

Technical Support Document
Notice of Construction Approval Order No. NOC 21AQ-C255
Microsoft Corporation – EAT02 Data Center
AQPID No. B0170071
East Wenatchee, WA

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1. Project Summary

Microsoft Corporation's EAT02 Data Center (the source) is classified as a synthetic minor for nitrogen oxide emissions, in that the allowed emissions for that pollutant are below 80% of the 100 ton-per-year threshold that would trigger applicability of Title V of the federal Clean Air Act. This review is for the installation of 21 new diesel-fired emergency generators (gensets).

An initial Notice of Construction (NOC) application dated 10/12/20 was submitted by the source; the application was received by the Washington State Department of Ecology (Ecology) on 11/25/20. Ecology reviewed the initial application and found it incomplete per WAC 173-400-111 on 12/1/20. Amended NOC applications and supporting materials were received by Ecology on 2/9/21, 4/26/21, 6/15/21, and 7/25/21. Ecology found the application to be complete on 7/26/21.

2. Application Processing

a. Public Notice

This project is subject to a mandatory 30-day public comment period per WAC 173-400-171(3)(b) for increases in emissions of toxic air pollutants above acceptable source impact levels. If comment is received during the public comment period, response will be contained in a separate document.

b. State Environmental Policy Act

An environmental checklist was submitted with the NOC Application which considered environmental impacts of the project as required by Chapter 43.21C RCW, also known as the State Environmental Policy Act (SEPA). Ecology reviewed the checklist and made a Determination of Nonsignificance, issued on 8/18/21, which will be made available for public comment at the same time as the NOC Approval Order.

3. Applicable Regulations

a. State Regulations

i. Minor New Source Review Applicability

Per WAC 173-400-110, an NOC application and an order of approval must be issued by the permitting authority prior to the establishment of a new source or modification.

As stated in the NOC application and consistent with Ecology’s review, each of the the gensets are being constructed by this project and are therefore subject to minor new source review (NSR).

On a potential to emit (PTE) basis, emission increases from the new gensets were subject to minor new source review. PTE for the project was based on 500 hours of operation for each unit, consistent with the EPA memo *Calculating Potential to Emit (PTE) for Emergency Generators*, issued by OAQPS on 9/6/95. PTE emissions of CO, NO_x, PM_{2.5}, PM₁₀, and VOC were greater than the exemption levels listed under WAC 173-400-110(5). Also, PTE emissions of 17 toxic air pollutants were above the de minimis emission values listed under WAC 173-460-150.

The allowable emissions for the project are based on the limited operations of the gensets, in accordance with Ecology’s *AQP-POL-2021 Data Center Permitting*, issued 6/16/21. The maximum increases in allowable emissions (with commissioning activities) are shown in Tables 1 and 2 below.

Table 1. Emissions Increases for pollutants listed under WAC 173-400-110(5)

Pollutant	Total Project (tons/year)
Carbon Monoxide (CO)	8.6
Nitrogen Oxides (NO _x)	72
PM ₁₀	1.2
PM _{2.5}	1.2
Total Suspended Particulates (TSP)	1.2
Sulfur Dioxide (SO ₂)	0.02
Volatile Organic Compounds, total (VOC)	0.90

Table 2. TAP Emission Increases

Pollutant	Emissions Increase (lb/avg. period)	Averaging Period
Acetaldehyde	1.60E+00	year
Acrolein	1.10E-01	24-hr
Benzene	4.80E+01	year
Benz(a)anthracene	3.90E-02	year
Benzo(a)pyrene	1.60E-02	year
Benzo(b)fluoranthene	6.90E-02	year
Benzo(k)fluoranthene	1.40E-02	year

Pollutant	Emissions Increase (lb/avg. period)	Averaging Period
Carbon Monoxide	1.75E+02	1-hr
Dibenz(a,h)anthracene	2.10E-02	year
Diesel engine exhaust, particulate	8.20E+02	year
Formaldehyde	4.90E+00	year
Indeno(1,2,3-cd)pyrene	2.60E-02	year
Naphthalene	8.10E+00	year
Nitrogen Dioxide	1.42E+02	1-hr
Propylene	4.00E+01	24-hr
Sulfur Dioxide	9.03E-01	1-hr
Xylenes	2.70E+00	24-hr

During the preapplication meeting and within the submitted SEPA checklist, the source referenced anticipated expansion at a later date. The documents referenced plans for two additional buildings; no information was listed for the expected gensets for those buildings. The consultant stated that modeling for this project included the anticipated expansion buildings.

I informed the consultant that the anticipated expansion may require reanalysis of the units revied under this project. Specifically, I stated we would need to have discussions on this topic, in case there is concern regarding potential circumvention of new source review requirements. The consultant stated he'd check in with the source to verify the timing and intent regarding the anticipated expansion.

ii. Prevention of Significant Deterioration

PSD does not apply, based on allowable emissions for the new gensets.

iii. Other Applicable Requirements

In accordance with WAC 173-400-113, the source must comply with all applicable emission standards adopted under Chapter 70A.15 RCW. The following applicable emission standards are associated with the proposed project:

A. General Standards for Maximum Emissions

WAC 173-400-040(2) generally limits visible emissions from all sources to no more than three minutes of 20 percent opacity, in any one hour, of an air contaminant from any emissions unit. This standard applies to each of the proposed gensets. However, the limit has been set at 10% opacity based on Ecology's experience with this source sector. Therefore, the higher limit is not specified for the gensets.

B. Emission Standards for Combustion and Incineration Units

WAC 173-400-050(1) limits emissions of particulate matter from combustion units to 0.23 gram per dry cubic meter at standard conditions (0.10 grains per dry standard cubic foot) of exhaust gas. This standard applies to each of the proposed gensets. The standard is specified as an emission limit in Condition 2.c.ii.B.

C. Standards of Performance for New Sources

WAC 173-400-115(1)(a) adopts by reference 40 C.F.R. Part 60, Subpart III as the regulation existed on 1/24/18; Subpart III applies to each of the proposed gensets. Subpart III was since revised on 11/13/19 and 12/4/20; however, the revisions were specific to engines used in Alaska and removed existing expired fuel quality provisions, respectively. Therefore, requirements of the state-adopted version are equivalent to the current federal version (discussed below).

b. Federal Regulations

In accordance with WAC 173-400-113, the proposed new stationary sources must comply with all applicable new source performance standards (NSPS) included in 40 C.F.R. Part 60, national emission standards for hazardous air pollutants (NESHAPs) included in 40 C.F.R. Part 61, and NESHAPs for source categories included in 40 C.F.R. Part 63. The following applicable emission standards are associated with the proposed project:

i. Standards of Performance for New Stationary Sources

The ICE NSPS (40 C.F.R. Part 60, Subpart III) applies to each genset engine. The regulation specifies:

- Criteria for classification as emergency engines.
- Tier-2 emission standards for the engines.
- Fuel, monitoring, compliance, and notification requirements for the Permittee.

The Tier-2 emission standards specified by the regulation were the basis of the emission limits listed under Condition 2.c.i.

ii. National Emission Standards for Hazardous Air Pollutants for Source Categories

The RICE NESHAP (40 C.F.R. Part 63, Subpart ZZZZ) applies to each genset engine. However, each engine is also subject to the ICE NSPS (see above). At 40 C.F.R. 63.6590(c), the NESHAP specifies that compliance shall be met by meeting the requirements of the NSPS; therefore, no further requirements apply to the engines.

4. Emissions

a. Emission Factors

Emission-unit specific emission factors for CO, NO_x, PM, and unburned hydrocarbons were acquired by the consultant through N C Powersystems, and were received by Ecology via email on 5/12/21. The data replaced the emission factors originally included in the 2/9/21 application.

The manufacturer data was treated in the following manner:

- Unburned hydrocarbons were assumed to be equivalent to VOC and NMHC.
- DEEP was taken to be the manufacturer-measured PM.
- The sum of PM and hydrocarbon emissions (assuming all condense) was used to NAAQS PM standard compliance demonstrations.

The emission factor for SO₂ was calculated by the consultant, based on the sulfur content of ultra-low-sulfur diesel and an average heating value of diesel fuel, assuming complete conversion of sulfur to SO₂.

Generic stationary diesel-engine emissions factors for 15 additional TAPs were taken from EPA's *AP-42 Compilation of Air Pollutant Emission Factors, 5th Edition, Volume 1*, Chapter 3.4, Tables 3.4-3 and 3.4-4.

b. Best Available Control Technology | Best Available Control Technology for Toxics

Per the definition of best available control technology (BACT), application of the BACT shall not "result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard under 40 C.F.R. Part 60 and Part 61". As such, the starting point for the BACT analysis was the Tier-2 emission standards for nonroad engines with rated power exceeding 560 kW, as specified at 40 C.F.R. 89.112.

In addition, the consultant considered the following inherently lower emitting processes/practices and emission controls:

- Tier-2 certified engines (including combustion controls and the use of ultra-low sulfur diesel fuel):
 - without additional controls,
 - with selective catalytic reduction,
 - with catalyzed diesel particulate filter (active and passive), and
 - with diesel oxidation catalyst.
- Tier-4 certified engines (integrated control package)

In the analysis, the consultant used a sufficiently conservative equipment life of 40 years, and a plausible interest rate of 5.5%.

The analysis references 'Ecology's cost-effectiveness threshold' in several places. However, Ecology does not have a static cost effectiveness threshold for any pollutant,

including TAPs. Similarly, the application references a derived cost threshold methodology (i.e., the ‘Hanford method’) for TAPs. However, while that methodology has been accepted historically for some projects, it is not currently used or accepted by Ecology as a default methodology. Therefore, I didn’t evaluate the calculated costs as a part of confirming BACT and tBACT for reviewed controls.

Ecology’s recent experience with Tier-4 certified emergency engines, Tier-2 certified emergency engines controlled to Tier-4 levels, and passive filters applied to emergency engines suggests they are technically infeasible. We believe that this is due to over loading of the control devices, frequent operation of controls at lower temperature than is necessary to effect control, and infrequent operation.

While Tier-2 certified engines with active filters may be technically feasible, they have a high capitol cost (likely cost prohibitive), and we are only familiar with one vendor who is independent of the engine manufacturers. Ecology is prohibited from requiring the use of emission control equipment produced by any particular manufacturer. Finally, our toxicologist has previously expressed concern regarding increased NO₂ emissions from diesel oxidation catalysts.

Therefore, largely based on Ecology’s experience with this sector, I agree that uncontrolled Tier-2 certified engines, combustion controls, and the use of ultra-low sulfur diesel fuel meets or exceeds: BACT for CO, NO_x, particulate, and VOC emissions; and tBACT for emissions of all 17 TAPs triggering review.

5. Ambient Air Quality Standards

As specified in WAC 173-400-113, the proposed new or modified source(s) must not cause or contribute to a violation of any ambient air quality standard. This includes the ambient air quality standards for both criteria and toxic air pollutants.

a. Pollutants Listed Under WAC 173-400-110 (Except TAPs)

Modeling was not required for SO₂ allowable emissions, as they are below the Table 110(5) exemption level in WAC 173-400-110(5). This is in keeping with prior practice within this section, where it is assumed that the exemption levels were based on concentrations which would not cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) or Washington Ambient Air Quality Standards (WAAQS).

For CO, NO_x, PM_{2.5}, and PM₁₀ emissions, modeling was performed to demonstrate compliance with the NAAQS (and equivalent WAAQS). The modeling demonstrates that the emissions increases as a result of the project will not exceed the ambient air quality standards. The modeling results are included in Table 3.

Dispersion modeling was not conducted for VOC, as aggregate VOC is not a criteria air pollutant. While, under the right conditions, VOC is a precursor for ozone and secondary PM_{2.5} (each a criteria pollutant), this source’s VOC emissions are not expected to contribute to NAAQS exceedances.

Table 3. Criteria Pollutant Modeling Results.

Criteria Pollutant	Averaging Period	Maximum Modeled Concentration (µg/m³)	Ambient Air Quality Standard (µg/m³)	Percent of NAAQS
CO	1 hour	1,849	40,000	4.6 %
CO	8 hours	1,686	10,000	17 %
NO _x	1 hour	173	188	92 %
NO _x	1 year	10	100	10 %
PM _{2.5}	24 hours	31	35	89 %
PM _{2.5}	1 year	7.3	12	61 %
PM ₁₀	24 hours	91	150	61 %

b. Toxic Air Pollutants

In accordance with WAC 173-460-040, new TAP stationary sources must meet the requirements of Chapter 173-460 WAC, unless they are exempt by WAC 173-400-110(5).

As shown in Table 2, minor NSR is required for this project. As such, the new gensets trigger WAC 173-460-070 (ambient impact requirement). The source may demonstrate compliance with the ambient impact requirement by either showing that the emissions increase is less than the small quantity emissions rates (SQER) or through dispersion modeling. Table 4 includes the estimated emissions increases associated with the project and the applicable SQER.

Table 4. TAP Analysis

TAP	Estimated Increase (lb/avg. period)	SQER (lb/avg. period)	Modeling Required?
Acetaldehyde	2.1E+00	6.0E+01	-
Acrolein	1.1E-01	2.6E-02	yes
Benzene	6.6E+01	2.1E+01	yes
Benz(a)anthracene	5.3E-02	8.9E-01	-
Benzo(a)pyrene	2.2E-02	1.6E-01	-
Benzo(b)fluoranthene	9.4E-02	8.9E-01	-
Benzo(k)fluoranthene	1.8E-02	8.9E-01	-
Carbon Monoxide	1.7E+02	4.3E+01	yes
Dibenz(a,h)anthracene	2.9E-02	8.2E-02	-
Diesel Engine Exhaust, Particulate	1.1E+03	5.4E-01	yes
Formaldehyde	6.7E+00	2.7E+01	-
Indeno(1,2,3-cd)pyrene	3.5E-02	8.9E-01	-

TAP	Estimated Increase (lb/avg. period)	SQER (lb/avg. period)	Modeling Required?
Naphthalene	1.1E+01	4.8E+00	yes
Nitrogen Dioxide	1.4E+02	8.7E-01	yes
Propylene	3.9E+01	2.2E+02	-
Sulfur Dioxide	9.0E-01	1.2E+00	-
Xylenes	2.7E+00	1.6E+01	-

To satisfy the requirements of Chapter 173-460 WAC, dispersion modeling was performed for For each TAP emitted above the SQER. The modeling demonstrates that the emissions increases as a result of the project will not exceed the acceptable source impact level (ASIL) thresholds, with the exception of diesel engine exhaust particulate and nitrogen dioxide. The modeling results are included in Table 5.

Table 5. TAP Modeling Results.

TAP	Maximum Modeled Concentration (µg/m³)	Acceptable Source Impact Level (µg/m³)	Percent of ASIL
Acrolein	0.0024	0.35	1 %
Benzene	0.0090	0.13	7 %
Carbon Monoxide	1,849	23,000	8 %
Diesel Engine Exhaust, Particulate	0.15	0.0033	4,500 %
Naphthalene	0.0015	0.029	5 %
Nitrogen Dioxide	1,495	470	320 %

A Second-Tier Health-Impact Assessment (HIA) was conducted for diesel engine exhaust particulate and nitrogen dioxide. The HIA was submitted separately from the NOC application, per WAC 173-460-090. Ecology reviewed the assessment and recommended approval of the project. Ecology’s analysis and recommendations are included in the document titled, “Second Tier Review Recommendation for: Microsoft Corporation EAT02 Data Center Douglas County, Washington”.

Appendix A – Federal Rule Applicability

1. 40 C.F.R. Part 60, Subpart IIII

The ICE NSPS (40 C.F.R. Part 60, Subpart IIII) applies to each genset engine. The applicable portions the rule appear to be:

Citation	Subject	Notes
60.4202(a)(2)	Manufacturer emission standards	Specifies that 2007 model year and later emergency stationary CI ICE with a maximum engine power ≥ 37 kW and $\leq 2,237$ KW be certified to the emission standards specified in 40 C.F.R. 89.112 and 40 C.F.R. 89.113.
60.4205(b)	Owner/Operator emission standards	Directs owners and operators of 2007 model year and later emergency stationary CI ICE to comply with the emission standards for new nonroad CI engines in §60.4202.
60.4209(a)	Owner/Operator monitoring requirements	Requires installation install a non-resettable hour meter prior to startup of each engine, since the engines do not meet the standards applicable to non-emergency engines.
Table 8 to Subpart IIII of Part 60	Applicability of General Provisions to Subpart IIII	The table lists what portions of 40 C.F.R. 60 Subpart I are applicable, including notification and recordkeeping requirements.

2. 40 C.F.R. Part 63, Subpart ZZZZ

The RICE NESHAP applies to each genset engine. However, each engine is also subject to the ICE NSPS (see above). At 40 C.F.R. 63.6590(c), the NESHAP specifies that compliance must be met by meeting the requirements of the NSPS; therefore, no further requirements apply to the engines.