

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A NEW)
AIR CONTAMINANT SOURCE FOR) Preliminary Determination
MICROSOFT CORPORATION)
MWH DATA CENTER (FKA: OXFORD)

TO: Brett Muhlestein, Data Center Operations Manager
Microsoft Corporation
1515 Port Industrial Pkwy
Quincy, WA 98848

On January 27, 2014, Ecology received a Notice of Construction (NOC) application submittal from the Microsoft Corporation (Microsoft), requesting approval for Phases 1 and 2 of a new facility named the Oxford Data Center located at 1515 Port Industrial Parkway in Quincy, WA. Approval Order 14AQ-E537 was issued on August 15, 2014. On April 8, 2016 Ecology received an NOC from Microsoft requesting revisions to Approval Order 14AQ-E537 and changing the facility name to the MWH Data Center (or MWH). The application was considered complete on September 20, 2016.

EQUIPMENT

A list of equipment for this project is provided in Tables 1.1–1.4 below. Engine sizes listed in Tables 1.1–1.3 are in megawatt (MWe) units with the “e” indicating “electrical” based on generator power ratings listed on the engine specifications provided with the application. MWe is the assumed engine power rating unit for all Approval Conditions related to this Order.

Table 1.1. 2.5 MWe Engine & Generator Serial Numbers for Phases 1 & 2				
Phase/Building	Unit ID	Engine SN	Generator SN	Date of Commission Completion
Primary Emergency Generators				
Ph 1/AZA, Cell 1	MWH01.AS1.AZA.CE1.XXX.GEN1	DD500650	G7J00455	11/13/2015
“Cell 2	MWH01.AS1.AZA.CE2.XXX.GEN1	DD500647	G7J00451	11/13/2015
“Cell 3	MWH01.AS1.AZA.CE3.XXX.GEN1	DD500655	G7J00458	11/13/2015
“Cell 4	MWH01.AS1.AZA.CE4.XXX.GEN1	DD500642	G7J00446	11/13/2015
Ph 1/AZB, Cell 1	MWH01.AS1.AZB.CE1.XXX.GEN1	DD500625	G7J00440	9/21/2015
“Cell 2	MWH01.AS1.AZB.CE2.XXX.GEN1	DD500641	G7J00442	9/21/2015
“Cell 3	MWH01.AS1.AZB.CE3.XXX.GEN1	DD500626	G7J00439	11/13/2015
“Cell 4	MWH01.AS1.AZB.CE4.XXX.GEN1	DD500637	G7J00441	11/13/2015
Ph 1/AZC, Cell 1	MWH01.AS1.AZC.CE1.XXX.GEN1	DD500651	G7J00456	11/13/2015
“Cell 2	MWH01.AS1.AZC.CE2.XXX.GEN1	DD500657	G7J00457	11/13/2015
“Cell 3	MWH01.AS1.AZC.CE3.XXX.GEN1	DD500663	G7J00459	11/13/2015

Table 1.1. 2.5 MWe Engine & Generator Serial Numbers for Phases 1 & 2				
Phase/Building	Unit ID	Engine SN	Generator SN	Date of Commission Completion
“Cell 4	MWH01.AS1.AZC.CE4.XXX.GEN1	DD500644	G7J00447	11/13/2015
Ph 1/AZD, Cell 1	MWH01.AS1.AZD.CE1.XXX.GEN1	DD500643	G7J00445	9/21/2015
“Cell 2	MWH01.AS1.AZD.CE2.XXX.GEN1	DD500645	G7J00448	9/21/2015
“Cell 3	MWH01.AS1.AZD.CE3.XXX.GEN1	DD500664	G7J00460	11/13/2015
“Cell 4	MWH01.AS1.AZD.CE4.XXX.GEN1	DD500648	G7J00450	11/13/2015
Ph 2/AZA, Cell 1	MWH02.AZA.CE1.GEN01			
“Cell 2	MWH02.AZA.CE2.GEN01			
“Cell 3	MWH02.AZA.CE3.GEN01			
“Cell 4	MWH02.AZA.CE4.GEN01			
Ph 2/AZB, Cell 1	MWH02.AZB.CE1.GEN01			
“Cell 2	MWH02.AZB.CE2.GEN01			
“Cell 3	MWH02.AZB.CE3.GEN01			
“Cell 4	MWH02.AZB.CE4.GEN01			
Ph 2/AZC, Cell 1	MWH02.AZC.CE1.GEN01			
“Cell 2	MWH02.AZC.CE2.GEN01			
“Cell 3	MWH02.AZC.CE3.GEN01			
“Cell 4	MWH02.AZC.CE4.GEN01			
Ph 2/AZD, Cell 1	MWH02.AZD.CE1.GEN01			
“Cell 2	MWH02.AZD.CE2.GEN01			
“Cell 3	MWH02.AZD.CE3.GEN01			
“Cell 4	MWH02.AZD.CE4.GEN01			
Reserve Emergency Generators				
Phase/Building	Unit ID	Engine SN	Generator SN	Date of Commission Completion
Ph 1/AZA	MWH01.AS1.AZA.ELECR1.GEN1			
Ph 1/AZB	MWH01.AS1.AZB.ELECR1.GEN1			
Ph 1/AZC	MWH01.AS1.AZC.ELECR1.GEN1			
Ph 1/AZD	MWH01.AS1.AZD.ELECR1.GEN1			
Ph 2/AZA	MWH02.AZA.ELECR1.GEN01			
Ph 2/AZB	MWH02.AZB.ELECR1.GEN01			
Ph 2/AZC	MWH02.AZC.ELECR1.GEN01			
Ph 2/AZD	MWH02.AZD.ELECR1.GEN01			

Table 1.2. 2.0 MWe Engine & Generator Serial Numbers for Phases 1 & 2				
Building	Unit ID	Engine SN	Generator SN	Date of Commission

				Completion
CNR-A	MWH01.XXX.CNA.XXX.XXX.GEN1	DD600483	G7F00184	7/27/2015
CNR-B	MWH01.XXX.CNB.XXX.XXX.GEN1	DD600485	G7F00185	7/27/2015
CNR-C	MWH01.XXX.CNC.XXX.XXX.GEN1	DD600480	G7F00186	8/31/2015
CNR-D	MWH01.XXX.CND.XXX.XXX.GEN1	DD600481	G7F00183	8/31/2015

Table 1.3. 0.750 MWe Engine & Generator Serial Numbers for Phases 1 & 2				
Building	Unit ID	Engine SN	Generator SN	Date of Commission Completion
Admin	MWH01.XXX.AB1.XXX.XXX.GEN1	MJE03975	GDG00160	8/31/2015

Table 1.4. Cooling Towers for Phases 1 & 2			
Phase/Building	# Cooling Towers	# Cells per Tower	Total # Cooling Tower Cells
Ph 1/AZA	4	4	16
Ph 1/AZB	4	4	16
Ph 1/AZC	4	4	16
Ph 1/AZD	4	4	16
Ph 2/AZA	4	4	16
Ph 2/AZB	4	4	16
Ph 2/AZC	4	4	16
Ph 2/AZD	4	4	16
Total	32	4	128

PROJECT SUMMARY

1. When complete, the MWH Data Center will contain four Phase 1 activity zone (AZ) buildings designated AZ-A, AZ-B, AZ-C, AZ-D; four core network room (CNR) buildings; an administrative building; and four phase 2 AZ buildings designated AZ-A, AZ-B, AZ-C, AZ-D. MWH Phases 1 and 2 will have forty (40) Caterpillar Model 3516C-HD-TA diesel powered electric emergency generators in the activity zone buildings with a power rating of 2.5 MWe per generator, four (4) Caterpillar Model 3516C-TA diesel powered electric emergency generators in the CNR buildings with a power rating of 2.0 MWe per generator, and one (1) Caterpillar Model C27ATAAC diesel powered electric emergency generator in the administrative building with a power rating of 0.75 MWe. Eight (8) of the 40 combined Phases 1 and 2 engines rated 2.5 MWe will be reserve emergency generators (reserve engines). The words “engine,” or “generator” are used synonymously through the remainder of this permit to refer to the overall unit.

2. MWH will use cooling towers (Phase 1 will use SPX-Marley Model MD5008PAF2; Phase 2 will use EVAPCO cooling towers with similar design values) to dissipate heat from the AZ buildings. Each cooling tower has four cells and four fans. Each of the eight AZ buildings will have four cooling towers for a total of thirty-two (32) cooling towers. Each of the thirty-two individual cooling towers has a design recirculation rate of 950 gallons per minute (gpm) and 143,600 cubic feet per minute (cfm).

Combined Phase 1 and 2 emissions for MWH are contained in Tables 2.1 and 2.2.

Table 2.1. Criteria Pollutants^(b) Potential to Emit for Phases 1 & 2 (TPY)			
Pollutant	Main Generator Engines	Cooling Tower	Total Facility Emissions
Total particulate matter (PM)	All PM _{2.5}	23	23.8
PM smaller than 10 microns in diameter (PM ₁₀)	All PM _{2.5}	12.8	13.6
PM smaller than 2.5 microns in diameter (PM _{2.5}) ^(a)	0.814	2.99	3.8
Carbon monoxide (CO)	7.3	0	7.3
Nitrogen oxides (NO _x)	33.0	0	33.0
Volatile organic compound (VOC)	1.033	Negligible	1.033
Sulfur dioxide (SO ₂)	0.069	0	0.069
Lead	Negligible	0	Negligible
^(a) All PM emissions from the generator engines are PM _{2.5} , and all PM _{2.5} from the generator engines is considered Diesel Engine Exhaust Particulate (DEEP).			
^(b) Pollutants above WAC 173-400-110(5) de minimis levels.			

Table 2.2. Toxic Air Pollutants^(c) Potential To Emit for Phases 1 & 2 (TPY)			
Pollutant	Main Generator Engines	Cooling Tower	Total Facility Emissions
CO	7.3	0	7.3
Ammonia	1.14	0	1.14
DEEP ^(a)	0.814	0	0.814
SO ₂	0.069	0	0.069
Primary nitrogen dioxide (NO ₂) ^(b)	3.300	0	3.3
Benzene	3.5E-03	0	3.5E-03
Toluene	1.3E-03	0	1.3E-03
Xylenes	8.6E-04	0	8.6E-04
1,3 Butadiene	1.8E-04	0	1.8E-04
Formaldehyde	3.5E-04	0	3.5E-04
Acetaldehyde	1.1E-04	0	1.1E-04
Acrolein	3.5E-05	0	3.5E-05
Benzo(a)pyrene	1.2E-06	0	1.2E-06
Benzo(a)anthracene	2.8E-06	0	2.8E-06
Chrysene	6.9E-06	0	6.9E-06
Benzo(b)fluoranthene	5.0E-06	0	5.0E-06
Benzo(k)fluoranthene	9.8E-07	0	9.8E-07
Dibenz(a,h)anthracene	1.6E-06	0	1.6E-06
Ideno(1,2,3-cd)pyrene	1.9E-06	0	1.9E-06
Napthalene	5.8E-04	0	5.8E-04
Propylene	1.3E-02	0	1.3E-02
Fluoride	0	4.8E-03	4.8E-03
Manganese	0	4.6E-04	4.6E-04
Copper	0	1.6E-04	1.6E-04
Chloroform	0	2.6E-04	2.6E-04
Bromodichloromethane	0	2.6E-04	2.6E-04
Bromoform	0	6.9E-03	6.9E-03
^(a) DEEP is considered filterable (front-half) particulate emissions. ^(b) NO ₂ is assumed to be equal to 10 percent of the total NO _x emitted. ^(c) Pollutants above WAC 173-460-150 de minimis levels.			

DETERMINATIONS

In relation to this project, the Washington State Department of Ecology (Ecology), pursuant to Revised Code of Washington (RCW) 70.94.152, Washington Administrative Code (WAC) 173-460-040, and WAC 173-400-110, makes the following determinations:

1. The project, if constructed and operated as herein required, will be in accordance with applicable rules and regulations, as set forth in Chapter 173-400 WAC, and Chapter 173-460 WAC, and the operation thereof, at the location proposed, will not emit pollutants in concentrations that will endanger public health.
2. The proposed project, if constructed and operated as herein required, will meet applicable air quality requirements as defined below:

Table 2a.1 Best Available Control Technology (BACT) Determinations	
Pollutant(s)	BACT Determination
PM, CO, and VOCs	<ol style="list-style-type: none"> a. Use of EPA Tier 2 certified engines installed and operated as emergency engines, as defined in 40 CFR Section 60.4219. b. Compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII. c. Use of high-efficiency drift eliminators which achieve a liquid droplet drift rate of no more than 0.0005 percent of the recirculation flow rate within each cooling tower.
NO _x	<ol style="list-style-type: none"> a. Use of EPA Tier 2 certified engines installed and operated as emergency engines, as defined in 40 CFR Section 60.4219, and satisfy the written verification requirements of Approval Condition 2.5. b. Compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
SO ₂	Use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

3. The proposed project, if constructed and operated as herein required, will utilize Best Available Control Technology for toxic air pollutants (TAPs) (tBACT) as defined below:

Table 3.1 tBACT Determinations	
TAPs	tBACT Determination
Acetaldehyde, CO, acrolein, benzene, benzo(a)pyrene, 1,3-butadiene, DEEP, formaldehyde, toluene, total PAHs, xylenes, chrysene, benzo(a)anthracene, naphthalene, benzo(b)fluoranthene, propylene, dibenz(a,h)anthracene, ldeno(1,2,3-cd)pyrene, fluoride, manganese, copper, chloroform, bromodichloromethane, bromoform,	Compliance with the VOC and PM BACT requirement.
Ammonia	No more than 15 parts per million volume-dry (ppmvd) at 15 percent oxygen per engine.
NO ₂	Compliance with the NO _x BACT requirement.
SO ₂	Compliance with the SO ₂ BACT requirement.

4. In accordance with WAC 173-460-090, a second tier health risk analysis has been submitted by the applicant for DEEP and NO₂ ambient impacts. Ecology has concluded that this project has satisfied all requirements of a second tier analysis.

THEREFORE, IT IS ORDERED that the project as described in the NOC application and more specifically detailed in plans, specifications, and other information submitted to Ecology is approved for construction and operation, provided the following conditions are met:

APPROVAL CONDITIONS

1. ADMINISTRATIVE CONDITION

- 1.1. Notice of Construction Approval Order No. 14AQ-E537 is rescinded and replaced entirely with this Approval Order.
- 1.2. The emergency engine generators approved for operation by this Order are to be used solely for those purposes authorized for emergency generators under 40 CFR 60, Subpart III. This includes the hourly operation requirements described in 40 CFR 60.4211(f), except that there shall 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.
- 1.3. The MWH Data Center shall coordinate engine maintenance and testing schedules with Dell and the Microsoft Columbia Data Center in Quincy to minimize overlap between data center scheduled testing. Microsoft shall maintain records of the coordination communications with the other data centers, and those communications shall be available for review by Ecology.

2. EQUIPMENT RESTRICTIONS

- 2.1. The thirty-two 2.5 primary MWe engine, eight 2.5 MWe reserve engines, four 2.0 MWe engines, and the single 0.750 MWe engine shall be operated in accordance with applicable 40 CFR 60, Subpart III requirements including but not limited to: certification by the manufacturer to meet the 40 CFR 89 EPA Tier 2 emissions levels as required by 40 CFR 60.4202; and installed and operated as emergency engines, as defined in 40 CFR 60.4219.
 - 2.1.1. At the time of the effective date of this permit, Tier 4 interim and Tier 4 final certified engines (as specified in 40 CFR 1039.102 Table 7 and 40 CFR 1039.101 Table 1, respectively), are not required for 0.750 MWe, 2.0 MWe, and 2.5 MWe electrical generators used for emergency purposes as defined in 40 CFR 60.4219 in attainment areas in Washington State. Any engines installed at the MWH Data Center after Tier 4 or other limits are implemented by EPA for emergency generators, shall meet the applicable specifications as required by EPA at the time the emergency engines are installed.

- 2.2. Each engine must be equipped with selective catalytic reduction (SCR) and catalyzed diesel particulate filter (DPF) controls to meet the emission requirements of EPA Tier 4 engines. The only engines and electrical generating units approved for operation at the MWH Data Center are those listed in Tables 1.1–1.3 above.
- 2.3. Replacement of failed engines with identical engines (same manufacturer and model) requires notification prior to installation, but will not require NOC unless there is an emission rate increase from the replacement engines.
- 2.4. The thirty-two 2.5 MWe engine and eight 2.5 MWe reserve engine exhaust stack dimensions shall be greater than or equal to 40 feet above ground level, no more than 22 inches in diameter, and approximately 12 feet above roof height. The four 2.0 MWe engine-generator exhaust stack heights shall be greater than or equal to 40 feet above ground level, no more than 22 inches in diameter, and approximately 19 feet above roof height. The one 0.750 MWe engine-generator exhaust stack height shall be greater than or equal to 35 feet above ground level, no more than 14 inches in diameter, and approximately 12 feet above roof height.
- 2.5. In addition to meeting EPA Tier 2 certification requirements, the source must have written verification from the engine manufacturer that each engine of the same make, model, and rated capacity installed at the facility uses the same electronic Programmable System Parameters, i.e., configuration parameters, in the electronic engine control unit.

3. OPERATING LIMITATIONS

- 3.1. Fuel consumption at the MWH Data Center facility shall be limited to a total of 615,000 gallons per year and 148,000 gallons per day of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil (less than 0.00150 weight percent sulfur). Total facility annual fuel consumption may be averaged over a three (3) year period using monthly rolling totals.
- 3.2. The thirty-seven (37) MWH Data Center primary engines and eight reserve engines shall not exceed the following load specific engine hour limits:
 - 3.2.1. Each engine shall not exceed 86 hours per year of operation averaged across all generators in service over a 36-month rolling average. If a reserve engine is used to temporarily replace a primary engine during a power outage, then the actual runtime for the reserve engine at an electrical load exceeding zero load shall be deducted from the primary engine's allowable runtime.
 - 3.2.2. Each reserve engine shall not exceed 40 hours per year for purposes other than stack testing or power outages, averaged across all reserve generators in service over a 36 month rolling period.

- 3.2.3. For commissioning events, each engine shall not exceed a one-time total of 50 hours of operation over a full range of loads, averaged over all facility engines commissioned in that year.
- 3.2.4. Stack testing shall be conducted according to the testing requirements and the schedule in Approval Condition 4. Each engine shall operate no more than 45 hours per stack testing event. If more than 45 hours are needed for re-testing to satisfy Approval Condition 4.4, those hours should be deducted from other preapproved hours in Approval Condition 3.2. Additional operation of the engines for the purpose of emissions testing beyond the operating time and fuel consumption limits authorized by this Order will be considered by Ecology upon request in writing.
- 3.2.5. Daily generator usage of all generators combined (including reserve engines), shall not exceed a maximum limit of 160 generator hours per calendar day, except during up to four days per year of emergency power outage.

3.3. All of the 32 Phase 1 and 2 cooling towers shall comply with the following conditions:

- 3.3.1. Each individual cooling tower unit shall use a mist eliminator that meets the BACT determination for PM of Section 2(c) of this Order.
- 3.3.2. Chemicals containing hexavalent chromium cannot be used to pre-treat the cooling tower makeup water.

4. GENERAL TESTING AND MAINTENANCE REQUIREMENTS

- 4.1. The MWH Data Center will follow engine-manufacturer's recommended diagnostic testing and maintenance procedures to ensure that each of the thirty-two (32) 2.5 MWe primary engines, eight (8) reserve engines, four (4) 2.0 MWe engines, and one (1) 0.750 MWe engines will conform to applicable engine specifications in Approval Condition 2.1 and applicable emission specifications in Approval Condition 5 throughout the life of each engine.
- 4.2. Any emission testing performed to verify conditions of this Approval Order or for submittal to Ecology in support of this facility's operations, requires that Microsoft comply with all requirements in 40 CFR 60.8 except subsection (g). 40 CFR 60.8(g) may be required by Ecology at their discretion. A test plan will be submitted to Ecology at least 30 days prior to testing that will include a testing protocol for Ecology approval that includes the following information:
 - 4.2.1. The location and Unit ID of the equipment proposed to be tested.
 - 4.2.2. The operating parameters to be monitored during the test.
 - 4.2.3. A description of the source including manufacturer, model number, design capacity of the equipment and the location of the sample ports or test locations.
 - 4.2.4. Time and date of the test and identification and qualifications of the personnel involved.
 - 4.2.5. A description of the test methods or procedures to be used.

4.3. The MWH Data Center shall source test engines as described in Approval Order 4.4 to show compliance with emission limits in Table 4.

4.4. The following testing requirements are for ammonia, PM, NO_x, CO, and non-methane hydro-carbons (NMHC). The test methods in Table 4 shall be used for each test event unless an alternate method is proposed by Microsoft and approved in writing by Ecology prior to the test. Test reports shall be submitted to Ecology as provided in Condition 9.5 of this Order.

Table 4. Emission Limits and Testing Requirements				
Pollutant	Load Test	Test Method^(a)	Emission Limits	Compliance Test Frequency
PM	Five-load weighted avg.	EPA Method 5 or alternative method from 40CFR1065	0.03 g/kW-hr	See Approval Conditions 4.4.4, 4.4.5, 4.4.6, and 4.4.7.
NO _x	Five-load weighted avg.	EPA Method 7E, or alternative method from 40CFR1065	0.67 g/kW-hr	
CO	Five-load weighted avg.	EPA Method 10, or alternative method from 40CFR1065	3.5 g/kW-hr	
NMHC/ VOC	Five-load weighted avg.	EPA Method 25A and EPA Method 18; or alternative method from 40CFR1065	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 40CFR1065	0.19 lb/hr (0.75 MWe)	
			0.48 lb/hr (2.0 MWe)	
			0.61 lb/hr (2.5 MWe)	
(a) In lieu of these requirements, Microsoft may propose an alternative test protocol to Ecology in writing for approval.				

4.4.1. For the five load tests, testing shall be performed at each of the five engine torque load levels described in Table 2 of Appendix B to Subpart E of 40 CFR Part 89, and data shall be reduced to a single-weighted average value using the weighting factors specified in Table 2. Each test run shall be done within 2 percent of the target load value (e.g., the test runs for the nominal 10 percent load condition shall be done at loads from 8 to 12 percent). Microsoft may replace the dynamometer requirement in Subpart E of 40 CFR Part 89 with corresponding measurement of gen-set electrical output to derive horsepower output.

4.4.2. For all tests, the F-factor described in Method 19 shall be used to calculate exhaust flow rate through the exhaust stack, except that EPA Method 2 shall be used to calculate the flow rate for purposes of particulate testing. The fuel meter data, as measured according to Approval Condition 4.5, shall be included in the test report, along with the emissions calculations.

- 4.4.3. Three test runs shall be conducted for each engine, except as allowed by the sampling protocol from 40CFR1065. Each run must last at least 60 minutes except as allowed by the sampling protocol from 40CFR1065. Analyzer data shall be recorded at least once every minute during the test. Engine run time and horsepower output and fuel usage shall be recorded during each test run for each load and shall be included in the test report.
 - 4.4.4. For new engine families other than those in Tables 1.1, 1.2, and 1.3, at least one representative engine from each manufacturer and each size engine from each manufacturer shall be tested as soon as possible after commissioning and before it becomes operational.
 - 4.4.5. The 0.750 MWe engine shall be tested within 12 months of the date of this permit.
 - 4.4.6. At least one of the 2.0 MWe engines shall be tested within 12 months of the date of this permit.
 - 4.4.7. Every 60 months after the June 2016 source test, Microsoft shall test at least one 2.5 MWe engine, including the engine with the most operating hours as long as it is a different engine from that which was tested during the previous 60 month interval testing.
 - 4.4.8. In the event that any source test of a 2.0 MWe or a 2.5 MWe engine shows non-compliance with any applicable Table 4 emission standards for the engines specified in Approval Condition 2.1, Microsoft shall repair or replace the engine and repeat the test on the same engine plus two additional equivalent engines. If the 0.750 MWe engine fails a test, it must be repaired or replaced and retested.
 - 4.4.9. In addition to Conditions 4.4.4., 4.4.5, 4.4.6, 4.4.7, and 4.4.8, at least one reserve engine must be testing after commissioning and before it becomes operational. The testing method(s) and procedures for the reserve engine(s) must be pre-approved by Ecology.
- 4.5. Each engine shall be equipped with a properly installed and maintained non-resettable meter that records total operating hours.
- 4.6. Each engine shall be connected to a properly installed and maintained fuel flow monitoring system (either physical or generator manufacturer provided software) that records the amount of fuel consumed by the engine.

5. EMISSION LIMITS

The thirty-two (32) primary 2.5 MWe engine, the eight (8) reserve engines, the four (4) 2.0 MWe engine-generators, and the one (1) 0.750 MWe engine-generator shall meet the following emission rate limitations:

- 5.1. Each emergency engine shall not exceed the applicable emission limits in Table 4.

- 5.2. Total annual facility-wide emissions shall not exceed the 36-month rolling average emission estimates for PM10, PM2.5, CO, NOx, VOC, SO2, DEEP, NO2, and ammonia as listed in Tables 2.1 and 2.2.
- 5.3. Visual emissions from each diesel engine exhaust stack shall be no more than five percent, with the exception of a ten (10) minute period after unit start-up. Visual emissions shall be measured by using the procedures contained in 40 CFR 60, Appendix A, Method 9.
- 5.4. The actual 1-hour aggregate NOx emissions from all engines operating in any hour shall not exceed 575 lbs. Actual NOx emissions shall be based on algebraic equations of the most accurate load-specific NOx emission factors available.

6. OPERATION AND MAINTENANCE MANUALS

A site-specific O&M manual for the MWH Data Center facility equipment shall be developed and followed. Manufacturer's operating instructions and design specifications for the engines, generators, cooling towers, and associated equipment shall be included in the manual. The manual shall include the manufacturer's recommended procedures for low-load generator operation. The O&M manual shall 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

- 6.1. The O&M manual for the diesel engines, engine exhaust control equipment, cooling towers, and associated equipment shall at a minimum include:
 - 6.1.1 Manufacturer's testing and maintenance procedures that will ensure that each individual engine (and engine exhaust control equipment) will conform to the EPA Emission Standards appropriate for that engine (and engine exhaust control equipment) throughout the life of the engine (and engine exhaust control equipment).
 - 6.1.2. Normal operating parameters and design specifications.
 - 6.1.3. Operating maintenance schedule.
 - 6.1.4. Specification sheet for cooling towers verifying 0.0005 percent drift rating, water flow, air flow, makeup water rate, and a list of chemicals used to pre-treat cooling tower makeup water.

7. SUBMITTALS

All notifications, reports, and other submittals shall be sent to:

Washington State Department of Ecology

Air Quality Program
4601 N. Monroe Street
Spokane, WA 99205-1295
Or:
Emissions.inventory@ecy.wa.gov

8. RECORDKEEPING

All records, O&M manual, and procedures developed under this Order shall be organized in a readily accessible manner and cover a minimum of the most recent 60-month period except as required for stack testing in Condition 8.3. Any records required to be kept under the provisions of this Order shall be provided within 30 days to Ecology upon request. The following records are required to be collected and maintained.

- 8.1. Fuel receipts with amount of diesel and sulfur content for each delivery to the facility.
- 8.2. Monthly, annual, and 36-month rolling fuel usage.
- 8.3. Monthly, annual, and 36-month rolling hours of operation for each diesel engine. The cumulative hours of operation for each engine shall be maintained for the life of the engine while at Microsoft, and shall include which engines have been stack tested, and the report information from Condition 9.5.
- 8.4. Annual number of start-ups for each diesel engine.
- 8.5. Annual gross power generated by facility-wide operation of the emergency backup electrical generators.
- 8.6. Record of each operational period for each engine with the following information:
 - 8.6.1. Date of engine operation,
 - 8.6.2. engine unit ID,
 - 8.6.3. reason for operating: an operational period for an engine will be identified as one of the following reasons for operating: EMERGENCY SITUATIONS, STACK TESTING, COMMISSIONING, MAINTENANCE CHECKS, READINESS TESTING, DEVIATION OF VOLTAGE OR FREQUENCY, or UNSPECIFIED NON-EMERGENCY SITUATIONS,
 - 8.6.4. duration of operation, and percent of generator electrical load, for each category of generator load
 - 8.6.5. For each unplanned power outage that activates 30 or more engines in an hour, record the actual 1-hour NO_x emission rate from all operating engines, as provided in Conditions 5.4 and 9.2.6.
- 8.7. Upset condition log for each emission unit (the 45 engines and 32 cooling towers) and their respective control units that include unit ID, date, time, duration of upset, cause, and corrective action.

8.8 Applicable recordkeeping for emergency engines required by 40 CFR Part 60, Subpart III Section 60.4214 (b),(c), and (d).

8.9 Air quality complaints received from the public or other entity, the affected emissions units and any actions taken by Microsoft in response to those complaints.

8 REPORTING

9.1 The serial number, manufacturer make and model, and standby capacity for each engine and generator, and the engine build date will be submitted prior to installation of each engine.

9.2 The following information will be submitted to the AQP at the address in Condition 7 above by January 31 of each calendar year to report operating conditions for the previous calendar year. This information may be submitted with annual emissions information requested by the AQP.

9.2.1 Monthly, annual, and 36-month rolling total summary of all air contaminant emissions for pollutants listed in Tables 2.1 and 2.2 of this permit.

9.2.2 Monthly, annual, and 36-month rolling facility-wide generator hours of operation.

9.2.3 Gross power generation with annual total as specified in Approval Condition 8.5.

9.2.4 Monthly, annual, and 36-month rolling total summary of fuel usage (in gallons) compared to Condition 3.1.

9.2.5 Calendar year annual total runtime hours.

9.2.6 For each power outage operating scenario described in Condition 8.6.5, the aggregate NOx emission rate for all operating engines during each hour in which the NOx emission rate exceeds 575 lbs/hour

9.3 Written notification that the O&M manual described in Approval Condition 6 has been developed and updated within 60 days after the issuance of this Order. A copy of the most current O&M manual will be provided to Ecology if requested.

9.4 Any air quality complaints resulting from operation of the emissions units or activities shall be promptly assessed and addressed. A record shall be maintained of Microsoft Corporation's action to investigate the validity of the complaint and what, if any, corrective action was taken in response to the complaint. Ecology shall be notified within three (3) days of receipt of any such complaint.

9.5 Stack test reports of any engine shall be submitted to Ecology within 45 days of completion of the test and shall include, at a minimum, the following information:

9.5.1 The information from Conditions 4.2.3, 4.2.4, and 4.2.5 including field and analytical laboratory data, quality assurance/quality control procedures and documentation.

- 9.5.2 A summary of results, reported in units and averaging periods consistent with the applicable emission standard or limit.
- 9.5.3 A summary of control system or equipment operating conditions.
- 9.5.4 A summary of operating parameters for the diesel engines being tested.
- 9.5.5 Copies of field data and example calculations.
- 9.5.6 Chain of custody information.
- 9.5.7 Calibration documentation
- 9.5.8 Discussion of any abnormalities associated with the results.
- 9.5.9 A statement signed by the senior management official of the testing firm certifying the validity of the source test report.

9.6 Microsoft shall 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.

10 GENERAL CONDITIONS

- 10.1 **Commencing/Discontinuing Construction and/or Operations:** This Approval Order shall become void if construction of Phase 1 is not commenced within eighteen (18) months following the date of this Approval Order, or if Phase 2 is not commenced within eighteen (18) months following completion of commissioning of the final engine in Phase 1. No additional engines shall be installed, if construction of both phases is discontinued for a period of eighteen (18) months, or if operation of backup emergency diesel electric generators are discontinued at the facility for a period of eighteen (18) months, unless prior written notification is received by Ecology at the address in Condition 7 above.
- 10.2 **Compliance Assurance Access:** Access to the source by representatives of Ecology or the EPA shall be permitted upon request. Failure to allow such 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 Approval Order.
- 10.3 **Availability of Order and O&M Manual:** Legible copies of this Order and the O&M manual shall be available to employees in direct operation of the emergency diesel electric generators, and cooling towers, and be available for review upon request by Ecology.
- 10.4 **Equipment Operation:** Operation of the generator units, cooling towers, and related equipment shall be conducted in compliance with all data and specifications submitted as part of the NOC application and in accordance with the O&M manual, unless otherwise approved in writing by Ecology.
- 10.5 **Modifications:** Any modification to the generators, engines, or cooling towers and their related equipment's operating or maintenance procedures, contrary to information in the NOC application, shall be reported to Ecology at least 60 days

before such modification. Such modification may require a new or amended NOC Approval Order.

- 10.6 **Quincy Community Assessment 2017:** On or before July 1, 2017, Microsoft shall submit to Ecology a protocol for a health risk assessment that analyzes the public health risk to Quincy residents from DEEP emissions in the Quincy area, including emissions from data center engines, highways, locomotives and other source categories. Microsoft shall submit the completed health risk assessment to Ecology within 90 days of Ecology's approval of the risk assessment protocol. Ecology may extend this deadline for good cause. The study shall model the locations in the community that experience the highest exposure to DEEP emissions, estimate the health risks associated with that exposure, and apportion the health risks among contributing source categories. In preparing the study Microsoft may collaborate with other owners of diesel engines in or near Quincy. Ecology shall review the assessment and take appropriate action based on the results.
- 10.7 **Activities Inconsistent with the NOC Application and this Approval Order:** Any activity undertaken by the permittee or others, in a manner that is inconsistent with the NOC application and this Order, shall be subject to Ecology enforcement under applicable regulations.
- 10.8 **Obligations under Other Laws or Regulations:** Nothing in this Approval Order shall be construed to relieve the permittee of its obligations under any local, state, or federal laws or regulations.

All plans, specifications, and other information submitted to Ecology relative to this project and further documents and any authorizations or approvals or denials in relation thereto shall be kept at the Eastern Regional Office of the Department of Ecology in the "Air Quality Controlled Sources" files, and by such action shall be incorporated herein and made a part thereof.

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

1. Violation of any terms or conditions of this authorization;
2. Obtaining this authorization by misrepresentation or failure to disclose fully all relevant fact.

The provisions of this authorization are severable and, if any provision of this authorization, or application of any provisions of their circumstances, and the remainder of this authorization, shall not be affected thereby.

YOUR RIGHT TO APPEAL

You have a right to appeal this Approval Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this 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 the following within 30 days of the date of receipt of this Approval Order:

- File your appeal and a copy of this 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 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

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk P.O. Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel Road SW, Suite 301 Tumwater, WA 98501	Pollution Control Hearings Board P.O. Box 40903 Olympia, WA 98504-0903

*For additional information visit the Environmental Hearings Office Website:
<http://www.eho.wa.gov>*

*To find laws and agency rules visit the Washington State Legislature Website:
<http://www1.leg.wa.gov/CodeReviser>*

DATED this xx day of 2016, at Spokane, Washington.

Prepared By:

Approved By:

Gary J. Huitsing, P.E.
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Air Quality Program
Department of Ecology
State of Washington

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