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By Air Quality at 11:38 am, Mar 20, 2020

Environmental Health & Safety

General Services Building
222 South Chapel Street
Newark, DE 19716-4150
Phone: 302-831-8475
Fax: 302-831-1528

March 17, 2020

Mr. David Fees
Program Administrator
DNREC - Division of Air Quality
State Street Commons
100 West Water Street, Suite 6A
Dover, DE 19904

Subject: University of Delaware
Construction/Operating Permit Application: Worrilow Hall Emergency Generator

Dear Mr. Fees,

Please find enclosed an application for a Natural Minor operating permit for a replacement natural gas fuel fired 750 KW emergency generator located at the Worrilow Hall on the Newark Campus of the University of Delaware. This equipment will replace an existing emergency generator currently servicing Worrilow Hall.

Enclosed with the application are the pertinent manufacturer's data sheets for the generator, the Stationary Generator Initial Notification form, calculations of the potential emissions from the generator engine, and a summary of the potential NO_x emissions from all new equipment installed on the Newark Campus since 2016, with supporting calculations. Due to the current shutdown on campus related to the COVID-19 prevention measures, the permit and advertising check will be submitted under separate cover at a later date.

Please contact me at (302) 831-8274 if you have any questions about this application.

Sincerely yours,

William Harris
Environmental Compliance Officer

cc: Mr. Mohamed Mellaouch, DNREC (w/enclosures)
Mr. Michael Glade, University of Delaware
Mr. Paul Dickinson, University of Delaware

CAMPUS & PUBLIC SAFETY



DNREC – Division of Air Quality
Application to Construct, Operate, or Modify
Stationary Sources

Form AQM-1
Page 1 of 4

Administrative Information

One original and one copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 West Water Street, Suite 6A
Dover, DE 19904

All Checks Should Be Made Payable To:
State of Delaware

<u>Company and Site Information</u>	
1.	Company Name: The University of Delaware
2.	Company Mailing Address: 222 S. Chappel Street, GSB Room 132 City: Newark State: DE Zip Code: 19716
3.	Site Name: Worrlow Hall
4.	Site Mailing Address: (if different from above) City: State: Zip Code:
5.	Physical Location of Site: 529 South College Avenue (if different from above) City: Newark State: DE Zip Code: 19716
6.	Site Billing Address: (if different from above) City: State: Zip Code:
7.	Air Quality Management Facility ID Number: 100300022
8.	Site NAICS Code(s): 611310 (list all that apply)
9.	Site SIC Code: 8221 (list all that apply)
10.	Site Location Coordinates: Latitude: N39 ° 40' 0.3" Longitude: W75 ° 45' 2.5"
11.	Is the Facility New or Existing? <input checked="" type="checkbox"/> NEW <input type="checkbox"/> EXISTING
<i>If the Facility is an Existing Facility, Complete the Rest of Question 11. If Not, Proceed to Question 12.</i>	
11.1.	Does the Facility Have Active Air Permits? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
12.	Is this Application For New Equipment or a Modification to Existing Equipment? <input checked="" type="checkbox"/> New Equipment <input type="checkbox"/> Modification of Existing Equipment <input type="checkbox"/> Other (Specify):
<i>If the application is for the modification of existing equipment, complete the rest of Question 12. If not, proceed to Question 13.</i>	



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Company and Site Information

12.1. Does the Equipment Have an Active Air Permit? ☐ YES ☒ NO

If the equipment has an active air permit, complete the rest of Question 12. If not, proceed to Question 13.

12.2. Permit Number of Existing Equipment:

13. Status of Equipment Being Applied For: ☒ Natural Minor Source
☐ Synthetic Minor Source
☐ Major Source
☐ Federally Enforceable Restrictions

14. Facility Status: ☐ Natural Minor Facility ☐ Synthetic Minor Facility ☒ Major Facility

If the facility is a Major Source, complete the rest of Question 14. If not, proceed to Question 15.

14.1. Responsible Official Name: **Peter Krawchyk**

14.2. Responsible Official Title: **Vice President Facilities, Real Estate, and Auxiliary Services**

Contact Information

15. Name of Owner or Facility Manager: **Paul Dickinson**

16. Title of Owner or Facility Manager: **Director Facilities, Maintenance, and Operations**

17. Permit Contact Name: **William Harris**

18. Permit Contact Title: **Environmental Compliance Officer**

19. Permit Contact Telephone Number: **(302) 831-8274**

20. Permit Contact Fax Number: **(302) 831- 1528**

21. Permit Contact E-Mail Address: **wkharris@udel.edu**

22. Billing Contact Name: **William Harris**

23. Billing Contact Title: **Environmental Compliance Officer**

24. Billing Contact Telephone Number: **(302) 831-8274**

25. Billing Contact Fax Number: **(302) 831- 1528**

26. Billing Contact E-Mail Address: **wkharris@udel.edu**

Proposed Construction and Operating Schedule

27. When Will the Proposed Construction/Installation/Modification Occur: **07/31/2020**

28. Proposed Operating Schedule: **24 hours/day 7 days/week 52 weeks/year**

28.1. Is There Any Additional Information Regarding the Operating Schedule? ☒ YES ☐ NO

If YES, complete the rest of Question 28. If NO, proceed to Question 29.



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Proposed Construction and Operating Schedule

28.2. Describe the Additional Information: **Emergency operation only. Use 500 hours operation per year to calculate emissions.**

Coastal Zone Information

29. Is the Facility Located in the Coastal Zone? ☐ YES ☒ NO

If the facility is located in the Coastal Zone complete the rest of Question 29. If not, proceed to Question 30.

29.1. Is a Coastal Zone Permit Required for Construction or Operation of the Source Being Applied for? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Determination if it has not been previously submitted

If a Coastal Zone Permit is required complete the rest of Question 29. If not, proceed to Question 30.

29.2. Has a Coastal Zone Permit Been Issued? ☐ YES ☐ NO

Attach a copy of the Coastal Zone Permit if it has not been previously submitted

Local Zoning Information

30. Parcel Zoning: **N/A**

Attach Proof of Local Zoning if it has not been previously submitted

Application Information

31. Is the Appropriate Application Fee Attached? ☒ YES ☐ NO

32. Is the Advertising Fee Attached? ☒ YES ☐ NO

*For help determining your application and advertising fees see:
<http://www.dnrec.state.de.us/DNREC2000/Library/Fees/DE%20Permit%20Fees.htm>*

Attach the appropriate fees. Note that your Application will not be considered complete if the appropriate fees are not included.

33. Is a Cover Letter Describing the Process Attached? ☒ YES ☐ NO

Attach a brief cover letter describing your Application.

If the Facility is a New Facility complete Question 34. If not, proceed to Question 35.

34. Is a Copy of the Applicant Background Information Questionnaire on Record at the Department? ☒ YES ☐ NO

If NO, complete the rest of Question 34. If YES, process to Question 35.

34.1 Is a Copy of the Applicant Background Information Questionnaire Attached? ☐ YES ☐ NO

*For a copy of the Applicant Background Information Questionnaire see
<http://www.dnrec.delaware.gov/services/Documents/Chapter79Form.pdf>*

Attach a copy of the Applicant Background Information Questionnaire if applicable.

35. Check Which Application Forms are Attached:



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Form AQM-1
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Application Information

- | | | | | | | |
|---|----------------------------------|-----------------------------------|---|----------------------------------|---|--------------------------------|
| <input checked="" type="checkbox"/> AQM-1 | <input type="checkbox"/> AQM-3.4 | <input type="checkbox"/> AQM-3.9 | <input type="checkbox"/> AQM-3.14 | <input type="checkbox"/> AQM-4.4 | <input type="checkbox"/> AQM-4.9 | <input type="checkbox"/> AQM-6 |
| <input checked="" type="checkbox"/> AQM-2 | <input type="checkbox"/> AQM-3.5 | <input type="checkbox"/> AQM-3.10 | <input type="checkbox"/> AQM-3.15 | <input type="checkbox"/> AQM-4.5 | <input type="checkbox"/> AQM-4.10 | |
| <input type="checkbox"/> AQM-3.1 | <input type="checkbox"/> AQM-3.6 | <input type="checkbox"/> AQM-3.11 | <input checked="" type="checkbox"/> AQM-4.1 | <input type="checkbox"/> AQM-4.6 | <input type="checkbox"/> AQM-4.11 | |
| <input type="checkbox"/> AQM-3.2 | <input type="checkbox"/> AQM-3.7 | <input type="checkbox"/> AQM-3.12 | <input type="checkbox"/> AQM-4.2 | <input type="checkbox"/> AQM-4.7 | <input type="checkbox"/> AQM-4.12 | |
| <input checked="" type="checkbox"/> AQM-3.3 | <input type="checkbox"/> AQM-3.8 | <input type="checkbox"/> AQM-3.13 | <input type="checkbox"/> AQM-4.3 | <input type="checkbox"/> AQM-4.8 | <input checked="" type="checkbox"/> AQM-5 | |

36. Check Which Documents are Attached:

- | | |
|---|---|
| <input type="checkbox"/> Coastal Zone Determination | <input type="checkbox"/> Claim of Confidentiality |
| <input type="checkbox"/> Coastal Zone Permit | <input checked="" type="checkbox"/> Manufacturer Specification(s) |
| <input type="checkbox"/> Proof of Local Zoning | <input type="checkbox"/> Material Safety Data Sheets (MSDSs) |
| <input checked="" type="checkbox"/> Application Fee | <input checked="" type="checkbox"/> Supporting Calculations |
| <input checked="" type="checkbox"/> Advertising Fee | <input checked="" type="checkbox"/> Descriptive Cover Letter |
| <input type="checkbox"/> Applicant Background Information Questionnaire | <input type="checkbox"/> Other (Specify): |

Confidentiality Information

37. Do You Consider Any of the Information
Submitted With this Application Confidential? ☐ YES ☒ NO

For help on how to submit a confidentiality claim see

<http://regulations.delaware.gov/register/december2011/final/15%20DE%20Reg%20864%2012-01-11.htm>

If a Claim of Confidentiality Is made it MUST meet the requirements of Section 6 of DNREC's Freedom of Information ("FOIA") Regulation at the time the Application is submitted.

Signature Block

I, the undersigned, hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all of its attachments as to the truth, accuracy, and completeness of this information. I certify based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete. By signing this form, I certify that I have not changed, altered, or deleted any portions of this application. I acknowledge that I cannot commence construction, alteration, modification or initiate operation until I receive written approval (i.e. permit, registration, or exemption letter) from the Department. I acknowledge that I may be required to perform testing of the equipment to receive construction or operation approval, and that if I do not receive approval to construct or operate that I may appeal the decision.

Peter Krawchyk

Owner or Operator

Signature of Owner or Operator

1/31/2020

Date

One Original and One Copy of All Application Forms Should Be Mailed To:
Division of Air Quality
100 W. Water Street, Suite 6A
Dover, Delaware 19904

All Checks Should Be Made Payable To:
State of Delaware

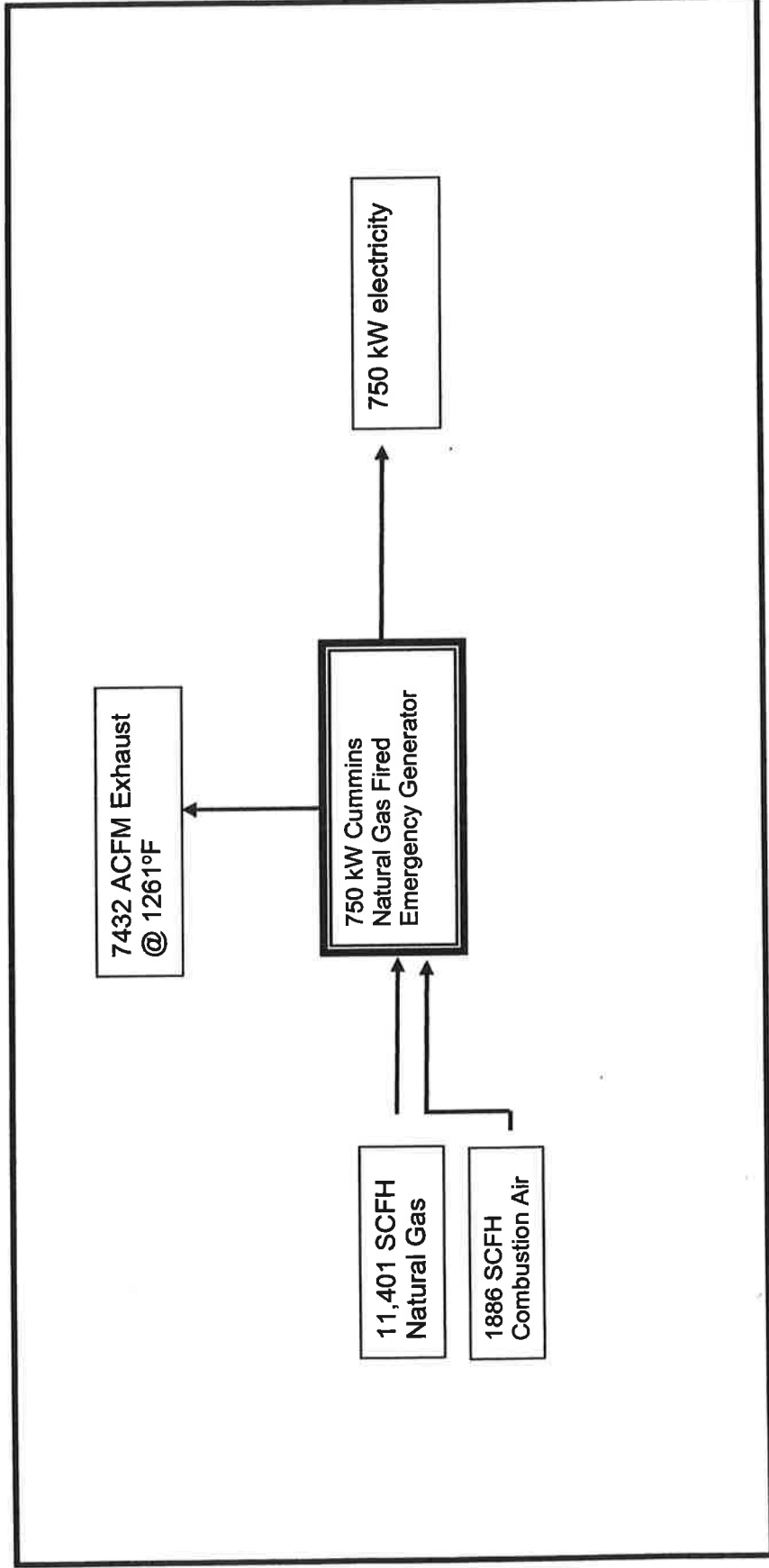


DNREC – Air Quality Management Section
Application to Construct, Operate, or Modify
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Form AQM-2
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Process Flow Diagram

Sketch the Process Flow Diagram for the equipment or process being applied for. Include each emission unit and control device (even existing emission units that will not be modified by this application). You may identify each emission unit with a simple shape. Label each emission unit and control device with a unique identifier. Show the relationship between each emission unit and/or control device by drawing arrows between them to indicate the flow of air pollutants. List which application forms are included for each emission unit or control device below the shape representing each emission unit or control device. See <http://www.delaware.gov/reg2/default.htm> for example Process Flow Diagrams for common processes. If you already have a Process Flow Diagram for the equipment or process being applied for, you may attach it to the application instead of using this form.





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Application to Construct, Operate, or Modify
Stationary Sources

Form AQM-3.3
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Generator/Engine Application

If you are using this form electronically, press F1 at any time for help

General Information

1. Facility Name: **University of Delaware**
2. Equipment ID: **Worrlow EG-1**
3. Manufacturer: **Cummins NPower**
4. Model: **C750N6**
5. Serial Number:
6. Maximum Power Rating of Engine: **1098** horsepower
7. Standby Power Rating of Generator: **750** kilowatt
8. Date of Manufacture: **2019**
9. Installation Date: **2Q2020**

10. Is the Equipment Being Applied For a Generator or an Engine? ☒ Generator ☐ Engine

If the equipment is a Generator, complete the rest of Question 10. If not, proceed to Question 11.

- 10.1. Is the Generator Existing or New? ☐ Existing ☒ New
- 10.2. Will the Generator Be Classified as an Emergency Generator or a Distributed Generator? ☒ Emergency ☐ Distributed
- 10.3. Has an Initial Notification Pursuant to 7 DE Admin. Code 1144 Been Submitted for this Generator? ☒ YES ☐ NO

If NO, include a copy of the Initial Notification with this application.

- 10.4. Have the Emissions From the Generator Been Certified to Meet the Currently Applicable US EPA Non-Road Emission Standards? ☒ YES ☐ NO

If YES, attach a copy of the Manufacturer's Certification. If NO, attach copies of any/all of the following: any maintenance or operating requirements/instructions provided by the generator manufacturer; the type, or a description, of any emission control equipment use; and/or emissions test data for the generator (such as a manufacturer's technical data sheet), any supporting documentation for any emission control equipment used, any supporting calculations, any quality control or assurance information, and any other information needed to demonstrate compliance with the requirements. Proceed to Question 11.

11. Primary Fuel: ☒ Natural Gas ☐ Biodiesel
☐ Diesel ☐ Other (specify):
☐ Propane

- 11.1. Maximum Annual Primary Fuel Consumption: **5.7 MMCF**

- 11.2. Heat Content of Primary Fuel: **1030 BTU/CF**

- 11.3. Maximum Firing Rate: **0.0011 MMCF/hr**

- 11.4. Percent Sulfur of Primary Fuel: **0 %**

12. Secondary Fuel: ☐ Natural Gas ☐ Biodiesel
☐ Diesel ☐ Other (specify):
☐ Propane



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Form AQM-3.3
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General Information

- 12.1. Maximum Annual Secondary Fuel Consumption: **MMCF**
- 12.2. Heat Content of Secondary Fuel: **BTU/CF**
- 12.3. Maximum Firing Rate: **MMCF/hr**
- 12.4. Percent Sulfur of Secondary Fuel: **%**
13. Is SCR/NSCR/SNCR/Ammonia Injection Used: ☐ YES ☐ NO

Stack Information

14. How Does the Process Equipment Vent:
(check all that apply)
☒ Directly to the Atmosphere
☐ Through a Control Device Covered by Forms AQM-4.1 through 4.12

If any of the process equipment vents directly to the atmosphere proceed to Question 15. If the process equipment vents through a control device, provide the stack parameters on the control device form and proceed to Question 16.

15. Emission Point Name: **Worrilow EG**
- 15.1. Stack Height Above Grade: **15 feet**
- 15.2. Stack Exit Diameter: **0.83 feet**
(Provide Stack Dimensions If Rectangular Stack)
- 15.3. Is a Stack Cap Present? ☐ YES ☐ NO
- 15.4. Stack Configuration: ☐ Vertical ☒ Horizontal ☐ Downward-Venting
(check all that apply) ☐ Other (Specify):
- 15.5. Stack Exit Gas Temperature: **1261 °F**
- 15.6. Stack Exit Gas Flow Rate: **7432 ACFM**
- 15.7. Distance to Nearest Property Line: **500 ft**
- 15.8. Describe Nearest Obstruction: **Building**
- 15.9. Height of Nearest Obstruction: **20 ft**
- 15.10. Distance to Nearest Obstruction: **15 ft**
- 15.11. Are Stack Sampling Ports Provided? ☐ YES ☒ NO

Monitoring Information

16. Will Emissions Data be Recorded by a Continuous Emission Monitoring System? ☐ YES ☒ NO
- If Yes, Attach a Copy of the Continuous Emission Monitoring System Manufacturer's Specification Sheets**
- If YES, complete the rest of Question 16. If NO, proceed to Question 17.**
- 16.1. Pollutants Monitored: ☐ VOCs ☐ HAPs ☐ PM ☐ PM₁₀ ☐ PM_{2.5} ☐ NO_x ☐ SO_x ☐ Metals
☐ Other (Specify):
- 16.2. Describe the Continuous Emission Monitoring System:



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Form AQM-3.3
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Monitoring Information

16.3. Manufacturer:

16.4. Model:

16.5. Serial Number:

16.6. Will Multiple Emission Units Be Monitored at the Same Point? ☐ YES ☐ NO

If YES, complete the rest of Question 16. If NO, proceed to Question 17.

16.7. Emission Units Monitored:

16.8. Will More Than One Emission Unit be Emitting From the Combined Point At Any Time? ☐ YES ☐ NO

If YES, complete the rest of Question 15. If NO, proceed to Question 17.

16.9. Emission Units Emitting Simultaneously:

Visible Emissions Monitoring Information

For Primary Fuel

17. Proposed Technique Used to Monitor Visible Emissions: ☐ Opacity Monitor (COM)
☒ Manual (Method 9)
☐ Manual (Method 22)
☐ Other (Describe):

If an Opacity Monitor (COM) is used, complete the rest of Question 17. If not, proceed to Question 18.

17.1. Describe the Continuous Opacity Monitoring System:

17.2. Manufacturer:

17.3. Model:

17.4. Serial Number:

18. Proposed Frequency of Opacity Monitoring: **quarterly**

For Secondary Fuel. If no Secondary Fuel is used, proceed to Question 20.

19. Proposed Technique Used to Monitor Visible Emissions: ☐ Opacity Monitor (COMs)
☐ Manual (Method 9)
☐ Manual (Method 22)
☐ Other (Describe):

If an Opacity Monitor (COMs) is used, complete the rest of Question 19. If not, proceed to Question 20.

19.1. Describe the Continuous Opacity Monitoring System:

19.2. Manufacturer:

19.3. Model:

19.4. Serial Number:

20. Proposed Frequency of Opacity Monitoring:



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Voluntary Emission Limitation Request Information

21. Are You Requesting Any Voluntary Emission Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 21. If NO, proceed to Question 22.

21.1. Describe Any Proposed Emission Limitations:

Voluntary Operating Limitation Request Information

22. Are You Requesting Any Voluntary Operating Limitations to Avoid Major Source Status, Minor New Source Review, MACT, NSPS, etc.? ☐ YES ☒ NO

If YES, complete the rest of Question 22. If NO, proceed to Question 23.

22.1. Describe Any Proposed Operating Limitations:

Additional Information

23. Is There Any Additional Information Pertinent to this Application? ☐ YES ☐ NO

If YES, complete the rest of Question 23.

22.1. Describe: **Replace existing 250 KW Emergency Generator**



**DNREC – Division of Air Quality
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Form AQM-5
Page 1 of 3

Emissions Information Application

If you are using this form electronically, press F1 at any time for help

Process Information	
1.	Number of Individual Pieces of Process Equipment in Process: 1
2.	Number of Individual Control Devices in Process: 1

Emissions Information for First Emission Point/Stack	
3.	Emission Point Name: Worrlow Emergency Generator
4.	Equipment ID Number for all Process Equipment and Control Devices Venting Through Emission Point/Stack: Worrlow EG-1
5.	Pollutant Emissions

If more than 15 pollutants are emitted at this Emission Point/Stack, attach additional copies of this page as needed.

Pollutant Name (Specify VOCs and HAPs Individually in 5.10 through 5.18)	CAS Number (Not required for 5.1 through 5.10)	Maximum Uncontrolled Emission Rate at Design Capacity	Maximum Controlled Emission Rate at Design Capacity	Annual Potential to Emit (PTE)	Requested Permitted Annual Emissions
5.1. Particulate Matter (PM)		0 lbs/hour	0 lbs/hour	0 tons/year	tons/year
5.2. PM ₁₀		0 lbs/hour	0 lbs/hour	0 tons/year	tons/year
5.3. PM _{2.5}		0 lbs/hour	0 lbs/hour	0 tons/year	tons/year
5.4. Sulfur Oxides (SO _x)		0 lbs/hour	0 lbs/hour	0 tons/year	tons/year
5.5. Nitrogen Oxides (NO _x)		0.0022 lbs/hour	2.42 lbs/hour	0.61 tons/year	tons/year
5.6. Carbon Monoxide (CO)		0.0044 lbs/hour	4.83 lbs/hour	1.21 tons/year	tons/year
5.7. Total Volatile Organic Compounds (VOCs)		0.0015 lbs/hour	1.65 lbs/hour	0.41 tons/year	tons/year



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Emissions Information for First Emission Point/Stack

6. Provide Any Additional Information Necessary to Understanding the Emission Rates Provided Above: Annual emissions based on 500 hours of operation per year

Attach the Basis of Determination or Calculations for each Emission Rate provided above.

Minor New Source Review Information

21. Does the Process Have the Potential to Emit More Than Five Tons Per Year of Any Pollutant? ☐ YES ☒ NO

22. Is the Source New or Existing? ☒ NEW ☐ EXISTING
See Question 11 of AQM-1

If the Process has the Potential to Emit more than five tons per year of any pollutant, and is a New Source, a Control Technology Analysis pursuant to Regulation No. 1125 Section 4 must be conducted and attached to this application.

Major New Source Review Information

23. Does the Process Have the Potential to Emit More Than the Significance Level for Any Pollutant? (Check All That Apply)

- ☐ Greater Than 25 Tons Per Year of Particulate Matter (PM)
- ☐ Greater Than 15 Tons Per Year of PM₁₀
- ☐ Greater Than 10 Tons Per Year of PM_{2.5}
- ☐ Greater Than 40 Tons Per Year of Sulfur Dioxide (SO₂)
- ☐ Greater Than 25 Tons Per Year of Nitrogen Oxides (NO_x) in New Castle and Kent County
- ☐ Greater Than 100 Tons Per Year of Nitrogen Oxides (NO_x) in Sussex County
- ☐ Greater Than 100 Tons Per Year of Carbon Monoxide (CO)
- ☐ Greater Than 25 Tons Per Year of Total Volatile Organic Compounds (VOCs) in New Castle and Kent County
- ☐ Greater Than 50 Tons Per Year of Total Volatile Organic Compounds (VOCs) in Sussex County
- ☐ Greater Than 75,000 Tons Per Year of Equivalent Carbon Dioxide (CO_{2e})

If the Process has the Potential to Emit greater than any of the amounts listed above 7 DE Admin. Code 1125 Sections 2 and/or 3 apply. Contact the Department at (302) 323-4542 or (302) 739-9402 for additional information

Additional Information



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24. Is There Any Additional Information Pertinent to this Application? ☐ YES ☒ NO

If YES, complete the rest of Question 24.

24.1. Describe:

Worritow

750 kW

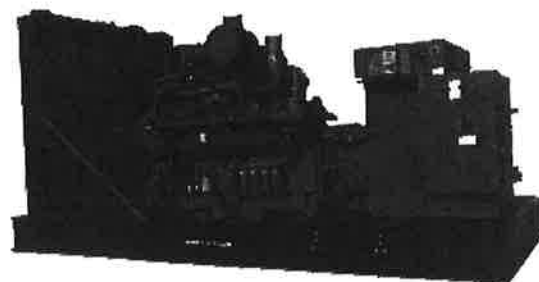


Specification sheet

Gaseous Fuel Generator Set

GTA50E Engine Series

600 kW - 750 kW 60 Hz



Description

The Cummins GTA50E-series commercial Generator Set boasts an EPA-certified, fully-integrated power generation system providing optimum performance, reliability, and versatility for stationary emergency standby power applications.

Features

- Cost-saving EPA-Certified GenSet - No Site Emissions Testing
- Accepts 100% Rated Load in a Single Step.
- Surge Rating - 110% of Nameplate
- Standard Power Command® Control (PCC) 3300 with Paralleling Capability
- Meets NFPA 110 Level 1 Type 10 Requirements for 10-Second Ready-To-Load

UL 2200 Certification - This Cummins GenSet has been designed, tested, and certified to UL 2200 standards. (See Fuel Installation Requirements on page 4.)

Warranty and Service - Backed by a comprehensive warranty and global distributor network.

Cummins Heavy-Duty Engine - Rugged 4-cycle industrial spark-ignited engine, with electronic controls, delivers reliable power, low emissions, and quick response to load changes.

Alternator - Several alternator sizes offer selectable motor-starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads, fault-clearing short-circuit capability, and class H insulation.

Control System - The PCC electronic control provides total GenSet system integration, including automatic remote starting/stopping, precise voltage regulation, alarm and status message display, AmpSentry™ protective relay, output metering, and auto-shutdown at fault detection.

National Fire Protection Association (NFPA) - The GenSet accepts full rated load in a single step in accordance with NFPA 110 Type 10 (ten seconds) for Level 1 and Level 2 Emergency or Standby Power Supply Systems (EPSSs).

Model	Standby Power Rating*		Emissions Compliance	Engine Data sheet
	60 Hz			
C600N6		kW (kVa)	EPA SI NSPS Stationary Emergency Certified	FR60376
C650N6		600 (750)	EPA SI NSPS Stationary Emergency Certified	
C650N6		650 (813)	EPA SI NSPS Stationary Emergency Certified	
C750N6		750 (937)	EPA SI NSPS Stationary Emergency Certified	

* Tested at 0.8 power factor (PF) per NFPA 110.

GenSet Specifications

Voltage Regulation, No Load to Full Load	±1%
Random Voltage Variation	±1% (Three-phase only.)
Frequency Regulation	isochronous
Random Frequency Variation	±0.5%
Radio Frequency Interference	Optional PMG excitation operates in compliance with BS800 and VDE level G and N. Addition of RFI protection kit allows operation per MIL-STD-461 and VDE level K.

Engine Specifications

Base Engine	Cummins Model GTA60E
Displacement	50.3 L (3069 in ³)
Overspeed Limit	2100 rpm
Regenerative Power	TBD
Cylinder Block Configuration	Cast iron with replaceable wet cylinder liners
Cranking Current	1800 CCA at ambient temperature of 0 °C (32 °F)
Battery Charging Alternator	43 amps
Battery Type	8D (x4)
Starting Voltage	24-volt, negative ground
Standard Cooling System	See derates on Engine Data Sheet
Lube Oil Filter Types	Four spin-on canisters-combination full flow with bypass

Alternator Specifications

Design	Brushless, 4-pole, drip-proof revolving field
Stator	2/3 pitch
Rotor	Direct-coupled by flexible disc
Insulation System	Class H per NEMA MG1-1.65 or better
Standard Temperature Rise *	125 °C
Exciter Type	Permanent Magnet Generator (PMG)
Phase Rotation	A (U), B (V), C (W)
Alternator Cooling	Direct-drive centrifugal blower

* For UL 1004 ratings, refer to temperature rise at 120 °C or below, and ambient temperature up to 40 °C.

Full-load Amperage (FLA) at Rated Voltage

Model	Fuel Type	Voltage								
		120/240 (1 Ph)	120/208	127/220	139/240	220/380	240/416	254/440	277/480	347/600
C600N6	NG	N/A	2082	1968	1804	1140	1041	984	902	722
C650N6	NG	N/A	2255	2132	1955	1235	1128	1066	977	782
C750N6	NG	N/A	2802	2480	2255	1424	1301	1230	1128	902

Rated Load Fuel Consumption in Standard Cubic Feet per Hour (CFH)*

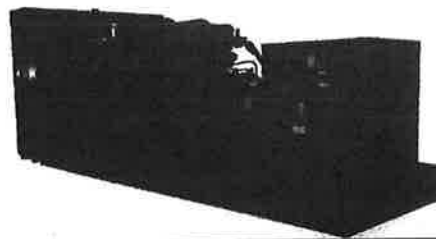
Model	Fuel Type	Load			
		1/4	1/2	3/4	Full
C600N6	NG	3358	5424	7226	9557
C650N6	NG	3591	5359	7707	10221
C750N6	NG	3872	6081	8724	11401

* See Fuel Installation Requirements on page 4.

Fuel inlet pressure, measured at the regulator inlet, must be 356 to 508 mm WC (14 to 20 in. WC).

Gaseous Fuel Generator Set

GTA50 Engine Series



Specification Sheet

Model GFLC EPA SI NSPS Compliant Capable



KW(KVA) @ 0.8 P.F.	
Compression	60 Hz-1800 RPM
Ratio	Standby
8.5:1 (Note 1)	725 kW (906 kVa)

Note:

(1) 54°C (130°F) or lower water temperature into the aftercooler.

NOTE: This engine is EPA SI NSPS compliant capable. A site validation emission test must be performed.

Fuel Application Guide	
Compression Ratio	8.5:1
Dry Processed Natural Gas	Yes
Propane (HD-5)	N/A
All gases such as field gas, digester and sewage gas will require an analysis of the specified gas and pre-approval from CNGE. Consult your Cummins Distributor for details.	

Description

The Cummins NPower GF-series commercial generator set is a fully integrated power generation system providing optimum performance, reliability, and versatility for stationary standby power applications.

A primary feature of the GF GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty Cummins 4-cycle spark ignited engine, an AC alternator with high motor-starting kVA capacity, and an electronic voltage regulator with three phase sensing for precise regulation under steady-state or transient loads. The GF GenSet accepts 100% of the nameplate standby rating in one step.* Sets comply with 10 second ready to load per NFPA 110.

The standard PowerCommand® digital electronic control is an integrated system that combines engine and alternator controls for high reliability and optimum GenSet performance.

Optional protective housing and component heaters shield the generator set from extreme operating conditions.** Environmental concerns are addressed by low exhaust emission engines, sound-attenuated housings, and exhaust silencers. A wide range of options, accessories, and services are available, allowing configuration to your specific power generation needs.

Every production unit is factory tested at rated load and power factor. This testing includes demonstration of rated power and single-step rated load pickup. Cummins NPower manufacturing facilities include quality standards, emphasizing our commitment to high quality in the design, manufacture, and support of our products. The PowerCommand control is UL508 Listed.

All Cummins NPower generator sets are backed by a comprehensive warranty program and supported by a worldwide network of 233 locations to assist with warranty, service, parts, and planned maintenance

Features

Cummins Heavy-Duty Engine - Rugged 4-cycle industrial spark ignited engine delivers reliable power, low emissions, and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor-starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads, fault-clearing short-circuit capability, and class H insulation. The alternator electrical insulation system is UL1446 Recognized.

Control Systems - The PowerCommand electronic control is standard equipment and provides total genset system integration, including automatic remote starting/stopping, precise voltage regulation, alarm and status message display, output metering, and auto-shutdown at fault detection, and NFPA 110 compliance. PowerCommand control is Listed to UL508.

Cooling System - Standard cooling package provides reliable running at the rated power level, at up to 104°F ambient temperature.

Housings - Optional weather-protective housing and sound attenuation housing(s) are available.

Standards - Generators are designed, manufactured and tested to relevant UL, NFPA, ISO and IEC standards. The alternator is certified to CSA 22.2. The controls are CSA C282-M1999 and 22.2 No.14 M91. PowerCommand control is UL508 Listed.

Warranty and Service - Backed by a comprehensive warranty and worldwide distributor service network.

* Adequate fuel pressure and volume must be provided.

** Cold weather heaters are recommended when ambient temperatures are below 32°F.

Generator Set

The general specifications provide representative configuration details. Consult the outline drawing for installation design.

Specifications - General	
Unit Width	2515 mm (90 in) - Open set
Unit Height	2744 mm (108 in) - Open set
Unit Length	5182 mm (204 in) - Open set
Unit Dry Weight	10241 to 11181 kg (22578 to 24650 lbs) - Dependant on selected alternator.
Rated Speed	1800 rpm
Voltage Regulation, No Load to Full Load	±1.0%
Random Voltage Variation	±1.0%
Frequency Regulation	Isochronous
Random Frequency Variation	±0.5%
Radio Frequency Interference	Optional PMG excitation operates in compliance with BS800 and VDE level G and N. Addition of RFI protection kit allows operation per MIL-STD-461 and VDE level K.
See outline drawing for installation design specifications.	

Rating Definitions

Standby Rating based on: Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated. Usage based on ISO 8528.

Site Derating Factors

See engine data sheet FR 996081 for altitude and ambient derate curves.

Gensets with Weather or Sound Enclosures may reduce ambient capability by 2 to 4.5 °C (4 to 8 °F) depending on enclosure type and site conditions.

1) Data represents gross engine performance capabilities obtained and corrected in accordance with SAEJ1349 conditions of 29.61 in. Hg.(100KPa) barometric pressure [361 ft. (110m) altitude], 77°F (25°C) inlet air temperature, and 0.30 in Hg.(100KPa) water vapor pressure using dry processed natural gas fuel with 905 BTU per standard cubic foot (33.72 kJ/L) lower heating value. Deration may be required due to altitude, temperature or type of fuel. Consult your local Cummins Distributor for details.

2) FUEL SYSTEM

Standard Carburetor – IMPCO Make

Low Pressure Dry Processed Natural Gas – (905 BTU/ft.³ L.H.V.)

Running Pressure to Engine381 to 508 mm H₂O(15 to 20 in. H₂O)

Minimum Gas Supply Pipe Size @ Engine50.8 mm (2.0 in.)

Gas Supply Filter Pressure Rating690 kPa (100psi)

The preceding pipe sizes are only suggestions and piping may vary with temperatures, distance from fuel supply and application of local codes. Gas must be available at adequate volume and pressure for engine at the regulator.

The Genset (engine) performance is based on processed natural gas fuel with 905 BTU per standard cubic foot (33.72 kJ/L) lower heating value. Variations in fuel composition and/or supply pressure must be eliminated during steady state operation. Locate the gas regulator as near to the engine as possible. Some systems may need an accumulator or other device(s) for startup or unstable conditions, contact the Fuel Supply utility for details.

Engine

Cummins heavy-duty spark ignited engines use advanced combustion technology for reliable and stable power, low emissions, and fast response to sudden load changes.

Electronic governing is standard for applications requiring constant (isochronous) frequency regulation such as Uninterruptible Power Supply (UPS) systems, non-linear loads, or sensitive electronic loads. Optional coolant heaters are recommended for all emergency standby installations or for any application requiring fast load acceptance after start-up.

Specifications - Engine				
Base Engine		Cummins Model GTA50 GC		
Displacement		50.3 L (3067 in ³)		
Overspeed Limit		2100 rpm		
Regenerative Power		24 kW		
Cylinder Block Configuration		Cast iron with replaceable wet cylinder liners		
Cranking Current		850 amps at ambient temperature of 0°C (32°F)		
Battery Charging Alternator		35 amps		
Battery Type		8D		
Starting Voltage		24-volt, negative ground		
Standard Cooling System		40°C (104°F) ambient radiator		
Lube Oil Filter Types		Five spin-on canisters combination full flow with bypass		
Fuel		STANDBY		
Fuel Consumption	Load	1/2	3/4	Full
(Approximate)	kW	362	544	725
Natural Gas	CFH	6006	7894	10021
Propane Vapor	CFH	N/A	N/A	N/A
Propane Liquid	GPH	N/A	N/A	N/A
Cooling		Full Load		
Jacket Water Heat Rejection to Coolant		831 kW (47320 BTU/min)		
Aftercooler Heat Rejection to Coolant		84 kW (4770 BTU/min)		
Heat Rejection to Room		173 kW (9830 BTU/min)		
Jacket Water Coolant Capacity (w/radiator)		326 L (86 USG)		
Jacket Water Coolant Flow Rate		1813 L/min (479 GPM)		
Aftercooler Coolant Capacity (w/radiator)		182 L (48 USG)		
Aftercooler Coolant Flow Rate		420 L/min (111 GPM)		
Maximum Coolant Friction Head *		34 kPa (5 psi)		
Maximum Coolant Static Head *		18.3 m (60 ft)		
Radiator Fan Load		54 kW (72 hp)		
Air		Full Load		
Combustion Air		774 L/sec (1640 cfm)		
Maximum Air Cleaner Restriction		381 mm H ₂ O (15 in H ₂ O)		
Alternator Cooling Air (309F)		1.96 m ³ /s (4156 cfm)		
Radiator Cooling Air		27845 L/sec (59000 cfm)		
Maximum Restriction at Radiator Discharge (static)		12.7 mm H ₂ O (0.5 in H ₂ O)		
Exhaust		Full Load		
Gas Flow (Full Load)		2890 L/sec (6124 cfm)		
Gas Temperature		662°C (1224°F)		
Maximum Back Pressure		51 mm Hg (2 in Hg)		
Engine		Full Load		
Gross Engine Power Output		819 kWm (1098 hp)		
BMEP		1089 kPa (158 psi)		
Piston Speed		9.5 m/s (1875 ft/min)		
Oil Capacity (High/Low)		224 L (59.2 gal) / 194 L (51.2 gal)		

* Jacket water only.

Alternator

Several alternators are available for application flexibility based on the required motor-starting kVA and other requirements. Larger alternator sizes have lower temperature rise for longer life of the alternator insulation system. In addition, larger alternator sizes can provide a cost-effective use of engine power in across-the-line motor-starting applications and can be used to minimize voltage waveform distortion caused by non-linear loads.

Single-bearing alternators couple directly to the engine flywheel with flexible discs for drive train reliability and durability. No gear reducers or speed changers are used. Two-thirds pitch windings eliminate third-order harmonic content of the AC voltage waveform and provide the standardization desired for paralleling of generator sets. The standard excitation system is a self (shunt) excited system with the voltage regulator powered directly from the

Alternator Application Notes

Separately Excited Permanent Magnet Generator (PMG) System - This option uses an integral PMG to supply power to the voltage regulator. A PMG system generally has better motor-starting performance, lower voltage dip upon load application, and better immunity from problems with harmonics in the main alternator output induced by non-linear loads. This option is recommended for use in applications that have large transient loads, sensitive electronic loads (especially UPS applications), harmonic content, or that require sustained short-circuit current (sustained 3-phase short circuit current at approximately 3 times rated for 10 seconds).

Alternator Sizes - On any given model, various alternator sizes are available to meet individual application needs. Alternator sizes are differentiated by maximum winding temperature rise, at the generator set standby rating, when operated in a 40°C (104°F) ambient environment. Available temperature rises range from 80°C to 150°C (176°F to 302°F). Not all temperature rise selections are available on all models. Lower temperature rise is accomplished using larger alternators at lower current density. Lower temperature rise alternators have higher motor-starting kVA, lower voltage dip upon load application, and they are generally recommended to limit voltage distortion and heating due to harmonics induced by non-linear loads.

Alternator Space Heater - is recommended to inhibit condensation.



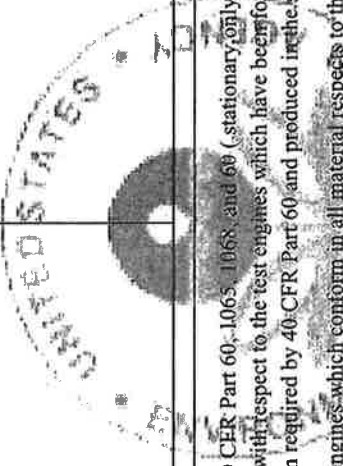
Available Output Voltages

Three Phase Reconnectable			Single Phase Non-Reconnectable			Three Phase Non-Reconnectable		
<input type="checkbox"/>	120/208	<input type="checkbox"/>	240/416	<input type="checkbox"/>	120/240	<input type="checkbox"/>	220/380	
<input type="checkbox"/>	127/220	<input type="checkbox"/>	254/440			<input type="checkbox"/>	347/600	
<input type="checkbox"/>	139/240	<input type="checkbox"/>	277/480					
<input type="checkbox"/>	120/240							

Specifications - Alternator									
Design	Brushless, 4-pole, drip-proof revolving field								
Stator	2/3 pitch								
Rotor	Direct coupled by flexible disc								
Insulation System	Class H per NEMA MG1-1.65 or better								
Standard Temperature Rise *	125° C *								
Exciter Type	PMG								
Phase Rotation	A (U), B (V), C (W)								
Alternator Cooling	Direct-drive centrifugal blower								
AC Waveform Total Harmonic Distortion	<5% total no load to full linear load <3% for any single harmonic								
Telephone Influence Factor (TIF)	<50 per NEMA MG1-22.43.								
Telephone Harmonic Factor (THF)	<3								

	80° C Alternator			105° C Alternator			125° C Alternator		
Voltage Ranges	120/208 Thru 139/240 240/416 Thru 277/480	277/480	347/600	120/208 Thru 139/240 240/416 Thru 277/480	277/480	347/600	120/208 Thru 139/240 240/416 Thru 277/480	277/480	347/600
Motor Starting	Broad Range	480	600	Broad Range	480	600	Broad Range	480	600
Maximum KVA (90% Sustained Voltage)	3866	3866	3866	3313	2944	2944	3313	2944	2944
Alternator Datasheet No.	ADS311D	ADS311D	ADS311D	ADS310D	ADS309F	ADS309F	ADS310D	ADS309F	ADS309F
Full Load Current		120/208	127/220	139/240	220/380	240/416	254/440	277/480	347/600
(Amps @ Standby Rating)		2516	2378	2180	1377	1258	1189	1090	872

* Other Temp Rises Available. See options at end of datasheet for more details.

	<div>UNITED STATES ENVIRONMENTAL PROTECTION AGENCY 2019 MODEL YEAR CERTIFICATE OF CONFORMITY WITH THE CLEAN AIR ACT</div>	<div>OFFICE OF TRANSPORTATION AND AIR QUALITY ANN ARBOR, MICHIGAN 48105</div>
<div>Certificate Issued To: Cummins Inc. (U.S. Manufacturer or Importer) Certificate Number: KCEXB38.0AAA-013</div>	<div>Effective Date: 12/18/2018 Expiration Date: 12/31/2019</div>	<div> Byron J. Bunker, Division Director Compliance Division</div> <div>Issue Date: 12/18/2018 Revision Date: N/A</div>
<div><div>Manufacturer: Cummins Inc. Engine Family: KCEXB38.0AAA Mobile/Stationary Certification Type: Stationary Fuel : Natural Gas (CNG/LNG) LPG/Propane Emission Standards : Stationary Part 1048 NMHC + NOx (g/kW-hr) : 2.7 HC + NOx (g/kW-hr) : 2.7 CO (g/kW-hr) : 4.4 Part 60 Subpart JJJ Table 1 NOx (g/HP-hr) : 1.0 VOC (g/HP-hr) : 0.7 CO (g/HP-hr) : 2.0 Emergency Use Only : N</div><div></div></div>		
<div><p>Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 1065, 1068, and 68 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.</p><p>This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.</p><p>It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR Part 60 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void <i>ab initio</i> for other reasons specified in 40 CFR Part 60.</p><p>This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.</p></div>		

University of Delaware New Emission Sources - Five year rolling period emissions

Equipment	Date	Permit #	Unrestricted PTE NOx (tons/year)	Restricted PTE NOx (tons/year)	SO _x (tons/year)	PTE SO _x (tons/year)	PTE CO (tons/year)	Comments
Christiana East Tower Emergency Generator	2014	Registration	0.17	0.17	0.00	0.00	0.28	100 KW natural gas generator. 500 hours, no restrictions
Christiana West Tower Emergency Generator	2014	Registration	0.17	0.17	0.00	0.00	0.28	100 KW natural gas generator. 500 hours, no restrictions
DuPont Hall Emergency Generator	2014	Registration	0.05	0.05	0.00	0.00	0.03	180 KW natural gas generator, 500 hours, no restrictions
Old Christians Commons Generator	2014	Registration						No emission data so no credit applied for removal
Caesar Rodney Hall	2015	Registration	0.09	0.09	0.00	0.00	0.06	350 KW natural gas generator, 500 hours, no restrictions
Dickinson Emergency Generator	2015							No emission data so no credit applied for removal
Harrington Hall Emergency Generator	2015	Registration	0.04	0.04	0.00	0.00	0.05	80 KW natural gas generator, 500 hours, no restrictions
ISEB #3 Clean Room Emergency Generator	2015	Registration	0.87	0.87	0.00	0.00	0.76	350 KW natural gas generator, 500 hours, no restrictions
Old Harrington Hall Emergency Generator	2015							No emission data so no credit applied for removal
South Academy Street Residence Emergency generator	2016	Registration	0.02	0.02	0.00	0.00	0.01	Installed 2016
Gold Ice Arena Emergency Generator	2018	Registration	0.11	0.11	0.00	0.00	0.87	25 KW natural gas generator, 500 hours, no restrictions
Old Gold Ice Arena Emergency Generator	2018							No emission data so no credit applied for removal
Worrlow Dairy Emergency Generator	2018	Registration	0.01	0.01	0.00	0.00	0.07	100 KW natural gas generator, 500 hours, no restrictions
STAR Campus temporary Emergency Generator	2019	Registration	0.91	0.91	0.00	0.00	1.13	154 KW diesel generator, 500 hours, no restrictions
PBI Boilers (3 total)	2020		41.94	13.97	0.00	0.00	3.78	Three 600 BHP natural gas Input boilers, 210,000 MMBTU Input restriction
PBI Generators (6 total)	2020		0.12	0.12	0.00	0.00	0.19	400 KW natural gas generators, 500 hours, no restrictions
Whitney Athletic Center Boilers (4 total)	2020		0.82	0.82	0.00	0.00	2.14	
Whitney AC Water Heater	2020		0.05	0.05	0.00	0.00	0.14	
Worrlow Hall 750 MW Emergency Generator	2020		0.61	0.61	0.00	0.00	1.21	

Anticipated New Source Total:



GTA 50E Cooling and Air Data 60 Hz C750N6

Cooling Data @ Full Load

Jacket Water Heat Rejection to Coolant	1018 kW	(57886 BTU/min)
Aftercooler Heat Rejection to Coolant	97 kW	(5509 BTU/min)
Heat Rejection to Room	90 kW	(5143 BTU/min)
Jacket Water Coolant Capacity (w/radiator)	86 USG	(326 L)
Jacket Water Coolant Flow Rate @ 3.5 psi	1832 L/min	(484 GPM)
Aftercooler Coolant Capacity (w/radiator)	48 USG	(182 L)
Aftercooler Coolant Flow Rate @ 2.5 psi	397 L/min	(105 GPM)
Jacket Water Max Coolant Friction Head	34 kPa	(5 psi)
Jacket Water Max Coolant Static Head	18.3 m	(60 ft)
Radiator Fan Load	66.4 kW	(89 hp)

Air Data @ Full Load

Radiator Cooling Air	31927 L/sec	(67650 cfm)
Maximum Total External Restriction at Radiator (static)	12.7 mm H ₂ O	(0.5 in H ₂ O)
Alternator Cooling Air	1614 L/sec	(3420 cfm)

Engine Data @ Full Load

Combustion Air	890 L/sec	(1886 cfm)
Maximum Air Cleaner Restriction (Dirty)	381 mm H ₂ O	(15 in H ₂ O)
Exhaust Gas Flow	3508 L/sec	(7432 cfm)
Maximum Gas Temperature – Dry Stack	683 °C	(1261 °F)
Total System Back Pressure Allowed (After Catalyst)	51 mm Hg	(2 in Hg)
Catalyst Back Pressure	7.4 mm Hg	(.29 in Hg)
Silencer Back Pressure (Factory Enclosed Units Only)	39 mm Hg	(1.55 in Hg)

2) WEIGHTS DO NOT INCLUDE SPRINGER BAR
3) WEIGHTS INCLUDE SPRINGER BAR WHEN
AND 400 LBS/1100 KG
4) CONTROLLER CAN BE MOUNTED ON EITHER
5) REQUIRES USE OF SPRINGER BAR WHEN
6) GENSET DOES NOT INCLUDE FLOOR, CO
7) GENSETS HAVE INTERNAL ISOLATION &

University of Delaware

New Emissions

2016 through 2020

Source	2016	Registration	0.02	0.02	0.00	0.00	0.00	0.01	Installed 2016
South Academy Street Residence	2018	APC-2018/0077-/0082	0.12	0.12	0.00	0.00	0.00	0.19	400 KW generators, 500 hours, no restrictions
BPI Generators (6 total)	2019	APC-2018/0110-/0112	41.94	13.98	0.00	0.00	0.00	26.79	Permitted rates
Dairy Processing Emergency generator	2020	Registered	0.80	0.80	0.00	0.00	0.00	0.17	100 KW Emergency generator, 500 hours operation per year, no restrictions
Townsend Hall EG	2020		0.09	0.09				0.18	100 KW Emergency Generator, 500 hours operation per year
Life Science Research Facility EG 2	2020		0.01	0.01				0.06	350 KW Emergency Generator, 500 hours operation per year
Old Football Stadium Emergency Generator	2020								Removed from service
Whitney Emergency Generators	2020		0.63	0.38	0.00	0.00	0.00	0.75	750 KW natural gas generator, 300 hour restrictions
Anticipated New Source Total:									
2016-2020 Total			43.61	15.40				28.16	