

State of Washington Department of Ecology  
Notice of Construction Approval Order

IN THE MATTER OF APPROVING A )  
 NEW AIR CONTAMINANT SOURCE ) **Preliminary Determination**  
 FOR **VANTAGE DATA CENTERS** ) **Approval Order No.**  
**VANTAGE-QUINCY DATA CENTER** ) AQPID: A0250308

TO: Ryan Peterson  
 Vantage Data Centers  
 2101 M Street NE  
 Quincy, WA 98848

**EQUIPMENT**

The list of equipment that was evaluated for this order of approval consists of five existing MTU Model 20V4000 diesel engines used to power emergency electrical generators, Model MTU 3000 (WA-11), and 10 Caterpillar Model 3516E diesel engines powering Caterpillar SR5 electrical generators (WA-12), two Caterpillar Model C15 generators (WA-12), and 44 Caterpillar Model 3516E generators (WA-13).

The five MTU 3.0 megawatt (MWe) generators will have a combined capacity of 15 MWe. The ten Caterpillar 2.75 MW engine generators and two 500kW Caterpillar life-safety generators will have a combined capacity of 28.5 MW for a facility total of 49.5 MW. The generators will be installed in two phases. Phase 1 is in place and consists of five 3.0 MWe generators that were installed within 18 months of initial approval. Phase 2 is in place and consists of a total of the 10 additional 2.75 MWe generators and 2 500 kW life-safety generators that were installed within 18 months of initial approval.

Table 1.1: Engine & Generator Serial Numbers						
Project Phase	BLDG	Unit ID	Capacity MWe	Engine SN	Generator SN	Build date
1	WA-11	1 MTU	3.0	34487-1-1	28420-01	9/1/2013
1	WA-11	2 MTU	3.0	34487-1-2	28420-0	9/1/2013
1	WA-11	3 MTU	3.0	34487-1-3	28420-0	9/1/2013
1	WA-11	4 MTU	3.0	34487-1-4	34571-01	9/1/2014
1	WA-11	5 MTU	3.0	34487-1-5	34707-01	9/1/2014
2	WA-12	6 CAT	0.5	CAT00C15PT3300683	G6B25171	12/1/2020
2	WA-12	7 CAT	0.5	CAT00C15TT3300682	G6B25200	12/1/2020
2	WA-12	8 CAT	2.75	CAT3516EAJD700222	G7H03051	12/1/2020
2	WA-12	9 CAT	2.75	CAT3516EJJD700217	G7H00821	12/1/2020
2	WA-12	10 CAT	2.75	CAT3516EJJD700216	G7H00819	12/1/2020
2	WA-12	11 CAT	2.75	CAT3516EPJD700214	G7H00813	12/1/2020
2	WA-12	12 CAT	2.75	CAT3516EVJD700221	G7H00820	12/1/2020
2	WA-12	13 CAT	2.75	CAT3516EVJD700302	G7H00893	12/1/2020



<b>Table 1.1: Engine &amp; Generator Serial Numbers</b>						
Project Phase	BLDG	Unit ID	Capacity MWe	Engine SN	Generator SN	Build date
3	WA-13	-	2.75	-	-	-
3	WA-13	-	2.75	-	-	-
3	WA-13	-	2.75	-	-	-
3	WA-13	-	2.75	-	-	-
3	WA-13	-	2.75	-	-	-
3	WA-13	-	2.75	-	-	-
3	WA-13	-	2.75	-	-	-
3	WA-13	-	2.75	-	-	-

The Vantage Data Center will utilize indirect evaporative cooling units to dissipate heat from electronic equipment at the facility, thus eliminating evaporative cooling tower emissions from the project.

**PROJECT SUMMARY**

The Vantage Data Center Phase 1 construction consists of Building 1 with the five engine-generators already in place. Phase 2 construction consists of Building 2 with 12 smaller engine generators. Phase 3 construction will consist of Building 3 with 44 engine generators for a total of 61 facility engine generators. The data center will be leased for occupancy by companies that require a fully supported data storage and processing facility. Vantage will own and operate the engine/generators.

**LEGAL AUTHORITY**

The emissions from the proposed project have been reviewed under the legal authority of RCW 70A.15.2210 and the applicable rules and regulations adopted thereunder. The proposed project, if operated as specified, will be in accordance with applicable rules and regulations, as set forth in Chapters 173-400 WAC and 173-460 WAC and the operation thereof, at the location proposed, will not result in ambient air quality standards being exceeded.

This Notice of Construction (NOC) Approval Order (**order number**) rescinds and replaces NOC Approval Order No. 19AQ-E026; NOC Approval Order No. 19AQE026 is no longer in effect.

**THEREFORE, IT IS ORDERED** that the project, as described in the Notice of Construction (NOC) application and/or in the plans, specifications, and other information submitted to the Washington State Department of Ecology (Ecology), is approved for construction and operation provided the following conditions are satisfied:

**APPROVAL CONDITIONS**

1) **ADMINISTRATIVE CONDITIONS**

- a) The engine generators approved for operation by this order are to be used solely for those purposes described in application materials as further limited by the conditions of this Order. There must be no operation of this equipment to produce power for

demand-response arrangements, peak shaving arrangements, nor to provide power as part of a financial arrangement with another entity, nor to supply power to the grid.

## 2) **EQUIPMENT RESTRICTIONS**

- a) Any engine used to power the electrical generators must be certified by the manufacturer to meet 40 CFR 60 Tier II emission levels or other more restrictive specifications required by the EPA at the time the engines are installed. Each engine to be installed must be permanently labeled by the manufacturer as an emergency engine in accordance with 40 CFR § 60.4210(f). Each engine approved in this Order must operate as an emergency engine as defined at 40 CFR 60, Subpart IIII or 40 CFR 63, Subpart ZZZZ, and as limited by the other conditions of this approval.
- b) The only engines and electrical generating units approved for operation at the Vantage Data Center are those listed by serial number in Table 1.
- c) The installation of any new or replacement engines 18 months after the final WA13 engine is installed will require notification to Ecology that includes engine manufacturer's specification sheets. Ecology will determine whether new source review is required based on various factors including whether the new engines will have either an increased emission rate or result in an emission concentration that may increase impacts over those evaluated for this approval Order, or if an update to the current BACT analysis is necessary.
- d) The five existing MTU Model 20V4000 engines and 10 CAT 2.75 MW engines will have exhaust stack heights that must be greater than or equal to 43 feet above ground level. The stacks must be no more than 26 inches in diameter. Additionally, the two 500 kW CAT life-safety generators must have exhaust stack heights no less than 15 feet above ground level. Vantage Data Centers must verify that, for the phases of the Quincy project, exhaust stack parameters such as diameter, height, and exhaust rate and velocity do not result in ambient impacts greater than what was evaluated for this project.
- e) The 44 new Cat Model 3516E engines will have stack heights that must be greater than or equal to 60 feet above grade. The stacks must be no more than 20 inches in diameter. Vantage Data Centers must verify that, for the phases of the Quincy project, exhaust stack parameters such as diameter, height, and exhaust rate and velocity do not result in ambient impacts greater than what was evaluated for this project.
- f) The manufacture and installation of the 17 engine/generator sets proposed for Buildings 1 and 2 of the project must occur by January 1, 2020. If the manufacture and installation of the engines has not been completed by the above date, new source review may be required prior to continued installation, and ambient air quality impacts will be re-evaluated if new source review is required. Vantage may request an extension of this time schedule, and Ecology may approve an extension without revision to this Order.
- g) The manufacture and installation of the 44 engine/generator sets proposed for Buildings WA-13 of the project must occur by **DATE, 202X**. If the manufacture and installation of the engines has not been completed by the above date, new source review may be required prior to continued installation, and ambient air quality impacts will be re-

evaluated if new source review is required. Vantage may request an extension of this time schedule, and Ecology may approve an extension without revision to this Order.

- h) This Order only applies to the five MTU Model 20V4000 engines, each with a rated full standby capacity of 4678 HP, the 54 Caterpillar Model 3516E engines with a rated full standby capacity of 4043 HP, and the two CAT Model C15 engines with a rated full standby capacity of 762 HP that were proposed in the Notice of Construction applications for this facility approval. On a case-by-case basis, Ecology may require additional ambient impacts analyses prior to installation of engines not listed in Table 1.

**3) OPERATING LIMITATIONS**

- a) The fuel consumption at the Vantage Data Center facility at build-out (three buildings with a total of 61 engines) must be limited to a total of 1,172,230 gallons per year of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil (less than 0.00150 weight percent sulfur). Total annual fuel consumption by the facility may be averaged over a three-year period using monthly rolling totals.
- b) Except as provided in Approval Condition 3(e), the 61 Vantage Data Center engines are limited to the following average hours of operation, and averaging periods:
- i) Each MTU engine (total of 5 engines) must not exceed 45 hours of operation (at any load, for any purpose, including commissioning) per year, on a rolling monthly three-year average, and averaged over all MTU engines in service.
  - ii) Each Cat 3516E engine (total of 54 engines, included in the WA12 and WA13 set) must not exceed 84 hours of operation (at any load, for any purpose, including commissioning) per year, on a rolling monthly three-year average, and averaged over all CAT 3516E engines in service.
    - (1) A one-time allowance of 23 hours of operation for each of the new Cat 3516E engines (44 engines, the WA-13 install project) is permitted for commissioning. These additional hours for each engine will expire 365 days after each engine is installed. Any additional hours needed for commissioning will be used from the annual runtime permitted for each engine.
  - iii) Each Cat C15 engine (total of 2 engines) must not exceed 84 hours of operation (at any load, for any purpose, including commissioning) per year, on a rolling monthly three-year average, and averaged over all Cat C15 engines in service.
  - iv) Each MTU engine must not exceed an annual fuel consumption of 9,315 gallons, averaged over a three-year period using monthly rolling totals, and averaged over all MTU engines in service.
  - v) Each Cat 3516E engine (total of 10 engines, at the WA-12 building) must not exceed an annual fuel consumption of 16,952 gallons, averaged over a three-year period using monthly rolling totals, and averaged over all 2.75 MW Cat engines in service.
  - vi) Each Cat 3516E engine (total of 44 engines, at the WA-13 building) must not exceed an annual fuel consumption of 21,594 gallons, averaged over a three-year period using monthly rolling totals, and averaged over all 2.75 MW Cat engines in service.

- vii) Each Cat C15 engine (total of 2 engines) must not exceed an annual fuel consumption of 2,999 gallons, averaged over a three-year period using monthly rolling totals, and averaged over 0.5 MW Cat engines in service.
  - c) For each MTU engine, a load bank will be used for electrical energy dissipation whenever prescheduled monthly maintenance testing, corrective testing or annual load bank testing occurs above idle, and the engine must be run for these purposes at 50 percent operating load or greater.
  - d) The 61 engines, five MTU Model 20V4000 engines, 54 Cat 3516E engines, and two CAT C15 life-safety engines at the Vantage Data Center require periodic scheduled operation. To mitigate engine emission impacts, Vantage Data Center will perform all scheduled engine maintenance testing, bypass operations, and load testing during daylight hours. The Vantage Data Center must develop an operating schedule that must be available for review by Ecology upon request. Changes to the operating schedule will not trigger revision or amendment of this Order if approved in advance by Ecology.
  - e) During a site integration test, no more than 11 generator engines may operate concurrently for no more than 10 continuous hours.
  - f) All startup and commissioning testing must be conducted during daylight hours.
  - g) Following start-up, commissioning testing, and the initial certification testing of one engine of each batch of similar size engines installed, the number of hours each engine has run, the fuel consumed during the testing, and the date must be recorded. Data must be provided to Ecology on request.
  - h) Each of the Cat 3516E engines (total of 44) installed as part of the WA-13 project must employ Catalyzed Diesel Particulate Filters (cDPF) and Selective Catalytic Reduction (SCR) as part of the emissions controls for these engines. No engine is permitted to operate without these controls in place and operating as designed. These controls must be installed and operated per manufactures' specifications.
- 4) **GENERAL TESTING AND MAINTENANCE REQUIREMENTS**
- a) The Vantage Data Center will follow engine-manufacturer's recommended diagnostic testing and maintenance procedures to ensure that each engine will conform to the emission limits in Condition 5 of this approval throughout the life of each engine.
  - b) Following installation and commissioning, but prior to engines being placed into service, to demonstrate the engines are commissioned and programmed to run within the Tier 2 emission limits in Condition 5(b), for PM (filterable only), NO, NO<sub>2</sub>, NMHC, and CO emissions measurement must be conducted for one engine from each batch of similar size engines installed (e.g. one CAT 3516 and one Cat C15). Testing must be conducted at the loads of 100 percent, 75 percent, 50 percent, 25 percent and 10 percent using weighted averaging according to Table 2 of Appendix B to Subpart E of 40 CFR 89. Testing may be conducted using 40 CFR 1065.
  - c) Within 60 months of the first engine installation of each phase of installation, and every 60 months thereafter, the Vantage Data Center must measure emissions of particulate matter (PM), Volatile Organic Compounds (VOC), nitric oxide (NO), nitrogen dioxide (NO<sub>2</sub>), carbon monoxide (CO), and oxygen (O<sub>2</sub>) from at least one representative engine

from each batch of engines installed, in accordance with Approval Condition 4(d)(ii) and 4(d)(iii). This testing will serve to demonstrate compliance with the emission limits contained in Condition 5(b); confirm that the engine's emissions remain within the EPA Tier 2 certification specifications, and as an indicator of proper operation of the engines. The selection of the engine(s) to be tested must be subject to prior approval by Ecology and must be defined in the source test protocol submitted to Ecology no less than 30 days in advance of any compliance-related stack sampling conducted by Vantage. Each engine tested must be the engine from each batch of engines installed with the most operating hours since an engine of that batch was last tested.

- d) The following procedures must be used for each test for the engines required by Approval Condition 4(c) unless an alternate method is proposed by the Vantage Data Center and approved in writing by Ecology prior to the test:
- i) Periodic emissions testing should be combined with other pre-scheduled maintenance testing and annual load bank engine testing. Additional operation of the engines for the purpose of emissions testing beyond the operating hours allowed in this Order must be approved by Ecology in writing.
  - ii) To demonstrate that the engines satisfy the engine manufacturer's not to exceed emissions rates, PM (filterable and condensable), non-methane hydrocarbons (NMHC), NO, NO<sub>2</sub>, and CO emission measurement must be conducted on a representative engine(s) from each phase of installation. This testing must utilize EPA Reference Methods from 40 CFR 60, 40 CFR 51, and /or 40 CFR 1065, and must be conducted at the single load point the engines have operated at during the preceding five year period (e.g. for first five engines of Phase 1, 33 percent), and at the highest load the engines have supported or at 100 percent electrical output, if the highest load is less than 90 percent.
  - iii) The F-factor method, as described in EPA Method 19, may be used to calculate exhaust flow rate through the exhaust stack. The fuel meter data, as measured according to Approval Condition 4(f), must be included in the test report, along with the emissions calculations.
  - iv) In the event that any stack test indicates non-compliance with the emission limits presented from the manufacturer during permit review, Vantage must repair or replace the engine and repeat the test on the same engine plus two additional engines from the same phase of installation as the engine showing non-compliance. Test reports must be submitted to Ecology within 60 days of the final day of testing. Test reports must be submitted to the address in Condition 7.
- e) Each engine must be equipped with a properly installed and maintained non-resettable meter that records total operating hours.
- f) Each engine must be connected to a properly installed and maintained fuel flow monitoring system that records the amount of fuel consumed by that engine.
- g) For WA11 generators only, the following additional restrictions apply:
- i) Concurrent operation of all generators in service for more than three hours must not exceed one day per calendar year, averaged over three years. Additionally,

concurrent operation of all generators in service for three hours or less must not exceed three days per calendar year.

- ii) In addition to operation in accordance with Condition 4(g)(i), concurrent operation of generators must be limited to a maximum of five generators located in a single building. These engines may be operated no more than four hours per day and for no more than six days per calendar year.

5) **EMISSION LIMITS**

- a) The 61 engines must meet the emission rate limitations contained in this section. The limits are for an engine operating in a steady-state mode (warm) and do not include emission rates during initial commissioning testing of the engines. The annual limits may be averaged over a rolling monthly three-year period. Unless otherwise approved by Ecology in writing, compliance with emission limits for those pollutants that are required to be tested under Approval Conditions 4(b) and 4(c) must be based on emissions test data determined according to those approval conditions.
- b) To demonstrate compliance with the g/kW-hr EPA Tier II and Tier IV average emission limits through stack testing, the Vantage Data Center must conduct exhaust stack testing and averaging of emission rates for five individual operating loads (10 percent, 25 percent, 50 percent, 75 percent, and 100 percent) according to 40 CFR §89.410, Table 2 of Appendix B, 40 CFR Part 89, Subpart E, and/or 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement in effect at the time the engines are installed. The Tier II and Tier IV emission limits for the 59 engine generators (both MTU and Cat) are explained below:
  - i) For all 15 of the MTU and Cat engines from building WA11 and WA12 (excludes the two 0.5 MWe engines from WA12), the following Tier II testing requirements and emission limits include:

Pollutant	Load Test	Test Method <sup>(a)</sup>	Emission Limits
PM	Five-Load weighted Avg.	EPA Method 5 or alternative method from 40 CFR 1065	0.20 g/kW-hr
CO	Five-Load weighted Avg.	EPA Method 10, or alternative method from 40 CFR 1065	3.5 g/kW-hr
NHMC/NOx	Five-Load weighted Avg.	EPA Method 25A and EPA Method 18; or alternative method from 40 CFR 1065	6.4 g/kW-hr

(a) In lieu of these requirements, Vantage may propose an alternative test protocol to Ecology in writing for approval.

- ii) For all 44 of the Cat engines from building WA13, the following Tier II testing requirements and emission limits include:



Pollutant	Load Test	Test Method <sup>(a)</sup>	Emission Limits
CO	Five-Load weighted Avg.	EPA Method 10, or alternative method from 40 CFR 1065	3.5 g/kW-hr

(a) In lieu of these requirements, Vantage may propose an alternative test protocol to Ecology in writing for approval.

iii) For all 44 of the Cat engines from building WA13, the following Tier IV testing requirements and emission limits include:

Pollutant	Load Test	Test Method <sup>(a)</sup>	Emission Limits
PM	Five-load weighted avg.	EPA Method 5, ISO Method 8178, or alternative method from 40 CFR 1065	0.03 g/kW-hr
NOx	Five-load weighted avg.	EPA Method 7E; or alternative method from 40 CFR 1065	0.67 g/kW-hr
NHMC/VOC	Five-load weighted avg.	EPA Method 25A and EPA Method 18; or alternative method from 40 CFR 1065	0.19 g/kW-hr
Ammonia	100%-load (± 2%)	BAAQMD Method ST-1B or EPA Method 320 or EPA CTM-027; or alternative method suitable for use with 40 CFR 1065	0.57 g/kW-hr

(a) In lieu of these requirements, Microsoft may propose an alternative test protocol to Ecology in writing for approval.

- c) Diesel Engine Exhaust Particulate (DEEP: filterable only) emissions from all 61 engines must not exceed 1.04 tons per year averaged over a rolling monthly three-year period.
  - i) Total Particulate Matter (PM=PM2.5) emissions from all 61 engines combined must not exceed 2.3 tons/yr averaged over a rolling monthly three-year period.
  - ii) Nitrogen Oxides emissions from all 61 engines combined must not exceed 80 tons per year averaged over a rolling monthly three-year period.
  - iii) Nitrogen dioxide (NO2) emissions from all 61 engines combined must not exceed 8.0 tons/yr averaged over a rolling monthly three-year period.
  - iv) Volatile organic compound (VOC) emissions from all 61 engines combined must not exceed 0.91 tons/yr averaged over a rolling monthly three-year period.
  - v) Carbon Monoxide (CO) emissions from all 61 engines combined must not exceed 18 tons/yr averaged over a rolling monthly three-year period.
  - vi) Sulfur dioxide emissions from all 61 engines combined must not exceed 1.0 tons/yr averaged over a rolling monthly three-year period.
  - vii) Visual emissions from each diesel electric generator exhaust stack must be no more than 10 percent, with the exception of a five-minute period after unit start-up.

Visual emissions must be measured by using the procedures contained in 40 CFR 60, Appendix A, Method 9.

**6) OPERATION AND MAINTENANCE MANUALS**

- a) A site-specific O&M manual for the Vantage Data Center facility equipment must be developed and followed. Manufacturers' operating instructions and design specifications for the engines, generators, and associated equipment must be included in the manual. The O&M manual must be updated to reflect any modifications of the equipment or its operating procedures. Emissions that result from failure to follow the operating procedures contained in the O&M manual or manufacturer's operating instructions may be considered proof that the equipment was not properly installed, operated, and/or maintained. The O&M manual for the diesel engines and associated equipment must at a minimum include:
  - i) Manufacturer's testing and maintenance procedures that will ensure that each individual engine will conform to the EPA Tier Emission Standards appropriate for that engine throughout the life of the engine.
  - ii) Normal operating parameters and design specifications.
  - iii) Operating and maintenance schedules.

**7) SUBMITTALS**

- a) All notifications, reports, and other submittals must be sent to:
  - (a) Washington State Department of Ecology
  - (b) Air Quality Program
  - (c) 4601 N. Monroe Street
  - (d) Spokane, WA 99205-1295
- b) Electronic Annual Report Submittals: [emissions.inventory@ecy.wa.gov](mailto:emissions.inventory@ecy.wa.gov)
- c) *OR AS DIRECTED.*

**8) RECORDKEEPING**

- a) All records, Operations and Maintenance Manual, and procedures developed under this Order must be organized in a readily accessible manner and cover a minimum of the most recent 60-month period. Any records required to be kept under the provisions of this Order must be provided within 30 days to Ecology upon request. The following records are required to be collected and maintained:
  - i) Fuel receipts with amount of diesel and sulfur content for each delivery to the facility.
  - ii) Monthly and annual hours of operation for each diesel engine.
  - iii) Purpose, electrical load, and duration of runtime for each diesel engine during any periods of operation.
  - iv) Annual gross power generated by or for each independent tenant at the facility and total annual gross power generated by the facility.

- v) Upset condition log for each engine and generator that includes date, time, duration of upset, cause, and corrective action.
- vi) Air quality complaints received from the public or other entity, and the affected emissions units.

9) **REPORTING**

- a) Within 10 business days after entering into a binding agreement with a new tenant, Vantage must notify Ecology of such agreement. The serial number, manufacturer make and model, standby capacity, and date of manufacture of engines proposed will be submitted prior to installation of engines in any of the phases of this project.
- b) The following information will be submitted to the AQP at the address in Condition 7 above by January 31 of each calendar year. This information may be submitted with annual emissions information requested by the AQP.
  - i) Monthly rolling annual total summary of air contaminant emissions.
  - ii) Monthly rolling hours of operation for each engine with annual total.
  - iii) Monthly rolling gross power generation with annual total as specified in Approval Condition 8(a)(iv).
  - iv) A log of each start-up of each diesel engine that shows the date, the purpose, fuel usage, and duration of each period of operation.
- c) Any air quality complaints resulting from operation of the emissions units or activities must be promptly assessed and addressed. Vantage must maintain a record of the action taken to investigate the validity of the complaint and what, if any, corrective action was taken in response to the complaint. Ecology must be notified within three days of receipt of any such complaint.
- d) Vantage must notify Ecology by e-mail or in writing within 24 hours of any engine operation of greater than 60 minutes if such engine operation occurs as the result of a power outage or other unscheduled operation. This notification does not alleviate Vantage from annual reporting of operations contained in any section of Approval Condition 9.

10) **GENERAL CONDITIONS**

- a) **Activities Inconsistent with this Order** - Any activity undertaken by the Permittee, or others, in a manner that is inconsistent with the data and specifications submitted as part of the NOC application or this NOC Approval Order, will be subject to Ecology enforcement under applicable regulations.
- b) **Availability of Order** - Legible copies of this NOC Approval Order and any O&M manual(s) must be available to employees in direct operation of the equipment described in the NOC application and must be available for review upon request by Ecology.
- c) **Compliance Assurance Access** - Access to the source by representatives of Ecology or the United States Environmental Protection Agency (EPA) must be permitted upon request. Failure to allow access is grounds for enforcement action under the federal

Clean Air Act or the Washington State Clean Air Act, and may result in revocation of this NOC Approval Order.

- d) **Discontinuing Construction or Operation** – This NOC Approval Order will become invalid if construction of the equipment described in the NOC application and this NOC Approval Order does not commence within 18 months after receipt of this NOC Approval Order. If construction or operation is discontinued for 18 months or longer on a portion or all of the equipment described in the NOC application and this NOC Approval Order, the portion of the NOC Approval Order regulating the inactive equipment will become invalid. Ecology may extend the 18-month period upon request by the Permittee and a satisfactory showing that an extension is justified.
- e) **Equipment Operation** - Operation of the facility must be conducted in compliance with all data and specifications submitted as part of the NOC application and in accordance with O&M manuals, unless otherwise approved in writing by Ecology.
- f) **Registration** - Periodic emissions inventory and other information may be requested by Ecology. The requested information must be submitted within 30 days of receiving the request, unless otherwise specified. All fees must be paid by the date specified.
- g) **Violation Duration** - If the Permittee violates an approval condition in this NOC Approval Order, the violation is presumed to commence at the time of the testing, recordkeeping, or monitoring which indicates noncompliance. The violation is presumed to continue until the time of retesting, recordkeeping, or monitoring which indicates compliance. A violation of an approval condition includes, but is not limited to, failure of air pollution control equipment, failure of other equipment resulting in increased emissions, or a failed source test indicating an exceedance of an emission limit. The duration of a violation may also be determined based on credible evidence which shows that the violation was of longer duration, that there were intervening days during which no violation occurred, or that the violation was not continuous in nature.
- h) **Obligations Under Other Laws or Regulations** - Nothing in this NOC Approval Order excuses the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.
- i) **Maintaining Compliance** - It will not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the operations in order to maintain compliance with the conditions of this NOC Approval Order.
- j) **Visible Emissions** - No visible emissions from the source are allowed beyond the property line, as determined by 40 C.F.R. Part 60, Appendix A, Test Method 22.
- k) **Changes in Operations** - Any changes in operation contrary to information submitted in the NOC application must be reported to Ecology at least 60 days before the changes are implemented. Such changes in operation may require a new or amended NOC Approval Order.

Authorization may be modified, suspended, or revoked in whole or part for cause, including, but not limited to, the following:

- Violation of any terms or conditions of this authorization.
- Obtaining this authorization by misrepresentation or failure to disclose full all relevant facts.

The provisions of this authorization are severable and, if any provision of this authorization or application of any provision to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this authorization, will not be affected thereby.

### **Your Right to Appeal**

You have a right to appeal this NOC Approval Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this NOC Approval Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this NOC Approval Order:

- File your appeal and a copy of this NOC Approval Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this NOC Approval Order on Ecology in paper form - by mail or in person (see addresses below). E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

### **Address and Location Information**

<b>Street Addresses</b>	<b>Mailing Addresses</b>
<b>Department of Ecology</b> Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	<b>Department of Ecology</b> Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
<b>Pollution Control Hearings Board</b> 1111 Israel RD SW, STE 301 Tumwater, WA 98501	<b>Pollution Control Hearings Board</b> PO Box 40903 Olympia, WA 98504-0903

**DATED** this **X**th day of **MONTH**, **2022**, at Spokane, Washington.

PREPARED BY:

APPROVED BY:

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Andy Kruse, P.E.  
Commercial/Industrial Unit  
Air Quality Program  
Eastern Regional Office

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David T. Knight  
Section Manager  
Air Quality Program  
Eastern Regional Office

**TECHNICAL SUPPORT DOCUMENT (TSD)  
NOTICE OF CONSTRUCTION APPROVAL ORDER NO. **DRAFT**  
VANTAGE DATA CENTERS MANAGEMENT COMPANY, LLC  
VANTAGE-QUINCY DATA CENTER  
2022**

**1. EXECUTIVE SUMMARY**

On September 2, 2021, Vantage Data Centers (VDC) submitted an NOC application to add 44 new Cat 3516E diesel generators (engines) to go with the new WA-13 building, as well as request a few updates to their existing conditions in their 19AQ-E026 permit. VDC proposed to increase the run time (up from 45 to 84 hours) of the 10 existing Cat 3516E engines located at the WA-12 building, as well as increase the permitted fuel usage. VDC is also asking for a one-time allowance of 23 hours for commissioning of each of the new 44 Cat engines. These additional hours would expire one year after the installation of each engine.

**2. PROJECT DESCRIPTION**

Phases 1 and 2 are now complete, VDC is requesting to begin the third phase which will install 44 additional Cat 3516E engines to the new WA-13 building that is being built in between buildings WA-11 and WA-12. VDC proposes to complete phase 3 (all 44 engines) by **DATE**. VDC is also requesting that the permitted opacity limit for all of the 61 engines being permitted be increased from 5% to 10%. During the review application review process, additional questions were sent to VDC (via Landau Associates) to address questions about the information submitted in the NOC application packet. The answers to those questions can be found in the permit folder, and the new permit has incorporated the new information.

**3. EQUIPEMENT EMISSIONS**

The emissions listed below is taken from the updated PTE emissions for the facility, emailed on 1/19/2022.

**Potential-to-Emit Emissions Summary**

Pollutant	PTE Project Sources (WA-12 and WA-13) <sup>a</sup>		PTE Existing Sources (WA-11) <sup>a,b</sup>	PTE Facility-Wide Total <sup>a</sup>
	Hourly (lbs/hr)	Annual <sup>c</sup> (tpy)	Annual (tpy)	Annual <sup>c</sup> (tpy)
<b>Criteria Pollutants</b>				
NO <sub>x</sub>	1,349	59	21	80
CO	339	14	3.9	18
VOCs	21	0.89	0.015	0.91
SO <sub>2</sub>	2.3	0.10	0.94	1.0
PM <sub>10</sub> /PM <sub>2.5</sub>	38	1.6	0.66	2.3
<b>Toxic Air Pollutants</b>				
Primary NO <sub>2</sub> <sup>d</sup>	135	5.9	2.1	8.0
DEEP	18	0.77	0.27	1.0
CO	339	14	3.9	18
SO <sub>2</sub>	2.3	0.10	0.015	0.12
Ammonia	2.5E+01	1.1E+00	--	1.1E+00
1,3-Butadiene	6.2E-02	2.7E-03	3.8E-04	3.1E-03

Pollutant	PTE Project Sources (WA-12 and WA-13) <sup>a</sup>		PTE Existing Sources (WA-11) <sup>a,b</sup>	PTE Facility-Wide Total <sup>a</sup>
	Hourly (lbs/hr)	Annual <sup>c</sup> (tpy)	Annual (tpy)	Annual <sup>c</sup> (tpy)
Acetaldehyde	4.0E-02	1.7E-03	2.5E-04	2.0E-03
Acrolein	1.2E-02	5.5E-04	7.7E-05	6.2E-04
Benzene	1.2E+00	5.4E-02	7.6E-03	6.1E-02
Benz(a)anthracene	9.9E-04	4.3E-05	6.1E-06	4.9E-05
Benzo(a)pyrene	4.1E-04	1.8E-05	2.5E-06	2.0E-05
Benzo(b)fluoranthene	1.8E-03	7.7E-05	1.1E-05	8.8E-05
Benzo(k)fluoranthene	3.5E-04	1.5E-05	2.1E-06	1.7E-05
Chrysene	2.4E-03	1.1E-04	1.5E-05	1.2E-04
Dibenz(a,h)anthracene	5.5E-04	2.4E-05	3.4E-06	2.7E-05
Formaldehyde	1.3E-01	5.5E-03	7.8E-04	6.2E-03
Indeno(1,2,3-cd)pyrene	6.6E-04	2.9E-05	4.1E-06	3.3E-05
Naphthalene	2.1E-01	9.0E-03	1.3E-03	1.0E-02
Propylene	4.4E+00	1.9E-01	2.7E-02	2.2E-01
Toluene	4.5E-01	1.9E-02	2.8E-03	2.2E-02
Xylenes	3.1E-01	1.3E-02	1.9E-03	1.5E-02

**Notes:**

- <sup>a</sup> Startup emissions are accounted for in the project emissions.
- <sup>b</sup> PTE for existing sources is based on currently permitted emission rates (19AQ-E026).
- <sup>c</sup> Includes one-time allotment of 23 hours and 17 startup events for up to 11 new WA-13 generators in a single year to be used for generator commissioning purposes.
- <sup>d</sup> Primary NO<sub>2</sub> is assumed to be 10% of the NO<sub>x</sub>.

**4. GENERATOR RUNTIME SCENARIOS**

Section 3.2 of the NOC Application outlines the proposed runtime scenarios for the generators. It may be pertinent to have those scenarios listed with the TSD. Below is taken from the App:

The emission estimates presented in this NOC application are based on emissions at “full-variable load,” which corresponds to the characteristic worst-case emission load of each pollutant. Emission estimates are discussed in more detail in Section 4.0.

Generator operating scenarios for the facility are as follows:

- **Non-emergency monthly operation:** Routine operation and maintenance on the emergency generators will be conducted on a monthly basis. This runtime activity will be conducted on one emergency generator at a time for up to 0.5 hours per generator per month without load.
- **Repair Testing:** Repair testing will be conducted on one emergency generator at a time for up to 2 hours per test. One test will be conducted per day for WA-12 engines and at most two tests per day for WA-13 engines.
- **Annual Load Testing:** Annual load testing will be conducted on one emergency generator at a time for up to 4 hours per test at greater than or equal to 75 percent load. At most, two tests will be performed per day.
- **Pull the Plug Test:** Pull the plug testing will occur for one day per year per building. All generators in a building will operate concurrently for up to 4 hours. Pull the plug testing will occur on different days for each building.



- **Transformer Maintenance:** Transformer maintenance will occur on five emergency generators at a time for up to 6 hours per day. At WA-12, transformer maintenance will occur for 2 days every 5 years. At WA-13, transformer maintenance will occur for up to 2 days per year. Transformer maintenance will not be conducted on both buildings concurrently.
- **MX Board Maintenance:** MX board maintenance will occur on five emergency generators at WA-13 and six emergency generators at WA-12 for up to 6 hours per day and up to 2 days per year. MX board maintenance will not be conducted on both buildings concurrently.
- **Unplanned power outage:** During a power outage at the site, all installed generators will activate in order to provide power to the data center. All 56 generators may operate concurrently under full-variable load.
- **Generator startup and commissioning:** After a new generator is installed, that generator will require commissioning. During commissioning, one generator will operate at a time for up to 40 hours per commissioned generator, followed by a site integration test in which up to 11 generators will operate concurrently for up to 10 hours in 1 day. Commissioning is required only for new engines, so it will occur only at WA-13.
- **Stack testing:** It is anticipated that Ecology will require exhaust stack emission testing of a single generator of each make/model and size once every 5 years in order to demonstrate continued compliance with air quality standards. It is assumed that each stack test will take 7 hours.

## 5. APPLICABLE REQUIREMENTS

The proposal by Vantage Data Center qualifies as a new source of air contaminants as defined in Washington Administrative Code (WAC) 173-400-110 and WAC 173-460-040, and requires Ecology approval. The installation and operation of the Vantage-Quincy Data Center is regulated by the requirements specified in:

- 4.1 Chapter 70.94 Revised Code of Washington (RCW), Washington Clean Air Act,
- 4.2 Chapter 173-400 Washington Administrative Code (WAC), General Regulations for Air Pollution Sources,
- 4.3 Chapter 173-460 WAC, Controls for New Sources of Toxic Air Pollutants, and
- 4.4 Title 40 CFR Part 60 Subpart III

All state and federal laws, statutes, and regulations cited in this approval shall be the versions that are current on the date the final approval order is signed and issued.

## 6. BEST AVAILABLE CONTROL TECHNOLOGY and BEST AVAILABLE CONTROL TECHNOLOGY FOR TOXICS

For both BACT and t-BACT the costs for controls beyond Tier 2 designed engines remain prohibitive to achieve Tier 4 controls. A more thorough evaluation of the cost-effectiveness of Tier 4 level controls was conducted for the earlier approval for VDC (16AQ-E026). Even using the 'Hanford' t-BACT cost estimations, the Tier 4 cost per ton of pollutant controlled are much higher than Ecology can justify requiring as t-BACT. This has not changed in the several years since that evaluation was conducted.

However, VDC is proposing to install Catalyzed Diesel Particulate Filters (cDPF) for Particulate Matter (PM) emissions reductions and Selective Catalytic Reduction (SCR) for Nitrogen Oxides (NOx) emissions reductions on all of the new 44 Cat 3516E engines being installed for the WA-13 building.

## 7. AMBIENT IMPACTS ANALYSIS

Vantage obtained the services of Landau Associates to conduct air dispersion modeling for Vantage Data Center’s generators to demonstrate compliance with ambient air quality standards and acceptable source impact levels. Each generator was modeled as a point source. Landau used EPA’s AERMOD dispersion model (v21112) to determine ambient air quality impacts caused by emissions from the proposed generators at the property line and beyond, and at the rooftops of the proposed data center buildings to be occupied by tenants, as well as the predicted highest impact location on the property. The ambient impacts analysis indicates that no National Ambient Air Quality Standards (NAAQS) are likely to be exceeded, but Diesel Engine Exhaust Particulates (DEEP) and nitrogen dioxide (NO<sub>2</sub>) levels may exceed acceptable source impact levels (ASILs). A second-tier health impact assessment will be conducted for those two impacts.

## 8. EMISSION RATES PULLED FROM PERMIT

The Emission Rates for the MTU and Cat generators are no longer being included in the Approval Order, however, that information is still important and it is being moved here. From what would have been Condition 5.3 – 5.4:

Emissions from each of the five MTU Model 20V4000 engines rated at 4678 brake horse power must not exceed the following emission rates at the stated loads, based on not-to-exceed emission rates stated in application materials:

<b>MTU Model 20V4000 Emission Rates</b>					
Fraction of Full Engine Power	1	0.75	0.50	0.25	0.10
Engine Power [kWm]	3490	2618	1745	872	349
Nox - g/kWh	8	6.5	5.6	4.9	9
NO <sub>2</sub> - g/kWh	0.9	0.8	0.6	0.6	1.1
CO - g/kWh	1.4	1.3	1.6	3.4	6.6
HC - g/kWh	0.2	0.29	0.44	0.68	2.48
PM (f) - g/kWh	0.06	0.08	0.19	0.41	1.03

Emissions from each of the 54 Cat Model 3516E engines rated at 4043 brake horse power must not exceed the following emission rates at the stated loads, based on not-to-exceed emission rates stated in application materials:

<b>Cat Model 3516E Emission Rates</b>					
Fraction of Full Engine Power	1	0.75	0.50	0.25	0.10
Engine Power [BHP]	4157	3118	2079	1039	416
Nox - g/HP-HR	6.0	4.9	3.5	3.6	14.6
NO <sub>2</sub> - g/HP-HR	0.60	0.49	0.35	0.36	1.46
CO - g/HP-HR	1.7	0.6	0.6	1.9	4.5
HC – g/HP-HR	0.088	0.122	0.169	0.311	0.433
PM (f) - g/HP-HR	0.11	0.06	0.08	0.27	0.31

## 9. SECOND TIER REVIEW FOR DIESEL ENGINE EXHAUST PARTICULATE

Proposed emissions of diesel engine exhaust particulate (DEEP) and nitrogen dioxide (NO<sub>2</sub>) from the 44 new Vantage engines exceed the regulatory trigger level for toxic air pollutants (also called an Acceptable Source Impact Level, (ASIL)). A second tier review is required for DEEP and NO<sub>2</sub> in accordance with WAC 173-460-090.

Large diesel-powered backup engines emit DEEP, which is a high priority toxic air pollutant in the state of Washington. In light of the potential rapid development of other data centers in the Quincy area, and recognizing the potency of DEEP emissions, Ecology evaluated Vantage's proposal on a community-wide basis. The community-wide evaluation approach considers the cumulative impacts of DEEP emissions resulting from Vantage's project, and includes consideration of prevailing background emissions from existing permitted data centers and other DEEP sources in Quincy. This evaluation was conducted under the second tier review requirements of WAC 173-460-090.

Under WAC 173-460-090, Vantage was required to prepare a health impact assessment. The HIA presents an evaluation of both non-cancer hazards and increased cancer risk attributable to Vantage's increased emissions of DEEP and NO<sub>2</sub>. Vantage also reported the cumulative risks associated with Vantage and prevailing sources in their HIA document. This cumulative DEEP related risk estimate was based on the latest cumulative air dispersion modeling work performed by Ecology. The Vantage HIA document along with a brief summary of Ecology's review will be available on Ecology's website.

## **10. CONCLUSION**

Based on the above analysis, Ecology concludes that operation of the 61 generators at Vantage will not have an adverse impact on local air quality. Ecology finds that Vantage has satisfied all requirements for NOC approval.

This TSD is a continuation of the TSD made for the previous permit, 19AQ-E026. However, this TSD only highlights the changes and/updates to the facility with respect to air emissions and regulations. For information about pre-existing changes and review, please see the previous TSD.

## **11. COMMENTS and RESPONSES**