

Technical Support Document  
Notice of Construction Approval Order No. 22AQ-E006  
Microsoft Corporation – Columbia Data Center  
AQPID No. A0250278  
Quincy, WA

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**1. Project Summary**

Microsoft Corporation – Columbia Data Center (the source) is data center classified as a Synthetic Minor with 40 existing generators and two cooling tower bank emissions units. This review is for a project to add six new emergency generators.

An initial Notice of Construction (NOC) application dated October 7, 2021 was submitted by Microsoft Corporation for the Columbia Data Center CO7 and CO8 project. The Washington State Department of Ecology (Ecology) reviewed the initial application and found it incomplete per WAC 173-400-111 on October 26, 2021, due to the source's request to add emission controls to proposal. An amended NOC application was received by Ecology on December 8, 2021 and March 14, 2022 found to be complete on April 8, 2022.

**2. Application Processing**

a. Public Notice

Receipt of the application was posted on Ecology's Public Involvement Calendar from April 18, 2022 through May 4, 2022. A request for a public comment period was received. Ecology scheduled a 30-day comment period June 15 through July 20, 2022. Comments were received, Ecology's responses are attached as appendix A.

b. State Environmental Policy Act

City of Quincy issued a determination of nonsignificance (DNS) on September 15, 2021.

**3. Applicable Regulations**

a. State Regulations

i. Minor New Source Review Applicability

Per WAC 173-400-110, a 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, the new generators are being constructed for this project and therefore are subject to minor new source review (NSR).

B. Potential to Emit (Potential Emissions)

The potential emissions from the project are greater than the exemption levels listed under WAC 173-400-110(5) as shown below in Tables 1 and 2 (in bold).

**Table 1. Potential emissions for pollutants listed under WAC 173-400-110(5), NSR Exemption Levels**

Pollutant	New Generators (tons/year)	Minor NSR Exemption (tons/year)
Carbon Monoxide (CO)	4.18	5.0
Lead (Pb)	0.000	0.005
Nitrogen Oxides (NO <sub>x</sub> )	<b>18.94</b>	2.0
Particulate Matter, PM <sub>10</sub>	0.77	0.75
PM <sub>2.5</sub>	<b>0.77</b>	0.5
Total Suspended Particulates (TSP)	0.77	1.25
Sulfur Dioxide (SO <sub>2</sub> )	0.03	2.0
Volatile Organic Compounds, total (VOC)	0.54	2.0
Ozone Depleting Substances, total	0.000	1.0
Greenhouse Gases (GHG)	1,466	N/A

**Table 2. Potential TAP emissions and de minimis emission values**

Pollutant	Potential Emissions from Project (lb/Averaging Period)	De Minimis Emission Values	Averaging Period
Nitrogen Dioxide, (NO <sub>2</sub> )	<b>7.58</b>	0.46	1-hour
Carbon Monoxide (CO)	<b>16.7</b>	1.10	1-hour
Sulfur Dioxide (SO <sub>2</sub> )	0.12	0.46	1-hour
Diesel Engine Exhaust Particulate (DEEP)	<b>1.33</b>	2.70E-02	Year
Acetaldehyde	<b>3.01</b>	3.00	Year
Acrolein	<b>2.08E-02</b>	1.30E-03	24-hour
Benz(a)anthracene	1.48E-02	4.50E-02	Year
Benzene	<b>1.45</b>	1.00	Year

Pollutant	Potential Emissions from Project (lb/Averaging Period)	De Minimis Emission Values	Averaging Period
Benzo(a)pyrene	4.37E-03	8.20E-03	Year
Benzo(b)fluoranthene	1.64E-02	4.50E-02	Year
Benzo(k)fluoranthene	3.69E-03	4.50E-02	Year
1,3-Butadiene	<b>7.00E-01</b>	0.27	Year
Chrysene	2.34E-02	0.45	Year
Dibenz(a,h)anthracene	<b>7.00E-03</b>	4.10E-03	Year
Formaldehyde	<b>5.20</b>	1.40	Year
Indeno(1,2,3-cd)pyrene	7.30E-03	4.50E-02	Year
Naphthalene	<b>2.18</b>	0.24	Year
Propylene	2.37	11.00	24-hour
Toluene	2.64E-01	19.00	24-hour
Xylenes	1.81E-01	0.82	24-hour

ii. Prevention of Significant Deterioration

PSD does not apply to this project, based on uncontrolled 8,760 hr/yr PTE.

iii. Other Applicable Requirements

In accordance with WAC 173-400-113, the proposed new sources 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. WAC 173-400-040 General standards for maximum emissions: limits visible emissions from all sources to no more than three minutes of 20 percent opacity, in any hour, of an air contaminant from any emission unit.
- B. WAC 173-400-050 and 060 Emission standards for combustion and incineration units: limits emissions of particulate matter from combustion and general process units to 0.23 gram per dry cubic meter at standard conditions (0.10 grains per dry standard cubic foot) of exhaust gas.
- C. WAC 173-400-115 Standards of performance for new sources: adopts by reference 40 C.F.R. Part 60, Subpart IIII. See more below.

b. Federal Regulations

In accordance with WAC 173-400-113, the proposed new source 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 IIII) applies to each emergency generator. The regulation specifies: criteria for classification as emergency engines, Tier-2 emission standards for the engines; and fuel, monitoring, compliance, and notification requirements for the Permittee.

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

The RICE NESHAP applies to each 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.

#### 4. Emissions

a. Emission Factors

Emission factors for the emergency generator engines were provided as Not-to-Exceed-Limits by the manufacturer Catipillar for NO<sub>x</sub>, CO, PM, hydrocarbons (HC), and ammonia. The following was assumed for the emergency generators:

- i. DEEP is assumed to be manufacturer-measured PM
- ii. HCs were assumed to be equivalent to VOC and non-methane HC
- iii. The sum of PM and HC (assumed to all condense) and be equivalent PM<sub>10</sub> and PM<sub>2.5</sub> for the engines.

The emission factor for SO<sub>2</sub> was calculated based on sulfur content of the ultra-low sulfur fuel and an average heating value of diesel fuel. All sulfur was assumed to convert to SO<sub>2</sub>.

An additional factor was added for cold-start emissions (PM, CO, total VOC, and volatile TAPs). These factors are based on short-term concentration trends for VOC and CO emission observed immediately after startup of a large diesel backup generator. These observations were documented in the California Energy Commission's report "Air Quality Implications of Backup Generators in California" (Lents et al. 2005).

All the remaining emission rates for toxic air pollutants from the generators were calculated using emission factors from EPA's AP-42, Volume 1, Chapter 3.4, which provides emission factors for HAPs from large internal combustion diesel engines (EPA 1995).

**Potential to Emit** calculations were based on uncontrolled primary use generators running 500 hours per year. **Allowable emissions** are based on the CO7 and CO8 generators using controls and limited hours of operation.

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

In the analysis, the consultant proposed and successfully demonstrated that Tier-4 engines are cost prohibitive. Therefore, the consultant proposed uncontrolled Tier-2 engines as BACT and tBACT. I agree that the proposal meets or exceeds: BACT for emissions of NO<sub>x</sub>, CO, VOC and PM; and tBACT for emissions listed in Table 2.

c. Additional Voluntary Emission Controls

The Permittee and applicant proposed voluntary installation of Selective Catalytic Reduction, and catalyzed diesel particulate filter to control NO<sub>x</sub> and PM, respectively.

d. Allowable Emissions

The allowable emissions from the project, considering all emission and operational limits contained in the approval order, are shown in the tables below.

**Table 3. Allowable emissions for pollutants listed under WAC 173-400-110(5)**

<b>Pollutant</b>	<b>New Generators (tons/year)</b>
CO	0.78
NO <sub>x</sub>	0.50
PM <sub>10</sub>	0.11
PM <sub>2.5</sub>	0.11
TSP	0.11
SO <sub>2</sub>	0.01
VOC	0.11
GHG	317

**Table 4. Allowable TAP emissions**

<b>Pollutant</b>	<b>New Generators (lbs/Averaging Period)</b>	<b>Averaging Period</b>
NO <sub>2</sub>	2.46	1-hour
CO	16.70	1-hour
SO <sub>2</sub>	0.07	1-hour
DEEP	20.11	Year
Acetaldehyde	0.61	Year
Acrolein	2.08E-02	24-hour
Ammonia	10.34	24-hour
Benz(a)anthracene	3.14E-03	Year
Benzene	3.11	Year
Benzo(a)pyrene	9.48E-04	Year
Benzo(b)fluoranthene	3.60E-03	Year
Benzo(k)fluoranthene	8.01E-04	Year
1,3-Butadiene	0.15	Year
Chrysene	5.12E-03	Year
Dibenz(a,h)anthracene	1.50E-03	Year
Formaldehyde	1.06	Year
Indeno(1,2,3-cd)pyrene	1.58E-03	Year
Naphthalene	0.47	Year
Propylene	2.37	24-hour
Toluene	0.26	24-hour
Xylenes	0.18	24-hour

The table below presents the potential emissions and allowable emissions for Microsoft Corporation - Columbia Data Center with the emissions from the project included. The facility is considered a synthetic minor as it has taken limits to stay under Title V thresholds.

**Table 5. Potential and Allowable Emissions for Total Source**

<b>Pollutant</b>	<b>Total Source Potential Emissions (tons/year)</b>	<b>Total Source Allowable Emissions (tons/year)</b>
CO	33.98	6.49
NO <sub>x</sub>	213.94	37.60
PM <sub>10</sub>	18.92	14.29
PM <sub>2.5</sub>	15.42	6.49

Pollutant	Total Source Potential Emissions (tons/year)	Total Source Allowable Emissions (tons/year)
TSP	26.72	14.29
SO <sub>2</sub>	0.28	0.05
VOC	12.29	2.42
GHG	44,326	8,889

**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)

For NO<sub>2</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub>, modeling was performed to satisfy the requirements of Chapter 173-476 WAC. 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 the table below.

**Table 6. Criteria Pollutant Modeling Results.**

Criteria Pollutant	Averaging Period	Maximum Modeled Concentration (µg/m <sup>3</sup> )	Modeled Concentration with Background (µg/m <sup>3</sup> )	Ambient Air Quality Standard (µg/m <sup>3</sup> )
NO <sub>2</sub>	1-hr	80.7	139.45	188
NO <sub>2</sub>	Annual	0.02	6.62	100
CO	1-hr	120.2	121.5	40,000
CO	8-hr	62.6	63.5	10,000
PM <sub>10</sub>	24-hr	12.5	90.1	150
PM <sub>2.5</sub>	24-hr	3.6	22.5	35
PM <sub>2.5</sub>	Annual	0.012	5.812	12

b. Toxic Air Pollutants

In accordance with WAC 173-460-040, new TAP 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 the six new generators. As such, the new emission unit must comply with WAC 173-460-070 (ambient impact requirement). The facility 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. The table below includes the estimated emissions increases associated with the project and the applicable SQER.

**Table 7. TAP Analysis**

<b>TAP</b>	<b>Allowable Emissions - Increase</b>	<b>SQER</b>	<b>Modeling Required?</b>
<b>NO<sub>2</sub></b>	2.46	0.87	Yes
CO	16.70	43.00	No
<b>DEEP</b>	20.11	0.54	Yes
Acetaldehyde	0.61	60	No
Acrolein	2.08E-02	2.60E-02	No
Ammonia	10.34	37.00	No
Benzene	3.11	21.00	No
1-3-Butadiene	0.15	5.4	No
Dibenz(a,h)anthracene	1.50E-03	8.2E-02	No
Formaldehyde	1.06	27.0	No
Naphthalene	0.47	4.80	No

For NO<sub>2</sub> and DEEP that require modeling, modeling was performed to satisfy the requirements of Washington’s state toxics rule in Chapter 173-460 WAC. The modeling demonstrates that the emissions increases as a result of the project will not exceed the acceptable source impact level (ASIL) screening thresholds. The modeling results are included in the table below.

**Table 8. TAP Modeling Results.**

<b>TAP</b>	<b>Averaging Period</b>	<b>Maximum Modeled Concentration (µg/m<sup>3</sup>)</b>	<b>ASIL (µg/m<sup>3</sup>)</b>	<b>Percent of ASIL</b>
NO <sub>2</sub>	1-hour	110.9	470	23.6%
DEEP	1-Year	6.90E-04	0.0033	20.9%



### **Appendix A – Response to Comments**

This section will be updated following the public comment period.

**Appendix B – 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 engine. The applicable portions the rule appear to be:

<b>Citation</b>	<b>Subject</b>	<b>Notes</b>
60.4202(a)(2)	Manufacturer emission standards	Specifies that 2007 model year and later emergency stationary CI ICE with a maximum engine power $\geq 37$ 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 engine. Condition 1 of the Order requires general compliance with this regulation. 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.