Technical Support Document
Notice of Construction Approval Order No. 21AQ-E032
H5 Data Center - Quincy
AQPID No. A0250282
Quincy, WA

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1. **Project Summary**

H5 Data Center (the source) is a data center classified as a synthetic minor with six installed emergency generators and four cooling tower emissions units. This review is for a project to add 12 new emergency generators and eight cooling towers to the existing site building.

An initial Notice of Construction (NOC) application was submitted by H5 Data Center for the Quincy Expansion project. The Washington State Department of Ecology (Ecology) reviewed the initial application and found it incomplete per WAC 173-400-111 on April 15, 2021. An amended NOC application was received by Ecology on July 16th and October 8, 2021 and found to be complete on October 8, 2021.

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) and (k) for a project that exceeds an acceptable source impact level and an order issued under WAC 173-400-091 that establishes limitations on a source's potential to emit. The comment period was held November 10 through December 10, 2021. Response to comments received during the comment period are attached in appendix A.

b. State Environmental Policy Act

City of Quincy issued a determination of nonsignificance (DNS) for the current building with emergency engines on April 25, 2007.

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 units are being constructed for this project and therefore are subject to minor new source review (NSR).

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

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

Pollutant	Annual Project (tons/year)	Project emissions with commissioning (tons/year)	Minor NSR Exemption (tons/year)	PTE for facility (tons/year)	PTE for facility with commissioning (tons/year)
Carbon Monoxide (CO)	**2.7**	**4.8**	5.0	9.1	11.2
Lead (Pb)	0.000023	0.000023	0.005	0.000023	0.000023
Nitrogen Oxides (NO_X)	**10.8**	**18.8**	2.0	56.8	64.8
PM_{10}	**1.8**	**2.6**	0.75	2.3	3.0
$PM_{2.5}$	**1.6**	**2.4**	0.5	2.1	2.8
Total Suspended Particulates (TSP)	**1.8**	**2.6**	1.25	2.3	3.0
Sulfur Dioxide (SO_2)	0.0081	0.014	2.0	0.051	0.057
Volatile Organic Compounds, total (VOC)	0.62	1.1	2.0	0.66	1.1

Table 2. Toxic Air Pollutant (TAP) Emission Increases and De Minimis Levels

Pollutant	Averaging Period	Project emissions with commissioning (lbs/averaging period)	De Minimis
Generator Emissions			
Nitrogen dioxide (NO_2)	1-hr	**57**	0.46
Diesel Engine Exhaust Particulate (DEEP)	Year	**1,276**	0.027
Carbon monoxide (CO)	1-hr	**152**	1.1
Sulfur dioxide	1-hr	0.43	0.46

Pollutant	Averaging Period	Project emissions with commissioning (lbs/averaging period)	De Minimis
1,3-Butadiene	Year	**0.73**	0.27
Acetaldehyde	Year	0.47	3.0
Acrolein	24-hr	**6.7E-03**	1.3E-03
Benzene	Year	**15**	1.0
Benz(a)anthracene	Year	1.2E-02	4.5E-02
Benzo(a)pyrene	Year	4.8E-03	8.2E-03
Benzo(b)fluoranthene	Year	2.1E-02	4.5E-02
Benzo(k)fluoranthene	Year	4.1E-03	4.5E-02
Chrysene	Year	2.9E-02	0.45
Dibenz(a,h)anthracene	Year	**6.5E-03**	4.1E-03
Formaldehyde	Year	1.5	1.4
Indeno(1,2,3-cd)pyrene	Year	7.8E-03	4.5E-02
Naphthalene	Year	**2.4**	0.24
Propylene	24-hr	2.4	11
Toluene	24-hr	0.24	19
Xylenes	24-hr	0.16	0.82
Cooling Tower TAPs			
Arsenic	Year	**1.1E-02**	2.5E-03
Beryllium	Year	3.9E-04	3.4E-03
Cadmium	Year	3.9E-04	1.9E-03
Chromium[a]	24-hr	1.8E-06	3.7E-04
Cobalt	24-hr	3.2E-05	3.7E-04
Copper	1-hr	1.4E-04	9.3E-03
Lead	Year	4.6E-02	10
Manganese	24-hr	1.8E-04	1.1E-03
Mercury	24-hr	2.1E-06	1.1E-04
Selenium	24-hr	1.8E-05	7.4E-02
Vanadium	24-hr	**6.5E-04**	3.7E-04
Total Cyanide	24-hr	1.1E-04	3.0E-03
Ammonia	24-hr	7.4E-04	1.9
Total Phosphorus	24-hr	7.4E-04	7.4E-02

[a]All chromium was assumed to be Chromium (III), soluble particulates.

ii. Prevention of Significant Deterioration

PSD does not apply to this source based on permitted potential to emit.

iii. Other Applicable Requirements

In accordance with WAC 173-400-113, the proposed new source(s) 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 general process units and 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(s) 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-Exceed-Limits by the manufacturers MTU Detroit Diesel and Kohler for NOx, CO, PM, and hydrocarbons (HC). 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_{10} and $PM_{2.5}$ for the engines.

The emission factor for SO_2 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_2.

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).

Emission rates for PM from the cooling towers were determined by the manufacturer guaranteed drift droplet rate percent. The size distribution of the evaporated solid particles was calculated based on the liquid droplet size distribution and the assumption that the total dissolved solids (TDS) concentration inside the liquid droplets will be the same as the TDS concentration within the cooler recirculation water. TAPs from the water droplets were calculated based on worst case concentrations within samples of the City of Quincy's domestic water supply and well water samples (Cascade Analytical 2020).

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

In the analysis, the consultant proposed and successfully demonstrated that Tier-4 engines, urea-based selective catalytic reduction, catayzed diesel particulate filter and diesel oxidation catalyst are cost prohibitive and are likely to cause operational problems with the proposed engine use patterns. Therefore, the consultant proposed uncontrolled Tier-2 engines as BACT and tBACT. I agree that the proposal meets or exceeds: BACT for emissions of NOx, CO, VOC and PM; and tBACT for engine TAP emissions listed in Table 2.

The proposed drift droplet rate of 0.0005 percent is presumptive BACT and tBACT for evaporative cooling towers. Emissions for the cooling towers comes from the total dissolved solids in the water used in the cooling towers: PM and the PM based cooling tower TAPs listed in Table 2.

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_2, CO, PM_{10}, $PM_{2.5}$, modeling was performed to satisfy the requirements of Chapter 173-476 WAC. The modeling demonstrates that the emission increases as a result of the project will not exceed the ambient air quality standards. The modeling results are included in Table 3.

Table 3. Criteria Pollutant Modeling Results.

Criteria Pollutant	Averaging Period	Maximum Modeled Concentration	Modeled Concentration with background	Ambient Air Quality Standard
Nitrogen Dioxide (NO_2)	1-hr	85	137	188
NO_2	Annual	3.5	8.2	100
CO	1-hr	4,945	6,211	40,000
CO	8-hr	2,250	3,135	10,000
PM_{10}	24-hr	71	149	150
$PM_{2.5}$	24-hr	15	33	35
$PM_{2.5}$	Annual	1.0	6.6	12

Notes:
[a]Background concentrations obtained from Idaho Department of Environmental Quality for model and monitoring data from July 2014 through June 2017 (IDEQ; accessed August 14, 2020). Location-specific 1-hour NO2 background concentrations provided by Ecology via the online Storymap tool for Quincy, WA.
[b]Cululative concentrations are calculated for pollutants where project-related contributions are above the significant impact level.
[c]Reported values represent the 1st – highest modeled impacts over 5 years.
[d]Reported values represent the 6th – highest modeled impacts over 5 years.
[e]Monthly maintenance operations are expected to occur on each engine for up to 1 hour per engine. Multiple sequential tests may occur within the same day for up to 6 hours per day.
[f]Reported values represent the average of the maximum 3 years of 1st- highest modeled impacts at each receptor.
[g]Reported value is based on the Monte Carlo assessment for NO_2.

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 12 new emergency generators and eight cooling tower units. As such, the new emission units 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. Table 4 includes the estimated emissions increases associated with the project and the applicable SQER.

Table 4. TAP Analysis

TAP	Estimated Increase	SQER	Modeling Required?
NO_2	57	0.87	Yes
DEEP	1,276	0.54	Yes
CO	152	43	Yes
1,3-Butadiene	0.73	5.4	No
Acrolein	6.7E-03	2.6E-02	No
Benzene	15	21	No
Dibenz(a,h)anthracene	6.5E-03	8.2E-02	No
Formaldehyde	1.5	27	No
Naphthalene	2.4	4.8	No
Arsenic	1.1E-02	4.9E-02	No
Vanadium	6.5E-04	7.4E-03	No

For NO_2, CO, and DEEP 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, with the exception of NO_2 and DEEP. The modeling results are included in Table 5.

Table 5. TAP Modeling Results

TAP	Averaging Period	Maximum Modeled Concentration (µg/m³)	ASIL (µg/m³)
NO_2	1-hr	919	470
CO	1-hr	4,945	23,000
DEEP	year	0.37	0.0033

As shown in Table 5, all TAPs except NO_2 and DEEP are below the associated ASIL. A Second Tier Health Impact Assessment (HIA) was conducted for NO_2 and DEEP and submitted separately from the NOC application, per WAC 173-460-090. Ecology reviewed the assessment and recommended approval of the project because, "the health hazards are considered to be acceptable." Ecology's analysis and recommendations are included in the document titled, Second Tier Review Recommendation for: H5 Data Center, October 25, 2021.

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**

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

Citation	Subject	Notes
60.4202(b)(2)	Manufacturer emission standards	Specifies that 2007 model year and later emergency stationary CI ICE with a maximum engine power ≥ 37 kW and ≤ 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.