

NARRATIVE

TO: Cynthia Dorrough

FROM: Jada Levers

DATE: October 16, 2024

Facility Name: **Microsoft Corporation – ATL06 Facility**
AIRS No.: 121-00969
Location: East Point, GA (Fulton County)
Application #: 29402
Date of Application: August 14, 2024

Background Information

Microsoft Corporation – ATL06 Facility is a datacenter located at 4165 Ben Hill Road, East Point, Georgia 30349, within the limits of Fulton County which is designated attainment area for all criteria air pollutants. Georgia Air Quality Control Rule 391-3-1-.03(8)(c)14(i) “Additional Provisions for Ozone Non-Attainment Areas” has been removed and is no longer applicable following the redesignation of metro Atlanta counties by EPA from nonattainment area to attainment area, effective October 17, 2022. The facility is currently a synthetic minor source with respect to provisions of Georgia Air Quality Rule 391-3-1-.03(10)(b)1(i) which establishes Part 70 Title V major source threshold for each criteria pollutant as 100 tons per year. The facility intends to maintain synthetic minor status by limiting annual fuel usage and using renewable hydrocarbon diesel fuel to meet the sitewide 99 tons per year NOx emission limit.

Purpose of Application

Application No. 29402 was dated August 14, 2024, and received on August 16, 2024, requesting the installation and operation of twenty [20] additional 3,000 kW emergency generators each with a heat capacity of 28.84 MMBtu/hr and one [1] additional 500 kW emergency generator with a heat capacity of 4.80 MMBtu/hr. All generators will be diesel fueled with renewable hydrocarbon diesel used as an alternative fuel and they will provide backup power to servers and other electronic equipment in the event of a power outage at the building 2 expansion. Public advisory was issued for this modification and expired on September 27, 2024.

Updated Equipment List

Source Code	Input Heat Capacity (MMBtu/hr)	Description	Installation Date	Construction Date
GN1	4.80	500 kW Diesel-Fueled Emergency Generator	2023	2023
GN2 – GN21	28.84	3,000 kW Diesel-Fueled Emergency Generators	2023	2023
GN22	4.80	500 kW Diesel-Fueled Emergency Generator	2025	2025

Source Code	Input Heat Capacity (MMBtu/hr)	Description	Installation Date	Construction Date
GN23 – GN42	28.84	3,000 kW Diesel-Fueled Emergency Generators	2025	2025

Emissions Summary

Emissions of nitrogen oxides (NO_x), carbon monoxide (CO), particulate matter (PM), and volatile organic compounds (VOC) from each emergency generator was calculated using emission rates provided by the generator manufacturer. The manufacturer provided data is included in Appendix D of Application No. 29402. For sulfur dioxide (SO₂), there was no emission rate provided by the manufacturer, therefore, the SO₂ emission factor was used for diesel fuel oil, 0.0015 % sulfur by weight, from AP-42 Chapter 3.4 – “Large Stationary Diesel and All Stationary Dual-fuel Engine”.

Emissions of toxic air pollutants (benzene, toluene, xylene, formaldehyde, acetaldehyde, acrolein, and naphthalene) from the combustion of the emergency generators were also calculated using AP-42 Chapter 3.4 – “Large Stationary Diesel and All Stationary Dual-Fuel Engines”. Facility-wide emission calculations for hazardous air pollutants (HAPs) are included in Appendix E of Application No. 29402.

Microsoft will use Renewable Hydrocarbon Diesel as an alternative fuel at the site. The Renewable Hydrocarbon Diesel will meet ASTM D975-24 standards and have a sulfur content less than 15 ppm. Microsoft data center conducted testing on Renewable Hydrocarbon Diesel to show lower emission rates than those calculated for ultra-low sulfur diesel (ULSD) based on manufacturer data, as shown in Table 1 below. Therefore, the calculated emission rates for the ULSD were used as a worst-case scenario for the facility. Facility-wide emission calculations for all other criteria air pollutants are included in Appendix C of Application No. 29402.

Table 1: Comparison of Emission Testing Data for Renewable Hydrocarbon Diesel to Calculated Emission Rates for ULSD

POLLUTANT	WORST-CASE EMISSION TESTING DATA FOR RENEWABLE HYDROCARBON DIESEL IN CUMMINS QSK-95 3,000-KW GENERATOR ENGINE (lb/hr/gen)	CALCULATED WORST-CASE EMISSION RATE FOR ULSD IN CUMMINS QSK-95 3,000-KW GENERATOR ENGINE (lb/hr/gen)
NO _x	50.53	61.02
CO	1.58	3.76
VOC	0.22	1.49
SO ₂	0.09	0.23

The facility proposes to continue operating under a Synthetic Minor Permit by limiting the operational hours of each emergency generator to ensure that NO_x emissions stay below the 99 tpy limit. The facility also proposes monitoring and tracking to demonstrate compliance with the NO_x limit by tracking operational data (hours and load rate) measured and recorded by the non-resettable hour meter required for each generator by Condition No. 5.1. The Permittee is required by Condition Nos. 7.2 through 7.5 to maintain records of emergency and non-emergency service to be used when calculating monthly NO_x emissions, each calendar month for each consecutive twelve-month period, from all emergency generators located

onsite. Monthly NO_x emissions from fuel combustion at the facility shall be determined using the monthly NO_x emission equation in Condition No. 7.5.

The facility intends to track hourly and load rate operational data load in order to calculate the monthly NO_x emissions each calendar month, from each emergency generator to demonstrate compliance with the 99 tpy NO_x limit to remain a synthetic minor source.

The facility must limit the hours of operation for each emergency generator to less than 500 hours per year in order to meet the definition of an emergency standby stationary engine located at a datacenter in order to avoid being subject to the NO_x emission standard outlined in 391-3-1-.02(2)(mmm).

Table 2: Facility-Wide Emissions
(in tons per year)

Pollutant	Potential Emissions			Actual Emissions		
	Before Mod.	After Mod.	Emissions Change	Before Mod.	After Mod.	Emissions Change
PM/PM ₁₀ /PM _{2.5}	1.51	3.02	+1.51	1.22	1.22	0
NO _x	123.03*	246.06*	+123.03	99*	99*	0
SO ₂	0.46	0.92	0.46	0.37	0.37	0
CO	7.76	15.52	7.76	6.25	6.25	0
VOC	3.01	6.02	3.01	2.42	2.42	0
Max. Individual HAP	4.51E-02	9.03E-02	4.51E-02	3.63E-02	3.63E-02	0
Total HAP	0.09	0.17	0.09	0.07	0.07	0
Total GHG (if applicable)	8.60E03	1.56E04	8.60E03	7.02E03	7.02E03	0

*99 tpy NO_x limit

Regulatory Applicability

Georgia Rule 391-3-1.02 (2)(b) – Visible Emissions

Rule (b) limits allowable visible emissions from any air contaminant source to not exceed 40 percent opacity. New emergency generators (Source IDs: GN22-GN42) will be subject to this rule and the facility will comply with this limitation through the exclusive use of ultra-low sulfur diesel (ULSD) fuel and renewable hydrocarbon diesel fuel in each emergency generator engines.

Georgia Rule 391-3-1.02 (2)(g) – Sulfur Dioxide

Rule (g) limits all fuel burning equipment below 100 MMBtu/hr to burn no more than 2.5% fuel sulfur, by weight. New emergency generators (Source IDs: GN22-GN42) will be subject to this rule and the facility will comply with this limitation through the exclusive use of ultra-low sulfur diesel (ULSD) fuel and renewable hydrocarbon diesel fuel in each emergency generator engines.

Georgia Rule 391-3-1.02 (2)(mmm) – NO_x emissions from Stationary Gas Turbines and Stationary Engines Used to Generate Electricity

Rule (mmm) limits NO_x emissions from any stationary engine used to generate electricity, whose capacity is greater than or equal to 100 kilowatts (kW) and less than or equal to 25 megawatts (MW). Stationary engines at data centers that meet the criteria in 391-3-1-.02(2)(mmm)8 are not subject to the emission limitations of Rule (mmm). To comply with this rule, the facility will operate only for routine testing and maintenance, when electric power from the local utility is not available, or during internal system failures; operate less than 500 hours per year; and conduct routine testing and maintenance between 10 p.m. and 4 a.m. during the months of May through September.

40 CFR 60 Subpart IIII – Standards of Performance for New Stationary Sources

Subpart IIII applies to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) that commenced construction after July 11, 2005, where the stationary CI ICE is manufactured after April 1, 2006, and is not a fire pump engine. Since the facility plans to install new emergency generators (Source IDs: GN22-GN42) by August 2025, new emergency generators (Source IDs: GN22-GN42) will be subject to the emission and operating limitations of this subpart.

40 CFR 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Source Categories

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. A stationary RICE is defined as any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. The facility is an area source for HAPs because potential HAP emissions are below 10 tpy for any individual HAP and below 25 tpy for combination of HAPs. Stationary RICE located at an area source of HAPs is considered new if construction of the stationary RICE commenced on or after June 12, 2006. New emergency generators (Source IDs: GN22-GN42) are considered new emergency stationary RICE under Subpart IIII. Per 40 CFR 63.6590(c)(1), new emergency generators meet the requirements of Subpart ZZZZ by meeting the emission and operating limitations for stationary CI ICE in 40 CFR 60 Subpart IIII.

Permit Conditions

Condition No. 2.1 establishes opacity standards for visible emissions from each emergency generator and was modified to include the opacity standards of 40 CFR 60 Subpart IIII and subsume Georgia Rule (b), as well as include new emergency generators, GN22 through GN42.

Condition No. 2.3 was modified to detail the operating standards of Subpart IIII and include new emergency generators, GN22 through GN42.

Condition No. 2.4 requires that the Permittee only use diesel fuel oil or renewable diesel fuel oil with a maximum sulfur content of 15 ppm (0.0015% by weight). This condition was modified to include new emergency generators, GN22 through GN42, and include renewable diesel fuel oil at the facility's request.

Condition No. 2.5 requires the Permittee to follow the criteria of Georgia Rule (mmm) to be operate the engines and emergency generator engines and be exempt from the emission and operational limitations of Rule (mmm). This condition was modified to include new emergency generators, GN22 through GN42, and to specify "local time" at the facility's request.

Condition No. 2.6 requires the Permittee to comply with all applicable provisions of 40 CFR 63 Subparts, A and ZZZZ, and was modified to include new emergency generators, GN22 through GN42.

Condition No. 2.7 requires the Permittee to comply with all applicable provisions of 40 CFR 60 Subparts, A and IIII, and was modified to include new emergency generators, GN22 through GN42.

New Condition No. 2.8 requires the Permittee to only fire diesel fuel oil no. 1 and 2 that meet the specifications of ASTM D975-24. Renewable diesel fuel oil was included in this condition at the facility's request.

Condition No. 5.2 was modified to include verbiage from 40 CFR 63 Subpart ZZZZ in reference to 40 CFR 63.6635(b) and (c) for continuous monitoring of each emergency generator.

New Condition No. 5.3 requires that the Permittee verify each shipment of diesel fuel oil received for combustion in each emergency generator. Renewable diesel fuel oil was included in this condition at the facility's request.

Condition No. 7.2 requires the Permittee to maintain monthly operating records for each emergency generator, including new emergency generators, GN22 through GN42, in both emergency and non-emergency service, recorded as required by Condition 5.1. This condition was modified to update verbiage and include citations from 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ.

Condition No. 7.3 requires the Permittee to use monthly operating time data required by Condition No. 7.2 to calculate monthly the twelve-month rolling total of operating time for each emergency generator, including new emergency generators, GN22 through GN42. This condition was modified to include reference to Gorgia Rule (mmm) and the new emergency generators.

Condition No. 7.4 requires the Permittee to use monthly non-emergency service operating time records required by Condition No. 7.2 to calculate monthly the twelve-month rolling total of the non-emergency service operating time for each emergency generator, including new emergency generators, GN22 through GN42.

Condition No. 7.5 was modified to use hourly and load rate operational data load when calculating the monthly NOx emissions each calendar month, from each emergency generator. This condition was modified to insert a new equation for calculating NOx emissions and include new emergency generators, GN22 through GN42.

Condition No. 7.6 requires the Permittee to calculate the 12-month rolling total of NOx emissions from each emergency generator. This condition was modified to include new emergency generators, GN22 through GN42.

Condition No. 7.7 requires the Permittee to demonstrate compliance with 40 CFR 60 Subpart IIII by purchasing a certified engine. This condition was modified to include new emergency generators, GN22 through GN42.

Condition No. 7.8 was modified to include new emergency generators, GN22 through GN42, when operating and maintain the generator engines as specified by the manufacturer.

Condition No. 7.9 was modified to include Condition Nos. 2.4 and 2.8 as reference for verifying each diesel fuel oil shipment received for firing the emergency generators.

New Condition No. 7.10 requires the Permittee to submit an annual report according to the requirements of 40 CFR 63.6650(h) and 40 CFR 60.4214(d) when the emergency generators are operated as specified in Condition 2.3.c.1.

Toxic Impact Assessment

Georgia EPD's Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions ("the Guideline") provides requirements for assessing impacts of toxic air pollutant (TAP) emissions from a proposed project. If a facility's emissions of a specific TAP are less than the minimum emission rate (MER) provided for that TAP in Appendix A of the Guideline, no further analysis is required for that TAP. Otherwise, an air dispersion modeling analysis is required to demonstrate that the facility's emissions of that TAP will not exceed the acceptable ambient concentration (AAC) provided for that TAP in Appendix A of the Guideline. Each potential TAP emission expected to be emitted from the facility was compared to the applicable MERs provided in Table 3 below, which indicates that a Toxic Impact Assessment (TIA) was required only for benzene.

Table 3: Comparison of Facility-Wide TAP Emissions to Georgia MERs

POLLUTANT	FACILITY-WIDE POTENTIAL EMISSIONS (lb/yr)	GEORGIA MER (lb/yr)	TOXIC IMPACT ANALYSIS (TIA) REQUIRED?
Benzene	180.52	31.63	Yes
Toluene	65.37	1,216,650	No
Xylenes	44.90	24,333	No
Formaldehyde	18.35	267	No
Acetaldehyde	5.86	1,107	No
Acrolein	1.83	4.87	No
Naphthalene	30.24	729.99	No

A TIA was conducted for benzene using US EPA's SCREEN3 modeling software (version 13043), which calculates maximum 1-hour average impacts. A model run was prepared for a single emergency generator engine from each group, based on the engine at the site in that group located nearest the fence line. Per Appendix A of the Guideline, benzene has both a short-term (i.e., 15-minute average) AAC and a long-term (i.e., annual average) AAC. Since the generators will not operate continuously throughout the year, separate short-term and long-term benzene emission rates were modeled. The short-term average emission rate provided to the model was the maximum potential hourly emission rate for a single generator (lb/hr/gen). The long-term average emission rate was calculated based on the assumption that each generator will operate for the maximum allowed hours per year (i.e., 200 hr/year) using the following equation:

$$\text{Long – Term Modeled Emission Rate per generator} \left(\frac{\text{lb}}{\text{hr} \cdot \text{gen}} \right) = \frac{\text{Short – Term Emission Rate} \left(\frac{\text{lb}}{\text{hr} \cdot \text{gen}} \right) \times 200 \left(\frac{\text{hr}}{\text{yr}} \right)}{8,760 \left(\frac{\text{hr}}{\text{yr}} \right)}$$

These calculated emission rates were converted from units of lb/hr to g/s for entry to the model. The maximum 1-hour average ambient impact attributable to the facility was calculated for benzene using the single-generator 1-hour average concentration predicted by the model as follows:

$$\text{Facility – wide Max. 1 – Hr impact} \left(\frac{\mu\text{g}}{\text{m}^3} \right) =$$

$$\text{Max. 1 – Hr impact from a single generator at } 1 \frac{\text{g}}{\text{s}} \left(\frac{\mu\text{g}}{\text{m}^3} \right) \times \text{No. of generators} \times \text{Emission rate per generator} \left(\frac{\text{g}}{\text{s} \cdot \text{gen}} \right)$$

Maximum predicted 1-hour concentrations were developed for both the short-term and long-term averaging periods, and individual model runs were conducted for each Group of engine type. In accordance with the Guideline, the concentration predicted by the model for the short-term averaging period was summed for the two engine types and converted to a 15-minute average concentration by multiplying the 1-hour concentration by a factor of 1.32. A similar procedure was used to calculate the long-term averaging period, except that a factor of 0.08 was used to convert the 1-hour average concentration to an annual average.

The results of the TIA are presented in table 4 below and demonstrate that the benzene modeled impacts from the facility will be less than the AAC's. Detailed calculations and the SCREEN3 model output files supporting this TIA are provided in Appendix E of Application No. 29402.

Table 4: Comparison of Modeled TAP Impacts with the AACs

POLLUTANT	AVERAGING PERIOD	MODELED IMPACT ($\mu\text{g}/\text{m}^3$)	AAC ($\mu\text{g}/\text{m}^3$)	BELOW AAC?
Benzene	15-Minute	14.66	1,600	Yes
	Annual	0.02	0.13	Yes

Summary & Recommendations

Based on the above considerations, I recommend issuing Permit 7376-121-0969-S-01-1 for the installation and operation of emergency generators GN22-GN42 at Microsoft Corporation – ATL06 Facility. Public advisory expired on September 27, 2024. The facility will maintain synthetic minor source status and the Mountain District (Atlanta) office will continue responsibility over compliance and report submittals.

Addendum to Narrative

The 30-day public review started on October 23, 2024, and ended on November 22, 2024. Comments were not received by the Division.