



Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE
4949-A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020
www.deq.virginia.gov

Travis A. Voyles
Secretary of Natural and Historic Resources

Michael S. Rolband, PE, PWD, PWS Emeritus
Director
(804) 698-4020

Jerome A. Brooks
Regional Director

July 12, 2023

via Electronic Mail

Mr. Jeff Bertocci
Datacenter Operations Manager
Microsoft Corporation
101 Herbert Drive, Office 1118
Boydton, VA 23917
Jeff.Bertocci@microsoft.com

Location: Mecklenburg County
Registration No.: 53071

Dear Mr. Bertocci:

Attached is a permit to construct and operate backup diesel engine-generator sets at Microsoft Corporation – AVC43 Datacenter in accordance with the provisions of the Virginia Regulations for the Control and Abatement of Air Pollution.

In the course of evaluating the application and arriving at a final decision to approve the project, the Department of Environmental Quality (DEQ) deemed the application complete on March 14, 2023.

This permit contains legally enforceable conditions. Failure to comply may result in a Notice of Violation and/or civil charges. Please read all permit conditions carefully.

This permit approval to construct and operate shall not relieve Microsoft Corporation of the responsibility to comply with all other local, state, and federal permit regulations.

The proposed diesel engine-generator sets are subject to 40 CFR 63, Maximum Achievable Control Technology (MACT), Subpart ZZZZ and 40 CFR 60, New Source Performance Standard (NSPS), Subpart IIII. Virginia has not accepted delegation of these rules. In summary, the units are required to comply with certain federal emission standards and operating limitations. The Department of Environmental Quality (DEQ) advises you to review the referenced MACT and NSPS to ensure compliance with applicable emission and operational

limitations. As the owner/operator you are also responsible for any monitoring, testing, notification, reporting and recordkeeping requirements of the MACT and NSPS. Notifications shall only be sent to EPA, Region III.

To review any federal rules referenced in the above paragraph or in the attached permit, the US Government Publishing Office maintains the text of these rules at www.ecfr.gov, Title 40, Part 60 and 63.

The Regulations as contained in Title 9 of the Virginia Administrative Code 5-170-200 provide that you may request a formal hearing from this case decision by filing a petition with the DEQ within 30 days after this case decision notice was mailed or delivered to you. Please consult the relevant regulations for additional requirements for such requests.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have 30 days from the date you actually received this permit or the date on which it was mailed to you, whichever occurred first, within which to initiate an appeal of this decision by filing a Notice of Appeal with:

Director
Department of Environmental Quality
P. O. Box 1105
Richmond, VA 23218

If this permit was delivered to you by mail, three days are added to the thirty-day period in which to file an appeal. Please refer to Part Two A of the Rules of the Supreme Court of Virginia for information on the required content of the Notice of Appeal and for additional requirements governing appeals from decisions of administrative agencies.

If you have any questions concerning this permit, please contact the regional office at (804) 527-5020.

Sincerely,



James E. Kyle, P.E.
Air Permit Manager

JEK/eds/53071-01 MS AVC43 NSR 7.12.23.docx

Attachments: Permit
Source Testing Report Format

Federal regulations can be found at: <http://www.gpo.gov/fdsys/search/showcitation.action>
40 CFR Part 60 Subpart IIII and 40 CFR Part 63 Subpart ZZZZ

cc: File
Inspector, Air Compliance



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STATIONARY SOURCE PERMIT TO CONSTRUCT AND OPERATE

In compliance with the Federal Clean Air Act and the Commonwealth of Virginia Regulations for the Control and Abatement of Air Pollution,

Microsoft Corporation
101 Herbert Drive
Boydton, VA 23917
Registration No.: 53071

is authorized to construct and operate

backup diesel engine-generator sets at a datacenter
(Ref. Nos. ENG1-ENG42 at AVC43-1 and AVC43-2)

located at

Microsoft Corporation – AVC43 Datacenter
2 Butts Street
South Hill, VA 23970

in accordance with the Conditions of this permit.

Approved on July 12, 2023.

A handwritten signature in blue ink, appearing to read "J. Kyle", written over a horizontal line.

James E. Kyle, P.E.
Air Permit Manager, Department of Environmental Quality

Permit consists of 10 pages.
Permit Conditions 1 to 23.

INTRODUCTION

This permit approval is based on the permit application dated January 6, 2023 and supplemental information dated March 7, 2023. Any changes in the permit application specifications or any existing facilities which alter the impact of the facility on air quality may require a permit. Failure to obtain such a permit prior to construction may result in enforcement action. In addition, this facility may be subject to additional applicable requirements not listed in this permit.

Words or terms used in this permit shall have meanings as provided in 9 VAC 5-10-10 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution. The regulatory reference or authority for each condition is listed in parentheses () after each condition.

Annual requirements to fulfill legal obligations to maintain current stationary source emissions data will necessitate a prompt response by the permittee to requests by the DEQ for information to include, as appropriate: process and production data; changes in control equipment; and operating schedules. Such requests for information from the DEQ will either be in writing or by personal contact.

The availability of information submitted to the DEQ or the Board will be governed by applicable provisions of the Freedom of Information Act, §§ 2.2-3700 through 2.2-3714 of the Code of Virginia, § 10.1-1314 (addressing information provided to the Board) of the Code of Virginia, and 9 VAC 5-170-60 of the State Air Pollution Control Board Regulations. Information provided to federal officials is subject to appropriate federal law and regulations governing confidentiality of such information.

Equipment List - Equipment at this facility covered by this permit consists of:

Equipment to be Constructed:

Reference No.	Equipment Description	Rated Capacity	Delegated Federal Requirements
ENG1-ENG20, ENG22-ENG41	Forty (40) Caterpillar Model C175-16 backup engine-generator sets	4,376 bhp 3,100 kWe, each	--
ENG21, ENG42	Two (2) Caterpillar Model C15 backup engine-generator sets	762 bhp 500 kWe, each	--

Specifications included in the above table are for informational purposes only and do not form enforceable terms or conditions of the permit.

PROCESS REQUIREMENTS

1. Emission Controls - Nitrogen oxides (NO_x) emissions from the engine-generator sets (Ref. Nos. ENG1-ENG20 and ENG22-ENG41) shall be controlled by turbocharged engine and aftercooler. Nitrogen oxides (NO_x) emissions from the engine-generator sets (Ref. Nos. ENG21 and ENG42) shall be controlled by turbocharged engine and charge air cooler. The permittee shall maintain documentation that demonstrates the engine design and/or control device has been installed on the engine-generator sets.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
2. Emission Controls - Visible emissions, particulate (PM, PM₁₀ and PM_{2.5}), volatile organic compound (VOC), nitrogen oxides (NO_x) and carbon monoxide (CO) emissions from the engine-generator sets (Ref. Nos. ENG1- ENG42) shall be controlled by the use of good operating practices and performing appropriate maintenance in accordance with the manufacturer recommendations. In addition, the permittee may only change those settings that are permitted by the manufacturer and does not increase air emissions.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)
3. Monitoring Devices - Each engine-generator set shall be equipped with a non-resettable hour metering device to monitor the operating hours and a fuel flow meter to monitor the fuel throughput. The non-resettable hour meter used to continuously measure the hours of operation and fuel flow meter used to continuously measure the amount of fuel consumed by each engine-generator set shall be observed by the owner with a frequency of not less than once each day the engine-generator set is operated. The owner shall keep a log of these observations.

Each monitoring device shall be installed, maintained, calibrated (as appropriate) and operated in accordance with approved procedures which shall include, as a minimum, the manufacturer's written requirements or recommendations. Each monitoring device shall be provided with adequate access for inspection and shall be in operation when the engine-generator sets are operating.

(9 VAC 5-80-1180 D)

OPERATING/EMISSION LIMITATIONS

4. Operation of the Engine-Generator Set - The permittee shall operate and maintain each engine-generator set and control device according to the manufacturer's written instructions or procedures developed by the permittee that are approved by the engine manufacturer. In addition, the permittee may only change those settings that are permitted by the manufacturer and does not increase air emissions.
(9 VAC 5-80-1180)
5. Fuel - The approved fuels for the engine-generator sets (Ref. Nos. ENG1-ENG42) are diesel and renewable diesel fuels. The diesel and renewable diesel fuels shall meet the ASTM D975 specification for S15 diesel fuel oil with a maximum sulfur content per

shipment of 0.0015%. A change in the fuel shall be considered a change in the method of operation of the engine-generator sets and may require a new or amended permit. However, if a change in the fuel is not subject to new source review permitting requirements, this condition should not be construed to prohibit such a change. (9 VAC 5-80-1180 and 9 VAC 5-50-260)

6. Fuel Throughput - The engine-generator sets (Ref. Nos. ENG1-ENG42) shall consume no more than the following:

Reference Number	Throughput Limit (combined)
ENG1-ENG20, ENG22-ENG41	707,952 gallons diesel/renewable diesel per year
ENG21, ENG42	5,998 gallons diesel/renewable diesel per year

Each throughput shall be calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months. (9VAC5-80-1180)

7. Fuel Certification - The permittee shall obtain a certification from the fuel supplier with each shipment of diesel and renewable diesel. Each fuel supplier certification shall include the following:
- The name of the fuel supplier;
 - The date on which the diesel and renewable diesel fuel was received;
 - The quantity of diesel and renewable diesel fuel delivered in the shipment;
 - A statement that the diesel and renewable diesel fuel complies with the American Society for Testing and Materials specifications (ASTM D975) for S15 diesel fuel oil; and
 - The sulfur content of the diesel and renewable diesel fuel.

Fuel sampling and analysis, independent of that used for certification, as may be periodically required or conducted by DEQ may be used to determine compliance with the fuel specifications stipulated in Condition 5. Exceedance of these specifications may be considered credible evidence of the exceedance of emission limits. (9 VAC 5-80-1180)

EMISSION LIMITS

8. Emission Limits - Emissions from the operation of the engine-generator sets (Ref. Nos. ENG1-ENG42) shall not exceed the limits specified below:

Pollutant	ENG1-ENG20, ENG22-ENG41 Caterpillar Model C175-16 (each unit)	ENG21, ENG42 Caterpillar C15 (each unit)
PM	0.8 lb/hr	0.2 lb/hr
PM-10	0.9 lb/hr	0.2 lb/hr
PM 2.5	0.9 lb/hr	0.2 lb/hr
Nitrogen Oxides (as NO ₂)	57.8 lb/hr	8.3 lb/hr
Carbon Monoxide	7.5 lb/hr	2.2 lb/hr
Volatile Organic Compounds	1.0 lb/hr	0.1 lb/hr
Sulfur Dioxide	0.6 lb/hr	0.01 lb/hr

Pollutant	Annual Emission Limit (all units combined)
PM	3.8 tons/yr
PM-10	4.2 tons/yr
PM 2.5	4.2 tons/yr
Nitrogen Oxides (as NO ₂)	98.0 tons/yr
Carbon Monoxide	24.6 tons/yr
Volatile Organic Compounds	4.0 tons/yr
Sulfur Dioxide	1.0 tons/yr

These emissions are derived from the estimated overall emission contribution from operating limits. Exceedance of the operating limits may be considered credible evidence of the exceedance of emission limits. Compliance with these emission limits may be determined as stated in Conditions 5, 6, and 10.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

9. Visible Emission Limit - Visible emissions from each engine-generator set exhausts (Ref. Nos. ENG1-ENG42) shall not exceed 10% opacity except during one 6-minute period in any one hour in which visible emissions shall not exceed 20% opacity as determined by EPA Method 9 (reference 40 CFR 60, Appendix A). This condition applies at all times except during startup, shutdown and malfunction.
(9 VAC 5-80-1180 and 9 VAC 5-50-260)

INITIAL COMPLIANCE DETERMINATION

10. Stack Test - Initial performance tests shall be conducted on four (4) engine-generator sets (Ref. Nos. ENG1-ENG20, ENG22-ENG41) for NO_x (as NO₂) and CO using appropriate EPA reference methods as approved by DEQ to determine compliance with the emission limits contained in Condition 8. The tests shall be performed and demonstrate compliance within 60 days after achieving the maximum production rate at which the facility will be operated but in no event later than 180 days after start-up of the permitted

facility. Tests shall be conducted and reported and data reduced as set forth in 9 VAC 5-50-30. The details of the tests are to be arranged with the Piedmont Regional Office. The permittee shall submit a test protocol at least 30 days prior to testing. One copy of the test results shall be submitted to the Piedmont Regional Office within 45 days after test completion and shall conform to the test report format enclosed with this permit.

- a. Emissions testing of each pollutant for each selected engine-generator set shall consist of three one-hour test runs under load. The average of the three runs shall be reported as the short-term emission rate for that engine-generator.
- b. Testing shall be conducted with the engine(s) operating at greater than 90% electrical capacity, unless multiple load band testing is approved by DEQ.
- c. Recorded information shall include, but not be limited to:
 - i. Generator load/kilowatt output.
 - ii. Fuel consumption and fuel sulfur content of the diesel fuel oil.

(9 VAC 5-50-30 and 9 VAC 5-80-1200)

CONTINUING COMPLIANCE DETERMINATION

11. Emissions Testing - The facility shall be constructed so as to allow for emissions testing upon reasonable notice at any time, using appropriate methods. This includes constructing the facility/equipment such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and providing a stack or duct that is free from cyclonic flow. Sampling ports shall be provided when requested at the appropriate locations and safe sampling platforms and access shall be provided.
(9 VAC 5-50-30 F and 9 VAC 5-80-1180)
12. Emission Testing/Visible Emissions Evaluation - Upon request by the DEQ, the permittee shall conduct stack tests and/or visible emission evaluations of the engine-generator sets (Ref. Nos. ENG1-ENG42) to demonstrate compliance with the emission limits contained in this permit. The details of the tests shall be arranged with the Piedmont Regional Office.
(9VAC5-80-1200 and 9VAC5-50-30 G)

RECORDS

13. On Site Records - The permittee shall maintain records of emission data and operating parameters as necessary to demonstrate compliance with this permit. The content and format of such records shall be arranged with the Piedmont Regional Office. These records shall include, but are not limited to:

- a. Annual hours of operation of each engine-generator set, calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
- b. Annual consumption of fuels for the combined operation of the engine-generator sets (ENG1-ENG20, ENG22-ENG41), calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
- c. Annual consumption of fuels for the combined operation of the engine-generator sets (ENG21 and ENG42), calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
- d. Annual emission calculations for the combined operation of the engine-generator sets (ENG1-ENG42), calculated monthly as the sum of each consecutive 12-month period. Compliance for the consecutive 12-month period shall be demonstrated monthly by adding the total for the most recently completed calendar month to the individual monthly totals for the preceding 11 months.
- e. All fuel supplier certifications.
- f. Engine information including make, model, serial number, model year, maximum engine power (bhp), and engine displacement for each engine-generator set.
- g. The manufacturer's written operating instructions or procedures developed by the owner/operator that are approved by the engine manufacturer for each engine-generator set.
- h. Records of the reasons for operation for each engine-generator set (Ref. Nos. ENG1-ENG42), including, but not limited to, the date, cause of operation, cause of the emergency, and the hours of operation.
- i. Results of all stack tests and visible emission evaluations.
- j. Scheduled and unscheduled maintenance and operator training.
- k. A log of monitoring device observations as required by Condition 3.

These records shall be available for inspection by the DEQ and shall be current for the most recent five years.

(9 VAC 5-80-1180 and 9 VAC 5-50-50)

NOTIFICATIONS

14. Initial Notifications - The permittee shall furnish written notification to the Piedmont Regional Office of:

- a. The actual date on which construction of the engine-generator sets (Ref. Nos. ENG1-ENG42) commenced within 30 days after such date.
- b. The anticipated start-up date of the engine-generator sets (Ref. Nos. ENG1-ENG42) postmarked not more than 60 days nor less than 30 days prior to such date.
- c. The actual start-up date of the engine-generator sets (Ref. Nos. ENG1-ENG42) within 15 days after such date. The actual start-up date shall be the date on which each engine completes manufacturer's trials but shall be no later than thirty days after the initial startup for manufacturer's trials.

(9 VAC 5-80-1180 and 9 VAC 5-50-50)

GENERAL CONDITIONS

15. Permit Invalidation – This permit to construct diesel engine-generator sets (Ref. Nos. ENG1-ENG42) shall become invalid, unless an extension is granted by the DEQ, if:

- a. A program of continuous construction is not commenced within 18 months from the date of this permit.
- b. A program of construction is discontinued for a period of 18 months or more, or is not completed within a reasonable time, except for a DEQ approved period between phases of the phased construction of a new stationary source or project.

(9 VAC 5-80-1210)

16. Permit Suspension/Revocation - This permit may be suspended or revoked if the permittee:

- a. Knowingly makes material misstatements in the permit application or any amendments to it;
- b. Fails to comply with the conditions of this permit;
- c. Fails to comply with any emission standards applicable to a permitted emissions unit;

- d. Causes emissions from the stationary source which result in violations of, or interfere with the attainment and maintenance of, any ambient air quality standard; or
- e. Fails to operate in conformance with any applicable control strategy, including any emission standards or emissions limitations, in the State Implementation Plan in effect at the time an application for this permit is submitted.

(9 VAC 5-80-1210 G)

17. Right of Entry - The permittee shall allow authorized local, state, and federal representatives, upon the presentation of credentials:
- a. To enter upon the permittee's premises on which the facility is located or in which any records are required to be kept under the terms and conditions of this permit;
 - b. To have access to and copy at reasonable times any records required to be kept under the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
 - c. To inspect at reasonable times any facility, equipment, or process subject to the terms and conditions of this permit or the State Air Pollution Control Board Regulations;
and
 - d. To sample or test at reasonable times.

For purposes of this condition, the time for inspection shall be deemed reasonable during regular business hours or whenever the facility is in operation. Nothing contained herein shall make an inspection time unreasonable during an emergency.

(9 VAC 5-170-130 and 9 VAC 5-80-1180)

18. Maintenance/Operating Procedures - At all times, including periods of start-up, shutdown, and malfunction, the permittee shall, to the extent practicable, maintain and operate the affected source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

The permittee shall take the following measures in order to minimize the duration and frequency of excess emissions:

- a. Develop a maintenance schedule and maintain records of all scheduled and non-scheduled maintenance.
- b. Maintain an inventory of spare parts.
- c. Have available written operating procedures for equipment. These procedures shall be based on the manufacturer's recommendations, at a minimum.

- d. Train operators in the proper operation of all such equipment and familiarize the operators with the written operating procedures, prior to their first operation of such equipment. The permittee shall maintain records of the training provided including the names of trainees, the date of training and the nature of the training.

Records of maintenance and training shall be maintained on site for a period of five years and shall be made available to DEQ personnel upon request.
(9 VAC 5-50-20 E and 9 VAC 5-80-1180 D)

19. Record of Malfunctions - The permittee shall maintain records of the occurrence and duration of any bypass, malfunction, shutdown or failure of the facility or its associated air pollution control equipment that results in excess emissions for more than one hour. Records shall include the date, time, duration, description (emission unit, pollutant affected, cause), corrective action, preventive measures taken and name of person generating the record.
(9 VAC 5-20-180 J and 9 VAC 5-80-1180 D)
20. Notification for Facility or Control Equipment Malfunction - The permittee shall furnish notification to the Piedmont Regional Office of malfunctions of the affected facility or related air pollution control equipment that may cause excess emissions for more than one hour. Such notification shall be made no later than four daytime business hours after the malfunction is discovered. The permittee shall provide a written statement giving all pertinent facts, including the estimated duration of the breakdown, within 14 days of discovery of the malfunction. When the condition causing the failure or malfunction has been corrected and the equipment is again in operation, the permittee shall notify the Piedmont Regional Office.
(9 VAC 5-20-180 C and 9 VAC 5-80-1180)
21. Violation of Ambient Air Quality Standard - The permittee shall, upon request of the DEQ, reduce the level of operation or shut down a facility, as necessary to avoid violating any primary ambient air quality standard and shall not return to normal operation until such time as the ambient air quality standard will not be violated.
(9 VAC 5-20-180 I and 9 VAC 5-80-1180)
22. Change of Ownership - In the case of a transfer of ownership of a stationary source, the new owner shall abide by any current permit issued to the previous owner. The new owner shall notify the Piedmont Regional Office of the change of ownership within 30 days of the transfer.
(9 VAC 5-80-1240)
23. Permit Copy - The permittee shall keep a copy of this permit on the premises of the facility to which it applies.
(9 VAC 5-80-1180)

SOURCE TESTING REPORT FORMAT

Report Cover

1. Plant name and location
2. Units tested at source (indicate Ref. No. used by source in permit or registration)
3. Test Dates.
4. Tester; name, address and report date

Certification

1. Signed by team leader/certified observer (include certification date)
2. Signed by responsible company official
3. *Signed by reviewer

Copy of approved test protocol

Summary

1. Reason for testing
2. Test dates
3. Identification of unit tested & the maximum rated capacity
4. *For each emission unit, a table showing:
 - a. Operating rate
 - b. Test Methods
 - c. Pollutants tested
 - d. Test results for each run and the run average
 - e. Pollutant standard or limit
5. Summarized process and control equipment data for each run and the average, as required by the test protocol
6. A statement that test was conducted in accordance with the test protocol or identification & discussion of deviations, including the likely impact on results
7. Any other important information

Source Operation

1. Description of process and control devices
2. Process and control equipment flow diagram
3. Sampling port location and dimensioned cross section Attached protocol includes: sketch of stack (elevation view) showing sampling port locations, upstream and downstream flow disturbances and their distances from ports; and a sketch of stack (plan view) showing sampling ports, ducts entering the stack and stack diameter or dimensions

Test Results

1. Detailed test results for each run
2. *Sample calculations
3. *Description of collected samples, to include audits when applicable

Appendix

1. *Raw production data
2. *Raw field data
3. *Laboratory reports
4. *Chain of custody records for lab samples
5. *Calibration procedures and results
6. Project participants and titles
7. Observers' names (industry and agency)
8. Related correspondence
9. Standard procedures

* Not applicable to visible emission evaluations