14A	637212	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_14B	637205	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_13A	637186	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_13B	637179	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_12A	637155	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_12B	637148	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_11A	637133	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_11B	637126	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_11C	637116	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_11M	637109	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_21M	637064	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61

B108_21C	637057	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_21A	637047	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_21B	637040	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_22A	637021	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_22B	637014	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_23A	636991	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_23B	636984	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_24A	636964	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_24B	636957	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_25A	636933	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_25B	636926	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_26A	636907	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B108_26B	636900	4306878	267.00	3.88E+00	12.09	679.26	10.14	0.61
B109_16A	636459	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_16B	636466	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_15A	636485	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_15B	636492	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_14A	636516	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_14B	636523	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_13A	636543	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_13B	636550	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_12A	636574	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_12B	636581	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_11A	636595	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_11B	636602	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_11C	636612	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_11M	636619	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_21M	636665	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_21C	636671	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_21A	636681	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_21B	636688	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_22A	636707	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_22B	636714	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_23A	636738	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_23B	636745	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_24A	636764	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_24B	636771	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_25A	636795	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_25B	636802	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_26A	636822	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B109_26B	636829	4306969	267.61	3.88E+00	12.09	679.26	10.14	0.61
B110_16A	636830	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_16B	636823	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_15A	636803	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_15B	636796	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_14A	636772	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_14B	636765	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_13A	636746	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_13B	636739	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_12A	636715	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_12B	636708	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_11A	636693	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_11B	636686	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_11C	636676	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_11M	636669	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_21M	636624	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_21C	636617	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_21A	636607	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_21B	636600	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_22A	636581	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_22B	636575	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61

B110_23A	636551	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_23B	636544	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_24A	636524	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_24B	636517	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_25A	636493	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_25B	636486	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_26A	636467	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B110_26B	636460	4306876	267.00	3.88E+00	12.09	679.26	10.14	0.61
B111_16A	636459	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_16B	636466	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_15A	636486	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_15B	636493	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_14A	636517	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_14B	636524	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_13A	636543	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_13B	636550	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_12A	636574	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_12B	636581	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_11A	636596	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_11B	636603	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_11C	636612	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_11M	636619	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_21M	636665	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_21C	636672	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_21A	636682	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_21B	636689	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_22A	636707	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_22B	636714	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_23A	636738	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_23B	636745	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_24A	636765	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_24B	636772	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_25A	636796	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_25B	636803	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_26A	636822	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B111_26B	636829	4306720	266.70	3.88E+00	12.09	679.26	10.14	0.61
B112_16A	636324	4307060	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_16B	636324	4307053	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_15A	636324	4307033	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_15B	636324	4307026	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_14A	636324	4307003	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_14B	636324	4306996	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_13A	636324	4306976	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_13B	636324	4306969	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_12A	636324	4306945	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_12B	636324	4306938	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_11A	636324	4306924	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_11B	636324	4306917	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_11C	636324	4306907	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_11M	636324	4306900	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_21M	636324	4306854	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_21C	636324	4306847	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_21A	636324	4306838	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_21B	636324	4306831	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_22A	636324	4306812	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_22B	636324	4306805	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_23A	636324	4306781	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_23B	636324	4306774	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_24A	636324	4306754	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_24B	636324	4306747	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_25A	636324	4306724	267.00	3.88E+00	12.09	679.26	10.14	0.61

B112_25B	636324	4306717	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_26A	636324	4306697	267.00	3.88E+00	12.09	679.26	10.14	0.61
B112_26B	636324	4306690	267.00	3.88E+00	12.09	679.26	10.14	0.61
B113_16A	636242	4306690	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_16B	636242	4306697	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_15A	636242	4306717	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_15B	636242	4306724	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_14A	636242	4306748	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_14B	636242	4306755	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_13A	636242	4306774	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_13B	636242	4306781	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_12A	636242	4306805	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_12B	636242	4306812	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_11A	636242	4306827	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_11B	636242	4306834	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_11C	636242	4306844	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_11M	636242	4306850	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_21M	636242	4306896	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_21C	636242	4306903	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_21A	636242	4306913	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_21B	636242	4306920	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_22A	636242	4306939	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_22B	636242	4306945	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_23A	636242	4306969	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_23B	636242	4306976	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_24A	636242	4306996	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_24B	636242	4307003	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_25A	636242	4307027	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_25B	636242	4307034	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_26A	636242	4307053	266.40	3.88E+00	12.09	679.26	10.14	0.61
B113_26B	636242	4307060	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_16A	636323	4307501	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_16B	636323	4307494	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_15A	636323	4307474	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_15B	636323	4307467	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_14A	636323	4307443	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_14B	636323	4307437	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_13A	636323	4307417	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_13B	636323	4307410	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_12A	636323	4307386	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_12B	636323	4307379	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_11A	636323	4307364	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_11B	636323	4307357	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_11C	636323	4307348	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_11M	636323	4307341	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_21M	636323	4307295	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_21C	636323	4307288	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_21A	636323	4307279	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_21B	636323	4307272	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_22A	636323	4307253	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_22B	636323	4307246	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_23A	636323	4307222	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_23B	636323	4307215	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_24A	636323	4307195	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_24B	636323	4307188	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_25A	636323	4307165	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_25B	636323	4307158	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_26A	636323	4307138	266.40	3.88E+00	12.09	679.26	10.14	0.61
B114_26B	636323	4307131	266.40	3.88E+00	12.09	679.26	10.14	0.61
B115_16A	636240	4307130	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_16B	636240	4307137	265.79	3.88E+00	12.09	679.26	10.14	0.61

B115_15A	636240	4307157	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_15B	636240	4307164	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_14A	636240	4307187	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_14B	636240	4307194	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_13A	636240	4307214	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_13B	636240	4307221	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_12A	636240	4307245	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_12B	636240	4307252	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_11A	636240	4307267	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_11B	636240	4307273	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_11C	636240	4307283	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_11M	636240	4307290	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_21M	636240	4307336	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_21C	636240	4307343	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_21A	636240	4307352	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_21B	636240	4307359	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_22A	636240	4307378	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_22B	636240	4307385	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_23A	636240	4307409	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_23B	636240	4307416	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_24A	636240	4307436	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_24B	636240	4307443	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_25A	636240	4307466	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_25B	636240	4307473	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_26A	636240	4307493	265.79	3.88E+00	12.09	679.26	10.14	0.61
B115_26B	636240	4307500	265.79	3.88E+00	12.09	679.26	10.14	0.61
B116_16A	636146	4307130	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_16B	636146	4307137	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_15A	636146	4307157	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_15B	636146	4307164	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_14A	636146	4307188	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_14B	636146	4307195	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_13A	636146	4307214	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_13B	636146	4307221	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_12A	636146	4307245	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_12B	636146	4307252	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_11A	636146	4307267	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_11B	636146	4307274	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_11C	636146	4307283	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_11M	636146	4307290	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_21M	636146	4307336	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_21C	636146	4307343	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_21A	636146	4307353	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_21B	636146	4307359	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_22A	636146	4307378	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_22B	636146	4307385	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_23A	636146	4307409	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_23B	636146	4307416	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_24A	636146	4307436	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_24B	636146	4307443	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_25A	636146	4307467	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_25B	636146	4307474	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_26A	636146	4307493	265.48	3.88E+00	12.09	679.26	10.14	0.61
B116_26B	636146	4307500	265.48	3.88E+00	12.09	679.26	10.14	0.61
ACB_GEN1	637116	4308073	262.33	6.17E-02	3.35	595.43	3.42	0.36
ACB_GEN2	637476	4306953	267.61	6.17E-02	3.35	595.43	3.42	0.36
AWB_GEN1	637277	4307667	264.57	5.70E-01	5.21	571.54	17.34	0.36
AWB_GEN2	637287	4307667	264.57	5.70E-01	5.21	571.54	17.34	0.36
AWB_GEN3	637258	4307091	267.31	5.70E-01	5.21	571.54	17.34	0.36
AWB_GEN4	637258	4307100	267.31	5.70E-01	5.21	571.54	17.34	0.36
CAB_GEN1	637307	4307242	267.31	1.03E-01	3.35	594.04	3.75	0.36

**Table B-3. Point Source Parameters, NO<sub>2</sub>, 1-Hour Average, LLT Scenario**

Source ID	UTM Coordinates		Base Elevation (m)	NOX Emission Rate (g/s)	Stack Release Height (m)	Stack Gas Temperature (K)	Stack Gas Exit Velocity (m/s)	Inner Stack Diameter (m)
	East	North						
B100_16A	637154	4307952	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_16B	637154	4307945	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_15A	637154	4307925	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_15B	637154	4307918	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_14A	637154	4307895	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_14B	637154	4307888	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_13A	637154	4307868	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_13B	637154	4307861	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_12A	637154	4307837	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_12B	637154	4307830	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_11A	637154	4307816	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_11B	637154	4307809	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_11C	637154	4307799	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_11M	637154	4307792	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_21M	637154	4307746	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_21C	637154	4307739	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_21A	637154	4307730	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_21B	637154	4307723	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_22A	637154	4307704	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_22B	637154	4307697	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_23A	637154	4307673	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_23B	637154	4307666	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_24A	637154	4307646	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_24B	637154	4307639	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_25A	637154	4307616	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_25B	637154	4307609	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_26A	637154	4307589	264.26	3.61E+00	12.09	766.09	35.71	0.61
B100_26B	637154	4307582	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_16A	637073	4307582	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_16B	637073	4307589	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_15A	637073	4307608	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_15B	637073	4307615	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_14A	637073	4307639	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_14B	637073	4307646	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_13A	637073	4307666	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_13B	637073	4307673	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_12A	637073	4307697	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_12B	637073	4307704	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_11A	637073	4307718	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_11B	637073	4307725	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_11C	637073	4307735	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_11M	637073	4307742	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_21M	637073	4307788	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_21C	637073	4307794	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_21A	637073	4307804	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_21B	637073	4307811	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_22A	637073	4307830	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_22B	637073	4307837	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_23A	637073	4307861	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_23B	637073	4307868	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_24A	637073	4307887	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_24B	637073	4307894	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_25A	637073	4307918	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_25B	637073	4307925	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_26A	637073	4307945	264.26	3.61E+00	12.09	766.09	35.71	0.61
B101_26B	637073	4307952	264.26	3.61E+00	12.09	766.09	35.71	0.61

B102_16A	636925	4307951	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_16B	636925	4307945	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_15A	636925	4307925	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_15B	636925	4307918	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_14A	636925	4307894	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_14B	636925	4307887	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_13A	636925	4307867	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_13B	636925	4307860	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_12A	636925	4307837	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_12B	636925	4307830	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_11A	636925	4307815	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_11B	636925	4307808	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_11C	636925	4307798	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_11M	636925	4307791	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_21M	636925	4307746	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_21C	636925	4307739	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_21A	636925	4307729	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_21B	636925	4307722	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_22A	636925	4307703	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_22B	636925	4307696	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_23A	636925	4307672	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_23B	636925	4307665	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_24A	636925	4307646	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_24B	636925	4307639	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_25A	636925	4307615	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_25B	636925	4307608	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_26A	636925	4307588	264.26	3.61E+00	12.09	766.09	35.71	0.61
B102_26B	636925	4307581	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_16A	636844	4307582	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_16B	636844	4307589	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_15A	636844	4307609	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_15B	636844	4307615	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_14A	636844	4307639	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_14B	636844	4307646	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_13A	636844	4307666	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_13B	636844	4307673	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_12A	636844	4307697	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_12B	636844	4307704	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_11A	636844	4307718	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_11B	636844	4307725	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_11C	636844	4307735	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_11M	636844	4307742	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_21M	636844	4307788	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_21C	636844	4307795	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_21A	636844	4307804	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_21B	636844	4307811	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_22A	636844	4307830	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_22B	636844	4307837	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_23A	636844	4307861	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_23B	636844	4307868	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_24A	636844	4307888	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_24B	636844	4307894	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_25A	636844	4307918	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_25B	636844	4307925	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_26A	636844	4307945	264.26	3.61E+00	12.09	766.09	35.71	0.61
B103_26B	636844	4307952	264.26	3.61E+00	12.09	766.09	35.71	0.61
B104_16A	637134	4307458	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_16B	637134	4307451	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_15A	637134	4307431	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_15B	637134	4307424	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_14A	637134	4307400	267.31	3.61E+00	12.09	766.09	35.71	0.61

B104_14B	637134	4307393	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_13A	637134	4307374	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_13B	637134	4307367	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_12A	637134	4307343	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_12B	637134	4307336	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_11A	637134	4307321	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_11B	637134	4307314	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_11C	637134	4307305	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_11M	637134	4307298	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_21M	637134	4307252	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_21C	637134	4307245	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_21A	637134	4307235	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_21B	637134	4307228	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_22A	637134	4307210	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_22B	637134	4307203	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_23A	637134	4307179	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_23B	637134	4307172	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_24A	637134	4307152	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_24B	637134	4307145	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_25A	637134	4307121	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_25B	637134	4307114	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_26A	637134	4307095	267.31	3.61E+00	12.09	766.09	35.71	0.61
B104_26B	637134	4307088	267.31	3.61E+00	12.09	766.09	35.71	0.61
B105_16A	637051	4307086	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_16B	637051	4307093	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_15A	637051	4307113	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_15B	637051	4307120	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_14A	637051	4307144	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_14B	637051	4307151	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_13A	637051	4307170	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_13B	637051	4307177	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_12A	637051	4307201	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_12B	637051	4307208	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_11A	637051	4307223	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_11B	637051	4307230	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_11C	637051	4307239	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_11M	637051	4307246	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_21M	637051	4307292	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_21C	637051	4307299	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_21A	637051	4307309	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_21B	637051	4307316	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_22A	637051	4307334	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_22B	637051	4307341	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_23A	637051	4307365	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_23B	637051	4307372	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_24A	637051	4307392	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_24B	637051	4307399	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_25A	637051	4307423	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_25B	637051	4307430	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_26A	637051	4307449	267.61	3.61E+00	12.09	766.09	35.71	0.61
B105_26B	637051	4307456	267.61	3.61E+00	12.09	766.09	35.71	0.61
B106_16A	636894	4307457	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_16B	636894	4307450	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_15A	636894	4307431	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_15B	636894	4307424	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_14A	636894	4307400	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_14B	636894	4307393	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_13A	636894	4307373	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_13B	636894	4307366	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_12A	636894	4307342	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_12B	636894	4307335	267.31	3.61E+00	12.09	766.09	35.71	0.61

B106_11A	636894	4307321	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_11B	636894	4307314	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_11C	636894	4307304	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_11M	636894	4307297	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_21M	636894	4307251	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_21C	636894	4307244	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_21A	636894	4307235	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_21B	636894	4307228	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_22A	636894	4307209	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_22B	636894	4307202	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_23A	636894	4307178	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_23B	636894	4307171	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_24A	636894	4307152	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_24B	636894	4307145	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_25A	636894	4307121	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_25B	636894	4307114	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_26A	636894	4307094	267.31	3.61E+00	12.09	766.09	35.71	0.61
B106_26B	636894	4307087	267.31	3.61E+00	12.09	766.09	35.71	0.61
B107_16A	636898	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_16B	636905	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_15A	636925	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_15B	636932	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_14A	636956	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_14B	636963	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_13A	636982	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_13B	636989	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_12A	637013	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_12B	637020	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_11A	637035	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_11B	637042	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_11C	637051	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_11M	637058	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_21M	637104	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_21C	637111	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_21A	637121	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_21B	637128	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_22A	637146	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_22B	637153	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_23A	637177	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_23B	637184	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_24A	637204	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_24B	637211	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_25A	637235	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_25B	637242	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_26A	637261	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B107_26B	637268	4306970	267.61	3.61E+00	12.09	766.09	35.71	0.61
B108_16A	637270	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_16B	637263	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_15A	637243	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_15B	637236	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_14A	637212	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_14B	637205	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_13A	637186	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_13B	637179	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_12A	637155	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_12B	637148	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_11A	637133	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_11B	637126	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_11C	637116	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_11M	637109	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_21M	637064	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61

B108_21C	637057	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_21A	637047	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_21B	637040	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_22A	637021	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_22B	637014	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_23A	636991	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_23B	636984	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_24A	636964	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_24B	636957	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_25A	636933	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_25B	636926	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_26A	636907	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B108_26B	636900	4306878	267.00	3.61E+00	12.09	766.09	35.71	0.61
B109_16A	636459	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_16B	636466	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_15A	636485	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_15B	636492	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_14A	636516	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_14B	636523	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_13A	636543	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_13B	636550	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_12A	636574	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_12B	636581	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_11A	636595	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_11B	636602	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_11C	636612	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_11M	636619	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_21M	636665	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_21C	636671	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_21A	636681	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_21B	636688	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_22A	636707	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_22B	636714	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_23A	636738	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_23B	636745	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_24A	636764	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_24B	636771	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_25A	636795	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_25B	636802	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_26A	636822	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B109_26B	636829	4306969	267.61	3.61E+00	12.09	766.09	35.71	0.61
B110_16A	636830	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_16B	636823	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_15A	636803	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_15B	636796	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_14A	636772	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_14B	636765	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_13A	636746	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_13B	636739	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_12A	636715	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_12B	636708	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_11A	636693	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_11B	636686	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_11C	636676	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_11M	636669	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_21M	636624	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_21C	636617	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_21A	636607	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_21B	636600	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_22A	636581	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_22B	636575	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61

B110_23A	636551	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_23B	636544	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_24A	636524	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_24B	636517	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_25A	636493	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_25B	636486	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_26A	636467	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B110_26B	636460	4306876	267.00	3.61E+00	12.09	766.09	35.71	0.61
B111_16A	636459	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_16B	636466	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_15A	636486	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_15B	636493	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_14A	636517	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_14B	636524	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_13A	636543	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_13B	636550	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_12A	636574	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_12B	636581	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_11A	636596	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_11B	636603	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_11C	636612	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_11M	636619	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_21M	636665	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_21C	636672	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_21A	636682	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_21B	636689	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_22A	636707	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_22B	636714	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_23A	636738	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_23B	636745	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_24A	636765	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_24B	636772	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_25A	636796	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_25B	636803	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_26A	636822	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B111_26B	636829	4306720	266.70	3.61E+00	12.09	766.09	35.71	0.61
B112_16A	636324	4307060	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_16B	636324	4307053	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_15A	636324	4307033	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_15B	636324	4307026	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_14A	636324	4307003	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_14B	636324	4306996	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_13A	636324	4306976	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_13B	636324	4306969	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_12A	636324	4306945	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_12B	636324	4306938	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_11A	636324	4306924	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_11B	636324	4306917	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_11C	636324	4306907	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_11M	636324	4306900	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_21M	636324	4306854	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_21C	636324	4306847	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_21A	636324	4306838	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_21B	636324	4306831	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_22A	636324	4306812	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_22B	636324	4306805	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_23A	636324	4306781	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_23B	636324	4306774	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_24A	636324	4306754	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_24B	636324	4306747	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_25A	636324	4306724	267.00	3.61E+00	12.09	766.09	35.71	0.61

B112_25B	636324	4306717	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_26A	636324	4306697	267.00	3.61E+00	12.09	766.09	35.71	0.61
B112_26B	636324	4306690	267.00	3.61E+00	12.09	766.09	35.71	0.61
B113_16A	636242	4306690	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_16B	636242	4306697	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_15A	636242	4306717	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_15B	636242	4306724	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_14A	636242	4306748	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_14B	636242	4306755	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_13A	636242	4306774	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_13B	636242	4306781	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_12A	636242	4306805	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_12B	636242	4306812	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_11A	636242	4306827	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_11B	636242	4306834	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_11C	636242	4306844	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_11M	636242	4306850	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_21M	636242	4306896	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_21C	636242	4306903	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_21A	636242	4306913	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_21B	636242	4306920	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_22A	636242	4306939	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_22B	636242	4306945	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_23A	636242	4306969	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_23B	636242	4306976	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_24A	636242	4306996	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_24B	636242	4307003	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_25A	636242	4307027	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_25B	636242	4307034	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_26A	636242	4307053	266.40	3.61E+00	12.09	766.09	35.71	0.61
B113_26B	636242	4307060	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_16A	636323	4307501	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_16B	636323	4307494	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_15A	636323	4307474	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_15B	636323	4307467	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_14A	636323	4307443	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_14B	636323	4307437	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_13A	636323	4307417	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_13B	636323	4307410	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_12A	636323	4307386	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_12B	636323	4307379	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_11A	636323	4307364	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_11B	636323	4307357	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_11C	636323	4307348	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_11M	636323	4307341	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_21M	636323	4307295	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_21C	636323	4307288	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_21A	636323	4307279	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_21B	636323	4307272	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_22A	636323	4307253	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_22B	636323	4307246	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_23A	636323	4307222	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_23B	636323	4307215	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_24A	636323	4307195	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_24B	636323	4307188	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_25A	636323	4307165	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_25B	636323	4307158	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_26A	636323	4307138	266.40	3.61E+00	12.09	766.09	35.71	0.61
B114_26B	636323	4307131	266.40	3.61E+00	12.09	766.09	35.71	0.61
B115_16A	636240	4307130	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_16B	636240	4307137	265.79	3.61E+00	12.09	766.09	35.71	0.61

B115_15A	636240	4307157	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_15B	636240	4307164	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_14A	636240	4307187	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_14B	636240	4307194	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_13A	636240	4307214	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_13B	636240	4307221	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_12A	636240	4307245	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_12B	636240	4307252	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_11A	636240	4307267	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_11B	636240	4307273	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_11C	636240	4307283	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_11M	636240	4307290	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_21M	636240	4307336	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_21C	636240	4307343	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_21A	636240	4307352	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_21B	636240	4307359	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_22A	636240	4307378	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_22B	636240	4307385	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_23A	636240	4307409	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_23B	636240	4307416	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_24A	636240	4307436	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_24B	636240	4307443	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_25A	636240	4307466	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_25B	636240	4307473	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_26A	636240	4307493	265.79	3.61E+00	12.09	766.09	35.71	0.61
B115_26B	636240	4307500	265.79	3.61E+00	12.09	766.09	35.71	0.61
B116_16A	636146	4307130	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_16B	636146	4307137	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_15A	636146	4307157	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_15B	636146	4307164	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_14A	636146	4307188	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_14B	636146	4307195	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_13A	636146	4307214	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_13B	636146	4307221	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_12A	636146	4307245	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_12B	636146	4307252	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_11A	636146	4307267	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_11B	636146	4307274	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_11C	636146	4307283	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_11M	636146	4307290	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_21M	636146	4307336	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_21C	636146	4307343	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_21A	636146	4307353	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_21B	636146	4307359	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_22A	636146	4307378	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_22B	636146	4307385	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_23A	636146	4307409	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_23B	636146	4307416	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_24A	636146	4307436	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_24B	636146	4307443	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_25A	636146	4307467	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_25B	636146	4307474	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_26A	636146	4307493	265.48	3.61E+00	12.09	766.09	35.71	0.61
B116_26B	636146	4307500	265.48	3.61E+00	12.09	766.09	35.71	0.61
ACB_GEN1	637116	4308073	262.33	3.45E-01	3.35	728.71	10.67	0.36
ACB_GEN2	637476	4306953	267.61	3.45E-01	3.35	728.71	10.67	0.36
AWB_GEN1	637277	4307667	264.57	3.86E+00	5.21	711.15	61.51	0.36
AWB_GEN2	637287	4307667	264.57	3.86E+00	5.21	711.15	61.51	0.36
AWB_GEN3	637258	4307091	267.31	3.86E+00	5.21	711.15	61.51	0.36
AWB_GEN4	637258	4307100	267.31	3.86E+00	5.21	711.15	61.51	0.36
CAB_GEN1	637307	4307242	267.31	8.27E-01	3.35	843.59	13.95	0.36

**Table B-4. Point Source Parameters, NO2, 1-Hour Average, LBT Scenario**

Source ID	UTM Coordinates		Base Elevation (m)	NOX Emission Rate (g/s)	Stack Release Height (m)	Stack Gas Temperature (K)	Stack Gas Exit Velocity (m/s)	Inner Stack Diameter (m)
	East	North						
B100_16A	637154	4307952	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_16B	637154	4307945	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_15A	637154	4307925	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_15B	637154	4307918	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_14A	637154	4307895	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_14B	637154	4307888	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_13A	637154	4307868	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_13B	637154	4307861	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_12A	637154	4307837	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_12B	637154	4307830	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_11A	637154	4307816	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_11B	637154	4307809	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_11C	637154	4307799	264.26	1.06E+00	12.09	722.51	19.90	0.61
B100_11M	637154	4307792	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_21M	637154	4307746	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_21C	637154	4307739	264.26	1.06E+00	12.09	722.51	19.90	0.61
B100_21A	637154	4307730	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_21B	637154	4307723	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_22A	637154	4307704	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_22B	637154	4307697	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_23A	637154	4307673	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_23B	637154	4307666	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_24A	637154	4307646	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_24B	637154	4307639	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_25A	637154	4307616	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_25B	637154	4307609	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_26A	637154	4307589	264.26	1.09E+00	12.09	725.78	21.24	0.61
B100_26B	637154	4307582	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_16A	637073	4307582	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_16B	637073	4307589	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_15A	637073	4307608	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_15B	637073	4307615	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_14A	637073	4307639	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_14B	637073	4307646	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_13A	637073	4307666	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_13B	637073	4307673	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_12A	637073	4307697	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_12B	637073	4307704	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_11A	637073	4307718	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_11B	637073	4307725	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_11C	637073	4307735	264.26	1.06E+00	12.09	722.51	19.90	0.61
B101_11M	637073	4307742	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_21M	637073	4307788	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_21C	637073	4307794	264.26	1.06E+00	12.09	722.51	19.90	0.61
B101_21A	637073	4307804	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_21B	637073	4307811	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_22A	637073	4307830	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_22B	637073	4307837	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_23A	637073	4307861	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_23B	637073	4307868	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_24A	637073	4307887	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_24B	637073	4307894	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_25A	637073	4307918	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_25B	637073	4307925	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_26A	637073	4307945	264.26	1.09E+00	12.09	725.78	21.24	0.61
B101_26B	637073	4307952	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_16A	636925	4307951	264.26	1.09E+00	12.09	725.78	21.24	0.61

B102_16B	636925	4307945	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_15A	636925	4307925	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_15B	636925	4307918	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_14A	636925	4307894	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_14B	636925	4307887	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_13A	636925	4307867	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_13B	636925	4307860	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_12A	636925	4307837	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_12B	636925	4307830	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_11A	636925	4307815	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_11B	636925	4307808	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_11C	636925	4307798	264.26	1.06E+00	12.09	722.51	19.90	0.61
B102_11M	636925	4307791	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_21M	636925	4307746	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_21C	636925	4307739	264.26	1.06E+00	12.09	722.51	19.90	0.61
B102_21A	636925	4307729	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_21B	636925	4307722	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_22A	636925	4307703	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_22B	636925	4307696	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_23A	636925	4307672	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_23B	636925	4307665	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_24A	636925	4307646	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_24B	636925	4307639	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_25A	636925	4307615	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_25B	636925	4307608	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_26A	636925	4307588	264.26	1.09E+00	12.09	725.78	21.24	0.61
B102_26B	636925	4307581	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_16A	636844	4307582	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_16B	636844	4307589	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_15A	636844	4307609	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_15B	636844	4307615	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_14A	636844	4307639	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_14B	636844	4307646	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_13A	636844	4307666	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_13B	636844	4307673	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_12A	636844	4307697	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_12B	636844	4307704	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_11A	636844	4307718	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_11B	636844	4307725	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_11C	636844	4307735	264.26	1.06E+00	12.09	722.51	19.90	0.61
B103_11M	636844	4307742	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_21M	636844	4307788	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_21C	636844	4307795	264.26	1.06E+00	12.09	722.51	19.90	0.61
B103_21A	636844	4307804	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_21B	636844	4307811	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_22A	636844	4307830	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_22B	636844	4307837	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_23A	636844	4307861	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_23B	636844	4307868	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_24A	636844	4307888	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_24B	636844	4307894	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_25A	636844	4307918	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_25B	636844	4307925	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_26A	636844	4307945	264.26	1.09E+00	12.09	725.78	21.24	0.61
B103_26B	636844	4307952	264.26	1.09E+00	12.09	725.78	21.24	0.61
B104_16A	637134	4307458	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_16B	637134	4307451	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_15A	637134	4307431	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_15B	637134	4307424	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_14A	637134	4307400	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_14B	637134	4307393	267.31	1.09E+00	12.09	725.78	21.24	0.61

B104_13A	637134	4307374	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_13B	637134	4307367	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_12A	637134	4307343	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_12B	637134	4307336	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_11A	637134	4307321	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_11B	637134	4307314	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_11C	637134	4307305	267.31	1.06E+00	12.09	722.51	19.90	0.61
B104_11M	637134	4307298	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_21M	637134	4307252	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_21C	637134	4307245	267.31	1.06E+00	12.09	722.51	19.90	0.61
B104_21A	637134	4307235	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_21B	637134	4307228	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_22A	637134	4307210	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_22B	637134	4307203	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_23A	637134	4307179	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_23B	637134	4307172	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_24A	637134	4307152	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_24B	637134	4307145	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_25A	637134	4307121	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_25B	637134	4307114	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_26A	637134	4307095	267.31	1.09E+00	12.09	725.78	21.24	0.61
B104_26B	637134	4307088	267.31	1.09E+00	12.09	725.78	21.24	0.61
B105_16A	637051	4307086	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_16B	637051	4307093	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_15A	637051	4307113	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_15B	637051	4307120	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_14A	637051	4307144	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_14B	637051	4307151	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_13A	637051	4307170	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_13B	637051	4307177	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_12A	637051	4307201	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_12B	637051	4307208	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_11A	637051	4307223	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_11B	637051	4307230	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_11C	637051	4307239	267.61	1.06E+00	12.09	722.51	19.90	0.61
B105_11M	637051	4307246	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_21M	637051	4307292	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_21C	637051	4307299	267.61	1.06E+00	12.09	722.51	19.90	0.61
B105_21A	637051	4307309	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_21B	637051	4307316	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_22A	637051	4307334	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_22B	637051	4307341	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_23A	637051	4307365	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_23B	637051	4307372	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_24A	637051	4307392	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_24B	637051	4307399	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_25A	637051	4307423	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_25B	637051	4307430	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_26A	637051	4307449	267.61	1.09E+00	12.09	725.78	21.24	0.61
B105_26B	637051	4307456	267.61	1.09E+00	12.09	725.78	21.24	0.61
B106_16A	636894	4307457	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_16B	636894	4307450	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_15A	636894	4307431	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_15B	636894	4307424	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_14A	636894	4307400	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_14B	636894	4307393	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_13A	636894	4307373	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_13B	636894	4307366	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_12A	636894	4307342	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_12B	636894	4307335	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_11A	636894	4307321	267.31	1.09E+00	12.09	725.78	21.24	0.61

B106_11B	636894	4307314	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_11C	636894	4307304	267.31	1.06E+00	12.09	722.51	19.90	0.61
B106_11M	636894	4307297	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_21M	636894	4307251	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_21C	636894	4307244	267.31	1.06E+00	12.09	722.51	19.90	0.61
B106_21A	636894	4307235	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_21B	636894	4307228	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_22A	636894	4307209	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_22B	636894	4307202	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_23A	636894	4307178	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_23B	636894	4307171	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_24A	636894	4307152	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_24B	636894	4307145	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_25A	636894	4307121	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_25B	636894	4307114	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_26A	636894	4307094	267.31	1.09E+00	12.09	725.78	21.24	0.61
B106_26B	636894	4307087	267.31	1.09E+00	12.09	725.78	21.24	0.61
B107_16A	636898	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_16B	636905	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_15A	636925	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_15B	636932	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_14A	636956	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_14B	636963	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_13A	636982	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_13B	636989	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_12A	637013	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_12B	637020	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_11A	637035	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_11B	637042	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_11C	637051	4306970	267.61	1.06E+00	12.09	722.51	19.90	0.61
B107_11M	637058	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_21M	637104	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_21C	637111	4306970	267.61	1.06E+00	12.09	722.51	19.90	0.61
B107_21A	637121	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_21B	637128	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_22A	637146	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_22B	637153	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_23A	637177	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_23B	637184	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_24A	637204	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_24B	637211	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_25A	637235	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_25B	637242	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_26A	637261	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B107_26B	637268	4306970	267.61	1.09E+00	12.09	725.78	21.24	0.61
B108_16A	637270	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_16B	637263	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_15A	637243	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_15B	637236	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_14A	637212	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_14B	637205	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_13A	637186	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_13B	637179	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_12A	637155	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_12B	637148	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_11A	637133	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_11B	637126	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_11C	637116	4306878	267.00	1.06E+00	12.09	722.51	19.90	0.61
B108_11M	637109	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_21M	637064	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_21C	637057	4306878	267.00	1.06E+00	12.09	722.51	19.90	0.61

B108_21A	637047	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_21B	637040	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_22A	637021	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_22B	637014	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_23A	636991	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_23B	636984	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_24A	636964	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_24B	636957	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_25A	636933	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_25B	636926	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_26A	636907	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B108_26B	636900	4306878	267.00	1.09E+00	12.09	725.78	21.24	0.61
B109_16A	636459	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_16B	636466	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_15A	636485	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_15B	636492	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_14A	636516	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_14B	636523	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_13A	636543	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_13B	636550	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_12A	636574	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_12B	636581	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_11A	636595	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_11B	636602	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_11C	636612	4306969	267.61	1.06E+00	12.09	722.51	19.90	0.61
B109_11M	636619	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_21M	636665	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_21C	636671	4306969	267.61	1.06E+00	12.09	722.51	19.90	0.61
B109_21A	636681	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_21B	636688	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_22A	636707	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_22B	636714	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_23A	636738	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_23B	636745	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_24A	636764	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_24B	636771	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_25A	636795	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_25B	636802	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_26A	636822	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B109_26B	636829	4306969	267.61	1.09E+00	12.09	725.78	21.24	0.61
B110_16A	636830	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_16B	636823	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_15A	636803	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_15B	636796	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_14A	636772	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_14B	636765	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_13A	636746	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_13B	636739	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_12A	636715	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_12B	636708	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_11A	636693	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_11B	636686	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_11C	636676	4306876	267.00	1.06E+00	12.09	722.51	19.90	0.61
B110_11M	636669	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_21M	636624	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_21C	636617	4306876	267.00	1.06E+00	12.09	722.51	19.90	0.61
B110_21A	636607	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_21B	636600	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_22A	636581	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_22B	636575	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_23A	636551	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61

B110_23B	636544	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_24A	636524	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_24B	636517	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_25A	636493	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_25B	636486	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_26A	636467	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B110_26B	636460	4306876	267.00	1.09E+00	12.09	725.78	21.24	0.61
B111_16A	636459	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_16B	636466	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_15A	636486	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_15B	636493	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_14A	636517	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_14B	636524	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_13A	636543	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_13B	636550	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_12A	636574	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_12B	636581	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_11A	636596	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_11B	636603	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_11C	636612	4306720	266.70	1.06E+00	12.09	722.51	19.90	0.61
B111_11M	636619	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_21M	636665	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_21C	636672	4306720	266.70	1.06E+00	12.09	722.51	19.90	0.61
B111_21A	636682	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_21B	636689	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_22A	636707	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_22B	636714	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_23A	636738	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_23B	636745	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_24A	636765	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_24B	636772	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_25A	636796	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_25B	636803	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_26A	636822	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B111_26B	636829	4306720	266.70	1.09E+00	12.09	725.78	21.24	0.61
B112_16A	636324	4307060	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_16B	636324	4307053	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_15A	636324	4307033	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_15B	636324	4307026	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_14A	636324	4307003	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_14B	636324	4306996	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_13A	636324	4306976	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_13B	636324	4306969	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_12A	636324	4306945	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_12B	636324	4306938	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_11A	636324	4306924	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_11B	636324	4306917	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_11C	636324	4306907	267.00	1.06E+00	12.09	722.51	19.90	0.61
B112_11M	636324	4306900	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_21M	636324	4306854	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_21C	636324	4306847	267.00	1.06E+00	12.09	722.51	19.90	0.61
B112_21A	636324	4306838	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_21B	636324	4306831	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_22A	636324	4306812	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_22B	636324	4306805	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_23A	636324	4306781	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_23B	636324	4306774	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_24A	636324	4306754	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_24B	636324	4306747	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_25A	636324	4306724	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_25B	636324	4306717	267.00	1.09E+00	12.09	725.78	21.24	0.61

B112_26A	636324	4306697	267.00	1.09E+00	12.09	725.78	21.24	0.61
B112_26B	636324	4306690	267.00	1.09E+00	12.09	725.78	21.24	0.61
B113_16A	636242	4306690	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_16B	636242	4306697	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_15A	636242	4306717	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_15B	636242	4306724	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_14A	636242	4306748	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_14B	636242	4306755	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_13A	636242	4306774	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_13B	636242	4306781	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_12A	636242	4306805	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_12B	636242	4306812	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_11A	636242	4306827	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_11B	636242	4306834	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_11C	636242	4306844	266.40	1.09E+00	12.09	722.51	19.90	0.61
B113_11M	636242	4306850	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_21M	636242	4306896	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_21C	636242	4306903	266.40	1.06E+00	12.09	722.51	19.90	0.61
B113_21A	636242	4306913	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_21B	636242	4306920	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_22A	636242	4306939	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_22B	636242	4306945	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_23A	636242	4306969	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_23B	636242	4306976	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_24A	636242	4306996	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_24B	636242	4307003	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_25A	636242	4307027	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_25B	636242	4307034	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_26A	636242	4307053	266.40	1.09E+00	12.09	725.78	21.24	0.61
B113_26B	636242	4307060	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_16A	636323	4307501	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_16B	636323	4307494	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_15A	636323	4307474	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_15B	636323	4307467	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_14A	636323	4307443	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_14B	636323	4307437	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_13A	636323	4307417	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_13B	636323	4307410	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_12A	636323	4307386	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_12B	636323	4307379	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_11A	636323	4307364	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_11B	636323	4307357	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_11C	636323	4307348	266.40	1.06E+00	12.09	722.51	19.90	0.61
B114_11M	636323	4307341	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_21M	636323	4307295	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_21C	636323	4307288	266.40	1.06E+00	12.09	722.51	19.90	0.61
B114_21A	636323	4307279	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_21B	636323	4307272	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_22A	636323	4307253	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_22B	636323	4307246	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_23A	636323	4307222	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_23B	636323	4307215	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_24A	636323	4307195	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_24B	636323	4307188	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_25A	636323	4307165	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_25B	636323	4307158	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_26A	636323	4307138	266.40	1.09E+00	12.09	725.78	21.24	0.61
B114_26B	636323	4307131	266.40	1.09E+00	12.09	725.78	21.24	0.61
B115_16A	636240	4307130	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_16B	636240	4307137	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_15A	636240	4307157	265.79	1.09E+00	12.09	725.78	21.24	0.61

B115_15B	636240	4307164	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_14A	636240	4307187	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_14B	636240	4307194	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_13A	636240	4307214	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_13B	636240	4307221	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_12A	636240	4307245	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_12B	636240	4307252	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_11A	636240	4307267	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_11B	636240	4307273	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_11C	636240	4307283	265.79	1.06E+00	12.09	722.51	19.90	0.61
B115_11M	636240	4307290	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_21M	636240	4307336	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_21C	636240	4307343	265.79	1.06E+00	12.09	722.51	19.90	0.61
B115_21A	636240	4307352	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_21B	636240	4307359	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_22A	636240	4307378	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_22B	636240	4307385	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_23A	636240	4307409	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_23B	636240	4307416	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_24A	636240	4307436	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_24B	636240	4307443	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_25A	636240	4307466	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_25B	636240	4307473	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_26A	636240	4307493	265.79	1.09E+00	12.09	725.78	21.24	0.61
B115_26B	636240	4307500	265.79	1.09E+00	12.09	725.78	21.24	0.61
B116_16A	636146	4307130	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_16B	636146	4307137	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_15A	636146	4307157	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_15B	636146	4307164	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_14A	636146	4307188	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_14B	636146	4307195	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_13A	636146	4307214	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_13B	636146	4307221	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_12A	636146	4307245	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_12B	636146	4307252	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_11A	636146	4307267	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_11B	636146	4307274	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_11C	636146	4307283	265.48	1.06E+00	12.09	722.51	19.90	0.61
B116_11M	636146	4307290	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_21M	636146	4307336	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_21C	636146	4307343	265.48	1.06E+00	12.09	722.51	19.90	0.61
B116_21A	636146	4307353	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_21B	636146	4307359	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_22A	636146	4307378	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_22B	636146	4307385	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_23A	636146	4307409	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_23B	636146	4307416	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_24A	636146	4307436	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_24B	636146	4307443	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_25A	636146	4307467	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_25B	636146	4307474	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_26A	636146	4307493	265.48	1.09E+00	12.09	725.78	21.24	0.61
B116_26B	636146	4307500	265.48	1.09E+00	12.09	725.78	21.24	0.61
ACB_GEN1	637116	4308073	262.33	1.39E-01	3.35	660.09	6.89	0.36
ACB_GEN2	637476	4306953	267.61	1.39E-01	3.35	660.09	6.89	0.36
AWB_GEN1	637277	4307667	264.57	1.45E+00	5.21	669.07	36.58	0.36
AWB_GEN2	637287	4307667	264.57	1.45E+00	5.21	669.07	36.58	0.36
AWB_GEN3	637258	4307091	267.31	1.45E+00	5.21	669.07	36.58	0.36
AWB_GEN4	637258	4307100	267.31	1.45E+00	5.21	669.07	36.58	0.36
CAB_GEN1	637307	4307242	267.31	2.41E-01	3.35	730.64	8.92	0.36

## **APPENDIX F**

### **PROCESS FLOW DIAGRAM**

**Figure 1. Process Flow Diagram for Emergency Generator**

**ADS**

