DEPARTMENT OF
ECOLOGY
State of Washington

Response to Comments

Microsoft MWH Data Center
Quincy, WA
Air Quality Permit Revision
17AQ-E002

Public Comment Period:
October 6, 2016 – December 2, 2016

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Introduction

Any new air pollutant source must meet emissions standards set by EPA and meet the requirements of the Washington State Clean Air Act. Ecology's Air Quality Program manages air pollution within the state and is responsible for ensuring that those federal and state standards are met. The Air Quality Program does this by writing permits to regulate emissions from various sources. The Air Quality Program's goal is to safeguard public health and the environment by preventing and reducing air pollution.

Before construction can begin on a new air pollution source or before changes can be made to an existing air pollution source, the applicant must apply to Ecology for an air quality permit. This permit is called a Notice of Construction. The application for the Notice of Construction requires the applicant describe all air contaminant emissions from the project, identify the federal air regulations that apply, describe the project's emission control technology, and prove that air quality standards won't be violated.

If emissions of toxic air pollutants exceed levels set in state regulations, a Health Impact Assessment must also be conducted to prove that there is minimal health risk to the community. Ecology reviews applications for projects and develops conditions of approval to ensure that the project will comply with the Washington Clean Air Act, Revised Code of Washington (RCW) 70.94 and the corresponding Washington Administrative Code developed to implement RCW 70.94.

If the project meets these requirements, Ecology must approve the Notice of Construction application.

This Response to Comments is prepared for the purpose of:

Proposed permit:	Revisions to the Microsoft MWH (formerly Oxford) Data Center Air Quality Permit 14AQ-E537 Quincy, Grant County, WA
Comment period:	October 6, 2016 – December 2, 2016
Date final permit issued:	Approval Order 17AQ-E002 issued on January 26, 2017

This document and other documents related to Ecology's final action on this draft permit can be viewed online at: www.ecy.wa.gov/programs/air/quincydatacenter/index.html.

Reasons for Changing the Permit

The Microsoft Corporation applied to Ecology to revise its permit for an existing air pollution source in Grant County. Formerly called Microsoft Oxford, the newly-named Microsoft MWH Data Center is located at 1515 Port Industrial Parkway in Quincy, Washington.

In August 2014, Ecology approved an air permit for 37 diesel backup generators at the facility. In 2015, Microsoft submitted a revision to the permit, but it was never finalized because Microsoft needed to make additional changes. In April 2016, Microsoft submitted a new revision to the permit, including the facility name change from Oxford to MWH.

The primary source of air contaminants at the facility are 37 diesel generators, which provide emergency backup power to Microsoft's data servers during an electrical outage. The updated permit adds eight new reserve backup generators to serve as "backups to the backups." The new generators will only be used if one of the original backup engines fails. The permit update also reflects changes to the height and diameter of the engine exhaust stacks to match the actual dimensions.

Public Involvement Actions

Ecology's Air Quality Program identifies innovative ways to connect with the Quincy community. Below is a list of advertisements, media reports, and outreach efforts (see *Appendix A* for copies of these items). Many community members continue to help spread the word about this project and assist in directing the outreach in a more meaningful way. Thank you.

Press Release
10/06/2016 – "Updating the air permit for Microsoft data center in Quincy"

Legal Notice: Original announcement and extension
10/06/2016 and 11/03/2016 – *Quincy Valley Post Register*
10/06/2016 and 11/04/2016 – *Columbia Basin Herald*
10/06/2016 and 11/03/2016 – *Wenatchee World*

Public Involvement Calendar
10/06/2016 – Notice of comment period on Ecology's website
11/03/2016 – Notice of comment period extension on Ecology's website
https://fortress.wa.gov/ecy/publiccalendar/

Document Repositories
10/06/2016 – Quincy City Hall
10/06/2016 – Quincy Library
10/06/2016 – Ecology's website www.ecy.wa.gov/programs/air/quincydatacenter/index.html

Quincy Data Center Emails (QUINCY-DATA-CENTERS@LISTSERV.WA.GOV)
10/05/2016 – "MWH (Microsoft Oxford) Data Center: Public Comment Period starts tomorrow"
10/06/2016 – "Microsoft MWH Data Center: Public Comment Period Open Now, Oct 6 - Nov 4"
10/28/2016 – "Microsoft MWH Data Center: Public Comment Period Ends Nov 4"
11/02/2016 – "EXTENDED to Dec 2: Microsoft MWH Data Center Public Comment Period"
11/21/2016 – "Ends Next Friday, Dec 2: Microsoft MWH Data Center Public Comment Period"

Twitter & Text Alerts (@ecyspokane and @ecyQuincyAir)
English and Spanish Twitter posts and text alerts were sent on October 6, November 3, November 4, November 8, and November 29, 2016.

Ecology Internet Home Page: Public input & events
Week of 11/09/2016 – "Data center air permit, Quincy – Public comments now through December 2."

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Response to Comments

Ecology accepted public comments on the draft revisions to Microsoft's MWH Data Center air permit from October 6, 2016 through December 5, 2016. Five parties submitted written comments. To view the written comments as they were originally submitted to Ecology, including any supporting documentation referenced in the comment, please see *Appendix B: Public Comments Received in Original Format.*

Ecology thanks all commenters for their participation.

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Comment Nos. 1-6: Received from Microsoft on 11/01/2016

Comment #1:

[Regarding] Table 4: Ecology should globally replace the imprecise term "g/kW-hr" with the more specific term "g/kWm-hr", and should add a footnote to define the term "kWm" to mean the brake kW of the engine, as opposed to the terms "kWe or MWe" that refer to the electrical output of the generator.

During the most recent compliance stack testing at two of the Quincy data centers, the operators and stack test personnel mistakenly did the "g/kWm-hr" calculations using the incorrect kWe value instead of using the correct kWm value. This proposed revision will reduce the potential for that mistake to be made during future stack tests.

Ecology Response to Comment #1:

Ecology is requiring Microsoft to meet the emission limits in Table 4 of the permit which are tier 4 limits. The units used in Table 4 should therefore be consistent with the final tier 4 units used in Table 1 of 39216 Federal Register, Volume 69, No. 124 titled: "Tier 4 Exhaust Emission Standards After the 2014 Model Year, G/kW-HR." Ecology sees no justification to change these units as g/kW-hr units are the appropriate units for Table 4 in the permit.

Comment #2:

[Regarding] Condition 4.4.1: Ecology should replace the last sentence with the following: "Microsoft may replace the dynamometer requirement in Subpart E of 40 CFR Part 89 with corresponding measurement of gen-set electrical output (kWe) to derive the mechanical output of the engine (kWm)".

During the compliance stack testing at two of the Quincy data centers, the operators and stack test personnel mistakenly did the "g/kWm-hr" calculations using the incorrect kWe value instead of using the correct kWm value. This proposed revision will reduce the potential for that mistake to be made during future stack tests.

Ecology Response to Comment #2:

The current statement in the permit is standard language used in multiple data center permits. The request for clarification may be more appropriate for preparers of the facility's O&M manual and any internal instructions or notes the facility wishes to use. Microsoft should ensure the use of correct values in the development and implementation of the source test protocol.

Comment #3:

[Regarding] Condition 4.4.4: This condition imposes source testing requirements if Microsoft installs an engine from a different manufacturer or model from the Caterpillar engines described in the Project Summary, Paragraph 1. We understand that this condition was borrowed from the approval orders for other local data centers at which the owner did not specify an engine vendor before issuance of the order. Microsoft already has installed many of the MWH engines, pursuant to authority granted in Approval Order 14AQ-E537. Microsoft has no plans to use any engines in MWH Phases 1 and 2 other than the Caterpillar units described in the Project Summary. All of the currently- installed Phase 1 generators were supplied by Caterpillar. On the remote chance that Microsoft finds it necessary to install different manufacturers' engines during the build-out of the currently- perrnitted [sic] Phase 2 data center, Microsoft has no objection to Ecology's demand to source test representative engine(s) from the new engine family or families. Our only concern is with the timing of the test demanded by

Condition 4.4.4. A source test performed before an engine commences operation may not yield data that is representative of the routine operation of the engine. That is why EPA rules and innumerable Ecology approval orders and PSD permits authorize a short shakedown period before initial performance testing of a newly installed emission unit. See, e.g., 40 CFR 60.8(a), incorporated by reference in Condition 4.2 of the Preliminary Determination. We request that Ecology foJlow [sic] that precedent here, and revise Condition 4.4.4 to read:

4.4.4 For engine models or manufacturers other than those listed in Project Summary Paragraph 1, at least one representative engine from each manufacturer and each size engine from each manufacturer shall be tested no later than 180 days following initial startup.

Ecology Response to Comment #3:
Ecology agrees with part of the requested revision. The term "families" can be removed and replaced with the suggested wording for clarity. However, the remaining part of the condition is based on previous internal Ecology discussions and was given careful consideration. It is Ecology's intention that all new Ecology approval orders for data centers shall reflect this new approach regardless of previous data center permit conditions. A scenario where an engines fails a test before it becomes operational allows for the programmable parameters to be modified before it becomes operational. This condition also assists compliance personnel with evaluating compliance with Condition 2.5. The testing requirements for the smaller engines are explained in the response to Comment # 4.

Comment #4:
[Regarding] Condition 4.4.9: This condition implements Ecology's goal to obtain some data about the performance of reserve engines during cold start and zero electrical load operation. Microsoft is willing to help Ecology develop that information. The proposed 2.5 MWe reserve engines at MWH are, of course, the same model and size as the currently-permitted 2.5 MWe primary engines at the data center. Our biggest concern with Condition 4.4.9 is that Microsoft just completed a costly source test on one of the 2.5 MWe engines and the Preliminary Determination (Condition 4.4.7) requires the next compliance test on those engines in 2021. Microsoft would prefer not to conduct a special, costly source test solely to develop this data. The Preliminary Determination does require a source test on one of the 2.0 MWe engines within 12 months of permit issuance. Microsoft requests that Ecology attach the low load/cold start testing requirements to that test. The data from the 2.0 MWe engine during cold start and low load operation easily could be scaled to represent the performance of the 2.5 MWe engines.

A second concern with Condition 4.4.9 is that it should clarify that the referenced testing is for data development, not compliance. The order does not set limits for cold start and zero electrical load conditions. Instead the order sets limits for the average of all operating conditions, including cold start and low load.

For these reasons, Microsoft requests that Ecology delete Condition 4.4.9 and amend Condition 4.4.6 to read as follows:

4.4.6 At least one of the 2.0 MWe engines shall be tested within 12 months of the date of this permit. In addition to the compliance testing required by Section 4.4 of this Permit the test shall include data development testing to measure emission rates during zero electrical load operation and cold start. The test methods and procedures for this portion of the test must be pre-approved by Ecology.

Ecology Response to Comment #4:
The reason that Ecology is allowing 12 months to test the 0.750 MWe and 2.0 MWe engines is that they were already installed at the time of this permit. However, the goal of condition 4.4.4, is that all new engines be tested before they become operational for the reasons stated in the response to Comment 3.

With regard to reserve engine testing described in Condition 4.4.9, Microsoft agreed to this testing during the development of the preliminary determination. Some of the testing is for compliance and some is for data gathering. Ecology believes the context in the permit is sufficient to discern which is which. Ecology will work with MWH to design a source test based upon the operational scenario developed for those engines.

Comment #5:
[Regarding] Condition 8.5: This condition requires Microsoft to maintain records of the "annual gross power generated by facility-wide operation of the emergency backup electrical generators." The term "gross power" is imprecise. Please substitute "MWe-hours" for the term "gross power" in this condition.

Ecology Response to Comment #5:
Ecology agrees with this comment/request. The final permit will read: 8.5 Annual gross electrical power in MWe generated by facility-wide operation of the emergency backup electrical generators.

Comment #6:
[Regarding] Condition 8.6.4: Section 8.6 requires Microsoft to record certain data for each "operational period" of an MWH engine. During any operating interval (e.g., a lengthy power outage), however, the load on the engine may vary while the generator responds to the varying demand of the servers. Condition 8.6.4 as proposed does not reflect this variability. And it uses a term, "category of generator load," that we believe was developed for other data centers at which the engines are permitted to operate at fixed load levels. We request that Ecology clarify Condition 8.6.4 to better reflect the variability in the operating levels of MWH engines. Condition 8.6.4 should be revised to read as follows:

8.6.4 Duration of operation and average electrical output in KWe.

Ecology Response to Comment #6:
Ecology agrees that the last part of Condition 8.6.4 was developed for other data center permits. Consistent with the August 2014 permit for this facility (Approval Order 14AQ-E537) and also with the draft September 2015 version, which was never finalized, Condition 8.6.4 will be revised to require only the following recordkeeping parameters: "duration of operation and percent of generator electrical load."

Comment No. 7: Received from William Riley on 11/02/2016

Comment #7:
This has been a long drawn out process but changes in application played a role in this. I am still fully in support of the issuance of the permit as previously stated.

Ecology Response to Comment #7:
Thank you for your comment.

Comment Nos. 8-20: Received from Danna Dal Porto on 12/02/2016

Comment #8:

Why did Ecology change the policy of not presenting/preparing a Response to Comments from the July 9, 2016 [*sic* 2015] Public Hearing? Community members take considerable time to read the documents, prepare their questions and either send or deliver their comments in order to learn answers to questions about the proposed projects in their community. People plan and set aside time to attend public meetings. All of this community involvement is critically important as the basis of understanding and trust between the pubic and Ecology. Failure to follow procedure in responding to comments erodes public trust. I am disappointed in the lack of respect Ecology showed to the public by not answering, in the normal manner, the July 9, 2016 [*sic* 2015], Oxford Public Hearing Comments.

Ecology Response to Comment #8:

Ecology appreciates and understands the time and effort made by the Quincy community to attend our public hearings, submit comments, and review our reports. We too dedicated significant time and work to the 2015 Oxford public comment period, including responding to all comments. Ecology's standard procedure is to publish our work and the community's involvement in a formal Response to Comments Report when the permit has been issued, but in this unusual case, no permit was issued. Two of the four commenters of the 2015 Oxford project requested and received a copy of Ecology's draft report, including Ecology's responses to their comments. To integrate and provide a full record of public input on the Oxford and MWH projects, the draft 2015 Oxford Response to Comments Report is contained in *Appendix C* of this document.

Comment #9:

I do not want Microsoft to average emissions to determine data from the operation of Microsoft MWH. Microsoft wants to average the operational emissions from their engines. Doing that, Microsoft avoids the concentrated surge of emissions from the engine cold-start. I do not agree that an average of emissions is protective for the public. Many charts are available to show the VOC spike between 20 and 40 seconds. The NOx spike is especially important in air quality monitoring and averaging would not catch the input from this important data. Over the years, the Ecology air permitting has developed a technical testing procedure for checking the emissions and the operation of the difference data centers. I do not believe the technical testing procedure should be modified. It is important for Ecology and the public to know that all emissions are going to be monitored/tested under the same technical procedure. Microsoft wants to modify engine-testing requirements to make testing more representative of actual operations. I want uniformity in testing throughout the data center community in Quincy.

Ecology Response to Comment #9:

It's not clear what averaging is being questioned in this comment. However, the permit allows compliance with the operational load and fuel usage requirements to be met by averaging over 3 years. See Conditions 3.1 and Condition 3.2.1. Assuming this is the averaging the commenter is questioning, as discussed below, these provisions are reasonable.

EPA has determined that compliance with several of the National Ambient Air Quality Standards (NAAQS) is to be based on 3 year averages: NOx primary 1-hour standard, PM2.5 primary and secondary annual standards, PM2.5 primary and secondary 24-hour standard, PM1O primary and secondary annual standards, S02 primary 1-hour standard. For several other NAAQS, such as the NO2 annual standard, compliance is based on more immediate measurements rather than on 3-year averages.

The rolling average requirements in the MWH permit track compliance with the NAAQS for those pollutants for which compliance is determined via a 3-year average. For those NAAQS for which compliance is not based on a 3-year average, to ensure that the maximum emissions that could occur during the 3-year averaging period would be taken into consideration, Microsoft provided a worst-case scenario where 3-years' worth of emissions were assumed to be emitted in just one year. This analysis demonstrated that under the 3-year average operational limits in the permit, the Microsoft MWH project would comply with the NAAQS.

Cold starts do not change this analysis. Based on the California Energy Commission's report titled: *Air Quality Implications of Backup Generators in California, Volume II (2005),* Microsoft used a cold start factor of 0.999 (or 1.0) for NOx. Ecology accepts this as appropriate. The amount of NOx emitted during cold starts is not higher than during normal running of the engines because NOx is formed during high temperature combustion. Less NOx is formed during cold start because the temperature is not so high. Ecology believes the way that Microsoft calculated cold start factors as a percentage of runtime is appropriate for all pollutants considered. However, because the NOx cold start factor is approximately 1.0, the runtime is irrelevant for NOx cold start emission estimates.

The revised testing procedures provide more uniformity with how the engines are tested by manufacturers during certification. The previous testing methods are also approved EPA methods and will continue to be available as alternative methods.

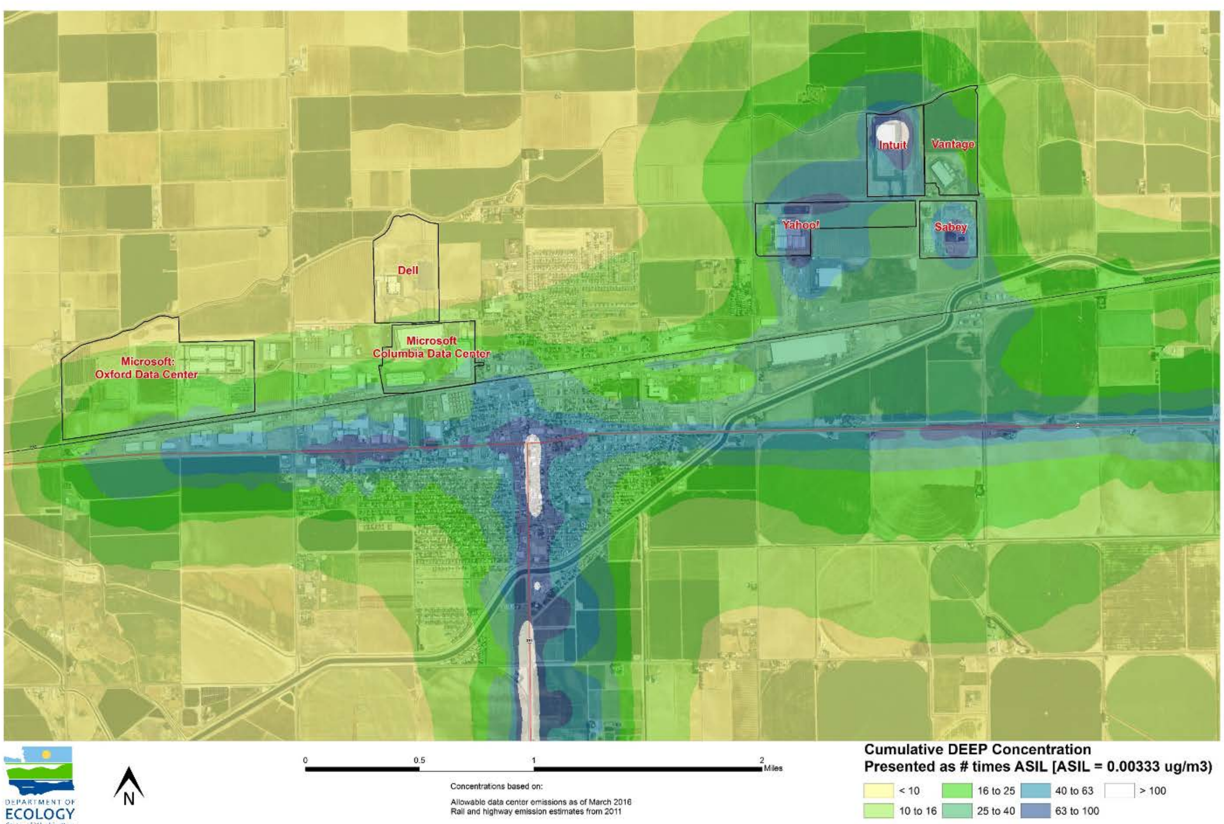
Comment #10:
I will, once again, ask for on-site air quality monitors in Quincy. The modeling can only go so far to determine the continuing deteriorating air quality above Quincy. I live 8 miles south of Quincy and I can see the cloud of "soiled" air above town. The plume of pollution strings to the east and is a visible reminder of the lack of protection my community is getting from the Washington State Air Quality program. I am requesting physical monitors in Quincy and I am raising the specifics of my request in that I want a 24-7, two-year base line data set established for air quality in Quincy. The truck, car and train traffic is seasonal as well as the dust particles in the air are determined by the harvest cycle. Any attempt to satisfy my request by installing a monitor for a week or two during February will not get an accurate view of air issues. I do not believe that telling Quincy residents that there is no money to install monitors will hold up under scrutiny. This is a matter of public health and it is time to know the accurate levels of toxic components in the air instead of guessing. Decisions have already been made by industry and the different city and state agencies to build additional data centers here in Quincy. My community is a captive to market forces and big business. Not knowing the facts about the air quality in Quincy is a dereliction of the duty of the Department of Ecology to protect state residents. Ecology is the state agency granting the permits and I would like Ecology to pass rules that would require businesses to fund the monitoring equipment to protect human health and the environment. Ecology already acknowledges that the Quincy concentration of data centers is unique because that is the basis for the Community Wide approach (that I do not like) to allow this 200+ number of huge diesel engines to be gathered inside the city limits of such a small rural community. This unusual situation demands a unique solution for protecting public health and I believe Ecology owes it to Quincy residents to come up with a creative solution to test the actual air quality instead of guessing.

Ecology Response to Comment #10:
Ecology has recently approved special project funding to purchase equipment for a monitoring study in Quincy. This study will consist of PM2.5 (via a correlated nephelometer), NOx, black carbon (a diesel marker), and meteorological parameters (wind speed, wind direction, and ambient temp).

Ecology estimates that monitoring in Quincy would begin in late spring/early summer 2017.

Comment #11:
I want a colored full-page map showing the Cumulative Diesel Particulate Concentration over Quincy with the addition of the 45 diesel engines at MWH. I believe this visual is an important aid in understanding the potential health impact the data centers have on the community. I am aware of the contribution of vehicle traffic on this concentration but the issue is the cumulative effect of adding data center emissions to already existing pollution. The job of Ecology is permitting facilities in communities and adding up existing particulate material to new pollution sources. Somehow Ecology thinks it is OK to compartmentalize these emission sources. Reality, however, does not separate Vantage air from Microsoft air. All the air is combined over Quincy and the total emission factors are my concern. Just assuming that the pollution stops at the fence line is unrealistic but that, in effect, is the language in some of these permits.

Ecology Response to Comment #11:
The map provided below was prepared for the March 31, 2016 public hearing on the Yahoo! data center. This map includes emissions from all the engines currently permitted in Quincy as well as 37 of the 45 engines in the MWH permit. Additional impacts resulting from design changes occurring at the MWH facility since this map was developed (i.e., lower stacks) and the remaining engines would not significantly change the appearance of this map.



Public Hearing for the Yahoo! Data Center – Project Genesis Air Permit, March 31, 2016

Ecology has evaluated the cumulative impacts of multiple diesel engine emissions in Quincy in previous data center permit applications. Based on past experience, Ecology determined that emissions from data centers on one side of Quincy have minimal impact on residences on the other side of Quincy. For example, in evaluating the cumulative risk to residential receptors near Yahoo! data center for the recent project Genesis permit, Ecology estimated the combined risk attributable to west side data centers (e.g., Microsoft Columbia, Microsoft MWH [formerly Oxford], and Dell) to be less than one in million (i.e., combined concentrations attributable to west side engines was less than the ASIL at residences near Yahoo!.)

Comment #12:
I want to know if the data centers in Quincy are in compliance with the stipulations of the tax breaks granted, on at least two different occasions, to encourage data center construction in Eastern Washington. Are the data centers employing the correct number of workers to be in compliance with the tax incentives and are those workers making a living wage? The data centers were to hire a specific number of workers. After interviewing some data center low-income employees, I know the custodial workers are paid as low as $10 per hour and work few hours weekly. In more than one instance, the hours worked per week could never be considered a living wage. The legislation stipulated that a specific number of workers be hired, I guess the legislation should have been more specific to ensure that these workers are paid a living wage and get enough hours to make the job worth having. I am going to speculate that your response to this comment will be that this is an air quality conversation and you do not have to answer my question. My response in return is to ask just how is the public to determine the value of legislation to encourage companies to build in Washington State and yet have the ethics to provide an economic return for state citizens? The data center conversation belongs with the Department of Ecology so I want an answer to how I can access information about data center compliance with tax incentives.

Ecology Response to Comment #12:
Ecology has no authority or knowledge regarding the tax breaks granted to MWH. Ecology is charged with reviewing the operations for potential air pollution impacts and to establish requirements through the Notice of Construction Approval Order to ensure compliance with the regulations regarding air pollution control. We are unable to respond to this comment.

Comment #13:
Microsoft MWH is requesting additional back-up generators for the back-up generators. Please explain the reason for this request as none of the other data center permits have included requests for redundant engines. On page 7 of the Preliminary Determination, the diesel engines are referred to as “primary engines”, “reserve engines” and “emergency engines” to be used only if the original engines fail. So this is in effect a “backup for the backup. One of the primary reasons for data center construction in Quincy is the supposed 99.9% electrical reliability. Is there a problem with the reliable electrical line?

Ecology Response to Comment #13:
The back-up generators were proposed by Microsoft, and Ecology is not authorized to question the equipment proposed for a project or the method of operations of a source. It is Ecology’s role to evaluate the ambient impacts of the air pollutants emitted by MWH’s proposed project to determine if the project will meet federal and state rules. Ecology is not aware of any problems with the reliability of the electrical system.

Comment #14:
Is the 99.9% Grant PUD electrical reliability not true? Why the back-up generators? I am requesting the operating records for these generators to determine if they are actually back-up or are they going to be used on-line with the other generators to power the facility?

Ecology Response to Comment #14:
Ecology is not aware of any concerns regarding PUD electrical reliability. The back-up generators are proposed by the project proponent to ensure continuation of operations in the unlikely event of a power outage. Since the reserve generators have not yet been installed, there are no operating records available to provide to the commenter.

Ecology has learned from MWH that the reserve engines will have to operate at greater than 30% load during an outage rather than at idle, as previously proposed by MWH. However the applicant modeled reserve engine emissions assuming greater emissions than will actually be emitted at 30% load, thus overestimating reserve engine emissions. The 30% load will support server operations during the outage. In the event of a primary engine failure, the reserve engine will increase load and operate as a primary engine during the remainder of the outage.

Comment #15:
The 2nd Revised Health Impact Assessment Review Document, September 27, 2016, page 17, references power outages for data centers in Quincy. I am asking for the specific records of those power outages, both for the east and west side of town.

Ecology Response to Comment #15:
The comment refers to the following statement made in the 2nd Revised Health Impact Assessment Review Document dated September 27, 2016:

"While existing power outage reports from each of the data centers do not indicate power outages have simultaneously affected all Quincy data centers, Ecology should track outage reports from the data centers to ensure that assumptions used in the analysis remain plausible."

This statement is based on a previous review of the Oxford data center in which Ecology presented reported outages at Quincy data centers from 2008 through May 2014. Section 4.3 of the May 13, 2015 Revised Health Impact Assessment Review Document for the Microsoft Oxford Data Center describes the issue. The table of power outages from that document is reproduced in *Table 4* below. The information in that table was provided by various data centers in response to requests from Ecology. We have not verified with Grant County PUD that this information is consistent with their records.

Table 4. Summary of Power Outage Reports from Quincy-Area Data Centers (2008 to 2014)										
	Microsoft Columbia Data Center		Yahoo!		Intuit		Dell		Sabey	
# Permitted Engines	37		23		9		28		44	
Date of Reported Outage	**# Engines**	**Duration**	**# Engines**	**Duration**	**# Engines**	**Duration**	**# Engines**	**Duration**	**# Engines**	**Duration**
08/09/2008	---	---	Not specified	0.5 hr	---	---	---	---	---	---
10/25/2008	---	---	Not specified	2 hr	---	---	---	---	---	---
06/05/2009	---	---	Not specified	0.5 hr	---	---	---	---	---	---
12/2009	Not specified	Not specified	---	---	---	---	---	---	---	---
01/2010	Not specified	Not specified	---	---	---	---	---	---	---	---
01/22/2010	Not specified	Not specified	---	---	---	---	---	---	---	---
12/ 20/2011	2	0.6 hrs	---	---	---	---	---	---	---	---
03/2012	---	---	13	0.5 hr	---	---	---	---	---	---
07/06/2012	---	---	---	---	---	---	5	0.2 to 0.4 hr (avg. 0.3 hr/engine)	---	---
05/29/2013	33	0.1 to 1.3 hr (avg. 0.8 hr)	---	---	---	---	5	0.4 to 1 hr (avg. 0.8 hr)	---	---
08/2013	---	---	16	1 to 5 hours (avg. 2 hr/ engine)	---	---	---	---	---	---
11/16/2013	---	---	---	--	--	---	---	---	Not Specified	1.5 hr
11/2013	---	---	20	1 to 26 hr (avg. 3.9 hr/engine)	---	---	---	---	---	---
02/2014	---	---	9	1 hr	---	---	---	---	---	---
04/21/2014	---	---	---	---	6	0.75 hr	---	---	---	---
04/24/2014	---	---	---	---	6	0.5 hr	---	---	---	---
04/2014	---	---	22	8 to 12 hr (avg. 9.4 hr/engine)	---	---	---	---	---	---
05/2014	---	---	12	1 hr	---	---	---	---	---	---
Note: Shaded cells represent times when more than one data center reports an outage at the same time interval.										

Adhering to Public Records Act protocol, Ecology will reply directly to this commenter with any responsive records we may have.

Comment #16:
The documents for the MWH project has divided Quincy risk into two sides of town, the west and east sides. I want to know if Ecology has now determined that these designations for town will be used to discuss environmental risk. The maps showing DEEP concentrations, NOx and other VOC does not divide town into two sides and I do not believe it is useful for Ecology to discuss risk as if there were a dividing line between air emission plumes.

Ecology Response to Comment #16:
As noted in Response to Comment #11, Ecology focuses their review on impacts that are relevant to the geographic area that is impacted by the new source of TAPs at levels in excess of ASILs. East and west side data center properties are separated by a minimum distance of about 1 ¼ mile. As demonstrated in earlier analyses of cumulative long-term diesel particulate impacts in Quincy, Ecology determined that emissions from data centers on one side of Quincy have only a minor impact on residences on the other side of Quincy.

Although not impossible, the likelihood of an outage affecting both east and west Quincy at the same time is reduced because, according to Grant County PUD, the east and west sides of Quincy are connected by separate power feeder lines. With regard to short-term NOx emissions during a system-wide power outage, Ecology has acknowledged that there is the potential for NO_2 levels to reach a level of short-term concern for sensitive individuals. For NO2 levels to cause problems for Quincy residents, outages would have to coincide with unfavorable dispersion conditions. Generally, these coincident conditions resulting in higher NO_2 impacts are more likely to impact areas closer to data center properties than areas farther removed. Still, these occurrences are expected to be uncommon.

Comment #17:
The September 27, 2016 Health Impact Assessment lists the pollution control equipment for the tBACT determination in section 2.2.1. I am requesting that the paragraph clearly specify that this equipment will be installed in every one of the MWH diesel generators. The document says that this will be for backup generators and I want the document to say that all 45 MWH generators will use this equipment.

Ecology Response to Comment #17:
Approval condition 2.2 of the draft permit specifies that all 45 proposed engines 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.

Comment #18:
Elevated exposure to exceed the ASIL will be experienced by 710 residents of Quincy as well as elevated exposure will be measured at Monument School, Quincy Valley School and at the Quincy Valley Hospital. I want Ecology to explain why these individuals and children are allowed to be at elevated risk.

Ecology Response to Comment #18:
While some of the 710 residents of Quincy identified in Ecology's Second Tier Review Recommendations concerning the MWH Health Impact Assessment may be exposed to concentrations of DEEP that exceed the ASIL, none of them will be exposed to concentrations of DEEP from the MWH facility that cause unacceptable cancer risk. Washington's rules that comprise the process of new source review are

designed to prevent a new industrial facility from causing a significant increase in air pollution. As part of this process, sources must demonstrate that they will not cause an exceedance of ambient air quality standards, and their emissions of toxic air pollutants do not cause an unacceptable health risk. Microsoft demonstrated that their emissions of criteria and toxic air pollutants would not cause an exceedance of applicable air quality standards or health risk thresholds.

Comment #19:
Has Microsoft done their Utility Feed- Swap? If so, how many hours did the generators operate?

Ecology Response to Comment #19:
Ecology has learned from MWH representatives that Grant County provided the permanent power to the site in November 2015. Each engine ran an estimated 1 hour for the switch.

Comment #20:
Microsoft is asking for their permit to be revised to read the stack heights/diameters as they were built, rather than the heights listed in their permit application. This is not the first time Microsoft has proceeded to build without the proper authorization. The Columbia data center was built without an air quality permit. Columbia is dangerous to the adjacent grade school and yet that facility is operating without emission controls. Apparently no penalty is applied by Ecology to an industry that just proceeds to build or operate without license or permit. The number and frequency of changes to the Microsoft Oxford/MWH permit is very complex and difficult for a community member like me to follow. It is almost like a shell game. The idea that any company can and will do whatever they want is very distressing to me as a Washington State resident. I am asking Ecology to take whatever steps possible to make Microsoft "play by the rules".

Microsoft's behavior brings into question every aspect of their data center operations. We were to believe that they would build the stacks to the determined height, but they did not follow the guidelines and built to suit themselves. Two years later Microsoft is telling Ecology to modify their permit to reflect what Microsoft has already constructed. Why should the Quincy community believe Microsoft would follow any of the operational guidelines set down in their permit to operate? Certainly Microsoft is a big and important player in the international arena. However, just because they are big and powerful should not excuse their willful and intentional violation of the guidelines of their permit.

I would like to comment on the proposed changes to the run times and operational loads for the engine operation. However, try as I might, that data is too advanced for me. I will say, however, I do not trust that what Microsoft is proposing is a positive step for human health and the environment. In fact, if Microsoft is proposing it, I am suspicious, based on their track record, that their proposal will benefit Microsoft and no one else.

This is the first time I have commented to Ecology about an air quality operating permit when I have been without hope that Ecology and Industry is going to protect the people who live and work in this little town. Quincy is a town with good, hard-working people and, without their knowledge or permission, industry is putting their health and the health of their children at risk. This has been a sad experience for me.

Ecology Response to Comment #20:
Thank you for your comments. Ecology has done a thorough analysis of the MWH project, including the new run times and operational loads, and has determined that it meets the requirements of the state and Federal Clean Air Acts.

Comment Nos. 21-76: Received from Patty Martin on 12/05/2016

Comment #21:
As you will recall I believe that Ecology is required to permit the MWH facility as a modification of Microsoft's original facility because they are under common control, under the same industrial classification and in close proximity. Permitting the facilities under common control may require controls on the existing facility because without them the two facilities might be subject to Title V regulation. Why isn't Ecology regulating Microsoft under common control?

Ecology Response to Comment #21:
Ecology does not believe the MWH Data Center and the Columbia Data Center should be treated as a single source. Whether or not two facilities are under common control is not the only criterion required to be met to determine whether they are a single source. An additional criterion is that the facilities need to be on adjacent or contiguous properties. The two Microsoft facilities are located about a half mile apart. The two Microsoft facilities are not physically adjacent, nor are they on contiguous properties. Because these two data centers do not meet the definition of a single source, Ecology has not looked at whether their combined emissions exceed major source thresholds.

This comment does not result in a change in the proposed permit.

Comment #22:
Dr. Joel Kaufmann at the UW has conducted research on chronic exposure to PM2.5 and its effect on the cardiovascular system. His research shows that diesel particulate and other ultra-fine particulate cause inflammatory responses resulting in atherosclerotic plaque formation and clotting that can cause heart attacks and strokes. It would appear that Ecology is using old information to make present day decisions that directly affect the health of my community.

Ecology Response to Comment #22:
Ecology is aware of recent and on-going research pertaining to non-cancer health effects, such as cardiovascular effects, of fine particles. Ecology has also long recognized that the public health implications of diesel engine exhaust are not limited to respiratory effects and increased risk of lung and bladder cancer.

Ecology uses the most recently available reference concentration from EPA and reference exposure level from California OEHHA when assessing chronic non-cancer hazards attributable to diesel particles. No other agency or entity has developed reference values for non-cancer related health effects of DEEP more recently than the California OEHHA we are using.

In addition, Ecology's analysis of the health risks for DEEP includes an acceptable threshold for excess cancer risk. As is the case for most carcinogenic TAPs, the level of exposure to DEEP that corresponds to the acceptable risk threshold for excess cancer is considerably lower than the reference value for non-cancer health effects. Therefore, the acceptable risk threshold pertaining to carcinogenic effects of DEEP is more than protective of non-cancer hazards posed by DEEP. Ecology does not allow an increased lifetime exposure to greater than 0.0333 ug/m^3 of DEEP from a new stationary source. This level is also protective of non-cancer hazards.

Comment #23:
I noticed that on page 3 of the 2nd Tier Review Recommendation that Ecology states that MWH increases cancer 5.9 in one million and then clarifies this by stating: "The cancer risk estimates reported here are for increases above a baseline lifetime risk of cancer of about 40 percent in the United States." I would like clarification on what this statement means.

Ecology Response to Comment #23:
In the U.S., an estimated 40% of the population will be diagnosed with cancer. Ignoring specific causes or risk factors, each person in the U.S. has about a 40% chance of being diagnosed with cancer in their lifetime. The cancer risk estimated from a lifetime of exposure at the residence most impacted by MWH's diesel engine emissions is estimated to be 5.9 in one million added to the existing baseline of cancer risk.

40% baseline risk + 0.00059% increased risk from MWH emissions = 40.00059% total cancer risk.

Comment #24:
Ecology also using the Monte Carlo analysis – which spreads the 1-hr NO2 emissions out over 5 years of meteorological data – to claim compliance with the 1-hr NO2 NAAQS? If so, please provide documentation that Ecology has received authorization to use the Monte Carlo analysis for this purpose.

Ecology Response to Comment #24:
Ecology did use the Monte Carlo method to determine compliance with the 1-hr NO2 NAAQS. It is inaccurate to say the Monte Carlo analysis "spreads the 1-hr NO2 emissions out over 5 years of meteorological data." Rather, AERMOD was run assuming the NO2 emissions associated with a full power outage plus testing occurred during *each of* the 43,800 hours that make up 5 years of time. In reality, the generators only run on a subset of these days. Therefore Ecology used the Monte Carlo tool to randomly select days from the AERMOD analysis on which these impacts are expected to occur. The Sabey document referenced below provides more detail on the Monte Carlo method.

EPA approval to use the Monte Carlo method is not required, because the Monte Carlo method is not a model – it is a post- processing tool that uses the results from the AERMOD model.

The results of the approved model (AERMOD), run according to EPA's guidance on dispersion modeling, are taken in different combinations to cater for the intermittent nature of emissions in this application. We are only aware of one other state (Minnesota) that has a technique for modeling intermittent emissions. Both our Monte Carlo method and MN's EMVAP method (www.cppwind.com/wp-content/uploads/2014/01/Innovative-Dispersion-Modeling_Guerra_EM_Dec_2014issue.pdf) have been presented at the EPA, Regional, State and Local Modelers meetings several years ago.

A more detailed explanation of our method is provided in response to comments associated with Sabey's permit: www.ecy.wa.gov/programs/air/quincydatacenter/docs/SabeyQuincy_TSD_6-24.pdf.

Comment #25:
Under what authority is Ecology acting as the "permit authority"?

Ecology Response to Comment #25:
RCW 43.21A.020 gives Ecology the authority to implement the air regulation and management program in the state of Washington.

RCW 70.94.152 (3) states that "…ecology…may require the submission of plans, specifications, and such other information as it deems necessary to determine whether the proposed new source will be in accord with applicable rules…If on the basis of…information required information, ecology....determines that the proposed new source will be in accord with this chapter…it shall issue an order of approval…"

The legislature also made it clear that it intended that "the implementation of programs and regulations to control air pollution shall be the primary responsibility of the department of ecology and local air pollution control authorities." Finding 1991, c199 note to RCW 70.94.011

Comment #26:
Has Ecology investigated the number of asthma attack, heart attacks and strokes that have occurred in Quincy since the arrival of the data centers? Wouldn't that provide some insight into air quality while the agency resists monitoring our air for compliance?

Ecology Response to Comment #26:
No. Ecology uses risk assessment methods to estimate health risks posed by increased emissions from commercial and industrial sources. Generally, the increased levels of pollutants allowed under Ecology's rules are typically much lower than the amount that would cause an epidemiologically detectable increase in adverse health effects.

Ecology is soon to begin community monitoring in Quincy as discussed under Response to Comment #10.

Comment #27:
What are the ground level ozone levels in Quincy? Why isn't ground level ozone being considered during the permitting process when it is a NAAQS requirement?

Ecology Response to Comment #27:
For the purpose of modeling impacts of NO_2, Landau Associates assumed a "background" ozone concentration of 49 ppb. This was based on the NWAIRQUEST lookup tool which provides an estimate of criteria pollutant design values (i.e., concentrations) at all locations in Washington.

Limited ozone monitoring in Quincy was conducted in the summers of 2010 and 2011. Results showed that the ozone levels in the Quincy area met the NAAQS.
See www.ecy.wa.gov/programs/air/quincydatacenter/docs/Quincy_ozone.pdf. Additionally, the monitoring showed that forecast models used to estimate ozone levels performed reasonably in predicting daytime ozone levels in Quincy.

Finally, ambient ground level ozone analysis is not typically conducted for minor new source review projects, especially in ozone attainment areas.

Comment #28:
Ecology acknowledges on page 7 of the 2nd Tier Review Recommendation that the NO2 level of 470 ug/m3 -- set by CalEPA or OEHHA back in 2008 – is not protective. Why does Ecology continue to use a number that they know is not protective of human health?

Ecology Response to Comment #28:
Contrary to this comment, Ecology believes the NO_2 level of 470 ug/m^3 is protective against mild adverse effects assuming exposures at this level occur infrequently and for limited duration.

On page 7 of the 2nd Tier Review Recommendation, Ecology states:

"OEHHA developed an acute reference exposure level for NO_2 based on inhalation studies of asthmatics exposed to NO_2. These studies found that some asthmatics exposed to about 0.25 ppm (i.e., 470 µg/m3) experienced increased airway reactivity following inhalation exposure to NO_2 (CalEPA, 2008). Not all asthmatic subjects experienced an effect. The acute REL derived for NO_2 does not contain any uncertainty factor adjustment, and therefore does not provide any additional buffer between the derived value and the exposure concentration at which effects have been observed in sensitive populations. This implies that exposure to NO_2 at levels equivalent to the acute REL (which is also the same value as Ecology's ASIL) could result in increased airway reactivity in a subset of asthmatics. People without asthma or other respiratory disease are not likely to experience effects at NO2 levels at or below the REL. "

This explanation was meant to explain that in deriving the acute (short-term) reference exposure level, California OEHHA did not include additional adjustments for uncertainty. California OEHHA determined that additional uncertainty factors were not warranted primarily because the controlled study subjects that were exposed to nitrogen dioxide represented a sensitive population. They also noted that other studies failed to reproduce airway reactivity in asthmatics at similar concentrations, and that these inconsistent results suggest that there may be a sensitive subset of asthmatics in the general population that may be susceptible to increased airway reactivity following exposure to NO_2. OEHHA considers the NO_2 acute (short-term) REL to be "protective against mild adverse effects." OEHHA intended for short-term RELs to be "for infrequent 1 hour exposures that occur no more than once every two weeks in a given year."

Comment #29:
How was the 1-hr NO2 compliance demonstrated? By the Monte Carlo?

Ecology Response to Comment #29:
A conservative, stochastic Monte Carlo analysis was used to demonstrate compliance with the 1-hr NO2 NAAQS. Sections 5.7 and 5.8 of the technical support document (TSD), provide a detailed explanation 1-hr NO2 compliance, including a description of how this was used. The TSD is available online:
www.ecy.wa.gov/programs/air/quincydatacenter/index.html

Comment #30:
Ecology cites to California regulations often, but doesn't CARB require LAER for air pollution sources?

Ecology Response to Comment #30:
It is not clear which California regulations this comment refers to. The commenter is correct that in some instances the BACT standard in California is equivalent to LAER. In addition, Lowest Achievable Emission Rate (or LAER), is applicable to non-attainment areas, of which California has multiple such areas, and Washington State currently does not have any such areas. It is not clear how California's standards affect the situation in Washington. Regardless of any California regulations that may have been cited by Ecology, Quincy is not located in a nonattainment area, and therefore LAER is not required in Quincy.

Comment #31:
Prior to 2009, didn't Ecology consider the additive and/or synergistic effects of TAPs? What increased risk is Quincy at when Ecology allows for multiple, additive and synergistic carcinogenic pollutants to be

emitted without comprehensive review? Are the WAC 173-460 regulations still enforced by the Spokane Regional Air Authority to protect the air that you breathe?

Ecology Response to Comment #31:
The process for evaluating risks from TAPs is the same now as it was prior to 2009. That is, Ecology considers the additive and/or synergistic effects of TAPs now to the same extent Ecology considered them prior to the changes made to WAC 173-460 in 2009.

Under second tier toxics review, Ecology considers the effects of multiple pollutants. In most cases, there are insufficient studies to determine if specific mixtures of pollutants interact synergistically or antagonistically. Because sufficient data are not available on the effects of most chemical mixtures of concern, Ecology assumes additivity for health hazards affecting the same organ system (for non-carcinogens). Because cancer risk is calculated as a probability, Ecology sums the risk attributable to each pollutant to derive a total risk of cancer from exposure to carcinogenic TAPs.

Ecology believes that Spokane Regional Clean Air Authority also uses WAC 173-460 when permitting activities in Spokane County.

Comment #32:
What does "much lower than unity for all receptors" mean? (2^{nd} Tier Review Recommendation page 10)

Ecology Response to Comment #32:
A hazard quotient that is lower than unity means it is less than one.

Comment #33:
Regarding NO2, Ecology states that the "MIBR hazard quotient and indices are greater than one" and indicate adverse effects may occur in people occupying areas near MWH property borders. How long do the engines need to operate before the hazard quotient or indices exceed one?

Ecology Response to Comment #33:
The issue related to short-term impacts of NO2 is not how long multiple engines need to operate under emergency loads before a potential short-term impact of concern occurs, but when the outage occurs. As demonstrated by dispersion modeling over a time period of 5 years (or about 43,800 hours), the meteorology determines the height and direction that the plume will disperse. At the MIBR for example, taking into account emissions and meteorology, a HQ could exceed one (unity) about nine total hours over that 5 year period assuming continuous operation of emergency engines at MWH data center.

Comment #34:
Ecology states on page 11 that the short term risk from DPM was not calculated and that Ecology chose to use the 24-hr PM2.5 as an indicator of safety. DPM is not equitable to PM2.5, but much more toxic. PM2.5 is presumed inert, yet ultrafine particulate, while DPM is known to be ultrafine and extremely toxic, hence its ranking as the #1 toxic air pollutant of concern. Ecology severely underestimates the risk to our community in equating these two substances.

Ecology Response to Comment #34:
Ecology does not consider PM2.5 to be inert and is aware that some components and sources of PM may be more toxic than others, In fact, Ecology evaluates the long-term health effects attributable to diesel

particulate differently than PM2.5. Ecology has prioritized diesel PM as an important pollutant, and has included it on the list of toxic air pollutants regulated under WAC 173-460.

With regard to short-term exposures to diesel particulate, Ecology indicated that there are currently no derived quantitative toxicity values to quantify the short-term hazards attributable to diesel PM exposure. That is not to say that Ecology ignores the acute hazards posed by diesel exhaust. Ecology considered the short-term exposure to NO_2, a large component of diesel exhaust, when evaluating short-term hazards associated with emissions from data center emergency engines.

Comment #35:
Ecology states on page 12 that NO2 sources of consideration were Dell, MWH and Microsoft's Columbia Data Center. Did Ecology consider the natural gas boilers at ConAgra and Amway? Are any of the cold storages or controlled atmospheric facilities sources of NOx? Are/were cooling tower emissions from Microsoft Columbia considered as a source of NOx while using groundwater with high levels of nitrates?

Ecology Response to Comment #35:
Page B-12 of the application confirmed that local emissions from "ConAgra food processing plant" were included. Other facilities and cold storage equipment either produce no NOx emissions or do not emit appreciable amounts of NOx emissions. The gas boilers at Amway's Nutrilite facility emit only approximately 2 tons per year of NOx.

Any nitrates (NO3) in the cooling tower water that migrate into the air during the cooling tower process will not be reduced to NOx (NO2 or NO) and will not contribute to the NOx concentrations in the air. Therefore the omission of nitrates (NO3) from PTE estimates and modeling is appropriate.

This comment does not result in a change in the proposed permit.

Comment #36:
Ecology used Grant County PUD outages from 2003-2009. Why not use the most recent outage information? Is it because one or more data centers violated the terms of the permits with regard to hours permitted for power outages?

Ecology Response to Comment #36:
Ecology refers to Grant County PUD outages from 2003-2009 because it is the most recent data provided to Ecology regarding the reliability of the entire Grant County PUD power system. The data centers have not violated the terms of their permits with regard to hours permitted for power outages.

Comment #37:
Ecology lists power outages as one of the uncertainties. Shouldn't this permit include more short term all-engine runtimes to account for this uncertainty?

Ecology Response to Comment #37:
The comment neither specifies how much "more" short-term runtimes they believe would be satisfactory, nor provides evidence that the short-term run times presented in the application are insufficient to account for power outage uncertainties.

The applicant requested run time limits and Ecology determined that the limits would satisfy applicable NAAQS and acceptable risk thresholds under WAC 173-460-090. Ecology conducts compliance monitoring and the facility will be out of compliance if these limits are exceeded.

Comment #38:
Ecology also lists the toxicity of DPM as one of the uncertainties. Wouldn't it be better to use the 10 times more protective EPA URF of $3x10^{-5}$ than to continue to use OEHHA's $3x10^{-4}$? Using the more protective URF affords Quincy a more protective margin of error.

Ecology Response to Comment #38:
Using a URF of $3x10^{-5}$ would actually be 10 times less protective than using OEHHA's 3×10^{-4} URF.

EPA did not actually derive a URF for DEEP. EPA determined that existing data was too uncertain to support a URF, but determined that a URF could broadly be in the range of 1of1 x 10^{-5} to 1 x 10^{-3}. The OEHHA URF is within this range.

Ecology typically relies on quantitative toxicity values that were derived after having undergone a formal process of review. In the case of the diesel particulate unit risk factor (URF), CA OEHHA is the only agency that has derived a URF. CA OEHHA uses a process of internal and external review before adopting unit risk values and reference exposure levels.

Health Effects Institute (HEI) recently reviewed epidemiological studies of workers occupationally exposed to diesel exhaust and determined that existing studies can provide the basis for a quantitative risk assessment of lung cancer from exposure to diesel exhaust. HEI cautions that should any effort be made to derive an exposure-response relationship (e.g., unit risk factor), numerous uncertainties should be considered including the change in today's diesel technology compared to the time periods when exposures occurred in epidemiological studies.

Comment #39:
What is Ecology doing to comply with the SSM (startup, shutdown, malfunctions) requirement of the CAA? How is MWH complying during startup when the pollution controls are not yet functional? What is the agency doing to make the existing data centers comply? Does Microsoft have shutdown emissions not being accounted for?

Ecology Response to Comment #39:
The proposed permit does not allow for exemptions from NAAQS compliance during startup, shut down, or malfunction. Ecology's analysis considered increased emissions that might be expected to occur during startup, shutdown, or malfunction (in this case that would be during startup) in the demonstration of NAAQS compliance.

Comment #40:
Ecology states on page 13 that AERMOD may underestimate annual concentrations of PM10. Why? Is AERMOD the best model to use for particulate? What other models might be a better choice?

Ecology Response to Comment #40:
Ecology was unable to locate the specific reference to AERMOD's underestimation of annual PM10 concentrations. Nevertheless, AERMOD is the EPA-approved model for PM10 from sources such as these. Generally, AERMOD is programmed to ensure ambient impacts are not underestimated.

Comment #41:
Ecology speaks to PAHs on page 15. It is disconcerting to note that DPM exhaust is not any less hazardous with the use of controls. Is this an accurate understanding of what was related on page 15?

Ecology Response to Comment #41:
The key improvement from the newer engines is that they emit much lower amounts of diesel particulate. California OEHHA has argued that the toxicity of diesel engine exhaust (measured as particulate) from newer engines is similar to the toxicity of an equal mass of exhaust from an older engine. Therefore, they argue, the risk posed by exposure to a given concentration of DPM from a new engine is similar to the risk posed by an equal amount of DPM from an older engine. However, regardless of this argument, the risk from exposure to emissions from the newer engines is much lower than the risk from exposure to emissions from the older engines (assuming equal operation) because the newer engines emit so much less diesel particulate.

Results from the recent Advanced Collaborative Emissions Study (ACES) suggest that older technology diesel engine exhaust may be more toxic in some ways than newer technology engine exhaust. While earlier studies of rats exposed to older technology exhaust showed evidence exposure-related lung tumors, the ACES study showed that long-term exposure to newer technology diesel exhaust was not carcinogenic in rats. See: www.healtheffects.org/system/files/ACES-Executive-Summary2015_0.pdf

Comment #42:
Ecology notes-- also on page 15 -- that the long-term ambient conditions and the non- cancer hazards may be underestimated. Ecology can correct both of these situations by monitoring Quincy's air. In the meantime, the use of the more protective URF would be prudent.

Ecology Response to Comment #42:
Please see Response to Comment #10. Ecology is planning to begin monitoring in Quincy in 2017.

Comment #43:
Quincy sits in a valley up against a hillside. According to 40 CRF 51 Appendix W, CalPUFF would be the more appropriate model for use in Quincy because of the topography and the secondary formation of PM2.5. Why isn't CalPUFF being used? Does AERMOD consider the secondary formation of PM2.5?

Ecology Response to Comment #43:
Calpuff is approved by EPA for use when estimating impacts further than 50km from the source. AERMOD is the model approved for estimating impacts up to 50km from the source. AERMOD does not consider secondary PM2.5; very few projects around the country have modeled secondary impacts from single facility emissions.

Comment #44:
A statement is made implying that condensable particulate matter is not an issue (page 16), however, condensable particulate forms outside the engine depending on ambient conditions, such as temperature, and its consideration is a requirement of NAAQS. It is a federally enforceable condition of the CAA and our SIP. It's potential to impact health should not be minimized.

Ecology Response to Comment #44:
Comment refers to this statement:

“It is important to note that diesel particulate is typically quantified as only the filterable fraction. This is because the health studies that form the basis for quantifying the health risk from diesel exposure used measurements of respirable particulate from ‘fresh’ diesel exhaust and elemental carbon as a surrogate for diesel exhaust emissions. Therefore, the increased risk estimated by Landau Associates represents a conservatively high estimate. Based on that filterable emissions are about 15 percent of MWH’s filterable and condensable emissions, an estimated risk of about one in one million at that location is a more realistic estimate.”

The statement refers to how the cancer unit risk factor was derived by California OEHHA. The unit risk factor was based primarily on studies of truckers and railroad workers occupationally exposed to diesel exhaust. These studies used exposure measurements that were judged by California to be representative of “fresh” diesel exhaust. In California’s Airborne Toxic Control Measure for Stationary Compression Engines, Diesel PM is defined as the filterable portion of particulate. This is consistent with how the URF was derived.

In evaluating emissions by MWH engines, Ecology considered both filterable and condensable PM when determining compliance with PM NAAQS. With regard to increased cancer risks attributable to MWH diesel particle emissions, Landau Associates considered both filterable and condensable PM2.5. The estimated cancer risk is conservative (erring on the side of caution).

Comment #45:
Why didn’t Ecology cite Microsoft for violating the terms of its 2014 permit when it didn’t construct its facility as stated, and as air quality was modeled? Shorter stacks with wider diameters increased emission concentrations and the corporation should be cited for violation of federal law.

Ecology Response to Comment #45:
Ecology has the authority and responsibility to take enforcement actions as needed to require sources to comply with applicable regulations and permit conditions. Ecology bases Notice of Violation (NOV) and other enforcement actions on numerous factors related to each incident. Generally, Ecology uses formal enforcement actions such as NOVs to compel reluctant sources to take actions needed to return to compliance.

In the case of MWH’s stack dimensions, MWH reported the change in dimensions when they realized that the stacks had not been constructed as they had been designed during air quality permitting. After the issuance of the permit, MWH had refined their engineering designs for the stacks and then constructed them according to the design specifications. Once MWH realized that the stack dimensions were not in compliance with the permit, they reported and then worked cooperatively with Ecology to model emissions using the actual dimensions of the stack. This Preliminary Determination is based on the correct dimensions and Ecology’s determination that all applicable requirements will be met.

Ecology did not issue a NOV regarding stack dimensions because MWH has demonstrated that the revised dimensions do not result in the exceedance of any applicable emissions limit or ambient air quality standard. Ecology believes that the compliance matter has been remedied by the source in a cooperative manner.

Comment #46:
A clean draft of the Approval Order is not online. The draft permit that is, still references Oxford.

Ecology Response to Comment #46:
Ecology issued Approval Order 14AQ-E537 to Microsoft for the Oxford facility on August 15, 2014. This is the Approval Order that MWH operates under currently. The Preliminary Determination currently under review is proposed to replace Approval Order 14AQ-E537. Both documents are available online at www.ecy.wa.gov/programs/air/quincydatacenter/index.html. [With the publication of this report, the final MWH Approval Order 17AQ-E002 is contained in *Appendix E*, as well as added to the link.]

Comment #47:
What is meant by "wet stack purge"? What is it and how does it impact emissions?

Ecology Response to Comment #47:
The term "wet stack purging" is used to describe operating engines at a higher load to burn off the collection of unburned fuel on the engines which can be indicated by soot on the diesel engine exhaust pipes or "stacks." Wet stacking is caused by operation of engines at low loads, which has a variable effect on emissions depending on the pollutant. The emission rates for each pollutant at specific loads is provided in the application.

Comment #48:
Microsoft offers no proof that a "cold start" lasts only 15 minutes for DPM and only 10 minutes for NOx. A manufacturer's guarantee is based on 30 minutes of "warm up" – 40 CFR 89.406-7 -- a requirement set by EPA with input from the engine manufacturers. Cold start estimates should be consistent with the regulations used to exclude them from manufacturer certifications: 30 minutes.

Ecology Response to Comment #48:
Microsoft based their cold start calculations on the California Energy Commission's (CEC) 2005 report entitled "*Air Quality Implications of Backup Generators in California, Volume II (2005)*." As shown in the document, cold start spikes occur within a 60 second timeframe. MWH calculated lower cold start factors but implemented them over a longer period of time. Other data centers calculated 60-second cold start estimates which are higher than those used at MWH. Both approaches are acceptable however, because if those other data centers extrapolated their cold start estimates over the MWH cold start timeframe, the cold start factors would be approximately the same as the ones used for the MWH facility.

Comment #49:
In the supplemental materials dated 9/9/2016 and inserted loose into the back of the packet at the library, there are PM10 estimates, but no PM2.5 emission estimates. Why?

Ecology Response to Comment #49:
The supplementary materials addressed operating reserve engines differently than originally proposed in Microsoft's April application.

Microsoft's supplementary materials re-evaluated emission increases of PM10 resulting from the new proposal for compliance with the NAAQS. The changes in the supplementary material did not result in any change to Microsoft's PM10 emission limits because, as noted in the supplementary materials: "Although the emissions are greater than estimated in Microsoft's April 2016 application, Microsoft is agreeing to maintain emissions at the lower April 2016 estimates which meet NAAQS. Microsoft believes there is enough conservatism (over-estimated emissions) built into the April emissions (those listed in the permit and TSD), that allows them to agree to those lower emission limits." The permit limit for PM10, therefore remains unchanged.

PM2.5 emission increases did not need to be re-evaluated because of the way compliance is determined for the 24-hour PM2.5 NAAQS. For PM2.5, the 24-hour NAAQS is determined by the 98th percentile concentration (i.e. 8th highest day) in a given year, averaged over three years. Microsoft's PM2.5 emission increases only occur during power outages, and the permit is based on an assumed two separate days of power outage. As such running the generators during power outages will only affect emissions on the first and second highest days, and not the 8th highest day.

Comment #50:
In this supplemental material there are no cold start factors for the "reserve engines". Why?

Ecology Response to Comment #50:
The supplemental material included no new cold starts for the reserve engines because, while the supplemental material addressed the longer run times requested by Microsoft, Microsoft did not request any new cold starts that had not already been accounted for in the primary application materials. See Response to Comment #59.

Comment #51:
Please review the cold start factor for NOx. It was demonstrated in the Sabey source test that the NOx emission are extremely high during cold starts, and may last longer than 10 minutes.

Ecology Response to Comment #51:
Issues with the sensor in the Sabey source test rendered the NOx results from that test inaccurate and unusable.

Based on the California Energy Commission's report titled: *Air Quality Implications of Backup Generators in California, Volume II (2005),* Microsoft used a cold start factor of 0.999 (or 1.0) for NOx. Ecology accepts this as appropriate. The amount of NOx emitted during cold starts is not higher than during normal running of the engines because NOx is formed during high temperature combustion. Less NOx is formed during cold start because the temperature is not so high. Ecology believes the way that Microsoft calculated cold start factors as a percentage of runtime is appropriate for all pollutants considered. However, because the NOx cold start factor is approximately 1.0, the runtime is irrelevant for NOx cold start emission estimates.

Comment #52:
In Table B-2-2D-2 shouldn't the cold start for the reserve 2.5 kW engines also be 50.6 lb/hr as it is for the "primary engines"?

Ecology Response to Comment #52:
Reserve engines have a different load and therefore a different emission factor during their reserve status. If they take on a primary function, they would then have a higher emission factor. Once they take on a primary function, they replace another primary engine so the emissions have already been accounted for.

Comment #53:
Why aren't the reserve engines emissions included in the draft approval order?

Ecology Response to Comment #53:
The reserve engines are included in the draft approval order. From section 5 of permit:

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 follow emission rate limitations: Each emergency engine shall not exceed the applicable emission limits in Table 4.

Comment #54:
How can the fuel usage increase from 431,000 gallons to 615,000 gallons without a similar increase in SO2 emissions when they are calculated mass balance?

Ecology Response to Comment #54:
SO2 emissions do have a similar increase. The 2014 permit allowed 0.047 tons per year of SO2. The proposed permit would allow 0.069 tons per year of SO2.

Comment #55:
How many hours of electrical bypass are included in the approval order?

Ecology Response to Comment #55:
There are no specific hour limits for bypass. Instead the approval order limits the total number of hours that engines can operate.

Comment #56:
In Table 2 "NOx Emissions 2500 kW", the 100% load is considered the load at which the most NOx is produced. Please review the Sabey source test to compare levels that were emitted at 0% and use the higher of the two for modeling purposes.

Ecology Response to Comment #56:
During the Sabey source test, the failure of the sensor rendered the results of that test inaccurate and unusable. Please see Response to Comment #51.

Comment #57:
In the supplement, in order to stay under the 575 lbs/hr, Microsoft drops the operational load from 100% to 99%. Is a 1% decrease in operational load sufficient to reduce NOx emissions as modeled, and are engines refined enough to accurately accommodate a 1% decrease?

Ecology Response to Comment #57:
There is an approximately a 2% error in operational load, so the commenter is correct to question the feasibility of accommodating a 1% decrease in operational load. However, the applicant was not suggesting an actual 1% decrease in load but rather included this scenario as part of its theoretical sensitivity analysis to show that emissions from worst case scenarios will still be in compliance with NAAQS. The facility is required to meet the 575 lb/hr limit and has shown it can do so because as stated in the supplementary materials: "calculated emissions for anticipated actual operating conditions are much lower than the worst-case emissions used to set the emission limits in the PD(proposed permit)."
Approval Order Condition 5.4 has a limit of 575 lbs/hr limit regardless of the load at which Microsoft chooses to operate their engines.

Comment #58:
Microsoft is claiming that operating for 160 generator hours/day will still allow it to comply with NAAQS. Would this be true without the Monte Carlo meteorological manipulation? I have been told by modelers in California, that any time 2 of these engines run they exceed the 188 ug/m3 1-hr NO2 NAAQS. Please

model 1-hr NO2 without the Monte Carlo analysis before allowing this language to remain in the approval order.

Ecology Response to Comment #58:
Ecology does not know, but assuming for the sake of argument that two generators operate side by side for a few hours and emit sufficient NO2 to result in concentrations of more than 188 ug/m3, this would not result in a violation of the NAAQS. The engines would need to operate simultaneously on at least 8 separate calendar days each year for 3 consecutive years before they could violate the NAAQS. Further, each of these 24 days needs to be characterized by poor dispersion of pollutants. The Monte Carlo method is a probabilistic tool to account for these scenarios. See Response to Comment #24. It is incomprehensible that any backup generator would operate continuously for 43,800 hours.

Comment #59:
How many "cold starts" were included in the modeling? Each engine starts at least 12 times per year from a "cold start".

Ecology Response to Comment #59:
In the emission calculations, it was assumed that each of the 2.5 MWe engines underwent 72 cold starts per year. The reason for cold starts depends on the specific function being considered. All of the following types of activities with associated annual number of cold starts were included in the application emission estimates: power outages (3 cold starts), electrical bypass (1 cold stars), monthly testing (10 cold starts), semiannual testing (2 cold starts), corrective testing (4 cold starts), weekly testing (52 cold starts). Each reserve engine was assumed to have 71 cold starts.

Comment #60:
Why do the "reserve engines" need 40 hours of operation? Why aren't their emissions included in the approval order? See Table 2.1

Ecology Response to Comment #60:
As noted in the application: "The new reserve generators will require an average of 40 hours per year for scheduled testing and maintenance, identical to the currently permitted primary emergency generators." The final permit will clarify in Table 2.1 that all engines are included.

Comment #61:
Any source test must require proof that the fuel is diesel. Ecology must be onsite for the test and sample the fuel prior to testing. This language should be included in the approval order.

Ecology Response to Comment #61:
The data centers all fuel their diesel powered generators with ultra-low sulfur diesel (ULSD) fuel. Ecology does require evidence that the data centers are purchasing ULSD. All data centers have fuel receipts that indicate that ULSD is used. Ecology does attend most source testing, but is unable to commit to attending all source testing.

Comment #62:
Compliance testing must require low loads as well. The approval order requirement to test at 50, 75 and 100 is not sufficient to assure that the emission estimates used are protective and accurate. Testing should include all NAAQS pollutants, VOCs and PM2.5 - both front and back half.

Ecology Response to Comment #62:
The 5-mode test required by this permit includes low load testing at 10% and 25% modes, in addition to 50%, 75% and 100% loads. Testing includes VOC (NMHC) and PM2.5.

Emission tests required by this permit are intended to demonstrate continued compliance with NSPS. Cold start and condensable emissions were factored into emissions estimates used in dispersion modeling and demonstrated that emissions from engines meeting the NSPS requirements would comply with the NAAQS. Ecology has explored the utility of condensable testing of data center engines using EPA Method 202. The results of Method 202 testing appeared to contain unexplained variation such that the value of the data is limited. To take condensable PM into account, Microsoft performed the NAAQS analysis assuming that all of post catalyst hydrocarbons (HC) (and twice the amount for cold starts) emitted from the Microsoft engines will condense to form particulate matter, and including the additional HC emission estimates as condensable particulate. This analysis, which overestimates condensable particulate matter emissions, demonstrated again that emissions from engines that comply with EPA's NSPS requirements comply with the NAAQS. By showing continued compliance with the NSPS tier 4 standards every 5 years as required by the permit, the applicant will also show compliance with the NAAQS because modeling results were evaluated to take into account cold start factors and condensable estimates. Also, the dilution tunnel system required in Table 2 of Appendix B to Subpart E of 40 CFR 89 accounts for some of the condensable PM.

Comment #63:
Source tests should be as required under 40 CFR 60 IIII that require 3 separate tests. Please deny Microsoft's request to use testing protocols under 40 CFR 1065. As demonstrated during the tests conducted in Tukwila, the emissions can vary widely between tests. An average of 3 tests is a better indicator of the accuracy of the emission rates than having only one test. Additionally, Microsoft requests the use of 40 CFR 89 dilution stack testing. I didn't have time to research this, but the applicability section of 1065 suggests that this test procedure might be used for older model engines. Please check this for accuracy.

§ 1065.1 (3) Nonroad diesel engines we regulate under 40 CFR part 1039 and stationary compression-ignition engines that are certified to the standards in 40 CFR part 1039, as specified in 40 CFR part 60, subpart IIII. <u>For earlier model years, manufacturers may use the test procedures in this part of those specified in 40 CFR part 89</u> according to § 1065.1.

I am not in favor of granting Microsoft any alternative means of testing its engines. They have demonstrated that they don't play by the rules.

Ecology Response to Comment #63:
As described in the TSD: "Because the engines at MWH are regulated under 40CFR60 subpart IIII (per 40CFR60.4200), they are not subject to 40CFR1039 requirements except as specifically required within 40CFR60. Some emergency engines with lower power rating are required by 40CFR60 to meet 40CFR1039 Tier 4 emission levels, but not emergency engines with ratings that will be used at MWH (0.750 MWe, 2.0 MWe, and 2.5 MWe). Instead, 40CFR60 requires the engines at MWH to meet the Tier 2 emission levels of 40CFR89.112"

The testing requirements of 40 CFR 1065 are an appropriate option because these are the current requirements manufacturers use to certify these engines. 40 CFR 60 requires three runs "unless otherwise specified." Method 40 CFR 1065 does not require three separate runs. Ecology believes the testing protocol for the engines at MWH, which includes testing at five modes (10%, 25%, 50%, 75%, and 100%), is appropriate.

Comment #64:
Annual limits for NAAQS should not be based on rolling averages as requested by Microsoft. Please deny this request.

Ecology Response to Comment #64:
EPA has determined that compliance with several of the National Ambient Air Quality Standards (NAAQS) is to be based on 3 year averages: NOx primary 1-hour standard, PM2.5 primary and secondary annual standards, PM2.5 primary and secondary 24-hour standard, PM1O primary and secondary annual standards, S02 primary 1-hour standard. For several other NAAQS, such as the NO2 annual standard, compliance is based on more immediate measurements rather than on 3-year averages.

The MWH permit allows operational limits to be met as a 3-year rolling average (see permit conditions 3.3.1, 3.3.2). These limits track compliance with the NAAQS for those pollutants for which compliance is determined via a 3-year average. For those NAAQS for which compliance is not based on a 3-year average, to ensure that the maximum emissions that could occur during the 3-year averaging period would be taken into consideration, Microsoft provided a worst-case scenario where 3-years' worth of emissions were assumed to be emitted in just one year. This analysis demonstrated that under the 3-year average operational limits in the permit, the Microsoft MWH project would comply with the NAAQS.

Comment #65:
Microsoft's modeling of 37 engines running for 1 hour is not long enough to demonstrate compliance with the NO2 ASIL of 470 ug/m3. A longer emission time may result in more NOx being converted to NO2 and should be modeled to rule this out.

Ecology Response to Comment #65:
To identify when and where maximum impacts could occur, NOx emissions were modeled for 43,800 hours (5 years), not 1 hour. This way the constant emissions were paired with all combinations of meteorological data.

AERMOD is a steady-state model which assumes that a plume disperses in the horizontal and vertical directions resulting in Gaussian concentration distributions. It does not track the contribution or carryover of plumes from previous hours. Consequently, each hour a plume is dispersed in the direction of that hour's meteorology in a straight-line trajectory. The PVMRM option accounts for the oxidation of NO to NO2 within that hour. Even if in reality more NO would be converted to NO2 in the next hour, bear in mind that the plume is also diluted as it interacts with the winds.

Comment #66:
Microsoft wants to report "actual loads and runtime" to calculate emissions. Calculating emissions is not proof of compliance. We need and deserve an air quality monitor. Certainly the state has profited from the data centers and can afford to put some of that money to work in our community.

Ecology Response to Comment #66:
Please see the Response to Comment #10. Ecology is planning to begin monitoring in Quincy in 2017.

Comment #67:
The approval order must make all recordkeeping reports available to the public. No more keeping the records electronically onsite so that the public cannot have the records. We cannot prove compliance without the records, nor can we hold the agency accountable for assuring compliance without the records. Please insert language into the permit making all records available upon request.

Ecology Response to Comment #67:
The general language in item Condition 8. RECORDKEEPING, states that all records required to be kept under the provisions of this Order shall be provided within 30 days to Ecology upon request.

Comment #68:
Does Microsoft have any other engines, such as for fire suppression, water, lights, etc., whose emissions were not included in the approval order?

Ecology Response to Comment #68:
Microsoft has indicated they do not. It should also be noted that equipment related to "fire suppression" is "exempt from new source review" under Washington Administrative Code (WAC) 173-400-110(4)(h)(xxix) miscellaneous emission unit and activity exemptions.

Comment #69:
Microsoft should be required to report every power outage, and all startups, regardless of how many engines are involved. Remove Microsoft's request to report NOx only if 30 engines or more run for a power outage. As I mentioned, the 1-hr NO2 standard will be violated when fewer than 30 engines run. Also, Microsoft should not be allowed to run for just "any" purpose as requested in the approval order.

Ecology Response to Comment #69:
This comment appears to be addressing Condition 8.6.5 of the approval order, which requires Microsoft to record the actual 1-hour NOx emission rates from the engines during each unplanned power outage that activates more than 30 engines in one hour. This condition applies in addition to Condition 8.5 of the permit, which requires Microsoft to report all power outages regardless of how many engines are involved. Condition 8.6.5 reflects the fact that 30 generators is "the number of generators that, if activated simultaneously at 100 percent load, could potentially cause the maximum 1-hour NO2 concentration at the facility boundary to approach ¾ of the ASIL." And the purpose for this specific issue regards keeping records of aggregate 1-hour NOx emissions.

Comment #70:
Why are *only* the emissions from the "main generators" included in the approval order?

Ecology Response to Comment #70:
The final permit will clarify in that Table 2.1 in approval order includes emissions from all engines.

Comment #71:
Emissions in Table 2.1 are "front-half" only emissions. What is the total amount of DPM - front and back half - that will be emitted under this approval order from all engines, including the "reserve engines"? What is the total amount of pollutants that will be emitted from all engines, including the "reserve engines"? Please list emissions from all engines and for all pollutants in Table 2.1.

Ecology Response to Comment #71:
The final permit will clarify in that Table 2.1 in approval order includes emissions from all engines. PM2.5 emissions shown in Table 2.1 consist of both front and back-half. Table 2.2. shows DEEP emissions which consist of front-half emissions only.

Note that risks estimated as part of the HIA considered both front and back half emissions to represent DEEP.

Comment #72:
Why aren't the emissions from all engines accounted for in the approval order? Since this is a federally enforceable permit, shouldn't the front and back half of the DPM be included for purposes of permitting under the CAA? Wouldn't both the front and back half have to be included on a Title V permit?

Ecology Response to Comment #72:
The final permit will clarify in that Table 2.1 in approval order includes emissions from all engines.

See Response to Comment #44 regarding DPM.

The proposed permit is not a Title V permit because the facility does not qualify as a Title V facility.
See Response to Comment #21 regarding Title V.

Comment #73:
What is the ground level ozone in Quincy? Why doesn't this approval order require demonstration of compliance with the O3 NAAQS?

Ecology Response to Comment #73:
See Response to Comment #27. Before issuing this approval order, Ecology did require demonstration of compliance with the O3 NAAQS. The O3 NAAQS is met through limits on emissions of NOx and VOCs.

Comment #74:
In Table 4 of the approval order, the PM and NMHC/VOC columns include reference to emissions at 50% twice. One of the emission rates under each of these should be 100%. Please double check the allowable emission rates in these columns to assure accuracy.

Ecology Response to Comment #74:
Ecology is not sure what the commenter is referring to here. Table 4 of the preliminary determination does provide emissions limits for this proposed project, but there is no reference "50%". The emissions limits listed are appropriate.

Comment #75:
What effect, if any, does the heat island affect have on the air quality modeling in Quincy? Has the increased temperature from the data centers been factored in to any air modeling?

Ecology Response to Comment #75:
The urban heat island typically serves to enhance dispersion by increasing the mixing height, thereby reducing pollutant concentrations. To remain conservative in our analyses, we did not account for this.

Comment #76:
Has the condensable portion of PM2.5 been considered in modeling compliance with PM10 NAAQS?

Ecology Response to Comment #76:
The condensable portion of PM2.5 was considered in modeling compliance with the PM10 NAAQS by assuming 100% of post-catalyst hydrocarbons would convert to particulate during normal operations. During cold starts the amount of hydrocarbons emitted was assumed to be double the amount of hydrocarbons emitted during normal operations, and again, 100% of these emissions were assumed to condense into PM 2.5. The modeling with these assumptions over-estimates emissions, as condensable emissions do not quantitatively convert to filterable particles. Modeling secondary PM2.5 by considering (S)VOC precursors would yield lower concentrations.

Comment No. 77: Received from Beth & Charlie Miracle on 12/02/2016

Comment #77:
Please do not approve the permit for eight additional reserve backup diesel generators. The information states that "they will only be used if *one* of the original backup engines fails." If one engine were to fail, why would it take eight backup engines to take its place? One engine fails – backup with one engine, not eight.

Diesel engine exhaust *does* contain fine particles that can cause health problems for people who are exposed frequently and high enough levels. DOE may evaluate the levels of all these pollutants during the permit review process, but they are not permanently monitoring the actual air quality with tests due to funding issues. It will be of no help when it is discovered in the near future that oops . . . maybe it was worse than we expected and our models were off. Maybe we shouldn't have permitted so many diesel generators.

The numbers of diesel generators at the data centers in Quincy have gotten far too high. One of the biggest problems would be that if the power were to actually go off and the data centers had to start up the diesel generators that they would all be running at the same time. And they don't just sit there not running. It is my understanding that the data centers have to run them to make sure they are working. There are so many now that if only one is started per day that there will be one started every day for approximately 2/3 of the year. And nowhere is there any information about noise pollution.

In this age of global warming, I cannot believe that we are still relying on outdated technology and allowing companies to install dirty diesel generators, especially when there are other viable alternatives. On Microsoft's website, there is information about Microsoft's commitment to renewable energy and greener datacenters. In fact, in their latest energy deal, their Cheyenne datacenter will now be powered entirely by wind energy. Their backup generators are NOT like traditional backup generators that run on diesel fuel. They are natural gas turbines. They can integrate wind and solar.

So now it's up to the DOE to actually do something about it to require a cleaner alternative for backup. Let's not continue to add to global warming but do something now while we still have a chance. But unfortunately, if it's like all the other diesel generator permits, DOE will do nothing and ignore the public's concerns/comments and go ahead and allow the permits for additional diesel generators. How and when will DOE finally come to the realization that they need to change the permitting process? DOE should at the very least build in fees that would fund permanent air quality testing.

Ecology Response to Comment #77:
Ecology cannot dictate equipment or methods of operations to a source. That is, Ecology cannot direct MWH to run only one reserve engine at any one time. Ecology is required to review the proposed project. If Ecology determines that the project will be in compliance with all applicable air pollution control requirements, Ecology is required to approve the project.

Each of the eight reserve engines is designed to back up one of the 8 different buildings/generator sets at the site. Reserve engines will be operated at greater than 30% load during an outage so they can readily be placed into full service in the event of a primary engine problem.

See Response to Comment #10 regarding Ecology's plans for ambient monitoring plans.

Ecology has no authority to address noise issues associated with the operations of this facility. However, this project was also reviewed through the State Environmental Policy Act (SEPA), RCW 43.21 C, as implemented through WAC 197-11. The City of Quincy was the lead agency for SEPA and issued a Determination of Non-significance in January 2014. Noise was addressed in SEPA checklist that was reviewed for that determination:

b. Noise

1. What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

   Traffic noise from nearby roads, railroads, agricultural uses and other adjacent industrial businesses should not affect the proposed development.

2. What types and level of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

   Daytime construction noise will be created during the construction phases of the project. Long term noise from employee, security, and delivery vehicles and freight unloading at variable hours. Long term noise from the periodic testing and operation of emergency standby generators. Noise from the continuous operation of HVAC equipment. Noise mitigation measures are to be implemented to account for noise generation features of the proposed use so as to comply with applicable local and state codes.

3. Proposed measures to reduce or control noise impacts, if any:

   See Section 7.b.2 above.

Appendix A:
Public Notices and Outreach Materials

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From: Beeler, Brook (ECY)
Subject: ECOLOGY NEWS: Updating the air permit for Microsoft data center in Quincy
Date: Thursday, October 06, 2016 10:16:27 AM

Washington Department of Ecology – *NEWS*
Oct. 6, 2016

Contacts:
Brook Beeler, communications, 509-329-3478, @ecyspokane

Updating the air permit for Microsoft data center in Quincy

State seeking review and comments on changes for facility

QUINCY – Microsoft Corporation is proposing to add eight backup generators at its MWH data center (formerly the Oxford data center) in Quincy. The additional generators require an updated air quality permit from the Washington Department of Ecology to ensure that people and the environment are protected.

Data centers house servers that store digital data, handle email, manage instant messages and run applications for computers. Microsoft uses backup generators powered by diesel engines to keep the servers functioning in case of power outages.

Diesel engine exhaust contains fine particles that can cause health problems for people who are exposed frequently and at high enough levels.

Ecology approved an air permit for 37 diesel generators at the facility in August 2014. Microsoft requested a revision to the permit in 2015, but it wasn't finalized because the company identified additional changes that needed to be included. The company requested a new revision in April 2016.

In addition to the eight reserve generators, the updated permit reflects changes to the height and diameter of the engine exhaust stacks to match the actual dimensions that were built. The new generators will be placed in reserve and only be used if one of the original engines fails.

These changes will result in increases of some types of pollution and decreases of others compared to the previous permit. Ecology required Microsoft to conduct a health impact assessment to evaluate the potential health risks from the increased emissions. That assessment found that the data center will meet criteria intended to protect people and the environment if operated according to the permit.

Submit comments
Comments and questions on the draft permit should be emailed or mailed to Kari Johnson, Department of Ecology, Air Quality Program, 4601 N. Monroe St., Spokane, WA. 99205. Comments will be accepted from Oct. 6 through Nov. 4.

Review the revised permit

- Ecology's website

- Ecology’s Eastern Regional Office, 4601 N. Monroe St., Spokane.
- Quincy City Hall, 115 1st Ave. S.W., Quincy.
- Quincy Library, 208 Central Ave S., Quincy.

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THE QUINCY VALLEY Post-Register

Public Notices

CITY OF QUINCY
NOTICE OF APPLICATION

Name of Applicant: Yahoo! Inc.

Application Number: SP/BLA 091916-44109
Date of Application: September 19, 2016
Date Letter of Completeness Issued: September 30, 2016
Date Notice of Application Issued: October 6, 2016

Description of Proposal and Project Permits: An application for a Short Plat and Boundary Line Adjustment for Parcel Number 312823000, Lot 2 LS N260' of E526' of W571' Port District Industrial Park No. 4 SP. Section 9, Township 20 North, Range 24 East, W.M., Quincy, Washington.

Requested Approvals, Actions and/or Required Studies: This application requires approval of deferred agreement by the City of Quincy for public improvements and review by outside agencies.

Other Permits Not Included, To the Extent Known: Unknown.

Existing Environmental Documents and Where They Can Be Reviewed: None required Statement of Public Comment Period: The fifteen (15) day comment period commences on October 6, 2016 and lasts through October 21, 2016. Any interested person/party has the right to comment on the proposal, receive notice of and participate in any hearings, request a copy of the decision once it is made, and may appeal the decision subject to the requirements of Title 17.

Statement of Preliminary Determination: The development regulations that will be used for project mitigation and to provide consistency with the type of land use for the proposed site are outlined in the Quincy Comprehensive Plan, Title 19 Subdivision Code, Title 12 Street and Sidewalks, Title 17 Development Code and Title 20 Zoning.

Threshold Determination: No Environmental review is necessary for this application.

Notice of Public Hearing: None required

Statement of Decision Time Line: A decision on this application will be made within 120 days of the letter of completeness, pursuant to RCW 36.70B and Title 17.

City Contact Person: For further information about this project, please contact Carl Worley, PO Box 338, 104 B Street, WA 98848, or by calling 787-3523.

Published in the Quincy Valley Post-Register on October 6, 2016.

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY
NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS

TAKE NOTICE:
That Familigia Water District, LLC of Quincy, WA on June 23, 2016 under Application No. G3-30765, filed for permit to appropriate public waters, subject to existing rights, from one (1) well in the amount of 750 gallons per minute each year, for continuous municipal supply. This request is for additional gallons per minute (Qi) only. No additional acre-feet are being requested. The source of the proposed appropriation is an existing well located within the SW¼NW¼ of Section 31, Township 19 N., Range 31 E.W.M., in Grant County.

Protests or objections to approval of this application must include a detailed statement of the basis for objections; protests must be accompanied by a fifty-($50.00) dollar recording fee and filed with the Department of Ecology, at the address shown below, within thirty (30) days from October 6, 2016.

State of Washington
Department of Ecology
WATER RESOURCES PROGRAM - ERO
PO BOX 47611
OLYMPIA, WA 98504-7611

Published in the Quincy Valley Post-Register on September 29 and October 6, 2016

NOTICE OF PUBLIC HEARING
WORKSHOP FOR 2017
PRELIMINARY BUDGET
GRANT COUNTY FIRE DISTRICT #3

NOTICE IS HEREBY GIVEN, that a Public Hearing will be held on the Grant Count Fire District #3 Preliminary Budget for Fiscal year 2017. Said budget has been prepared, placed on file and is available to the public Thursday, October 13, 2016- at GGFD#3 - Main Station - 1201 Central Avenue S., Quincy, Washington. The 2017 Preliminary Budget will be available at no charge.

Public hearing on the 2017 Preliminary Budget will be held on Thursday, Ovtover 13, 2016 at 9:30 a.m. at the GCFD#3 Main station, 1201 Central Avenue S., Quincy, Washington. All interested persons are invited to attend said Public Hearing.

Final Hearing on the proposed budget will be held at the Regular Commissioners Meeting on Wednesday, November 09, 2016 at 7:00 p.m. at the GCFD#3 Main Station.

Carmen Cordova-Weber
District Secretary

Published in the Quincy Valley Post-Register on September 29, 2016 and October 6, 2016.

PUBLIC NOTICES CONTINUED ON PAGE 18

Help Wanted

FOOD SERVICE PREP AND CASHIER POSITIONS. Monday - Friday, 8 -1 p.m. Call 787-0252.

YARD WORK HELPER needed. Must have your own transportation and be able to follow instructions. For more information call 750-8106.
rts

TRUCK DRIVERS WANTED for apple harvest. $19/hr. CDL with doubles endorsement and good driving record required. Call 509-787-5953.
9/29-10/21

WANTED IMMEDIATELY: Someone not afraid of yard work and other misc around outside of property. I will help the hired hand as well. Part-time as needed. Must have own transportation and be reliable. Great afternoon work opportunity for the right individual. $12 / hr to start. Call 509-398-5930.

CAREGIVER NEEDED – Immediate opening for a night shift caregiver. Shift hours are 11 p.m. – 7 a.m. Must be Nursing Assistant Certified or Home Care Aide Certified or willing to obtain within six months of employment. Duties include assisting senior citizens with activities of daily living; janitorial tasks; baking and simple food prep. Must be computer literate, have good writing and communication skills. Reliability and compassion are essential to this position. Shifts include weekends and holidays. Background check required. Apply at The Cambridge, 301 H St. S.W., Quincy.
9/29-10/3

PLANT GENERAL LABORERS, No experience necessary - We will train. National Frozen Foods Corporation in Quincy, WA is currently seeking plant general laborers to work various positions. No prior experience necessary but must meet following qualifications:
Must be able to communicate in English. Must be 18 or over and willing to work any shift. Ability to pass a pre-employment drug screen.
Wage: $11.23 per hr.
Apply at National Frozen Foods Corp., 10504 Hwy 28W, Quincy, WA.
EOE AA M/F/Vet/Disability
9/29-10/6

TRUCK DRIVERS WANTED: Semi and 10-wheeler drivers needed for potato harvest. Must have experience. Pay is $12/hour with end-of-season bonus incentives. Free full hook-ups; RV sites available. Call 509-787-4578 for more information.
9/1-9/29

Miscellaneous

DID YOU KNOW?
The cost is exactly the same no matter where you go to buy your license plate tabs now!! The only difference is this? when you mail them in or go to the courthouse to purchase them, the extra fees you pay go to the ferry systems. If you come into our office to purchase them, the extra fees stay local and help support our business! You also have the option now to purchase your tabs online and select our office and we will mail them to you! Call us with questions! 509-787-3585.Thank you for your support, Petersen Vehicle Licensing, located at 21 D St SW in Quincy!
9/22-10/13

Public Notices

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY

NOTICE OF APPLICATION TO CONSTRUCT AN AIR POLLUTION SOURCE

The State of Washington Department of Ecology (Ecology) received an application to revise a Notice of Construction (NOC) Approval Order for an existing air pollution source in Quincy, WA. The Microsoft Corporation located at One Microsoft Way in Redmond, WA 98052, requests a revision of their existing permit, Approval Order 14AQ-E537 issued on August 15, 2014. On April 8, 2016, Ecology received an NOC from Microsoft requesting revisions and changing the facility name from Microsoft Oxford to MWH Data Center (or MWH). The revised permit is to cover operation of existing and new emissions units. The primary air contaminant sources at the facility consist of 37 previously approved electric backup generators powered by diesel engines to provide emergency backup power to the facility. Eight new engines are being requested to serve as reserve to the primary backup generators. MWH is located at 1515 Port Industrial Parkway in Quincy, WA, Grant County. The application was considered complete on September 20, 2016.

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* Online at www.ecy.wa.gov/programs/air/quincydatacenter

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* Quincy City Hall, 115 1st Ave SW, Quincy, WA 98848

* Quincy Library, 208 Central Ave S, Quincy, WA, 98848

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To request ADA accommodation, call 360-407-6800, 711 (relay service), or 877-833-6341 (TTY).

Para asistencia en español: 509-329-3506 o preguntas@ecy.wa.gov.

Published in the Quincy Valley Post-Register on November 3, 2016.

PORT OF QUINCY
NOTICE OF PUBLIC MEETING
WASTE MANAGEMENT USE OF INTERMODAL RAIL TERMINAL

The Port of Quincy has received a letter of interest from Waste Management to use the Port's intermodal rail terminal. Waste Management made a presentation to the Board of Commissioners at its September 13 meeting. Since that time, Port staff has continued to meet with company representatives to better understand the proposal.

The Port will hold a public meeting on November 9, for the public to learn more about the proposal and to take public questions and comments.

Intermodal sites are common across the country and allow for materials such as solid waste to be transported in intermodal containers that completely contain the contents. Intermodal containers would travel by rail to the Port of Quincy rail terminal, where whole containers would be lifted from the rail onto trucks for delivery to the Greater Wenatchee Regional Landfill.

The intermodal containers would transport municipal solid waste (household garbage). No waste would be unloaded or processed on the Port property. No hazardous waste would be transported in the containers.

The public meeting will be at the Port of Quincy Conference Center, 115 F Street SW, Quincy. Waste Management will also have examples of intermodal containers in the parking lot of the conference center.

4 p.m. - Informational Open House at Conference Center. Waste Mangement and BNSF.

5 p.m. - Port Commission Meeting

-Proposal Presentation and Information
-Questions / Comments by Commission
-Public Questions and Comments

Published in the Quincy Valley Post-Register on November 3, 2016.

NOTICE OF PUBLIC HEARING

Notice is hereby given that the Preliminary Budget for the fiscal year 2017 has been prepared and placed on file at the office of Grant County Port District No. 1, commonly known as the Quincy Port District, and that a copy thereof may be obtained by any taxpayer at the Quincy Port District, 101 F Street SW, Quincy, Washington.

Notice is further given that the Commissioners of said Port District will meet at the Port Office on November 9, 2016 at the hour of 5:00 p.m. to hold a public hearing for the purpose of fixing and auditing the final budget of Grant County Port District No. 1 for the ensuing fiscal year.

PORT DISTRICT NO. 1 OF GRANT COUNTY, WASHINGTON
CURT A. MORRIS, CHAIRMAN
BOARD OF COMMISSIONERS

Published in the Quincy Valley Post-Register on October 27 and November 3, 2016.

NOTICE OF HEARING
2017 BUDGET

NOTICE IS HEREBY GIVEN, the City of George will hold a public hearing on November 15, 2016 at 7:30 pm, at George City Hall, 102 Richmond Avenue. Purpose of said public hearing will be to review revenue sources for the 2017 budget year and to consider the proposed property tax levy and the possible increase in property tax revenues. Final hearing on the 2017 Budget will be held on November 15, 2016.

Interested persons are invited to attend. The City Council may make a final decision to close the public hearing or continue the public hearing to a specific date for further consideration. The 2017 Preliminary Budget will be on file, at no charge, at City Hall, 102 Richmond Avenue, on November 15, 2016.

Martina M. Evenson
Clerk-Treasurer

Published in the Quincy Valley Post-Register on October 27 and November 3, 2016.

Help Wanted

POLICE DEPARTMENT
ANIMAL SHELTER PART TIME ASSISTANT

The City of Quincy is accepting applications for a Police Department Animal Shelter Assistant. This is a part-time non-union position and reports to the Animal Shelter Manager and indirectly to the Chief of Police. The Animal Shelter Assistant performs field and office work to administer the City's animal shelter to include animal licensing program, adoption program, shelter cleaning and animal feeding. Assist with the community education regarding the importance of licensing and responsible pet ownership. Work with staff and volunteer personnel. Minimum qualifications are a High School Diploma and a valid Washington State Driver's License. This is a part time position pays $12 per hour and is limited to 60 hours per month. To obtain an application and job description, contact the City Clerk's office at (509) 787-3523 or visit our website at www.quincywashington.us. Applications must be received by 5:00 PM Thursday, November 10, 2016. You can mail your application to City of Quincy, PO Box 338, Quincy, WA 98848 or you may drop it off during our business hours Monday-Friday 9:00 am-5:00 pm at 115 1st Ave SW, Quincy, WA 98848. The City of Quincy is an equal opportunity employer.

Help Wanted

NOW HIRING FOR 2 SHIFTS: 11-3 shift and 3-7 shift. No phone calls please. Apply in person at Harrington's Drive-In, Quincy.
10/27-11/3

SEEKING PRIVATE home-care helper. Light duty. Elderly gentleman. Monday - Thursday mornings. Call 509-499-8332
11/3

LOOKING FOR A DRIVER with reliable transportation to drive me to Quincy, Ephrata or Moses Lake once/week for shopping, etc. Call 509-881-8172. Please don't leave a message, keep trying.
11/3

LUNCH TIME SERVER needed Tuesday - Friday. Apply at Idle Hour Eatery & Spirits, 18 B St. S.W. No phone calls please.
11/3rts

Services

COLUMBIA BASIN WINDOW CLEANING SERVICE. Water spot removal available. We don't cut corners. We clean them. Free quotes. Call 509-237-3010.
9/15rts

NOTICE TO CONTRACTORS: Washington state law (RCW 18.27.100) requires that all advertisements for construction-related services include the contractor's current Department of Labor and Industries registration number in the advertisement. Failure to obtain a certificate of registration from L&I or show the registration number in all advertising will result in a fine of up to $5,000 against the unregistered contractor. For more information, call Labor and Industries Specialty Compliance Services Division at 1-800-647-0982 or check L&I's Internet site at www.wa.gov/lni.
rtsbx

HOUSE CLEANING SERVICES! Deep or light cleaning. Weekly, bi-monthly, etc. Cleaning products supplied. References avail. and satisfaction guaranteed. I have space for 2 more clients. Call Beth at 509-499-8332.
11/3

Statewides

EVENTS-FESTIVALS PROMOTE YOUR REGIONAL EVENT for only pennies. Reach 2.7 million readers in newspapers statewide for $275 classified or $1,350 display ad. Call this newspaper or (360) 515-0974 for details.

MISC.
SAWMILLS from only $4397.00- MAKE & SAVE MONEY with your own bandmill-Cut lumber any dimension. In stock ready to ship! FREE info/DVD: www.NorwoodSawmills.com 1-800-578-1363 Ext. 300N.

BACK TO LEGALS

LEGALS OCTOBER 6, 2016

October 06, 2016 at 10:00 am |

SUPERIOR COURT, STATE OF WASHINGTON, COUNTY OF GRANT In the Matter of the Estate of: | | NO. 16-4-00108-8 MARIE GLASS, | | NOTICE TO CREDITORS deceased. | The Personal Representative named below has been appointed as Personal Representative of this estate. Persons having a claim against the deceased must, before the time the claim would be barred by any otherwise applicable statute of limitations, present the claim in the manner as provided in RCW 11.40.070 by serving on or mailing to the Personal Representative or the Personal Representative's attorney at the address stated below, a copy of the claim and filing the original of the claim with the Court in which the probate proceedings were commenced. The claim must be presented within the later of: (1) thirty days after the Personal Representative served or mailed the notice to the creditor as provided under RCW 11.40.020(1)(c); or (2) four months after the date

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• Property Management
TOMLINSON RANCH & HOME
CBMosesLake.com • 509.766.0300
1000 Pioneer Way • Moses Lake, WA

SHARE NOW

READ MORE LEGALS

LEGALS JANUARY 31, 2017
January 31, 2017 at 5:00 am | Ordinance No.

LEGALS JANUARY 30, 2017
January 30, 2017 at 5:00 am | Notice of

BACK TO LEGALS

LEGALS NOVEMBER 4, 2016

November 04, 2016 at 5:00 am |

Superior Court of Washington, County of Grant In re Marriage of: | | JACQUELINE LEON VILLAFANA, | No. 16-3-00503-9 Petitioner, | | Summons Served by Publication | (SMPB) and | | ANTOLIN L. OLIVERA, | Respondent. | _ Summons Served by Publication To: ANTOLIN L. OLIVERA - The other party has asked the court to: End your marriage or domestic partnership. Order the division of property and debts. Approve or change a Parenting Plan or Residential Schedule. Approve or change a Child Support Order. Change the name/s of the: Petitioner You must respond in writing if you want the court to consider your side. Deadline! Your Response must be filed and served within 60 days of the date this summons is published. If you do not file and serve your Response or a Notice of Appearance by the deadline: No one has to notify you about other

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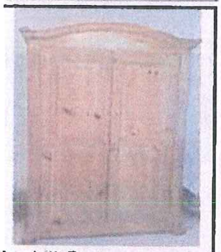
0100 Furniture / Appliances



Broyhill Fontana armoire. Asking $850/offer. 679-2622

Broyhill Lighted China Cabinet Beautiful Cherry $650 Price reduced. Offers (509) 476-3145

VACANCIES HURT! We can help fill that empty house, apartment, or condo quickly. 661-1111.

0100 Furniture / Appliances

Children's table set. 2 chairs 1 rocker. $150.00. Nice heavier solid wood. Cash. (509)884-7087

Corner computer desk, $40. Several office chairs, $25 ea. Rocker recliner, $45. Call (509)664-1009

TV LCD wall mount, 17.5" Sylvania, $135. New, still in box, beautiful set of dishes. Different colors: 4 bowls, 4 mugs, 4 desert plates, 4 big plates, $77 (509)264-8880

0100 Furniture / Appliances

Eat Healthy. Extraordinary Smoked Amber Vision® Corningware with Pyrex® Glass lids. Works on range top, oven, broiler. Metal free and non-porous. Glass ceramic. Won't react with acid based food. 14 pieces. $135. (509)264-8880

French Louis Style Curio Display China Cabinet $599 Beautiful!!!! Offers (509) 476-3145

Go to: wenatcheeworld.com

0100 Furniture / Appliances

Hall Tree – Mirror– Large $199 Price reduced Offers (509) 476-3145

Haviland china. Theodore Haviland New York. Delaware pattern. Service for 12. Worth $1500, asking $950. Please see photos online. Please call (509)782-3989

Kenmore 20 cu ft. upright freezer, $150. 19 cu ft. Frigidaire frost free refrigerator/freezer, $150. 19 cu. ft. GE refrigerator/freezer, $150. All in supreme working condition and very clean. (509)470-6725

If you don't use it any more, sell it fast in World classified. 661-1111.

0100 Furniture / Appliances

Large oak entertainment center. Good condition. Asking $50. Please call (509)884-1679 or (509)860-3150.

Laz-y-Boy recliner, chair and a half for big body. Beige fabric. Like new. Paid $1200, asking $550 Flexsteel leather recliner, burgundy, like new, this is a great chair, paid $1300, asking $700. Buyers haul. (509)885-2429

Lots of slightly used furniture, 4 occasional chairs, BBQ, several lamps, marble hall tree, antique sewing table, (509)782-2197

Thomasville pecan dining room table. Old but in excellent condition. Come with 2 leaves, pads, 6 chairs, - needs recovering, $450. Can be seen at 25770 Highway 97, Brewster. Virginia Madden (509)670-8241

MRS. C. said, "wow! The car sold before the ad ended!"

0100 Furniture / Appliances

Nice childs table and 2 chairs. In excellent condition. Asking $200. Call (509)663-3586

Oak Hall Bench - 7' x 3'2", beveled mirror 3'11" x 2'5". Excellent condition. Approx. 70 years old. $1,200. Call 509-662-3187.

GOT a good website? Include the URL in your ad.

LEGALS

STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUESTED BY THE ACT OF CONGRESS OF AUGUST 12, 1970, Section 3685, Title 39, United States Code.

If The Wenatchee World, Publication #674-340 published ues-Fri and Sunday (expect Christmas) at Wenatchee, Washington for September 29, 2016
Mailing Address P.O. Box 1511
Wenatchee, WA 98807-1511

. The names and addresses of the publisher and editor re:
Publisher, Rufus Woods-P.O. Box 1511, Wenatchee, WA, 8807
Editor, Cal Fitzimmons-P.O. Box 1511, Wenatchee, WA, 8807

. The owners:
World Publishing Co.-14 N. Mission Street, Wenatchee WA, 8801
Gretchen Woods- 1125 Wedgewood, Wenatchee, WA, 8801
Rufus Woods- 104 S. Delaware, Wenatchee, WA, 8801
Barbara Woods-14 N. Mission Street, Wenatchee, WA, 8801
Carolyn Oilikainen-14 N. Mission Street, Wenatchee, WA, 8801
Sara Hunnicut-14 N. Mission Street, Wenatchee, WA, 8801
Wendy Manhart-14 N. Mission Street, Wenatchee, WA, 8801

. The known bondholders, mortages, and other security olders owning or holding 1 percent or more of total amount f bonds, mortgages, or other securities are: None

. Tax status- The purpose, function, and nonprofit status of his organization and the exempt status for federal income ax purposes: Has not changed during preceding 12 months

	Average No. Copies Each Issue During Preceding 12 months	Actual No. Copies of Single Issue Published Nearest to filing date
Total Number of Copies	13,070	16,570

ADVERTISEMENT FOR BID NO. 16-60
Rock Island B1-B4 Generating Unit Modernization

Sealed bids will be received by Public Utility District No. 1 of Chelan County, Washington, at the office of the District, Attention: Christi VanWagner, Procurement and Contract Services, 327B North Wenatchee Avenue, Wenatchee, Washington, 98801, until 1:30 pm, Pacific Time, Thursday, December 8, 2016, for supplying all labor, materials, tools, equipment, facilities, and all other appliances and supplies as specified, and performing all work required in accordance with the Contract Documents.

The Contract Documents, in whole or in part, may be available in read-only format at http://www.chelanpud.org/cf/PCS_Bids. Prospective Bidders may obtain Contract Documents in electronic format from the Procurement and Contract Services Department. Requests are accepted online at http://www.chelanpud.org/cf/PCS_Bids, or in writing to P.O. Box 1231, Wenatchee, WA 98807, or by telephone at (509) 661-4479 or (888) 663-8121, extension 4479, or may be viewed in person at 327B N. Wenatchee Avenue, Wenatchee, Washington. The District makes every effort to insure the completeness of the electronic file. If there are any questions, please contact the Procurement and Contract Services department at the number stated above.

A mandatory pre-bid meeting and site visit with unit inspection will be conducted at the project site starting at 9:00 a.m. on October 19, 2016 and continuing through October 20, 2016 at 4:00 p.m. For security purposes, on-line registration for the pre-bid meeting and site visit is required. To register, select the hyperlink below and complete and submit the form. All attendees must register on-line by 4:00 p.m. October 17, 2016. All attendees intending to participate in a tour of the project or investigations of the project will be required to participate in a site safety orientation, which will be conducted during the pre-bid meeting and site visit. Attendees planning to attend unit inspection shall bring and wear proper PPE that includes hard hat, safety glasses and sturdy all leather footwear (hard toes are not required). IMPORTANT: Any contractor/vendor business not pre-registered for the pre-bid meeting will be denied access to the hydroelectric project. Valid photo identification should be carried for potential verification with meeting registration list. Registration and

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DEPARTMENT OF ECOLOGY State of Washington http://www.ecy.wa.gov

Public Involvement Calendar

Public Involvement Calendar

The Public Involvement Calendar is designed to engage the public in our **decision-making process**. We encourage you to read Frequently Asked Questions about Effective Public Commenting.

Activities that are educational only or are co-sponsored by Ecology may be found under the "More Ecology Events" link in the left column of this page. We invite your **feedback** about this Public Involvement Calendar.

Public Hearings, Meetings, Workshops, Open Houses

(Next 21 days. Use the search feature (right) for events beyond 21 days.)

Oct 27 2016 1:00PM **Public Workshop Followed by Public Hearing - Lacey**
--------------- 4:00PM **Aquatic Noxious Weed Control General Permit Workshop & Public Hearing**

Ecology is holding this workshop to explain the general permit and answer questions prior to the formal public hearing. The hearing provides an opportunity for people to give formal oral testimony and comments on the proposed draft permit. Written comments will receive the same consideration as oral testimony. The public workshop will begin at 1:00 pm on October 27, 2016. The public hearing will begin immediately following the workshop and will conclude when public testimony is complete.

More Information: More Information
Location: Dept of Ecology HQ/Southwest Regional Office
ROA-32
300 Desmond Drive SE
Lacey , WA
Sponsor: Ecology
ECY HQ
Contact: Nathan Lubliner
(360) 407-6563 / Nathan.Lubliner@ecy.wa.gov

Public Comment Period - Sep 21 2016 - Nov 4 2016

Oct 12 2016 6:00PM **Public Hearing - Longview**
------------------------- **Longview Nippon Dynawave, North Pacific Paper Corporation (NORPAC) and Weyerhaeuser Lumber Mill Air Operating Permits**

The Dept of Ecology invites you to comment on the Air Operating Permits for Nippon Dynawave, NORPAC and the Weyerhaeuser Lumber Mill in Longview. All requirements for these permits are currently in one Weyerhaeuser Longview permit. With the sale of pulp and paper operations, this now needs to split into three separate permits. For more information, visit the Longview Library, Ecology's Lacey office or the following webpage.

More Information: More Information
Location: Cowlitz County PUD
Auditorium
961 12th Ave
Longview , WA
Sponsor: Ecology
ECY HQ
Contact: Shingo Yamazaki
(360) 407-7563 / shingo.yamazaki@ecy.wa.gov

Public Comment Period - Sep 9 2016 - Oct 13 2016

Nov 1 2016 1:00PM **Public Hearing - Lacey**
------------------------- **Including EFSEC's Air Quality Rule Chapter 463-78 WAC in Washington's State Implementation Plan (SIP)**

Ecology offers an opportunity to comment and request a public hearing on including EFSEC's revised Chapter 463-78 WAC General and Operating Permit Regulations for Air Pollution Sources in the Washington air quality plan, SIP. This rule applies to certain types of energy facilities under EFSEC's jurisdiction. No changes to existing state or local rules are being proposed.

More Information: More Information
Location: Dept of Ecology HQ/Southwest Regional Office

300 Desmond Drive SE
Lacey , WA
Sponsor: Ecology
ECY HQ
Contact: Debebe Dererie
(360) 407-7558 / derd461@ecy.wa.gov

Public Comment Period - Sep 22 2016 - Nov 8 2016

Search Calendar

This search feature accesses only **decision-making events.**

Search

Select date range:
Today & Next 21 Days

Select city....
All Cities

....or county:
All Counties

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All Types

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401
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Aquifer

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Search

Search Help

Printed screenshot on 10/6/2016

Location:

Prosser , WA
Sponsor: Ecology
ECY CRO
Contact: Cindy Huwe
(509) 457-7105 / Cindy.Huwe@ecy.wa.gov

Oct 06 2016 Public Comment Period - Quincy
Nov 04 2016 Microsoft MWH Data Center (formerly Microsoft Oxford) Air Quality Permit Revision

Microsoft requests revisions to its air permit to include operation of existing and new emissions units. The primary air contaminant sources at the facility consist of 37 previously-approved electric backup generators powered by diesel engines that provide emergency power to the facility. 8 new engines are being requested as reserves to the primary backup generators.

More Information: More Information
Location:

Quincy , WA
Sponsor: Ecology
ECY ERO
Contact: Kari Johnson
(509) 329-3502 / kajo461@ecy.wa.gov

Oct 06 2016 Public Comment Period - Othello
Oct 21 2016 Alforex Seeds - Opportunity to Request a Public Comment Period for a Notice of Construction Application

Alforex Seeds requests approval to modify three conditioning lines and replace equipment associated with its secondary processing phase at the Alforex Othello facility. They are also requesting an increase of annual seed processing throughput (the amount passing through the system) from 97.2 million pounds per year to 181.3 million pounds per year. A public comment period on a draft air permit will be held only if Ecology receives a written request by October 21, 2016.

More Information: More Information
Location:

Othello , WA
Sponsor: Ecology
ECY ERO
Contact: Kari Johnson
(509) 329-3502 / kajo461@ecy.wa.gov

Oct 07 2016 Public Comment Period - Moses Lake
Oct 21 2016 TK Holdings: Opportunity to Request a Public Comment Period for a Notice of Construction Application

TK Holdings requests approval to replace two existing propellant wafer presses with two tablet presses. The presses emit particles and will be controlled by a high-efficiency dust collector. A public comment period on a draft air permit will be held only if Ecology receives a written request by October 21, 2016.

More Information: More Information
Location:

Moses Lake , WA
Sponsor: Ecology
ECY ERO
Contact: Kari Johnson
(509) 329-3502 / kajo461@ecy.wa.gov

First 1 Last

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Printed screenshot on 10/6/2016

DEPARTMENT OF ECOLOGY State of Washington http://www.ecy.wa.gov

Public Involvement Calendar

Public Involvement Calendar

The Public Involvement Calendar is designed to engage the public in our **decision-making process**. We encourage you to read Frequently Asked Questions about Effective Public Commenting.

Activities that are educational only or are co-sponsored by Ecology may be found under the "More Ecology Events" link in the left column of this page. We invite your **feedback** about this Public Involvement Calendar.

Public Hearings, Meetings, Workshops, Open Houses

(Next 21 days. Use the search feature (right) for events beyond 21 days.)

Nov 22 2016 1:00PM Public Hearing - Lacey
--------------- 4:00PM Bridge & Ferry Terminal Washing General Permit Workshop & Public Hearing

The purpose of the workshop is to explain the general permit and to answer questions prior to the formal public hearing. The purpose of the hearing is to provide an opportunity for people to give formal oral testimony and comments on the proposed draft permit. Written comments will receive the same consideration as oral testimony. The public workshop will begin at 1:00 pm on November 22, 2016. The public hearing will begin immediately following the public workshop and will conclude after public testimony.

More Information: More Information
Location: Dept of Ecology HQ/Southwest Regional Office
ROA-34/36
300 Desmond Drive SE
Lacey , WA
Sponsor: Ecology
ECY HQ
Contact: Foroozan Labib
(360) 407-6439 / Foroozan.Labib@ecy.wa.gov

Sep 21 2016 Public Comment Period - Lacey
Nov 04 2016 Aquatic Noxious Weed Control General Permit Workshop & Public Hearing

Ecology is holding this workshop to explain the general permit and answer questions prior to the formal public hearing. The hearing provides an opportunity for people to give formal oral testimony and comments on the proposed draft permit. Written comments will receive the same consideration as oral testimony. The public workshop will begin at 1:00 pm on October 27, 2016. The public hearing will begin immediately following the workshop and will conclude when public testimony is complete.

More Information: More Information
Location:

Lacey , WA
Sponsor: Ecology
ECY HQ
Contact: Nathan Lubliner
(360) 407-6563 / Nathan.Lubliner@ecy.wa.gov

Public Workshop Followed by Public Hearing - Oct 27 2016 1:00PM

Sep 21 2016 Public Comment Period - Lacey
Dec 20 2016 Dangerous Waste Regulations Rulemaking Informational Webinar

Ecology proposes to amend the Dangerous Waste Regulations (Chapter 173-303 WAC). Join us for an informal informational webinar and Q&A session to learn more.

More Information: More Information
Location:

Lacey , WA
Sponsor: Ecology
ECY HQ
Contact: Robert Rieck
(360) 407-6751 / RORI461@ecy.wa.gov

Public Meeting/Webinar - Nov 2 2016 1:30PM

Sep 21 2016 Public Comment Period - Lacey
Dec 20 2016 Informal Public Comment Period for Dangerous Waste Regulations Rulemaking

Search Calendar

This search feature accesses only **decision-making events.**

Search

Select date range: Today & Next 21 Days

Select city.... All Cities

....or county: All Counties

Select event type: All Types

Select keyword: All Keywords, 401, Air, Aquifer

Enter Search Text:

Search

Search Help

Printed screenshot on 11/3/2016

ECY SWRO
Contact: Melinda Wilson
(360) 407-6280 / Melinda.Wilson@ecy.wa.gov

Oct 05 2016 **Public Comment Period - Prosser**
Nov 07 2016 **Tree Top, Inc. Prosser Facility - Draft State Permit**
Ecology is renewing the Tree Top, Inc. Prosser Facility state wastewater permit. This permit allows them to discharge pretreated process waste water to Benton County sprayfields and the city of Prosser publicly owned treatment works (POTW).
More Information: More Information
Location:

Prosser , WA
Sponsor: Ecology
ECY CRO
Contact: Cindy Huwe
(509) 457-7105 / Cindy.Huwe@ecy.wa.gov

Oct 06 2016 **Public Comment Period - Quincy**
Dec 02 2016 **PUBLIC COMMENT PERIOD EXTENDED: Microsoft MWH Data Center (formerly Microsoft Oxford) Air Quality Permit Revision**
Microsoft requests revisions to its air permit to include operation of existing and new emissions units. The primary air contaminant sources at the facility consist of 37 previously-approved electric backup generators powered by diesel engines that provide emergency power to the facility. 8 new engines are being requested as reserves to the primary backup generators.
More Information: More Information
Location:

Quincy , WA
Sponsor: Ecology
ECY ERO
Contact: Kari Johnson
(509) 329-3502 / kajo461@ecy.wa.gov

Oct 07 2016 **Public Comment Period - Deer Park**
Nov 07 2016 **City of Deer Park - Draft Modified State Wastewater Discharge Permit**
Ecology is issuing a permit modification to the City of Deer Park for its municipal wastewater treatment plant that discharges to ground. Draft documents can be viewed at:
More Information: More Information
Location:

Deer Park , WA
Sponsor: Ecology
ECY ERO
Contact: Shara-Li Joy
(509) 329-3455 / stra461@ecy.wa.gov

Oct 14 2016 **Public Comment Period - Everett**
Nov 14 2016 **Everett Shipyard**
Ecology invites you to review and comment on the draft Amendment to the Cleanup Action Plan, the draft Amendment to Consent Decree and the draft Public Participation Plan for the Everett Shipyard Site in Everett, WA.
More Information: More Information
Location:

Everett , WA
Sponsor: Ecology
ECY HQ
Contact: Hun Seak Park
(360) 407-7189 / hpar461@ecy.wa.gov

Oct 17 2016 **Public Comment Period - Seattle**
Nov 17 2016 **Ash Grove Cement Company - Draft NPDES Permit Modification**
Ecology is issuing a modification for the Ash Grove Cement Company federal waste permit.
More Information: More Information
Location:

Seattle , WA

Printed screenshot on 11/3/2016

Johnson, Kari D. (ECY)

From: Johnson, Kari D. (ECY) <KAJO461@ECY.WA.GOV>
Sent: Wednesday, October 05, 2016 9:37 AM
To: QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject: MWH (Microsoft Oxford) Data Center: Public Comment Period starts tomorrow
Attachments: MWH-Legal-Notice-10062016.pdf

Head's up, Quincy Interested Parties:

A new Public Comment Period will be starting tomorrow, October 6, for **MWH Data Center**. This is the permit revision for the Quincy data center formerly called **Microsoft Oxford**. Attached is the legal notice that will be published in area newspapers tomorrow. I will also follow up with you tomorrow with more information.

Happy October to you!

Kari

Kari Johnson, Community Outreach Specialist
kari.johnson@ecy.wa.gov | (509) 329-3502
Air Quality Program | Washington Department of Ecology, Eastern Region

---

DEPARTMENT OF ECOLOGY
State of Washington

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Johnson, Kari D. (ECY)

From:	Johnson, Kari D. (ECY)
Sent:	Thursday, October 06, 2016 4:11 PM
To:	QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject:	Microsoft MWH Data Center: Public Comment Period Open Now, Oct 6 - Nov 4
Attachments:	Microsoft_MWH_factsheet_10062016.pdf; ECOLOGY NEWS_ Updating the air permit for Microsoft data center in Quincy.pdf

Hello, Friends of Quincy.

Here's a few things for your Thursday...

Today begins the public comment period for the Microsoft MWH Data Center: MWH is the former Microsoft Oxford. You may recall that Ecology held a public comment period & hearing for Oxford's proposed permit revision in summer 2015. That permit was never finalized because Microsoft needed to make additional changes. Ecology did respond to public comments received from the 2015 Oxford comment period & hearing. However, since that permitting effort was never completed, the Response to Comments Report was never formally published. If you would like a copy of the draft report, please email me.

In April 2016, Microsoft submitted a new revision to the permit, which included the facility name change from Oxford to MWH. This permit revision is now up for public comment. The attached Fact Sheet and News Release provide more details about the project.

Project documents can be viewed at these locations:

- Online at www.ecy.wa.gov/programs/air/quincydatacenter *(Scroll down to Microsoft MWH)*
- Ecology Eastern Region, 4601 N Monroe, Spokane, WA 99205 *(Please call 509-329-3400 for an appointment)*
- Quincy City Hall, 115 1st Ave SW, Quincy, WA 98848 *(Note their new/temporary address)*
- Quincy Library, 208 Central Ave S, Quincy, WA, 98848

The comment period runs from **October 6 to November 4, 2016.** Please have written comments postmarked or emailed by November 4th, 5:00 PM.

Mail comments to Kari Johnson at Ecology Eastern Region, 4601 N Monroe, Spokane, WA 99205, or email them to **kari.johnson@ecy.wa.gov**.

Website improvements: Ecology is working on a website redesign. You may notice some changes to the Quincy webpage in the near future. I hope you like it! If it looks awkward or links don't work, or if you have any suggestions, please let me know.

Have a wonderful October weekend!

Kari

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kari.johnson@ecy.wa.gov | (509) 329-3502
Air Quality Program | Washington Department of Ecology, Eastern Region

Johnson, Kari D. (ECY)

From:	Johnson, Kari D. (ECY) <KAJO461@ECY.WA.GOV>
Sent:	Friday, October 28, 2016 8:47 AM
To:	QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject:	Microsoft MWH Data Center: Public Comment Period Ends Nov 4
Attachments:	Microsoft_MWH_factsheet_10062016.pdf; ECOLOGY NEWS_ Updating the air permit for Microsoft data center in Quincy.pdf

Greetings, Quincy Friends.

There's just one week left to submit your comments for the Microsoft MWH Data Center air permit revision.

The comment period ends next Friday, **November 4, 2016.** Please have written comments postmarked or emailed by 5:00 PM.

Mail comments to Kari Johnson, Ecology Eastern Region, 4601 N Monroe, Spokane, WA 99205, or email them to **kari.johnson@ecy.wa.gov**.

See the email below and the attachments for more information.

Hope you have a happy, safe, and fun Halloween!

Kari

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kari.johnson@ecy.wa.gov | (509) 329-3502
Air Quality Program | Washington Department of Ecology, Eastern Region

From: Johnson, Kari D. (ECY)
Sent: Thursday, October 06, 2016 4:11 PM
To: 'QUINCY-DATA-CENTERS@LISTSERV.WA.GOV' <QUINCY-DATA-CENTERS@LISTSERV.WA.GOV>
Subject: Microsoft MWH Data Center: Public Comment Period Open Now, Oct 6 - Nov 4

Hello, Friends of Quincy.

Here's a few things for your Thursday...

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Air Quality Program | Washington Department of Ecology, Eastern Region

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State of Washington

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Johnson, Kari D. (ECY)

From:	Johnson, Kari D. (ECY) <KAJO461@ECY.WA.GOV>
Sent:	Wednesday, November 02, 2016 8:13 AM
To:	QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject:	EXTENDED to Dec 2: Microsoft MWH Data Center Public Comment Period
Attachments:	MWH_Legal_Notice_11032016.pdf; Microsoft_MWH_factsheet_10062016.pdf
Categories:	Printed for R2C

Good day, friends of Quincy.

Ecology has extended the Public Comment Period for the Microsoft MWH Data Center in Quincy. It will now end on **December 2, 2016.**

Here again is some info about the project: *MWH is the former Microsoft Oxford. You may recall that Ecology held a public comment period & hearing for Oxford's proposed permit revision in summer 2015. That permit was never finalized because Microsoft needed to make additional changes. Ecology did respond to public comments received from the 2015 Oxford comment period & hearing. However, since that permitting effort was never completed, the Response to Comments Report was never formally published. If you would like a copy of the draft report, please email me. In April 2016, Microsoft submitted a new revision to the permit, which included the facility name change from Oxford to MWH. This permit revision is now up for public comment. The attached Fact Sheet provide more details about the project.*

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Please have written comments postmarked by December 2nd, or emailed by 5:00 PM on December 2nd.

Happy November (wow!). Cheers!

Kari

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kari.johnson@ecy.wa.gov | (509) 329-3502
Air Quality Program | Washington Department of Ecology, Eastern Region

From: Johnson, Kari D. (ECY) [mailto:KAJO461@ECY.WA.GOV]
Sent: Friday, October 28, 2016 8:47 AM

To: QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject: Microsoft MWH Data Center: Public Comment Period Ends Nov 4

Greetings, Quincy Friends.

There's just one week left to submit your comments for the Microsoft MWH Data Center air permit revision.

The comment period ends next Friday, **November 4, 2016.** Please have written comments postmarked or emailed by 5:00 PM.

Mail comments to Kari Johnson, Ecology Eastern Region, 4601 N Monroe, Spokane, WA 99205, or email them to **kari.johnson@ecy.wa.gov**.

See the email below and the attachments for more information.

Hope you have a happy, safe, and fun Halloween!

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Air Quality Program | Washington Department of Ecology, Eastern Region

From: Johnson, Kari D. (ECY)
Sent: Thursday, October 06, 2016 4:11 PM
To: 'QUINCY-DATA-CENTERS@LISTSERV.WA.GOV' <QUINCY-DATA-CENTERS@LISTSERV.WA.GOV>
Subject: Microsoft MWH Data Center: Public Comment Period Open Now, Oct 6 - Nov 4

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Have a wonderful October weekend!

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Air Quality Program | Washington Department of Ecology, Eastern Region

---

DEPARTMENT OF ECOLOGY
State of Washington

Johnson, Kari D. (ECY)

From:	Johnson, Kari D. (ECY) <KAJO461@ECY.WA.GOV>
Sent:	Monday, November 21, 2016 2:28 PM
To:	QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject:	Ends Next Friday, Dec 2: Microsoft MWH Data Center Public Comment Period
Attachments:	MWH_Legal_Notice_11032016.pdf; Microsoft_MWH_factsheet_10062016.pdf

Hello, Quincy Interested Parties.

There's just over a week left to submit your comments for the Microsoft MWH public comment period. Comments will be accepted through Friday, December 2nd, postmarked or emailed by 5:00 PM.
Mail comments to Kari Johnson, Ecology Eastern Region, 4601 N Monroe, Spokane, WA 99205, or email them to **kari.johnson@ecy.wa.gov**. See more details in the emails below.

I was in Quincy last week and saw cactus nopales at Harvest Foods. I was tempted to give my chef husband a challenge! Instead he was treated with my leftover giant Taco Jalisco burrito. I love the food in Quincy!

May you all have a happy Thanksgiving full of gratefulness and joy.

Kari

Kari Johnson, Community Outreach Specialist
kari.johnson@ecy.wa.gov | (509) 329-3502
Air Quality Program | Washington Department of Ecology, Eastern Region

From: Johnson, Kari D. (ECY) [mailto:KAJO461@ECY.WA.GOV]
Sent: Wednesday, November 02, 2016 8:13 AM
To: QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject: EXTENDED to Dec 2: Microsoft MWH Data Center Public Comment Period

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From: Johnson, Kari D. (ECY) [mailto:KAJO461@ECY.WA.GOV]
Sent: Friday, October 28, 2016 8:47 AM
To: QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject: Microsoft MWH Data Center: Public Comment Period Ends Nov 4

Greetings, Quincy Friends.

There's just one week left to submit your comments for the Microsoft MWH Data Center air permit revision.

The comment period ends next Friday, **November 4, 2016.** Please have written comments postmarked or emailed by 5:00 PM.

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Air Quality Program | Washington Department of Ecology, Eastern Region

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Sent: Thursday, October 06, 2016 4:11 PM
To: 'QUINCY-DATA-CENTERS@LISTSERV.WA.GOV' <QUINCY-DATA-CENTERS@LISTSERV.WA.GOV>
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Air Quality Program | Washington Department of Ecology, Eastern Region

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DEPARTMENT OF ECOLOGY
State of Washington

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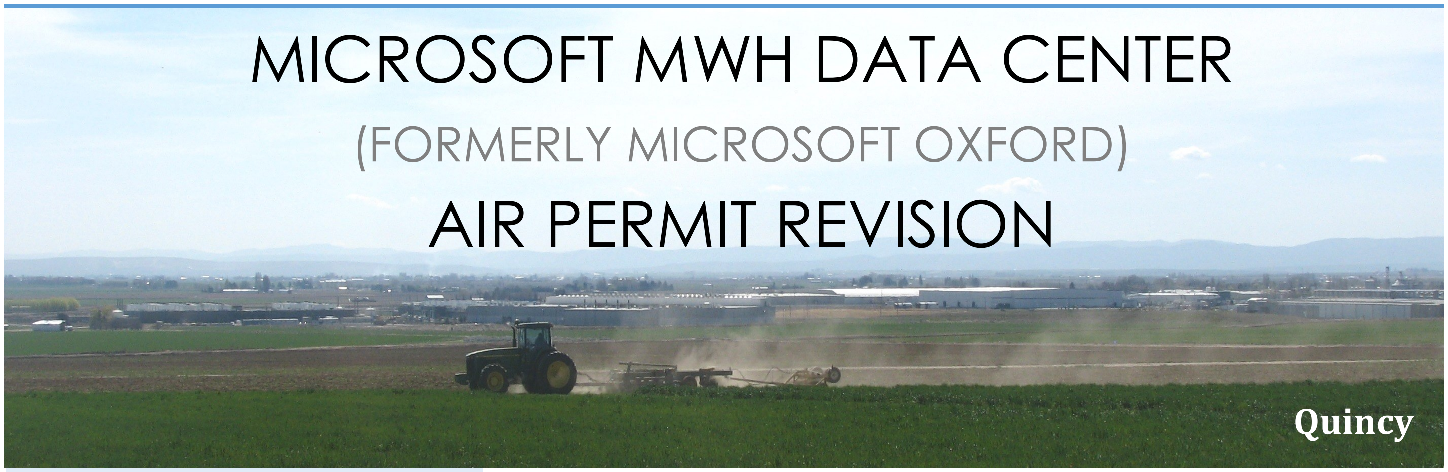
MICROSOFT MWH DATA CENTER

(FORMERLY MICROSOFT OXFORD)

AIR PERMIT REVISION



CONTACTS & INFORMATION

Comments accepted:

October 6 , 2016 - November 4, 2016

Submit comments to:

Washington Department of Ecology
Kari Johnson, Air Quality Program
4601 North Monroe Street
Spokane, WA 99205
(509) 329-3502
kari.johnson@ecy.wa.gov

Document review locations

ONLINE:
www.ecy.wa.gov/programs/air/quincydatacenter

Quincy City Hall
115 1st Avenue SW
Quincy, WA 98848

Quincy Library
208 Central Avenue S
Quincy, WA 98848

Ecology Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205

Ecology invites public input on proposed revisions to the air permit for Microsoft MWH Data Center.

Microsoft Corporation has applied to Ecology to revise its permit for an existing air pollution source in Grant County. Formerly called Microsoft Oxford, the newly-named Microsoft MWH Data Center is located at 1515 Port Industrial Parkway in Quincy.

In August 2014, Ecology approved an air permit for 37 diesel backup generators at the facility. In 2015, Microsoft submitted a revision to the permit, but it was never finalized because Microsoft needed to make additional changes. In April 2016, Microsoft submitted a new revision to the permit, including the facility name change from Oxford to MWH.

The primary source of air contaminants at the facility are 37 diesel generators, which provide emergency backup power to Microsoft's data servers during an electrical outage. The updated permit adds 8 new reserve backup generators to serve as "backups to the backups." The new generators will only be used if one of the original backup engines fails. The permit update also reflects changes to the height and diameter of the engine exhaust stacks to match the actual dimensions.

The proposed permit includes:

- 37 previously-permitted diesel-powered engines to serve as primary backup to the facility's operations
  - 32 engines will be rated at 2.5 megawatt electrical capacity (MWe)
  - 4 engines will be rated at 2.0 MWe
  - 1 engine will be rated at 0.75 MWe
- 32 previously-permitted cooling towers
- change in engine identification numbers
- 8 more reserve engines rated at 2.50 MWe
- modification to engine-testing requirements to make the testing more representative of actual operations
- A modification to engine stack heights and diameters to match the as-built dimensions

The permit includes conditions to protect the public from air pollution, including fuel limits and specified hours of operation for generators.

Language assistance

Para asistencia en español
(509) 329-3506
preguntas@ecy.wa.gov

Special accommodations

For special accommodations or documents in alternate format, call (509) 329-3400, 711 (relay service), or 877-833-6341 (TTY).

STAY CURRENT
QUINCY AIR PERMITS

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Text ecyQuincyAir to 40404 for text message alerts

www.ecy.wa.gov search keyword Quincy

Email updates listserv.wa.gov "Quincy-data-centers"

After review of the facility's application and the health risk assessment, Ecology has determined that this project will meet the General Regulations for Air Pollution Sources (Chapter 173-400 WAC).

How Ecology evaluates diesel engine exhaust

When Ecology reviews the permit application for a data center, they look at how much the project will add to the air pollutants in the area. Ecology cannot approve a permit that allows pollutants to be emitted often enough or in high enough levels to cause health problems.

Ecology relies on computer models to estimate where the wind will carry the pollutants in the exhaust from diesel-powered backup generators. The models predict the amount of toxic air pollutants that could be in the air. Ecology reviews modeling information and assesses the possible health risks.

Modeling impacts from all data centers in Quincy

Ecology evaluates the emissions from each individual data center as well as the combined emissions from all data centers and other air sources in the Quincy area. To do this, a computer modeling process adds any new data center emissions to those from other air sources and determines if the collective emissions would likely be harmful to human health. We refer to this cumulative modeling process as "community modeling." Community modeling was used in Quincy because many companies built data centers there.

The health risks

Diesel engine exhaust contains fine particles that can cause health problems for people who are exposed frequently and at high enough levels. The toxic air pollutants in diesel engine exhaust include nitrogen dioxide, carbon monoxide, organic compounds, and tiny particles called diesel exhaust particles. Ecology evaluates the levels of all these pollutants during the permit review process. The ones most likely to be produced in high enough amounts to potentially affect health are diesel exhaust particles and nitrogen dioxide.

For detailed information about the health effects of these pollutants, read Ecology's publication *Focus on Diesel Exhaust Health Risks* which is available in English and Spanish on our website. For more information, go to our data center webpage: http://www.ecy.wa.gov/programs/air/quincydatacenter.

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY
NOTICE OF APPLICATION TO CONSTRUCT AN AIR POLLUTION SOURCE

The State of Washington Department of Ecology (Ecology) received an application to revise a Notice of Construction (NOC) Approval Order for an existing air pollution source in Quincy, WA. The Microsoft Corporation located at One Microsoft Way in Redmond, WA 98052, requests a revision of their existing permit, Approval Order 14AQ-E537 issued on August 15, 2014. On April 8, 2016, Ecology received an NOC from Microsoft requesting revisions and changing the facility name from Microsoft Oxford to MWH Data Center (or MWH). The revised permit is to cover operation of existing and new emissions units. The primary air contaminant sources at the facility consist of 37 previously approved electric backup generators powered by diesel engines to provide emergency backup power to the facility. Eight new engines are being requested to serve as reserve to the primary backup generators. MWH is located at 1515 Port Industrial Parkway in Quincy, WA, Grant County. The application was considered complete on September 20, 2016.

The NOC Application, Preliminary Determination, and other documents related to the project are available for public review at the following locations:

- Online at www.ecy.wa.gov/programs/air/quincydatacenter
- Department of Ecology, Eastern Regional Office, 4601 N Monroe, Spokane, WA 99205
- Quincy City Hal, 115 1st Ave SW, Quincy, WA 98848
- Quincy Library, 208 Central Ave S, Quincy, WA, 98848

The public is invited to comment on this project proposal. Written comments will be accepted on this proposal from October 6, 2016 through November 4, 2016. For additional information on the project and to submit comments, contact Kari Johnson at Ecology's Eastern Regional Office, 4601 N. Monroe, Spokane, WA 99205-1295, or kari.johnson@ecy.wa.gov or 509-329-3502.

To request ADA accommodation, call 360-407-6800, 711 (relay service), or 877-833-6341 (TTY).
Para asistencia en español: 509-329-3506 o preguntas@ecy.wa.gov.

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY
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The public is invited to comment on this project proposal. Written comments will be accepted on this proposal from October 6, 2016 through December 2, 2016. A public hearing will be held if Ecology determines that there is significant public interest. For additional information on the project and to submit comments, contact Kari Johnson at Ecology's Eastern Regional Office, 4601 N. Monroe, Spokane, WA 99205-1295, or kari.johnson@ecy.wa.gov or 509-329-3502.

To request ADA accommodation, call 360-407-6800, 711 (relay service), or 877-833-6341 (TTY).
Para asistencia en español: 509-329-3506 o preguntas@ecy.wa.gov.

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Ecology East - Brook @ecyspokane · Oct 6

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2

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@ecyQuincyAir

We want to hear from you! Accepting comments on @Microsoft air permit for #QuincyWA data center now. ecy.wa.gov/news/2016/126.…

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www.ecy.wa.gov

NOTICE: Web applications will be unavailable during network maintenance after 6PM on Weds. Nov. 9th

DEPARTMENT OF ECOLOGY State of Washington

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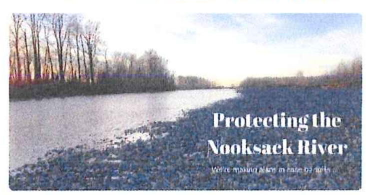
We need to make sure we didn't miss anything. Check out the plan & comment before Dec. 12. bit.ly/2fftDN8 #beprepared



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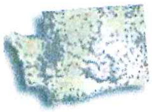
Ecology NW - Larry @ecyseattle

#PugetSound's #NoDischargeZone for vessel sewage would include waters east of the line between these 2 lighthouses

Printed screenshot on 11/9/2016



More than half of Washington's **12,500** toxic sites have already been cleaned up. Find them on our **What's in My Neighborhood** mapping tool.

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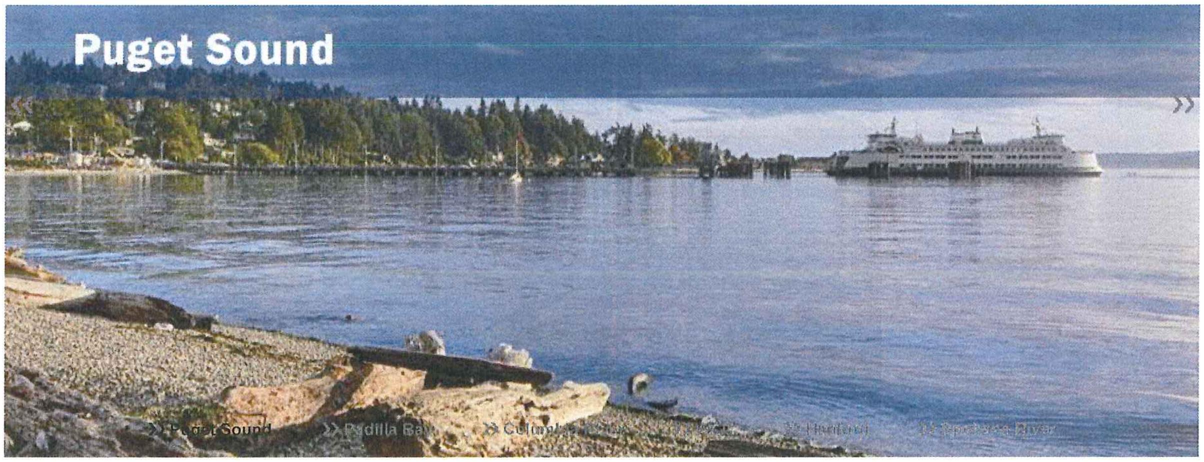

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Appendix B:
Public Comments Received in Original Format

Handwritten numbers were added to most comments to correspond with the sequence of responses in the report.

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Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 706 7329
www.microsoft.com

Microsoft

October 31, 2016

Ms. Kari Johnson
Air Quality Program
Washington Department of Ecology
4601 North Monroe Street
Spokane, WA 99205

Re: Preliminary Determination for Microsoft MWH Data Center Approval Order Amendments

Dear Ms. Johnson:

Microsoft appreciates this opportunity to comment on Ecology's Preliminary Determination for amendment and reissuance of Approval Order 14AQ-E537. Microsoft supports issuance of these amendments. They will accommodate necessary changes in the configuration and operation of the data center. We have only a handful of suggested edits to the proposed approval order.

1. Table 4

Ecology should globally replace the imprecise term "g/kW-hr" with the more specific term "g/kWm-hr", and should add a footnote to define the term "kWm" to mean the brake kW of the engine, as opposed to the terms "kWe or MWe" that refer to the electrical output of the generator.

During the most recent compliance stack testing at two of the Quincy data centers, the operators and stack test personnel mistakenly did the "g/kWm-hr" calculations using the incorrect kWe value instead of using the correct kWm value. This proposed revision will reduce the potential for that mistake to be made during future stack tests.

2. Condition 4.4.1

Ecology should replace the last sentence with the following: "Microsoft may replace the dynamometer requirement in Subpart E of 40 CFR Part 89 with corresponding measurement of gen-set electrical output (kWe) to derive the mechanical output of the engine (kWm)".

During the compliance stack testing at two of the Quincy data centers, the operators and stack test personnel mistakenly did the "g/kWm-hr" calculations using the incorrect kWe value instead of using the correct kWm value. This proposed revision will reduce the potential for that mistake to be made during future stack tests.

3. Condition 4.4.4

This condition imposes source testing requirements if Microsoft installs an engine from a different manufacturer or model from the Caterpillar engines described in the Project Summary, Paragraph 1. We understand that this condition was borrowed from the approval orders for other local data centers at which the owner did not specify an engine vendor before issuance of the order. Microsoft already has installed many of the MWH engines, pursuant to authority granted in Approval Order 14AQ-E537. Microsoft has no plans to use any engines in MWH Phases 1 and 2 other than the Caterpillar units described in the Project Summary. All of the currently-installed Phase 1 generators were supplied by Caterpillar. On the remote chance that Microsoft finds it necessary to install different manufacturers' engines during the build-out of the currently-permitted Phase 2 data center, Microsoft has no objection to Ecology's demand to source test representative engine(s) from the new engine family or families. Our only concern is with the timing of the test demanded by Condition 4.4.4. A source test performed before an engine commences operation may not yield data that is representative of the routine operation of the engine. That is why EPA rules and innumerable Ecology approval orders and PSD permits authorize a short shakedown period before initial performance testing of a newly installed emission unit. See, e.g., 40 CFR 60.8(a), incorporated by reference in Condition 4.2 of the Preliminary Determination. We request that Ecology follow that precedent here, and revise Condition 4.4.4 to read:

> 4.4.4 For engine models or manufacturers other than those listed in Project Summary Paragraph 1, at least one representative engine from each manufacturer and each size engine from each manufacturer shall be tested no later than 180 days following initial startup.

4. Condition 4.4.9

This condition implements Ecology's goal to obtain some data about the performance of reserve engines during cold start and zero electrical load operation. Microsoft is willing to help Ecology develop that information. The proposed 2.5 MWe reserve engines at MWH are, of course, the same model and size as the currently-permitted 2.5 MWe primary engines at the data center. Our biggest concern with Condition 4.4.9 is that Microsoft just completed a costly source test on one of the 2.5 MWe engines and the Preliminary Determination (Condition 4.4.7) requires the next compliance test on those engines in 2021. Microsoft would prefer not to conduct a special, costly source test solely to develop this data. The Preliminary Determination does require a source test on one of the 2.0 MWe engines within 12 months of permit issuance. Microsoft requests that Ecology attach the low load/cold start testing requirements to that test. The data from the 2.0 MWe engine during cold start and low load operation easily could be scaled to represent the performance of the 2.5 MWe engines.

A second concern with Condition 4.4.9 is that it should clarify that the referenced testing is for data development, not compliance. The order does not set limits for cold start and zero electrical load conditions. Instead the order sets limits for the average of all operating conditions, including cold start and low load.

For these reasons, Microsoft requests that Ecology delete Condition 4.4.9 and amend Condition 4.4.6 to read as follows:

4.4.6 At least one of the 2.0 MWe engines shall be tested within 12 months of the date of this permit. In addition to the compliance testing required by Section 4.4 of this Permit the test shall include data development testing to measure emission rates during zero electrical load operation and cold start. The test methods and procedures for this portion of the test must be pre-approved by Ecology.

5. **Condition 8.5**

This condition requires Microsoft to maintain records of the "annual gross power generated by facility-wide operation of the emergency backup electrical generators." The term "gross power" is imprecise. Please substitute "MWe-hours " for the term "gross power" in this condition.

6. **Condition 8.6.4**

Section 8.6 requires Microsoft to record certain data for each "operational period" of an MWH engine. During any operating interval (e.g., a lengthy power outage), however, the load on the engine may vary while the generator responds to the varying demand of the servers.. Condition 8.6.4 as proposed does not reflect this variability. And it uses a term, "category of generator load," that we believe was developed for other data centers at which the engines are permitted to operate at fixed load levels. We request that Ecology clarify Condition 8.6.4 to better reflect the variability in the operating levels of MWH engines. Condition 8.6.4 should be revised to read as follows:

8.6.4 Duration of operation and average electrical output in KWe.

Thank you for carefully considering Microsoft's comments. Please contact Jim Wilder at 425 329-0320 if we can provide any additional information in support of these comments.

Very truly yours,

Brett Muhlestein
Data Center Operations Manager

Cc: Gary Huitsing
John Poffenroth
Jim Wilder
Matthew Cohen
Matt Pearson

Johnson, Kari D. (ECY)

From:	William Riley <1724liberty@gmail.com>
Sent:	Wednesday, November 02, 2016 11:44 AM
To:	Johnson, Kari D. (ECY)
Subject:	Comments for the Record for MWH air quality permit at Quincy

7. This has been a long drawn out process but changes in application played a role in this. I am still fully in support of the issuance of the permit as previously stated.

William Riley-President of Columbia Basin Environmental Council
POB 1285
Soap Lake, WA 98851

December 2, 2016

Danna Dal Porto
1665 Road 3 W
Quincy, WA 98848

PUBLIC COMMENT FOR MICROSOFT MWH...December 2, 2016

This is the Public Comment for Danna Dal Porto of Quincy, Washington regarding the Microsoft MWH project. I have been involved in the data center construction in Quincy since the first public hearing for Microsoft Columbia. I am noticing differences in how Ecology is interacting with the public. I do not believe the public is being served by Ecology in order to learn about the construction of potentially hazardous industry in our community.

This second Microsoft project has evolved over several years. For the original Microsoft Oxford project, the Department of Ecology had a public hearing July 24, 2014. (Over two years ago) One of the most memorable issues in that public hearing was the technical person from Microsoft testifying in opposition to their own proposal.

The initial Oxford proposal was adjusted/refined by Microsoft and another hearing was held for Microsoft Oxford in Quincy on July 9, 2016. The most memorable aspect of this hearing was that Microsoft did not have a technical expert to answer questions from the public. Instead of a technical expert, Microsoft had their attorney present to answer technical, operational data center questions. Something else was different at that hearing. Several public figures were present at that meeting who had never attended a data center hearing before. It was as if a cheering section had been assembled to show community support for this project. A Grant PUD Commissioner (from Ephrata) was present, the Quincy school Board Chairman testified as well as several members of the public that were not known to any of the local Quincy residents in attendance. All of these new guests testified to how important the data centers were to Quincy and how proud they were to support the continued construction of data center industry in Quincy.

The Department of Ecology did not publish the Response to Comments from the July 9, 2016 Public Hearing although I did learn that the comments were available on-line only by request. In the past, all public comments received a response that was available to the public at Quincy City Hall or the Quincy Library. All persons commenting were offered on-line responses. No explanation was given for the change in policy.

8. **Comment #1**...Why did Ecology change the policy of not presenting/preparing a Response to Comments from the July 9, 2016 Public Hearing? Community members take considerable time to read the documents, prepare their questions and either send or deliver their comments in order to learn answers to questions about the

proposed projects in their community. People plan and set aside time to attend public meetings. All of this community involvement is critically important as the basis of understanding and trust between the pubic and Ecology. Failure to follow procedure in responding to comments erodes public trust. I am disappointed in the lack of respect Ecology showed to the public by not answering, in the normal manner, the July 9, 2016, Oxford Public Hearing Comments.

9. **Comment #2** I do not want Microsoft to average emissions to determine data from the operation of Microsoft MWH. Microsoft wants to average the operational emissions from their engines. Doing that, Microsoft avoids the concentrated surge of emissions from the engine cold-start. I do not agree that an average of emissions is protective for the public. Many charts are available to show the VOC spike between 20 and 40 seconds. The NOx spike is especially important in air quality monitoring and averaging would not catch the input from this important data. Over the years, the Ecology air permitting has developed a technical testing procedure for checking the emissions and the operation of the difference data centers. I do not believe the technical testing procedure should be modified. It is important for Ecology and the public to know that all emissions are going to be monitored/tested under the same technical procedure. Microsoft wants to modify engine-testing requirements to make testing more representative of actual operations. I want uniformity in testing throughout the data center community in Quincy.

10. **Comment #3** I will, once again, ask for on-site air quality monitors in Quincy. The modeling can only go so far to determine the continuing deteriorating air quality above Quincy. I live 8 miles south of Quincy and I can see the cloud of "soiled" air above town. The plume of pollution strings to the east and is a visible reminder of the lack of protection my community is getting from the Washington State Air Quality program. I am requesting physical monitors in Quincy and I am raising the specifics of my request in that I want a 24-7, two-year base line data set established for air quality in Quincy. The truck, car and train traffic is seasonal as well as the dust particles in the air are determined by the harvest cycle. Any attempt to satisfy my request by installing a monitor for a week or two during February will not get an accurate view of air issues. I do not believe that telling Quincy residents that there is no money to install monitors will hold up under scrutiny. This is a matter of public health and it is time to know the accurate levels of toxic components in the air instead of guessing. Decisions have already been made by industry and the different city and state agencies to build additional data centers here in Quincy. My community is a captive to market forces and big business. Not knowing the facts about the air quality in Quincy is a dereliction of the duty of the Department of Ecology to protect state residents. Ecology is the state agency granting the permits and I would like Ecology to pass rules that would require businesses to fund the monitoring equipment to protect human health and the environment. Ecology already acknowledges that the Quincy concentration of data centers is unique because that is the basis for the Community Wide approach (that I do not like) to allow this 200+ number of huge diesel engines to be gathered inside the city limits of such a small rural community. This unusual situation demands a unique solution

for protecting public health and I believe Ecology owes it to Quincy residents to come up with a creative solution to test the actual air quality instead of guessing.

11. **Comment #4** I want a colored full-page map showing the Cumulative Diesel Particulate Concentration over Quincy with the addition of the 45 diesel engines at MWH. I believe this visual is an important aid in understanding the potential health impact the data centers have on the community. I am aware of the contribution of vehicle traffic on this concentration but the issue is the cumulative effect of adding data center emissions to already existing pollution. The job of Ecology is permitting facilities in communities and adding up existing particulate material to new pollution sources. Somehow Ecology thinks it is OK to compartmentalize these emission sources. Reality, however, does not separate Vantage air from Microsoft air. All the air is combined over Quincy and the total emission factors are my concern. Just assuming that the pollution stops at the fence line is unrealistic but that, in effect, is the language in some of these permits.

12. **Comment #5** I want to know if the data centers in Quincy are in compliance with the stipulations of the tax breaks granted, on at least two different occasions, to encourage data center construction in Eastern Washington. Are the data centers employing the correct number of workers to be in compliance with the tax incentives and are those workers making a living wage? The data centers were to hire a specific number of workers. After interviewing some data center low-income employees, I know the custodial workers are paid as low as $10 per hour and work few hours weekly. In more than one instance, the hours worked per week could never be considered a living wage. The legislation stipulated that a specific number of workers be hired, I guess the legislation should have been more specific to ensure that these workers are paid a living wage and get enough hours to make the job worth having. I am going to speculate that your response to this comment will be that this is an air quality conversation and you do not have to answer my question. My response in return is to ask just how is the public to determine the value of legislation to encourage companies to build in Washington State and yet have the ethics to provide an economic return for state citizens? The data center conversation belongs with the Department of Ecology so I want an answer to how I can access information about data center compliance with tax incentives.

13. **Comment #6** Microsoft MWH is requesting additional back-up generators for the back-up generators. Please explain the reason for this request as none of the other data center permits have included requests for redundant engines. On page 7 of the Preliminary Determination, the diesel engines are referred to as "primary engines", "reserve engines" and "emergency engines" to be used only if the original engines fail. So this is in effect a "backup for the backup. One of the primary reasons for data center construction in Quincy is the supposed 99.9% electrical reliability. Is there a problem with the reliable electrical line?

14. **Comment # 7** Is the 99.9% Grant PUD electrical reliability not true? Why the back-up generators? I am requesting the operating records for these generators to

determine if they are actually back-up or are they going to be used on-line with the other generators to power the facility?

15. **Comment #8** The 2nd Revised Health Impact Assessment Review Document, September 27, 2016, page 17, references power outages for data centers in Quincy. I am asking for the specific records of those power outages, both for the east and west side of town.

16. **Comment# 9** The documents for the MWH project has divided Quincy risk into two sides of town, the west and east sides. I want to know if Ecology has now determined that these designations for town will be used to discuss environmental risk. The maps showing DEEP concentrations, NOx and other VOC does not divide town into two sides and I do not believe it is useful for Ecology to discuss risk as if there were a dividing line between air emission plumes.

17. **Comment #10** The September 27, 2016 Health Impact Assessment lists the pollution control equipment for the tBACT determination in section 2.2.1. I am requesting that the paragraph clearly specify that this equipment will be installed in every one of the MWH diesel generators. The document says that this will be for backup generators and I want the document to say that all 45 MWH generators will use this equipment.

18. **Comment #11** Elevated exposure to exceed the ASIL will be experienced by 710 residents of Quincy as well as elevated exposure will be measured at Monument School, Quincy Valley School and at the Quincy Valley Hospital. I want Ecology to explain why these individuals and children are allowed to be at elevated risk.

19. **Comment #12** Has Microsoft done their Utility Feed- Swap? If so, how many hours did the generators operate?

20. **Comment #13** Microsoft is asking for their permit to be revised to read the stack heights/diameters as they were built, rather than the heights listed in their permit application. This is not the first time Microsoft has proceeded to build without the proper authorization. The Columbia data center was built without an air quality permit. Columbia is dangerous to the adjacent grade school and yet that facility is operating without emission controls. Apparently no penalty is applied by Ecology to an industry that just proceeds to build or operate without license or permit. The number and frequency of changes to the Microsoft Oxford/MWH permit is very complex and difficult for a community member like me to follow. It is almost like a shell game. The idea that any company can and will do whatever they want is very distressing to me as a Washington State resident. I am asking Ecology to take whatever steps possible to make Microsoft "play by the rules".

Microsoft's behavior brings into question every aspect of their data center operations. We were to believe that they would build the stacks to the determined height, but they did not follow the guidelines and built to suit themselves. Two years later Microsoft is telling Ecology to modify their permit to reflect what Microsoft has already constructed. Why should the Quincy community believe Microsoft would follow any of the operational guidelines set down in their permit to operate? Certainly Microsoft is a big and important player in the international arena. However, just because they are big and powerful should not excuse their willful and intentional violation of the guidelines of their permit.

I would like to comment on the proposed changes to the run times and operational loads for the engine operation. However, try as I might, that data is too advanced for me. I will say, however, I do not trust that what Microsoft is proposing is a positive step for human health and the environment. In fact, if Microsoft is proposing it, I am suspicious, based on their track record, that their proposal will benefit Microsoft and no one else.

This is the first time I have commented to Ecology about an air quality operating permit when I have been without hope that Ecology and Industry is going to protect the people who live and work in this little town. Quincy is a town with good, hard-working people and, without their knowledge or permission, industry is putting their health and the health of their children at risk. This has been a sad experience for me.

Thank you for considering my comments,

Danna Dal Porto
Quincy, WA

December 4, 2016

Washington State Department of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205

RE: Microsoft MWH permit

Dear Ms. Johnson,

Please accept my comments for consideration before approving Microsoft's NOC Approval Order.

21. As you will recall I believe that Ecology is required to permit the MWH facility as a modification of Microsoft's original facility because they are under common control, under the same industrial classification and in close proximity. Permitting the facilities under common control may require controls on the existing facility because without them the two facilities might be subject to Title V regulation. Why isn't Ecology regulating Microsoft under common control?

22. Dr. Joel Kaufmann at the UW has conducted research on chronic exposure to PM2.5 and its effect on the cardiovascular system. His research shows that diesel particulate and other ultra fine particulate cause inflammatory responses resulting in atherosclerotic plaque formation and clotting that can cause heart attacks and strokes. It would appear that Ecology is using old information to make present day decisions that directly affect the health of my community.

After having read through much of the material provided by Ecology for our review, I have a list of questions that I would appreciate having answered *before* Microsoft's MWH Approval Order is granted. Thank you in advance for providing answers before providing a permit. People who take the time to comment should be rewarded with answers in advance of any permit issuance.

So, my questions are as follows:

23. 1. I noticed that on page 3 of the 2nd Tier Review Recommendation that Ecology states that MWH increases cancer 5.9 in one million and then clarifies this by stating: *"The cancer risk estimates reported here are for increases above a baseline lifetime risk of cancer of about 40 percent in the United States."* I would like clarification on what this statement means.

24. 2. Ecology is using the Monte Carlo analysis when considering the state's NO2 ASIL. Is Ecology also using the Monte Carlo analysis – which spreads the 1-hr NO2 emissions out over 5 years of meteorological data – to claim compliance with the 1-hr NO2 NAAQS? If so, please provide documentation that Ecology has received authorization to use the Monte Carlo analysis for this purpose.

25. 3. Under what authority is Ecology acting as the "permit authority"?

26. 4. Has Ecology investigated the number of asthma attack, heart attacks and strokes that have occurred in Quincy since the arrival of the data centers? Wouldn't that provide some insight into air quality while the agency resists monitoring our air for compliance?

27. 5. What are the ground level ozone levels in Quincy? Why isn't ground level ozone being considered during the permitting process when it is a NAAQS requirement?

28. 6. Ecology acknowledges on page 7 of the 2nd Tier Review Recommendation that the NO2 level of 470 ug/m3 -- set by CalEPA or OEHHA back in 2008 – is not protective. Why does Ecology continue to use a number that they know is not protective of human health?

29. 7. How was the 1-hr NO2 compliance demonstrated? By the Monte Carlo?

30. 8. Ecology cites to California regulations often, but doesn't CARB require LAER for air pollution sources?

31. 9. Prior to 2009, didn't Ecology consider the additive and/or synergistic effects of TAPs? What increased risk is Quincy at when Ecology allows for multiple, additive and synergistic carcinogenic pollutants to be emitted without comprehensive review? Are the WAC 173-460 regulations still enforced by the Spokane Regional Air Authority to protect the air that you breathe?

32. 10. What does "much lower than unity for all receptors" mean? (2nd Tier Review Recommendation page 10)

33. 11. Regarding NO2, Ecology states that the "MIBR hazard quotient and indices are greater than one" and indicate adverse affects may occur in people occupying areas near MWH property borders. How long do the engines need to operate before the hazard quotient or indices exceed one?

34. 12. Ecology states on page 11 that the short term risk from DPM was not calculated and that Ecology chose to use the 24-hr PM2.5 as an indicator of safety. DPM is not equitable to PM2.5, but much more toxic. PM2.5 is presumed inert, yet ultrafine particulate, while DPM is known to be ultrafine and extremely toxic, hence its ranking as the #1 toxic air pollutant of concern. Ecology severely underestimates the risk to our community in equating these two substances.

35. 13. Ecology states on page 12 that NO2 sources of consideration were Dell, MWH and Microsoft's Columbia Data Center. Did Ecology consider the natural gas boilers at ConAgra and Amway? Are any of the cold storages or controlled atmospheric facilities sources of NOx? Are/were cooling tower emissions from Microsoft Columbia considered as a source of NOx while using groundwater with high levels of nitrates?

36. 14. Ecology used Grant County PUD outages from 2003-2009. Why not use the most recent outage information? Is it because one or more data centers violated the terms of the permits with regard to hours permitted for power outages?

37. 15. Ecology lists power outages as one of the uncertainties. Shouldn't this permit include more short term all-engine runtimes to account for this uncertainty?

38. 16. Ecology also lists the toxicity of DPM as one of the uncertainties. Wouldn't it be better to use the 10 times more protective EPA URF of $3x10^{-5}$ than to continue to use OEHHA's $3x10^{-4}$? Using the more protective URF affords Quincy a more protective margin of error.

39. 17. What is Ecology doing to comply with the SSM (startup, shutdown, malfunctions) requirement of the CAA? How is MWH complying during startup when the pollution controls are not yet functional? What is the agency doing to make the existing data centers comply? Does Microsoft have shutdown emissions not being accounted for?

40 18. Ecology states on page 13 that AERMOD may underestimate annual concentrations of PM10. Why? Is AERMOD the best model to use for particulate? What other models might be a better choice?

41. 19. Ecology speaks to PAHs on page 15. It is disconcerting to note that DPM exhaust is not any less hazardous with the use of controls. Is this an accurate understanding of what was related on page 15?

42. 20. Ecology notes-- also on page 15 -- that the long-term ambient conditions and the non-cancer hazards may be underestimated. Ecology can correct both of these situations by monitoring Quincy's air. In the meantime, the use of the more protective URF would be prudent.

43. 21. Quincy sits in a valley up against a hillside. According to 40 CRF 51 Appendix W, CalPUFF would be the more appropriate model for use in Quincy because of the topography and the secondary formation of PM2.5. Why isn't CalPUFF being used? Does AERMOD consider the secondary formation of PM2.5?

44. 22. A statement is made implying that condensable particulate matter is not an issue (page 16), however, condensable particulate forms outside the engine depending on ambient conditions, such as temperature, and its consideration is a requirement of NAAQS. It is a federally enforceable condition of the CAA and our SIP. It's potential to impact health should not be minimized.

Questions and comments from other documents I reviewed include:

45. 1. Why didn't Ecology cite Microsoft for violating the terms of its 2014 permit when it didn't construct its facility as stated, and as air quality was modeled? Shorter stacks with wider diameters increased emission concentrations and the corporation should be cited for violation of federal law.

46. 2. A clean draft of the Approval Order is not online. The draft permit that is, still references Oxford.

47. 3. What is meant by "wet stack purge"? What is it and how does it impact emissions?

48. 4. Microsoft offers no proof that a "cold start" lasts only 15 minutes for DPM and only 10 minutes for NOx. A manufacturer's guarantee is based on 30 minutes of "warm up" – 40 CFR 89.406-7 -- a requirement set by EPA with input from the engine manufacturers. Cold start estimates should be consistent with the regulations used to exclude them from manufacturer certifications: 30 minutes.

49. 5. In the supplemental materials dated 9/9/2016 and inserted loose into the back of the packet at the library, there are PM10 estimates, but no PM2.5 emission estimates. Why?

50. 6. In this supplemental material there are no cold start factors for the "reserve engines". Why?

51. 7. Please review the cold start factor for NOx. It was demonstrated in the Sabey source test that the NOx emission are extremely high during cold starts, and may last longer than 10 minutes.

52. 8. In Table B-2-2D-2 shouldn't the cold start for the reserve 2.5 kW engines also be 50.6 lb/hr as it is for the "primary engines"?

53. 9. Why aren't the reserve engines emissions included in the draft approval order?

54. 10. How can the fuel usage increase from 431,000 gallons to 615,000 gallons without a similar increase in SO2 emissions when they are calculated mass balance?

55. 11. How many hours of electrical bypass are included in the approval order?

56. 12. In Table 2 "NOx Emissions 2500 kW", the 100% load is considered the load at which the most NOx is produced. Please review the Sabey source test to compare levels that were emitted at 0% and use the higher of the two for modeling purposes.

57. 13. In the supplement, in order to stay under the 575 lbs/hr, Microsoft drops the operational load from 100% to 99%. Is a 1% decrease in operational load sufficient to reduce NOx emissions as modeled, and are engines refined enough to accurately accommodate a 1% decrease?

58. 14. Microsoft is claiming that operating for 160 generator hours/day will still allow it to comply with NAAQS. Would this be true without the Monte Carlo meteorological manipulation? I have been told by modelers in California, that any time 2 of these engines run they exceed the 188 ug/m3 1-hr NO2 NAAQS. Please model 1-hr NO2 without the Monte Carlo analysis before allowing this language to remain in the approval order.

59. 15. How many "cold starts" were included in the modeling? Each engine starts at least 12 times per year from a "cold start".

60. 16. Why do the "reserve engines" need 40 hours of operation? Why aren't their emissions included in the approval order? See Table 2.1

61. 17. Any source test must require proof that the fuel is diesel. Ecology must be onsite for the test and sample the fuel prior to testing. This language should be included in the approval order.

62. 18. Compliance testing must require low loads as well. The approval order requirement to test at 50, 75 and 100 is not sufficient to assure that the emission estimates used are protective and accurate. Testing should include all NAAQS pollutants, VOCs and PM2.5 – both front and back half.

63. 19. Source tests should be as required under 40 CFR 60 IIII that require 3 separate tests. Please deny Microsoft's request to use testing protocols under 40 CFR 1065. As demonstrated during the tests conducted in Tukwila, the emissions can vary widely between tests. An average of 3 tests is a better indicator of the accuracy of the emission rates than having only one test. Additionally, Microsoft requests the use of 40 CFR 89 dilution stack testing. I didn't have time to research this, but the applicability section of 1065 suggests that this test procedure might be used for older model engines. Please check this for accuracy.

> § 1065.1 (3) Nonroad diesel engines we regulate under 40 CFR part 1039 and stationary compression-ignition engines that are certified to the standards in 40 CFR part 1039, as specified in 40 CFR part 60, subpart IIII. **For earlier model years, manufacturers may use the test procedures in this part or those specified in 40 CFR part 89** according to § 1065.10.

I am not in favor of granting Microsoft any alternative means of testing its engines. They have demonstrated that they don't play by the rules.

64. 20. Annual limits for NAAQS should not be based on rolling averages as requested by Microsoft. Please deny this request.

65. 21. Microsoft's modeling of 37 engines running for 1 hour is not long enough to demonstrate compliance with the NO2 ASIL of 470 ug/m3. A longer emission time may result in more NOx being converted to NO2 and should be modeled to rule this out.

66, 22. Microsoft wants to report "actual loads and runtime" to calculate emissions. Calculating emissions is not proof of compliance. We need and deserve an air quality monitor. Certainly the state has profited from the data centers and can afford to put some of that money to work in our community.

67, 23. The approval order must make all recordkeeping reports available to the public. No more keeping the records electronically onsite so that the public cannot have the records. We cannot prove compliance without the records, nor can we hold the agency accountable for assuring compliance without the records. Please insert language into the permit making all records available upon request.

68, 24. Does Microsoft have any other engines, such as for fire suppression, water, lights, etc, whose emissions were not included in the approval order?

69. 25. Microsoft should be required to report every power outage, and all startups, regardless of how many engines are involved. Remove Microsoft's request to report NOx only if 30 engines or more run for a power outage. As I mentioned, the 1-hr NO2 standard will be violated when fewer than 30 engines run. Also, Microsoft should not be allowed to run for just "any" purpose as requested in the approval order.

70. 26. Why are *only* the emissions from the "main generators" included in the approval order?

71. 27. Emissions in Table 2.1 are "front-half" only emissions. What is the total amount of DPM – front and back half -- that will be emitted under this approval order from all engines, including the "reserve engines"? What is the total amount of pollutants that will be emitted from all engines, including the "reserve engines"? Please list emissions from all engines and for all pollutants in Table 2.1.

72, 28. Why aren't the emissions from all engines accounted for in the approval order? Since this is a federally enforceable permit, shouldn't the front and back half of the DPM be included for purposes of permitting under the CAA? Wouldn't both the front and back half have to be included on a Title V permit?

73. 29. What is the ground level ozone in Quincy? Why doesn't this approval order require demonstration of compliance with the O3 NAAQS?

74, 30. In Table 4 of the approval order, the PM and NMHC/VOC columns include reference to emissions at 50% twice. One of the emission rates under each of these should be 100%. Please double check the allowable emission rates in these columns to assure accuracy.

75. 31. What effect, if any, does the heat island affect have on the air quality modeling in Quincy? Has the increased temperature from the data centers been factored in to any air modeling?

Finally, I am attaching a copy of my earlier comments on the Oxford approval order. I would appreciate having those questions answered and comments responded to as though they were written for the MWH facility approval order.

Thank you.

Sincerely,

Patricia Martin

Johnson, Kari D. (ECY)

From: martin@nwi.net
Sent: Monday, December 05, 2016 9:29 AM
To: Johnson, Kari D. (ECY)
Cc: Wood, Karen K. (ECY)
Subject: RE: MWH comments

Kari,

76. I would like to add one additional question regarding condensable PM2.5 and PM10 NAAQS. The question is this: has the condensable portion of
PM2.5 been considered in modeling compliance with PM10 NAAQS?

Thank you for adding this to my comments.

Patty

Johnson, Kari D. (ECY)

From: Beth Miracle <skippergirl59@gmail.com>
Sent: Friday, December 02, 2016 2:31 PM
To: Johnson, Kari D. (ECY)
Subject: Microsoft MWH Data Center Air Permit Revision

77 Please do not approve the permit for eight additional reserve backup diesel generators. The information states that "they will only be used if ***one*** of the original backup engines fails." If one engine were to fail, why would it take eight backup engines to take its place? One engine fails – backup with one engine, not eight.

Diesel engine exhaust ***does*** contain fine particles that can cause health problems for people who are exposed frequently and high enough levels. DOE may evaluate the levels of all these pollutants during the permit review process, but they are not permanently monitoring the actual air quality with tests due to funding issues. It will be of no help when it is discovered in the near future that . . . oops . . . maybe it was worse than we expected and our models were off. Maybe we shouldn't have permitted so many diesel generators.

The numbers of diesel generators at the data centers in Quincy have gotten far too high. One of the biggest problems would be that if the power were to actually go off and the data centers had to start up the diesel generators that they would all be running at the same time. And they don't just sit there not running. It is my understanding that the data centers have to run them to make sure they are working. There are so many now that if only one is started per day that there will be one started every day for approximately 2/3 of the year. And no where is there any information about noise pollution.

In this age of global warming, I cannot believe that we are still relying on outdated technology and allowing companies to install dirty diesel generators, especially when there are other viable alternatives. On Microsoft's website, there is information about Microsoft's commitment to renewable energy and greener datacenters. In fact, in their latest energy deal, their Cheyenne datacenter will now be powered entirely by wind energy. Their backup generators are **NOT** like traditional backup generators that run on diesel fuel. They are natural gas turbines. They can integrate wind and solar.

So now it's up to the DOE to actually do something about it to require a cleaner alternative for backup. Let's not continue to add to global warming but do something now while we still have a chance. But unfortunately, if it's like all the other diesel generator permits, DOE will do nothing and ignore the public's concerns/comments and go ahead and allow the permits for additional diesel generators. How and when will DOE finally come to the realization that they need to change the permitting process? DOE should at the very least build in fees that would fund permanent air quality testing.

Beth and Charlie Miracle
Landowners, Quincy

Appendix C:
Draft Response to Comments Report for Microsoft Oxford, July 2015

In December 2014, Microsoft requested revisions to Approval Order 14AQ-E537 for their facility then known as Oxford. Ecology held a public comment period May 18, 2015 through July 13, 2015, with a hearing and public meeting held in Quincy on July 9, 2015. Ecology received comments during the comment period and prepared responses to the comments.

In September 2015, Ecology was ready to issue the Response to Comments Report, along with Approval Order 15AQ-E609 to replace Approval Order 14AQ-E537, but at Microsoft's request, Ecology did not issue the permit. Microsoft informed Ecology of additional changes that the facility was making from what was previously requested. Microsoft indicated they would request those changes in a new Notice of Construction Application.

Microsoft requested a new permit revision in April 2016, including changing the name of the facility from Oxford to MWH. Ecology considered the application complete on September 20, 2016, prompting this MWH public comment period held October 6, 2016 through December 2, 2016.

To integrate and provide a full record of public input on the Oxford and MWH projects, the draft 2015 Oxford Response to Comments Report is contained in this Appendix.

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DEPARTMENT OF
ECOLOGY
State of Washington

Response to Comments

Draft Revisions to Oxford Data Centers
Air Quality Permit 14AQ-E537

Public Comment Period:
May 28, 2015 – July 13, 2015

Public Hearing:
July 9, 2015

Summary of a public comment period and responses to comments on a new air permit

[NO PUBLICATION NUMBER ISSUED]

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Publication and Contact Information

This publication is available on the Department of Ecology's website at:
http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html

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2.	Northwest Regional Office, Bellevue	425-649-7000
3.	Southwest Regional Office, Lacey	360-407-6300
4.	Central Regional Office, Yakima	509-575-2490
5.	Eastern Regional Office, Spokane	509-329-3400

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

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Response to Public Comments

Draft Revisions to Oxford Data Centers
Air Quality Permit 14AQ-E537

Public Comment Period: May 28, 2015 – July 13, 2015
Public Hearing: July 9, 2015

Department of Ecology
Air Quality Program
Eastern Regional Office
4601 N Monroe Street
Spokane, WA 99205-1295

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Table of Contents

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Introduction

Any new air pollutant source must meet emissions standards set by the federal Environmental Protection Agency (EPA) and meet the requirements of the Washington State Clean Air Act. The Washington State Department of Ecology's (Ecology) Air Quality Program (AQP) manages air pollution within the state and is responsible for ensuring that those federal and state standards are met. The AQP does this by writing permits to regulate emissions from various sources. The AQP's goal is to safeguard public health and the environment by preventing and reducing air pollution.

Before construction can begin on a new air pollution source project or before changes can be made to an existing air pollution source, the applicant must apply to Ecology for an air quality permit. This permit is called a Notice of Construction approval order (NOC). The application for the NOC requires the applicant describe all air contaminant emissions from the project, identify the federal air regulations that apply, describe the project's emission control technology, and prove that air quality standards won't be violated. If emissions of toxic air pollutants exceed levels set in state regulations, a Health Impact Assessment must also be conducted to prove that there is minimal health risk to the community. Ecology reviews applications for projects and develops conditions of approval to ensure that the project will comply with the Washington Clean Air Act, Revised Code of Washington (RCW) 70-94 and the Washington Administrative Codes (WAC) developed to implement RCW 70-94.

If the project meets these requirements, Ecology must approve the Notice of Construction application.

This Response to Comments is prepared for:

Proposed permit:	Revisions to the Oxford Data Center Air Quality Permit 14AQ-E537 Quincy, Grant County, WA
Comment period:	May 28, 2015 – July 13, 2015
Public hearing date:	July 9, 2015
Date final permit issued:	*[Not issued.]*

This document and other documents related to Ecology's final action on this draft permit can be viewed online at: http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html.

To see more information related to air quality in Washington, please visit the air program's website: http://www.ecy.wa.gov/programs/air/airhome.html.

Reasons for Changing the Permit

Ecology issued a permit to Microsoft (Approval Order No. 14AQ-E537) on August 15, 2014. The permit allowed Microsoft to install and operate equipment at a new data center called Oxford Data Center (Oxford). Before completing construction and beginning operation of the data center, Microsoft applied to change the permit.

Microsoft asked for flexibility in how they operate their emergency back-up diesel engine generators. Providing this flexibility in the permit would more accurately reflect the range of situations in which the engines will operate.

Emergency engines need flexibility when operating because power needs for data centers vary significantly throughout the day. The engines will most often operate between 25 and 75 percent of capacity, but flexibility to run between 10 and 100 percent capacity is needed during unplanned outages as well as during other planned situations.

While this flexibility could result in an increase in the amount of air pollution, the potential emissions will still be in compliance with state and federal air quality standards.

In addition, Microsoft requested changes to how they show they are complying with permit limits. The new permit allows them to reduce the minimum number of engines being tested per year from two to one. However, it extends the minimum number of years they must test and requires one more engine be tested overall. The effect of these changes increases the minimum number of engines tested from eight to nine and the minimum number of years Microsoft will be required to test the engines from 10 years to 25 years.

Public Involvement Actions

Ecology's Air Quality Program has been criticized over outreach efforts for the previous six data center air permit applications. With each application Ecology tried to incorporate suggestions from the community as well as identify innovative ways to connect with the Quincy community and in particular the Spanish speaking members. The outreach effort for this public comment period and hearing focused on broadening the number of possible ways that Quincy citizens could stay up to date and participate in commenting on this project. Below is a list of the various advertisements, media reports and outreach options that were implemented. Many community members helped to spread the word about this project and assist in directing the outreach in a more meaningful way. Thank you.

See Appendix A for copies of public involvement documents and outreach materials mentioned below and Appendix C for the transcripts and agenda from the public hearing.

<u>Press Release</u>
5/26/15 – Revising air permit for data center in Quincy: Seeking comments on changes to Microsoft's Oxford facility permit through June 18
5/26/15 - Revisión del permiso del aire para centro de datos en Quincy: Se solicitan comentarios hasta el 18 de junio sobre cambios al permiso para el centro Oxford de Microsoft

<u>Legal Advertisements</u>
5/28/15 – Quincy Valley Post Register (QVPR) in English and Spanish

<u>Display Advertisements</u>
05/28/15 – QVPR in English and Spanish
05/28/15 – El Mundo in Spanish
05/28/15 – Columbia Basin Herald in English and Spanish
05/26/15 – The Basin Register in English and Spanish
05/28/15 – The Wenatchee World in English
06/25/15 – QVPR in English and Spanish
07/02/15 – QVPR in English and Spanish

<u>Public Involvement Calendar</u>
5/28/15 – Posted comment period & hearing to Ecology's website
6/29/15 – Re-posted comment period & hearing to Ecology's website

<u>Document Repository</u>
Quincy City Hall
Quincy Library

<u>Information posted in Quincy</u>
05/27/15 – Posted English and Spanish factsheets in Quincy at the following locations:

- Quincy Community Health Center
- Central Market
- Akins Harvest Foods
- Monument Elementary
- Shopko
- A1 Stop
- City Hall
- Quincy Library
- The Grainery
- Quincy High School
- Casa Kino
- Mountain View Elementary
- Quincy School District Migrant Home Visitor Office
- IGA

Quincy Listserv Emails

03/09/15 – Oxford Data Center Update/Información reciente sobre el Centro de Datos "Oxford"

05/14/15 – Comment period coming up for revisions to Oxford Data Center Air Quality Permit/El período de comentario público que viene para revisiones al Permiso de Emisiones al Aire para Centro de Datos "Oxford" de Microsoft.

05/28/15 – Comment Period Open / El período de comentario público está abierto

06/29/15 – Reminder! Public Hearing on July 9th!!! / ¡Recordatorio! ¡Habrá una Audiencia Pública formal el 9 de julio!

06/30/15 – Correction on hyperlink

07/09/15 – Come to the Public Hearing! / ¡Ven a la Audiencia Pública!

Twitter & Text Alerts

English and Spanish Twitter posts and text alerts were posted on March 18, May 27, June 29, July 7 and July 8 of 2015.

Public Hearing for Oxford Data Center: July 9, 2015

A public hearing was held at the Quincy Community Center at 115 F Street SW in Quincy, WA> From 5:00pm -5:30pm a meet and greet provided an opportunity for attendees to view posters of various aspects of the project and ask questions of Ecology and Microsoft staff. From 5:30pm-6:30pm, Ecology and Microsoft staff gave presentations followed by a question and answer session. The formal portion of the hearing started at 6:30pm. Of the 21 people who attended this hearing, 6 people gave recorded testimony. See Appendix C for the transcript of this hearing.

Response to Comments

Ecology accepted comments for this project from May 28, 2015 through July 13, 2015. Ecology staff reviewed all comments received by email, mail and from the public hearing. In this section, questions identified from those comments are listed and followed by Ecology's response. To see the comment in full, please reference Appendix B: Public Comments, where you can locate each commenter's submission in full.

The following response to comments is split into three sections. Section 1 addresses comments received in written format either by email or mail. All comments, in full, and any supporting documents provided by commenters as received by Ecology, are available in Appendix B. Section 2 addresses comments given at the public hearing. The complete transcript of the July 9, 2015 hearing is available in Appendix C. Section 3 are email threads between commenters and Ecology that occurred during the comment period.

Nine people submitted comments on the draft revisions to the Oxford Data Center air permit either in written format or at the public hearing. Of the total submitted comments, 51 questions generated responses. Table 1 below lists the commenter, any organization they may represent, the format of their comments, the reference number for each person's comments, and the pages where those comments can be found. Thank you to everyone who provided comment for the public record on this topic.

List of Commenters

Table 1 lists the names of individuals who submitted a comment for this project. The table shows name, organization representing (if any), comment format, date received, comment number and page number where comments can be found.

Table 1. Comment Identifier Table

COMMENTER	FORMAT	DATE RECEIVED	COMMENT NO	PAGE NO
Cris Sherman	Email	5/28/15	1	14
Patty Martin	Written	7/13/15	2-24	14-24
Danna Dal Porto	Written	7/13/15	25-36	24-30
Danna Dal Porto	Hearing	7/9/15	37-43	30-33
Patty Martin	Hearing	7/9/15	44-49	34-36
Debbie Koehnen	Hearing	7/9/15	50-51	36-37

Section 1: Comments received in written format

The questions responded to in this section are from comments received either by email or mail. Many of the numbered comments are selections from a larger written comment received. Some commenters included supporting documentation that is referenced in their comments. To see comments in full, associated supporting information, and any other comments that did not generate a response, please go to Appendix B.

Cristopher Sherman, May 28, 2015

COMMENT 1, CRIS SHERMAN:

I lived in the town of Quincy for one year. After experiencing the lack of quality from the air, I chose to move to the country six miles out of town. I could actually see color in the air and I didn't want to be breathing whatever it is that was in the air. My question is, why is there a concern over an air permit for a data center when the quality of air in Quincy is already very poor? As I drive to teach at the high school in the morning, I can observe colored clouds coming from a plant that is located right behind the high school. I have even come out of school to find my car covered with some type of fine debris a couple of times due to the emissions from this plant. So again I ask, who cares about an air permit for a data center? It is my personal observation that there are bigger fish to fry when it comes to air quality in the town of Quincy. And they are polluting right next to our schools where kids are being expose daily.

ECOLOGY RESPONSE:

Ecology is required to go through a permitting process for facilities such as Oxford. If you have any questions about air pollution in your area or if you see a pollution source you have concerns about please contact Jolaine Johnson, Eastern Region Air Quality Commercial/Industrial Unit Manager, at 509-329-3452.

Patty Martin, July 13, 2015, comments 2-24

COMMENT 2: PATTY MARTIN:

Let me begin by stating that this permitting process has helped to highlight many past misrepresentations by Ecology, and/or the industry, and clarify areas of deficiencies in past Ecology permitting within the City of Quincy. All the "conservative estimates" made by Jim Wilder using the Tier 2 standards without consideration of the condensable "back-half" of the particulate matter, or without accurate "cold start" factors, suggest that prior permits may have been impermissibly issued and that federally mandated New Source Performance Standards (NSPS) and National Ambient Air Quality Standards (NAAQS) may have been violated. The haze that now lingers over our community throughout the year (after the arrival of the data centers) is most probably the consequence of underestimating $PM_{2.5}$ and PM_{10} emissions, and manipulating engine load modeling to comply with the 1-hour NO_2 standards.

ECOLOGY RESPONSE:

The Microsoft Oxford permit, Approval Order 15AQ-E609, takes into consideration two types of cold start factors. The first is associated with elevated emissions from the Tier 2 engine during engine start up. The second is associated with the time it takes the emission controls (SCR & DPF) to warm up enough to begin working effectively. The permit also requires Microsoft to measure the condensable back half of particulate matter emissions. This comment does not result in a change in the proposed permit.

COMMENT 3: PATTY MARTIN:
Oxford and Ecology are once again underestimating emissions from these engines, in spite of the "added safety factor" of 20%. Microsoft's earlier independent engine test in Tukwila demonstrated that the worst case scenario for particulate matter is the 10% load, not the 25% load claimed by Matt Cohen during the Public Hearing or the actual 50% load used during modeling. See attached NC Power Final Report, Tables 13, 15 and 17. The issue with the permit this time appears to be NOx, and as Jim Wilder had admitted to in earlier permits, there is a NOx problem in the Quincy area.

ECOLOGY RESPONSE:
The commenter is correct regarding worst-case scenarios for particulate matter. The worst-case $PM_{2.5}$ emissions occur at 10% load. If Microsoft or Ecology representatives at the public hearing on July 9, 2015 mistakenly referred to $PM_{2.5}$ maximum emissions occurring at 25% load, that was incorrect. However, the $PM_{2.5}$ emissions estimates used in the permit application (and modeling) were in fact based on a 10% load as correctly stated in the application.

The commenter is correct that concentrations of NOx resulting from this project come closest to the NAAQS. However, NOx concentrations resulting from emissions from the Microsoft Oxford project have been shown by the applicant not to exceed the NAAQS. Concentrations of the toxic air pollutant (TAP) NO_2 have been shown by the applicant to be less than the Acceptable Source Impact Level (ASIL) and therefore did not require a second Tier review. This comment does not result in a change in the proposed permit.

COMMENT 4: PATTY MARTIN:
Microsoft's attorney, in the presence of Ecology and without dispute from the agency, stated that the modeling conducted was done under the worst case scenarios. As mentioned previously, this is not correct. Carbon monoxide is highest at low load, not at the 100% load for which testing is required in the permit. Particulate matter is highest at low-load, not the 50% assumed in the permit. Volatile organic compounds (VOCs) are also highest at low-load, not the 50% for which testing is required in the permit. These misrepresentations underestimate exposure and risk to our community, and testing at these loads – which is not worst case scenario – will not be representative of what is actually being emitted by these engines.

ECOLOGY RESPONSE:
The commenter is confusing modeled emissions with testing requirements. The modeled emissions rate for each pollutant was based on the load that produced the highest emissions of that pollutant. For the majority of engines (32 of 37 total engines), the load with the highest emissions as measured in pounds of pollutant emitted per hour is generally as follows: CO and NOx at 100% load, PM and non-methane hydrocarbons (NMHCs or VOCs) at 10% load.

However, the load with the highest emissions for VOC and CO can vary depending on the engine size. For CO, the load with highest emissions is at 100% for a majority of the engines, but 10% for the smaller engines. For VOC and PM, the loads with highest emissions are at 10% and 50%. Based on manufacturer operation and maintenance requirements for operating engines at low loads (30% or less), testing engines at low loads can be problematic for testing equipment. Therefore, the single load test for PM will be conducted at 50% load, which is also more representative of the load at which the engines will operate. The single load tests for VOC and CO will be conducted at the 50% and 100% loads respectively.

This clarification has been added to the technical support document, but this comment does not result in a change in the proposed permit.

COMMENT 5 PATTY MARTIN:
Additionally, the assumptions in "TABLE 2 UNCONTROLLED (EPA TIER 2-COMPLIANT) GENERATOR EMISSION RATES" for the 2.5 MW engine particulate matter closely approximates the emission rates from Microsoft's source test in Tukwila which did not include cold starts. Again, the emission estimates appear to underestimate risk. Testing requirements in the original 2014 Oxford NOC permit 14AQ-E537 should be retained in the 2015 permit.

ECOLOGY RESPONSE:
Table 2 Uncontrolled (EPA Tier 2-Compliant) Generator Emission Rates Applicable to Cold Start Conditions (found in the March 13, 2014 NOC application – which is available at http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html) shows emissions from the engines before the emission controls have warmed up enough to start reducing emissions. This type of cold-start period, called the catalyst cold-start activation delay period is described in section 2.2.3 of the March 13, 2014 NOC application. It makes sense that these emission rates would be similar to those measured during the Tukwila source test as they are assumed to be the emission rates of the Tier 2 engines without controls. The increased emissions of particulate matter occurring as the engine itself warms up are taken into account by the cold-start "black puff" initial spike factors described in section 2.2.2 of the March 13, 2014 NOC application.

The testing requirements in the 2015 permit are nearly identical to the testing requirements in the 2014 permit. The testing regime in the 2015 permit extends the minimum number of years Microsoft must test from 10 years to 25 years. This requirement is more in line with the reasoning of the Pollution Control Hearings Board ruling requiring testing to ensure that, over the long term, the engines will continue to comply with Tier 2 emission rates. The testing regime in the 2015 permit also increases the minimum number of engines tested from eight to nine. See also response to comment 7.

COMMENT 6: PATTY MARTIN:
The agency should also require that the purpose of every engine operation be included in the permit. Without this requirement the agency cannot discern between discretionary and necessary engine runtime.

ECOLOGY RESPONSE:
Approval Condition 8.5 of the permit (See Appendix E) requires Oxford to record reasons for operating engines to address 40 CFR Part 60 requirements for emergency engines. In addition, Oxford must report annual usage allowed under 40 CFR 60.4214(d). This comment does not result in a change in the proposed permit.

COMMENT 7: PATTY MARTIN:
Using emission rates from Microsoft's Tukwila performance test, it appears that Oxford has underestimated the uncontrolled emissions of NOx. Oxford's claimed "cold start factors in the NOC Appendix C, Table 2 - 2500 kWe Generators Curve Fits are nearly identical to the warmed up engine emissions from Tukwila. See attached NC Power Final Report, Tables 1, 5 and 9. The "cold start" emissions should reflect numbers in excess of those from the Tukwila performance test, not less than it. Again, using the Tukwila engine emissions, it appears that Oxford would have been a major facility for NOx. Failure to use appropriate emission estimates inflates the cost of BACT making it appear unachievable.

ECOLOGY RESPONSE:
Microsoft used Caterpillar's NOx emission factors of 50.6 lb/hr, 42.1 lb/hr, and 15.8 lb/hr for the three engine types to be used at Oxford (2.5 MWe, 2.0 MWe, and 0.75 MWe) operating at 100% load. These are Caterpillar's highest NOx emission factors for these engines without the use of add-on controls. These emission factors were used to determine emission rates for NOx before the add-on controls for NOx (selective catalytic reduction) warmed up enough to work effectively. The "cold" emission rates shown in February 2, 2015 NOC Application Table 2 of attachment C-1 (available at: http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html) are the emission rates of the engines without add-on controls. The "warm" emission rates are the rates of NOx emissions once the add-on controls (selective catalytic reduction) have warmed up enough to remove NOx from the emission stream. In reality, because the engines will operate at a "range of loads" as specified in the application, they will not operate at 100% load full time.

Emissions of NOx from Tier-2 compliant engines without add-on controls are not higher during cold starts than when the engine is warm. Thus, the cold-start black-puff initial spike factor for NOx is 1.00, as shown on page 2-3 of the June 11, 2014 NOC application (also available at http://www.ecy.wa.gov/programs/air/quincydatacenter/docs/Final_Project_Oxford_NOC_rpt-06-11-14.pdf). It makes sense that the NOx emission rates in NOC Table 2 of attachment C-1 are similar to those found in the Tukwila tests because the emission rates are those that would be predicted for these engines without add-on controls.

Annual emissions of NOx from the Oxford emergency engines without the use of the Tier 4 add-on controls would be 79 tpy.

COMMENT 8: PATTY MARTIN:

After the Public Hearing I asked Gary Huitsing whether Oxford would be a major facility if they did not use emission controls. When he didn't answer directly with a "yes or no", I asked again, and again. I mentioned I believed Oxford to designate as major based on emitting over 100 tpy of NOx, to which he replied that "the 100 tpy only applied to 28 specific sources", and that to be major Oxford would have to exceed 250 tpy for all emissions. That is not my understanding of the definition of a major source. Please clarify for the record when a source becomes major for the purposes of the federal CAA.

ECOLOGY RESPONSE:

Under the federal Clean Air Act, there are two different types of major sources - those that are major for purposes of the Prevention of Significant Deterioration (PSD) program, and those that are major for purposes of the Title V Air Operating Permit program.

A major source for PSD permitting is defined in 40 CFR 52.21(b)(1). A more readable version of this definition is found on page A.1 of the 1990 NSR Workshop Manual Section (NSR Manual): "A new source is major if it has the potential to emit any pollutant regulated under the Act in amounts equal to or exceeding specified major source thresholds [100 or 250 tons per year (tpy)] which are predicated on the source's industrial category." The 100 tpy threshold applies to a specified list of 28 source categories and emission units. The major source threshold for data centers is 250 tons per year because the data centers and the emergency electric generators at those sites are not one of the designated 28 source categories or emission units. Therefore, Oxford is not a PSD major source because it does not have the potential to emit over 250 tons per year of any regulated pollutant.

For Title V Air Operating Permit purposes a major stationary source of air pollutants is one that directly emits or has the potential to emit, one hundred tpy or more of any air pollutant subject to regulation. Additionally, an air operating permit is required for a source that emits or has the potential to emit ten tons per year (tpy) or more of any single hazardous air pollutant (listed pursuant to section 112(b) of the FCAA) or twenty-five tpy or more of any combination of such hazardous air pollutants. The Oxford data center is not a major source for Title V purposes, whether it does or does not implement Tier 4 final controls, because potential emissions of all pollutants are less than 100 tpy even without Tier 4 controls. The pollutant with the highest rate of potential emissions is NOx, and potential annual emissions of NOx, without Tier 4 controls, would be about 79 tpy.

This comment does not result in a change in the proposed permit.

COMMENT 9: PATTY MARTIN:

As for compliance with NSPS, it must be met at all loads, not an average of loads as suggested in the Five-load weighted averages in Table 4 of NOC Approval Order 14AQ-E537.

ECOLOGY RESPONSE:
Compliance with the NSPS for Microsoft's emergency engines requires the use at all times of engines that are certified by the manufacturer to meet the 40 CFR 89 Tier 2 emission levels as required by 40 CFR Part 60 Subpart IIII. Compliance with Tier 2 emission requirements is determined by emission testing conducted at 5 different loads as defined in 40 CFR part 89, with the results averaged using the weighting factors specified in Appendix B to Subpart E of 40 CFR part 89. This comment does not result in a change in the proposed permit.

COMMENT 10: PATTY MARTIN:
The modeling of "3x this" and "20% that" appears to be a "smoke and mirrors" to obscure the reality that Microsoft's Oxford facility would have been a major facility for NOx emissions without the use of controls, and was therefore required to use them, if for no other reason than to avoid regulation under Title V. As one of two facilities under the common control of Microsoft, operating within the same industrial classification, and in close enough proximity to be considered under Common Control for purposes of the federal CAA, I believe that Microsoft's Columbia Data Center is also subject to the Tier 4F NSPS.

ECOLOGY RESPONSE:
Potential emissions of NOx from the Oxford facility without the use of Tier 4 controls would be about 79 tpy. This is less than 100 tpy and is therefore insufficient to make the Oxford data center a major facility subject to Title V permitting requirements.

Ecology does not believe the Oxford Data Center and the Columbia Data Center should be treated as a single source. Whether or not two facilities are under common control is not the only criterion required to be met to determine whether they are a single source. An additional criterion is that the facilities need to be on adjacent or contiguous properties. The two Microsoft facilities are not physically adjacent, nor are they on contiguous properties. Because these two data centers do not meet the definition of a single source, Ecology has not looked at whether their combined emissions exceed major source thresholds.

This comment does not result in a change in the proposed permit.

COMMENT 11: PATTY MARTIN:
As I mentioned at the Public Hearing, data centers locating in Quincy are circumventing the CAA by purchasing large parcels of property and measuring ambient concentrations at the fence line. The NAAQS, for purposes of Washington State, and as codified in the SIP, is measured in the "surrounding outside air". WAC 173-400-030(6).

ECOLOGY RESPONSE:
The federal Clean Air Act requires compliance with the NAAQS in all areas external to buildings, to which the general public has access (40 CFR 50.1(e)). The state Clean Air Act requires compliance with the toxic air pollution requirements in any area to which the applicant does not restrict or control access (WAC 173-460-070). Therefore, compliance with the NAAQS and with the ASILs

must be determined at the fence line. This comment does not result in a change in the proposed permit.

COMMENT 12: PATTY MARTIN:
As for emergency engines, the State of WA does not recognize the exemption under the statute or in the SIP. Additionally, a challenge by Delaware has found that the 100 hour exemption is arbitrary and capricious.

ECOLOGY RESPONSE:
WAC 173-400-930 exempts a facility from filing a notice of construction for emergency engines under certain circumstances. Microsoft filed a notice of construction for the Oxford engines and therefore did not take advantage of this exemption. In addition, this exemption does not apply to the Oxford facility because the cumulative brake horsepower of Oxford's emergency engines is greater than 2000 BHP.

State law requires BACT determinations and analyses to determine compliance with the NAAQS and the state TAPs requirements to evaluate the potential emissions from a facility. The potential emissions from the Oxford engines are limited by the fact that the engines will be operating as emergency engines. The permit reflects this operating scenario by including operating restrictions that limit the engines to operating for only 86 hours per year (rather than the possible 8760 hours in a year).

The challenge by Delaware mentioned by the commenter is the case, Delaware Department of Natural Resources [DNREC], et al. v. EPA (No. 13-1093). That case challenged the provisions of 40 CFR part 60 Subpart IIII and 40 CFR part 63 subpart ZZZZ authorizing emergency engines to operate for emergency demand response purposes. On May 1, 2015, the U.S. Court of Appeals for the District of Columbia Circuit issued an opinion stating that the100-hour exemption from controls included in these rules was "arbitrary and capricious" and vacated the exemptions. On July 21, 2015, the court issued a new ruling clarifying that the vacatur applies only to engines used in an emergency demand response program and that other portions of the rule remain in force, including those allowing the exemption for emergency engines being used for maintenance checks and readiness tests. For further information:
http://www.epa.gov/ttn/atw/icengines/tech.html#otheree

This comment does not result in a change in the proposed permit.

COMMENT 13: PATTY MARTIN:
Would the Oxford facility be a major facility if it were not using catalyzed DPFs and SCRs? Would it emit over 100 tpy of NOx without the use of Tier 4F controls?

ECOLOGY RESPONSE:
Assuming the same number of hours of operation, the Oxford data center would not be a major source for Title V or PSD purposes whether Tier 4 final controls are used or not. Potential emissions of NOx without SCR would be about 79 tpy. Potential emissions of PM without DPFs

would be 1.85 tpy. Emissions of VOCs without DPFs would be 1.99 tpy. Potential emissions of CO without DPFs would be 10.3. This comment does not result in a change in the proposed permit.

COMMENT 14: PATTY MARTIN:
At what loads will the engines at Microsoft be operating and for how many hours per load? Why isn't this information in the 2015 permit?

ECOLOGY RESPONSE:
As explained at the public meeting before the hearing, Microsoft's approach is not based on how many hours engines will operate at specific loads, but rather provides the facility some flexibility in how it operates the engines, as long as they operate no more than 86 hours per year as determined by a three year rolling average. Compliance with the NAAQS and state TAPs requirements was demonstrated by looking at, for each pollutant, the load with the highest emissions. This approach is explained in the technical support document for this permit as follows:

"Instead of load-based emission estimates, Microsoft conservatively over-estimated emissions at the load that causes the highest emissions, when in reality, the facility will operate engines at a range of loads and not solely at the load with highest emissions. As a result, even though permitted emission limits have increased, actual pollutant emissions will be less than the emission limits allowed by the permit."

This comment does not result in a change in the proposed permit.

COMMENT 15: PATTY MARTIN:
Why is Ecology only requiring Method 5 or Method 201a for compliance testing the engines against the NSPS emission limitation? Why isn't each of the load specific performance tests reviewed against the NSPS emission limitations?

ECOLOGY RESPONSE:
The manufacturer (Caterpillar) from whom Microsoft will acquire the engines for the Oxford data center is required to demonstrate that the engines meet NSPS emission standards according to 40 CFR 60.4202 before certifying that the engines meet Tier 2 standards. The permit specifically requires Microsoft to use only certified engines. NSPS emission limits are therefore assumed to be met. The testing that is required to demonstrate that the engines meet NSPS Tier 2 emission standards can be found at 40 CFR 89.410 and Table 2 in Appendix B to Subpart E of 40 CFR part 89.

In addition to this, and although not mandated, Ecology has chosen to require engine compliance testing for this permit. The compliance testing required by Ecology includes more than the particulate matter tests referred to by the commenter. Other tests that Ecology is requiring in this permit include EPA Method 7E (for NOx), EPA Method 10 (for CO), and EPA Method 25A and EPA Method 18 (for NMHC/VOC). The engines at Oxford are only required to be certified by the manufacturer to meet the Tier 2 emission levels of 40 CFR 89.112 according to 40 CFR 60 as explained in the Technical Support Document (TSD) for this permit. However, the engines must meet Tier 4 standards in order for the project to comply with the NAAQS. Therefore, Oxford will be testing to show compliance with Tier 4 final NSPS 40 CFR 1039.101 emissions limits as listed in Table 4 of the permit. The testing requirements for Tier 4 compliance can be found at 40 CFR 1039.501, 40 CFR 1039.510, and Appendix II to 40 CFR Part 1039.

In addition to the tests listed above, Ecology is also requiring single load tests for each of the pollutants listed above and also for ammonia. Method BAAQMD Method ST-1B (or EPA Method 320 or EPA CTM-027) is used for ammonia. The single load test for particulate includes EPA methods 5 and 202.

This comment does not result in a change in the proposed permit.

COMMENT 16: PATTY MARTIN:
Why is Ecology only reporting the filterable portion of the diesel particulate matter (PM2.5) in Table 2.1 "Criteria Pollutants Potential to Emit"?

ECOLOGY RESPONSE:
The commenter is incorrect. Table 2.1 in Approval Order No. 15AQ-E609 includes both filterable and condensable particulate matter estimates for PM2.5. This comment does not result in a change in the proposed permit.

COMMENT 17: PATTY MARTIN:
Did Ecology and Microsoft include emissions – NOx, VOCs, PM, etc. -- from Amway's boilers in their modeling?

ECOLOGY RESPONSE:
Ecology did not include emission from Amway in the modeling to demonstrate NAAQS compliance. For a minor source in an attainment area, with ambient impacts below the NAAQS, modeling of emission from a nearby minor source is up to the discretion of the modeler. Ecology determined not to include the Amway emissions because the air quality analysis supporting Amway's permit application showed that Amway emissions do not have a significant impact at Microsoft. However, Ecology has chosen to model Diesel Engine Exhaust Particulate (DEEP) sources in the area as part of a community-wide modeling approach. The community-wide modeling approach is not intended to include 100% of all sources in the area. The community-wide modeling approach for the Oxford data center included notable sources such as other nearby existing permitted data center sources including highways and railroads. This comment does not result in a change in the proposed permit.

COMMENT 18: PATTY MARTIN:
Did Ecology and Microsoft include particulate emissions from ConAgra, and from Columbia's cooling towers?

ECOLOGY RESPONSE:
Yes. The modeling was conducted by Landau, Microsoft's consultant on the Oxford Data Center, and the modeling was verified by Ecology's Air Program. Local background included Columbia Data Center, Dell Data Center and ConAgra fryers. This comment does not result in a change in the proposed permit.

COMMENT 19: PATTY MARTIN:
Can the Oxford engines meet the Tier 4 NSPS of 0.03 g/kW-hr for particulate matter (filterable plus condensable) with the controls they are installing?

ECOLOGY RESPONSE:
Table 4 in Approval Order 15AQ-E609 requires the engines to meet the Tier 4 particulate matter limit of 0.03 g/kWhr. This comment does not result in a change in the proposed permit.

COMMENT 20: PATTY MARTIN:
Where in the regulations is a 5-load weighted average of engine emissions required?

ECOLOGY RESPONSE:
As noted in the permit in Table 2a.1, the engines at Oxford must be certified by the manufacturer to meet the 40 CFR 89 Tier 2 emission levels as required by 40 CFR part 60. 40 CFR 89.410 and Table 2 in Appendix B to Subpart E of 40 CFR 89 outline the requirements for testing and specify the loads and the weighting factors to be used to determine compliance with Tier 2 emission limits. The comparable testing requirements for Tier 4 compliance can be found at 40 CFR 1039.501, 40 CFR 1039.510, and Appendix II to 40 CFR Part 1039.

COMMENT 21: PATTY MARTIN:
In estimating compliance with the NAAQS, did Ecology consider the "condensable" portion of diesel emissions from the Columbia Data Center and Dell? From Yahoo!, Vantage, Sabey and Intuit?

ECOLOGY RESPONSE:
"Local background" values for $PM_{2.5}$ and NO_2 consist of the ambient impacts, at Project Oxford's maximum impact location, caused by emissions from the nearby emergency generators and industrial emission sources at the Columbia Data Center, Dell Data Center, and ConAgra Foods. Potential emissions from each of those facilities were assumed to be equal to their respective permit limits.

COMMENT 22: PATTY MARTIN:
Where in the regulations is a 3-year rolling average allowed?

ECOLOGY RESPONSE:
National Ambient Air Quality Standards (NAAQS) for the following pollutants are based on 3 year averages: NOx primary 1-hour standard, PM2.5 primary and secondary annual standards, PM2.5

primary and secondary 24-hour standard, PM10 primary and secondary annual standards, SO2 primary 1-hour standard.

COMMENT 23: PATTY MARTIN:
Table C1-1, C1-2 and C1-3 in the NOC Application uses "TOTAL NOx (as NO2)". Please correct this report to reflect total NOx which is what is used for BACT purposes. Representing it as NO2 is useless for purposes of BACT, and misleads the reader regarding NOx emission levels.

ECOLOGY RESPONSE:
Microsoft provided separate BACT cost estimates for total NOx and for NO2. Total NOx emission levels as well as NO_2 emission levels are both provided in the permit and technical support document (TSD). This comment does not result in a change in the proposed permit.

COMMENT 24: PATTY MARTIN:
Why is the "regional background" for 1-hr NO2 lower now (15.6 ug/m3) than it was during the permitting of Dell (29 ug/m3)? See attached Regional Background.

ECOLOGY RESPONSE:
Previous estimates used the nearest monitor to derive a regional background concentration. Since the nearest monitor is far away it may not reflect what's going on in Quincy. A new tool was developed that uses a fusion of modeled and monitored concentrations to determine more accurate background estimates for the entire state. The new tool indicates that a more accurate estimate of one hour NO_2 background concentration is 8.3 ppb or 15.6 ug/m^3.

Danna Dal Porto, July 13, 2015, comments 25-36

COMMENT 25: DANNA DAL PORTO:
The meeting did not provide adequate time for questions and answers. The two Ecology spokespersons spent too much time doing a repetitive and long overview of information not really pertinent to the Permit Appeal. Although Karen Wood was listed as a Panel member on the agenda, she did not sit at the table or present herself at that formal time for questions, although she did stand in the general area. Because everything was so rushed, this meeting did not satisfy my need for specific data center operational information and I would consider this not a good faith effort by Ecology to interact with the public.

ECOLOGY RESPONSE:
Ecology strives to begin public hearings as close to the advertised start time as possible. Ecology began the hearing at 6:32pm. The hearing was advertised for 6:30. In order to allow members of the public time to talk with agency and applicant staff, a meet and greet began at 5pm. Presentations did go over time, which cut into the Q&A portion afterward. In an effort to start the hearing on time, the hearings officer asked if panelists would be open to staying afterward and answering additional questions after the formal testimony closed. Formal hearing adjourned at 7pm and Ecology staff remained to talk with members of the public until 8pm. The transcription of the recorded portion of the hearing is available in Appendix C.

COMMENT 26: DANNA DAL PORTO:

Referencing Responsiveness Document [*Response to Comments document from the Oxford Data Center Air Permit issued August 14, 2014*], Comment 9, John Radick; language that Radick proposes is that Microsoft "voluntarily" proposed to equip all of Oxford's diesel engines with control devices that achieve EPA's Tier 4 standards and exceed the Best Available Control Technology (BACT). "Microsoft believes it is important that the permit contain findings on these key details of the project." (Exhibit 4) The Ecology Response states that the Tier 4 controls are not "voluntary" and that these controls are required to reduce emissions to below BACT. (Exhibit 4) Please explain to me the importance of the word "voluntary" in this discussion. Why is Microsoft requesting the language to reflect that they are "voluntarily" adding controls to reach Tier 4 status when that is not true? Correspondence I had with Ecology clearly states that "Microsoft cannot meet emission conditions in the permit unless they use these controls for each engine" (Exhibit 5) I have another specific question about the Tier 4 level. The Oxford permit lists use of SCR's and DPF's alone to achieve Tier 4 and other paperwork I have see states Vantage Tier 4 engines use DOC's, DPF's and SCR's. Explain to me if this is correct, and how the Tier 4 set-up can vary in emission controls. How does the difference in the controls on these Tier 4 engines change the emission levels? I understood that the designation "Tier 4" had everything to do with the emission controls. Are the Vantage and Oxford Tier 4 engine operations, with different controls, performing the same level of emission control?

ECOLOGY RESPONSE:

The BACT determinations in the proposed permit and TSD state that Tier 2 engines (not Tier 4) are considered BACT. However, the use of Tier 4 engines is not voluntary because the Tier 4 controls are needed to ensure compliance with the NAAQS based on how the facility has chosen to operate (hours of operation, number and type of engines, etc...). Different combinations of different types of emission control equipment can be used to meet Tier 4 standards for different engines. This comment does not result in a change in the proposed permit.

COMMENT 27: DANNA DAL PORTO:

John Radick Responsiveness Comment 10 is a recommendation to change the basic method Ecology uses for the testing of engines and Microsoft wants to operate the engines in "load ranges" instead of the bank load testing of 0, 80, and 100. I read this comment and got very confused with the side comment that "it is useful to specify that "load" means electrical load (as opposed to mechanical load)." (Exhibit 6) I want an explanation of this concept. Please explain to me how "load" is used when the Permit discusses load limits. When I look at the Caterpillar Cat 3516C 2000 ekW Tier 2 Generator fact sheet, I see a column that is titled "Engine Load" and that correlates to different emission categories such as NOx, PM, and CO. (Exhibit 7) I understand this load as a mechanical load. Please explain how "load" is used as an electrical load. The Ecology comment is load ranges should have been introduced during the NOC review and not during the public comment period. This is an example of the odd and unusual disorganization I found in the Microsoft Response to Comments as well as the permit application. (Exhibit 6)

ECOLOGY RESPONSE:
In the context of diesel-powered generators, mechanical load refers to the work needed by the diesel engine to transfer power to the electrical generators. The electrical load is the electrical power generated by the generator after taking into account power losses due to the efficiency of the generator and fan power needs. Load in either case is often expressed as a percentage of the rated power capacity of the engine (for mechanical load) or the generator (electrical load).

No changes were proposed as part of this permit revision in terms of using the terminology of electrical load. The "e" in "ekW" referred to by the commenter refers to electrical load and was used in the previous permit as well as this one.

The commenter refers to comments made by Microsoft on the 2014 Oxford permit. Microsoft has the right to make comments or request changes to a permit during a comment period just the same as any member of the public. Ecology responds to comments and determines whether or not those comments/questions provide a basis for changing the permit. Microsoft requested significant technical changes to the permit during the 2014 public review of Microsoft Oxford's current permit. Ecology told Microsoft they had to submit a new permit application for the changes they were requesting because those changes were significant and would require another public comment period. After the 2014 permit was issued, Microsoft did submit a new permit application for those revisions, and Ecology drafted a revised permit. That revised permit was open for public comment from May 28, 2015 – July 13th. This response to comments document is the compilation of Ecology's responses to public comments received on the revisions in the revised Microsoft Oxford permit.

This comment does not result in a change in the proposed permit.

COMMENT 28: DANNA DAL PORTO:
Comment 18 [*Response to Comments document from the Oxford Data Center Air Permit issued August 14, 2014*], John Radick focuses on Recordkeeping and Reporting. His comment and Ecology's response indicate that consideration is being given to public requests for information on operating records. The Ecology response sounds as if public requests for operational information are being discussed. (Exhibit 10) I would like Ecology to tell me how that discussion is proceeding and when and how the public can expect to access some operational data.

ECOLOGY RESPONSE:
Ecology is requiring Microsoft to record and report reasons for operating their engines. Specific requirements are listed in Section 8 and Section 9 of the permit which can be found in Appendix E.

COMMENT 29: DANNA DAL PORTO:
I have questions on the Proposed Legal issues that are part of the appeal before the Pollution Control Hearing Board, PCHB No. 14-104. (Exhibit 3) This appeal isolates four of the requests Microsoft listed in the comments for the Public Hearing, July 24, 2014. Proposed Legal Issue 1is an argument over detailed test protocols. Proposed Legal Issue 2 is based on Condition 4.4 and

Table 4 of the Approval Order and this order regards the costly and time-consuming source testing necessary to document compliance with EPA performance standards. (Exhibit 3) I want to know if these tests mentioned in Issue 2 are being required because Microsoft Oxford is being tested as a "major facility"? Is this because Microsoft would now be required to measure filterable and condensable emissions? Is this testing normal for any data center using Tier 4 engines? Why is Microsoft objecting to this source testing if it is normally required for Tier 4 engines?

ECOLOGY RESPONSE:
The tests mentioned in Legal Issue No. 2 are required to determine compliance with emission limits. They are not related to questions about condensable versus filterable emissions. Microsoft Oxford is not a major facility and is, therefore, not being tested as a major facility.

COMMENT 30: DANNA DAL PORTO:
Proposed Legal Issue 3 in the appeal PCHB No. 14-104 (Exhibit 3) is a complaint because Ecology is limiting Oxford Data Center to three specified load levels. Ecology has always set load limits for data center operations. The three load recommendations have never been an issue with any other operational permit, even Microsoft Columbia that just went through a permit modification. If Microsoft wants to request load modifications they will have to put forward an entirely new operating permit and show how that would work through modeling the emission impacts.

ECOLOGY RESPONSE:
Ecology agrees that the mechanism for Microsoft to request an operating regime different from the one in their permit is to submit a new permit application with sufficient data and modeling to show that the emission impacts would not violate federal or state law. After receiving the 2014 permit, Microsoft did submit a new permit application asking for a new operating regime, and Ecology drafted a revised permit. That revised permit was open for public comment from May 28, 2015 – July 13th. This response to comments document is the compilation of Ecology's responses to public comments received on the revisions in the revised Microsoft Oxford permit.

COMMENT 31: DANNA DAL PORTO:
Proposed Legal issue 4 on the appeal PCHB No. 14-104 (Exhibit 3) describes how Microsoft does no want to maintain a record of the "reason for operating" each of the 37 engines at Oxford, each time that an engine starts up. I think requiring a record of operation is necessary and important for Ecology to know. I would like to know why the engines run as a member of the local community. I am requesting access to the operational records of the engines at Oxford and I think the record should include each and every time the engine runs and the reason for that operation.

ECOLOGY RESPONSE:
Approval Condition 8.5 of the permit requires Oxford to record reasons for operating engines. This comment does not result in a change in the proposed permit.

COMMENT 32: DANNA DAL PORTO:
I reviewed the documents available for study and comment at the July 9, 2015, Public Hearing. One of the Landau documents, Signed Air Permit Revision Application Form, Revised January 2013, (red lined version) had a variety of charts. I have included three of these charts and I need clarification about terminology used on each of these charts. Each chart has items labeled "Cherry Picked". I want an explanation of how the term "cherry picked" is used in relation to technical documents for data center permits. (Exhibit 11)

ECOLOGY RESPONSE:
As explained in the TSD, Landau picked worst-case scenarios in estimating emissions. The "cherry-picked" values (as stated on February 2, 2015 NOC Application table C1-4 available at http://www.ecy.wa.gov/programs/air/quincydatacenter/docs/NOCapplication.pdf) represent the worst case emissions, which are different for the three different size engines at the Oxford data center. For example, the worst-case CO emission for the 2.5 MWe engines is at 100% load (as shown on Table C1-1), whereas worst-case CO emissions for the 2.0 MWe and 0.75 MWe engines is at 10% load (as shown on Tables C1-2 and C1-3). As a conservative overestimation of emissions, these worst-case loads were "cherry-picked." For CO, this is demonstrated in part E of Table C1-5.

COMMENT 33: DANNA DAL PORTO:
I have a document from the Landau Associates Final NOC report June 2014 and this is Table 13, 1-Hour N02 NAAQS Compliance Modeling Results. The document uses Modeling years 2001-2005. The Local Background lists only partial sources of N02 and does not list the effects of the trains, trucks and the nearby Amway source. (Exhibit 12) I want to know if Microsoft can use old and incomplete data for modeling the levels of emissions. I would like updated information to be used to model the effects of data center emissions.

ECOLOGY RESPONSE:
Air quality modeling may be done for one of two purposes: 1) a forensic investigation which determines to the greatest degree possible the concentration of the pollutant of interest at specific times and places, or 2) an air quality analysis to determine the probable distribution of concentrations at one or more specific locations.

A forensic investigation attempts to use specific inputs, e.g., meteorology, emissions, land surface characteristics, for the time and place of a specific incident.

An air quality analysis uses a sufficiently long period of representative meteorology to develop the expected distribution of concentrations from specified emissions at a wide range of locations in the vicinity of the emission point. Although there are long term annual to decadal variations known to affect weather, e.g., ENSO (El Niño Southern Oscillation) and PDO (Pacific Decadal Oscillation), there is insufficient evidence to define their effect on air quality. Accordingly, any five year period of meteorology that meets quality and siting requirements, which almost all airport observations do, will provide a satisfactory estimate of the distribution of possible concentrations. Unlike a forensic investigation there is no requirement for the meteorology to be for a period when the emissions occurred which is impossible for future emissions.

Regarding Amway: The air quality analysis supporting Amway's permit application showed that Amway emissions do not have a significant impact at Microsoft.

COMMENT 34: DANNA DAL PORTO:

I am requesting two physical air monitors for Quincy. As was mentioned at the Hearing, Quincy is certainly getting more data centers. The 2015 Republican budget had a line item in the document that provides for tax relief for data center construction and the document mentions from 8 to 12 data companies that can build in Quincy. I do not know if that includes the expansions that are predicted for data centers already here. It is well known that Yahoo plans an expansion and perhaps others. Sabey is already expanding. The number of diesel generators in town will quickly exceed many more than 200 units and even the Spokane office of Ecology should recognize that is a huge number of huge generators in a small community. I think a real case can be made for installing air monitors in Quincy. I do not believe that telling residents that there is no money to install monitors will hold up under scrutiny. This is a matter of public health and it is time to know the accurate levels of toxic components in the air instead of guessing.

ECOLOGY RESPONSE:

Ecology is aware of Ms. Dal Porto's interest in monitoring and cause and effect studies for the Quincy area ambient air. At Ecology's March 2014 Monitoring Advisory Committee {MAC) this issue was discussed. It was determined during the March meeting that due to limited staffing and fiscal resources as well as the low impacts to the community, air quality monitoring studies cannot be conducted in the area at this time. However, Ecology is exploring other avenues to see if there is some way to find funding for monitoring in Quincy.

COMMENT 35: DANNA DAL PORTO:

I challenge any and all metrological assumptions about the weather in Quincy because Ecology uses weather data from Moses Lake. Quincy has distinct weather events because of the hills around the town as well as weather coming down the Columbia River from the north. Quincy needs accurate weather data to go along with the air monitors that must be installed in town. Ecology must do the right thing and not guess about air or weather.

ECOLOGY RESPONSE:

Analyses provided for previous data centers in Quincy indicate that, compared with data from Ephrata, the meteorological observations from Moses Lake tend to overestimate the impacts of pollution in Quincy because Moses Lake gets less wind (therefore less dispersion) than Ephrata. In previous actions, the Pollution Control Hearings Board has agreed that Moses Lake meteorology is sufficiently representative of conditions in Quincy to provide a basis for air dispersion modeling in Quincy.

COMMENT 36: DANNA DAL PORTO:

My final comments are that the proposed changes to the Oxford operational permit should not be allowed. Microsoft has not allowed Ecology to adjust their testing and emission modeling information to allow for these changes and therefore the Quincy Community would not be safe without adequate regulations to protect the air and the environment. Microsoft is asking to change horses in the middle of the stream. If Microsoft wants these changes, they should be required to start all over again with a new permit application that provides the revised data and provides the time necessary for Ecology to modify their methods to study the proposed changes to procedure and the effects on emissions.

ECOLOGY RESPONSE:

Microsoft did submit a new permit application with revised data supporting their requested new operating regime. Ecology technical staff reviewed the new permit application along with the supporting data and modeling results and prepared a new draft permit. That new draft permit is the subject of the May 28, 2015 – July 13th public comment period and the July 9, 2015 public hearing. This response to comments document is the compilation of Ecology's responses to the public comments received concerning Microsoft's requested revisions.

Section 2: Public Hearing Comments

The following comments are from the transcription of the public hearing. Not all of the testimony generated responses from Ecology. To view the entire transcription please see Appendix C. Anywhere the transcription company misspelled names or acronyms, the corrected spelling has been put in parentheses next to the misspelling.

Danna Dal Porto, July 9, 2015, comments 37-43

COMMENT 37: DANNA DAL PORTO:

And I'm afraid I have questions as part of my thing, and so I'm going to put those in as part of my public comment. One of the comments or questions I have is that in terms of discussing these engines, we've discussed emergency engines. My understanding is that how can you use emergency as a descriptor for these diesel generators when that descriptor is not recognized? It's an EPA designation is not recognized in the state of Washington. So I'd like to have some of that clarified. I think you can use "backup," but you can't use "emergency."

ECOLOGY RESPONSE:

State law requires BACT determinations and analyses to determine compliance with the NAAQS and the state TAPs requirements to evaluate the potential emissions of pollutants from a facility. The potential emissions of pollutants from the Oxford engines are limited by the fact that Microsoft will be operating them for a limited number of hours per year as emergency engines. The permit reflects this by providing operating restrictions on the engines that limit them to operating for only 86 hours per year (rather than the possible 8760 hours in a year). This comment does not result in a change in the proposed permit.

COMMENT 38 DANNA DAL PORTO:

As far as the proposed legal definitions or questions, so my reading of it says condition number one under proposed legal issues, 3.3.2 and 4.4, you want to allow fewer hours for source testing than required because you want to implement different source result? So you don't want to -- you want to reduce hours of testing. So when you get down to the second condition, 4.4, you want to mand-- you're saying that you don't want to do, mandate these costly and time-consuming source testings because they want to document compliance with EPA performance standards. Is that because you would be required to measure filterable and condensable emissions, therefore making you a major source, not a minor source item number three, you want to limit these engines to three speci-- you don't want to limit these engines to three specific load levels, and that would ignore your need to run these engines to assure security for your power supply.

ECOLOGY RESPONSE:

The testing requirements in the 2015 permit are nearly identical to the testing requirements in the 2014 permit. The testing regime in the 2015 permit extends the minimum number of years Microsoft must test from 10 years to 25 years. This requirement is more in line with the reasoning of the Pollution Control Hearings Board ruling requiring testing to ensure that, over the long term, the engines will continue to comply with Tier 2 emission rates. The testing regime in the 2015 permit also increases the minimum number of engines tested from eight to nine. This comment does not result in a change in the proposed permit.

COMMENT 39 DANNA DAL PORTO:

When John Radich (Radick) talked about load in the comments for the original permit, he made comment number 10, page number 13. He says that it is important to specify that load means the electrical load as opposed to the mechanical load. That's not the way I understood load at all. When I look at this fact sheet from Caterpillar, it's talking about engine load. It's talking about the mechanical load on that diesel generator.

So I don't understand, if you are talking about load, are you talking about how hard the engine is working, how much RPM, so to speak that this engine is using? Why is John Radich (Radick) referring to it as an electrical load? I tried to make an analogy with a car. So you put the car in first gear and you rev it up, and then you shift it into second gear and you rev it up. You're increasing the speed of your car, but you're also changing the RPMs by changing the gear that you're using. Is that what he's meaning by electrical load?

I really would like to have that clarified. What really is interesting is that this has never been an issue with any other data center, including Microsoft Columbia. So all of a sudden you have this big load issue, but we've had six other data permits granted, but this load has never been brought up. So why is it being brought up now?

ECOLOGY RESPONSE:

In the context of diesel-powered generators, mechanical load refers to the work needed by the diesel engine to transfer power to the electrical generators. The electrical load is the electrical power generated by the generator after taking into account power losses due to the efficiency of the generator and fan power needs. Load in either case is often expressed as a percentage of the rated power capacity of the engine (for mechanical load) or the generator (electrical load).

No changes were proposed as part of this permit revision in terms of using the terminology of electrical load. The "e" in "ekW" referred to by the commenter refers to electrical load and was used in the previous permit as well as this one. Microsoft asked for flexibility in how they operate their emergency back-up diesel engine generators. The flexibility they requested more accurately reflects the range of loads called for in the range of situations in which the engines will operate. Emergency engines need flexibility when operating because power needs for data centers vary significantly throughout the day. The engines will most often operate between 25 and 75 percent of capacity, but flexibility to run between 10 and 100 percent capacity is needed during unplanned outages as well as during other planned situations. This comment does not result in a change in the proposed permit.

COMMENT 40 DANNA DAL PORTO:
On the fourth point of the appeal, it says you don't want to maintain a record for your reason of operating for each of these 37 engines. Well, my question is what else do you have to do? Your servers run themselves. The Economic Development Council has said through the media that there are 1,000 people being employed by the data centers. Certainly you can have one of those people keep track of engines' operation. I would like -- I've been requesting at every meeting that we have access to the operational records of the data centers, and that has not been available to us. So I would disagree with your appeal of number four.

ECOLOGY RESPONSE:
Approval Condition 8.5 of the permit requires Oxford to record reasons for operating the engines. This comment does not result in a change in the proposed permit.

COMMENT 41 DANNA DAL PORTO:
There were some other things in the permit. There was a Landau report from December of '14, which would've been post-permit, that table C15 that says these items were "cherry-picked" for receiving data for estimates. How can somebody who's supposed to be technically competent use the term "cherry-picked" in terms of using data for a formal report? So I would like to have an answer from Microsoft on that.

ECOLOGY RESPONSE:
As explained in the TSD, Landau picked worst-case scenarios in estimating emissions. The "cherry-picked" values (as stated on February 2, 2015 NOC Application table C1-4 available at http://www.ecy.wa.gov/programs/air/quincydatacenter/docs/NOCapplication.pdf) represent the worst case emissions, which are different for the three different size engines at the Oxford data center. For example, the worst-case CO emission for the 2.5 MWe engines is at 100% load (as shown on Table C1-1), whereas worst-case CO emissions for the 2.0 MWe and 0.75 MWe engines is at 10% load (as shown on Tables C1-2 and C1-3). As a conservative overestimation of

emissions, these worst-case loads were "cherry-picked." For CO, this is demonstrated in part E of Table C1-5.This comment does not result in a change in the proposed permit.

COMMENT 42: DANNA DAL PORTO:
Every time I have one of these meetings, I request actual monitors in Quincy. Everything that you're hearing has been done by a computer model. They don't have any kind of the little machines sitting out by the side of the data center or over by Mountain View sucking up the air and telling us what we really have in terms of emissions.

..Anyway, I want some monitors. I've been told by Ecology every single time that they're too expensive. I don't understand why, if we have -- we're all the way up to 46 cancers in a million people. That's more than anybody -- we have more diesel generators in this town than any other city in Washington State. 198, 7? And I don't know if everybody knows, but as part of the budget that was just passed, we're going to get some more.

We might get as many as 6 more. So we're going to have -- if we have 6 and we have 35 diesel generators per thing, and everybody's going to expand, we're going to have a lot -- we're going to have a lot of generators here. We need monitors.

ECOLOGY RESPONSE:
Ecology is aware of Ms. Dal Porto's interest in monitoring and cause and effect studies for the Quincy area ambient air. At Ecology's March 2014 Monitoring Advisory Committee {MAC) this issue was discussed. It was determined during the March meeting that due to limited staffing and fiscal resources as well as the low impacts to the community, air quality monitoring studies cannot be conducted in the area at this time. However, Ecology is exploring other avenues to see if there is some way to find funding for monitoring in Quincy. This comment does not result in a change in the proposed permit.

COMMENT 43 DANNA DAL PORTO:
This modeling is ridiculous. And the other thing is I would like to challenge every single meteorological assumption, because Ecology uses weather from Moses Lake. Moses Lake is not Quincy. It does not have the contour of the land, it does not have the backup of the mountains, it does not have the weather off of the river. And so every time they're talking about meteorological information for this -- for all of these data centers, they're using information that is flawed. So that's what I have. Thank you very much.

ECOLOGY RESPONSE:
Analyses provided for previous data centers in Quincy indicate that, compared with data from Ephrata, the meteorological observations from Moses Lake tend to overestimate the impacts of pollution in Quincy because Moses Lake gets less wind (therefore less dispersion) than Ephrata. In previous actions, the Pollution Control Hearings Board has agreed that Moses Lake meteorology is sufficiently representative of conditions in Quincy to provide a basis for air dispersion modeling in Quincy. This comment does not result in a change in the proposed permit.

Patty Martin, July 9, 2015, comments 44-49

COMMENT 44, PATTY MARTIN:

And I also wanted to clarify something that Dana brought up about emergency engines. The state of Washington does not recognize the emergency engine exemption, okay? This federal rule for emergency engines has been adopted into the WAC 173-400-930, but I -- was not adopted into the federally enforceable state implementation plan, so it's not a federally enforceable -- actually, let's do this again. It's federally enforceable to apply back (BACT) to all sources and -- the emergency exemption is not recognized. We've had that discussion many times.

ECOLOGY RESPONSE:

WAC 173-400-930 exempts a facility from filing a notice of construction for emergency engines under certain circumstances. Microsoft filed a notice of construction for the Oxford engines and therefore did not take advantage of this exemption. In addition, this exemption does not apply to the Oxford facility because the cumulative brake horsepower (BHP) of Oxford's emergency engines is greater than 2000 BHP.

State law requires BACT determinations and analyses to determine compliance with the NAAQS and the state TAPs requirements to evaluate the potential emissions of pollutants from a facility. The potential emissions of pollutants from the Oxford engines are limited by the fact that Microsoft will be operating them for a limited number of hours per year as emergency engines. The permit reflects this by providing operating restrictions on the engines that limit them to operating for only 86 hours per year (rather than the possible 8760 hours in a year). This comment does not result in a change in the proposed permit.

COMMENT 45: PATRICIA MARTIN:

And I'm going to hold to that. The state of Washington has a more stringent definition for ambient air than the federal definition. When the -- Ecology responded to my question about ambient air, they gave a definition that EPA has crafted that says something about, you know, the fence line or where people have access -- the public has access. Ambient air by definition under the state is the outside surrounding air. So it's the point you have a source, the air that's around that source is the ambient air, and that's the point at which the National Ambient Air Quality Standards must be compliant. Not at the fence line. So as the data centers come in and they buy these huge pieces of property and then you're modeling and you're looking at ambient air at the fence line, that is not an appropriate mechanism for satisfying the compliance with the National Ambient Air Quality Standards.

ECOLOGY RESPONSE:

The federal Clean Air Act requires compliance with the NAAQS in all areas external to buildings, to which the general public has access (40 CFR 50.1(e)). The state Clean Air Act requires compliance with the toxic air pollution requirements in any area to which the applicant does not restrict or control access (WAC 173-460-070). Therefore, compliance with the NAAQS and with the ASILs must be determined at the fence line. This comment does not result in a change in the proposed permit.

COMMENT 46: PATRICIA MARTIN:

I raised the issue of common control before. I'm going to raise that issue again. That will be in my comments again. This is an issue of common control. Microsoft has both the Columbia data center and the Oxford Center. By definition, it's considered in the same industrial classification. It is also adjacent for purposes of the act.

ECOLOGY RESPONSE:

Ecology does not believe the Oxford Data Center and the Columbia Data Center should be treated as a single source. Whether or not two facilities are under common control is not the only criterion required to be met to determine whether they are a single source. An additional criterion is that the facilities need to be on adjacent or contiguous properties. The two Microsoft facilities are not physically adjacent, nor are they on contiguous properties. Because these two data centers do not meet the definition of a single source, Ecology has not looked at whether their combined emissions exceed major source thresholds.

This comment does not result in a change in the proposed permit.

COMMENT 47: PATRICIA MARTIN:

I have several questions. I would like to know -- it's mentioned in the response and in the permit -- no, not in the permit. It's mentioned in the response to comments that the tier 4 engines were required by Microsoft, but it never says why, okay? Now, this could be that Microsoft has agreed that these are not emergency engines and they're going to comply with the intent of the law, which is that back (BACT) with -- the tier 4 engines would be required. Or it could be, just possibly, that Microsoft needed to use these controls because Microsoft at this point would be a major facility at the Oxford Center. So my question is, would Oxford have been a major facility if it wasn't using the catalyzed DPF SCRs? You answered the question about the loads. In the permit, you're requiring method 5 or method 200-1-A for compliance testing the engines against the NSPS, or at least that's the implication. And the National -- or the New Source Performance Standards requires both condensable and filterable, which would require method 202.

ECOLOGY RESPONSE:

As explained in the response to comments 8 and 13, the Oxford facility would not be a major facility even if it were not meeting Tier 4 standards. Tier 4 engines are needed to enable the facility to comply with the NAAQS. This comment does not result in a change in the proposed permit.

COMMENT 48: PATRICIA MARTIN:

Do Ecology and Microsoft include emissions, the NOCs (NOx), the VOCs, and any particulate from Amway's boilers? Dana has one of the documents, and they mention ConAgra, Dell, and the Columbia Data Center, but Amway is there, and they have boilers, and that's a production of NOCs (NOx), and we are very, very, very, very close to failing the one-hour NO2 standard.

ECOLOGY RESPONSE:
See response to comment 33. This comment does not result in a change in the proposed permit.

COMMENT 49: PATRICIA MARTIN:
I also would like to know if the Oxford engines can meet the tier 4 NSPS of 0.03 grams per kilowatt hour for particulate matter. That's the filterable plus condensable with the controls they're installing. Some of the numbers that I looked at seem to suggest that maybe even with the tier 4 engines, they can't meet the New Source Performance Standard. I also would like to know where in the regulations is the five-load weighted average of engine emissions. Where is the citation for where those can be used? And my question of common control, if this is an issue of common control, which I will argue it is, then the NSPS not only applies to Oxford, but it applies to -- for the Columbia Data Center as well, which would imply that they would also have to use tier 4 engines. Thank you.

ECOLOGY RESPONSE:
Table 4 in Approval Order 15AQ-E609 requires the engines to meet the Tier 4 particulate matter limit of 0.03 g/kWhr. 40 CFR 89.410 and Table 2 in Appendix B to Subpart E of 40 CFR 89 outline the requirements for testing and specify the loads and the weighting factors to be used to determine compliance with Tier 2 emission limits. The comparable testing requirements for Tier 4 compliance can be found at 40 CFR 1039.501, 40 CFR 1039.510, and Appendix II to 40 CFR Part 1039. With or without common control, EPA NSPS requirements apply to the Columbia Data Center. The permit for the Columbia Data Center requires Microsoft to meet the NSPS requirements that were in effect at the time the permit for that facility was issued. This comment does not result in a change in the proposed permit.

Debbie Koehnen, July 9, 2015, comments 50-51

COMMENT 50: DEBBIE KOEHNEN:
It doesn't look like you're using the Microsoft parent company as the lump sum of the emissions, but you're looking at each facility for the emissions, the total maximum, and I'm afraid that you're going to set a precedent, it sounds like we already have, for a loophole where, geez, I want to build a new facility but I know I'm very close to the top; I'll just give it a new name, and now I can go over my emissions for -- because at the first meeting, I thought they said that companies were going to have to stay under a maximum emission. I would love that overlay. There's no overlay, again, of the whole thing. So I'd love that map to be included.

ECOLOGY RESPONSE:
The overlay mentioned is in Appendix H. See also Ecology response to comment 46.
This comment does not result in a change in the proposed permit.

COMMENT 51: DEBBIE KOEHNEN:
With -- I know Microsoft went to those really cool engines. Thank you so much. But now that we're moving on here, I wish they'd grandfather in -- put those -- you know, retrofit those old generators at Columbia to help keep those overall emissions down. And last summer we had a --

there was a proposal to use less water, but that leave higher emissions. I'm not sure we ever addressed that ever. So I'd really like to know how that affected the air quality input.

ECOLOGY RESPONSE:
Although this comment is out of scope for this project, you can find information about the Columbia permit revisions on our website at http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html. In addition, Ecology has included emissions of particulate matter from the Columbia data center in its analysis of the cumulative effects of diesel engine exhaust particulate (DEEP). That analysis can be found at xxx. This comment does not result in a change in the proposed permit.

Section 3: Email Threads

The following are email threads that Ecology received during the public comment period.

-----Original Message-----
From: Mort, Beth (ECY)
Sent: Monday, July 13, 2015 11:57 AM
To: 'Patty Martin' <martin@nwi.net>
Cc: Johnson, Kari D. (ECY) <KAJO461@ECY.WA.GOV>
Subject: RE: Request for information

Hi Patty!

Sorry, I forgot the attachment - here it is!

Beth Mort
beth.mort@ecy.wa.gov
509.329.3502

From: Mort, Beth (ECY)
Sent: Monday, July 13, 2015 11:54 AM
To: 'Patty Martin' <martin@nwi.net>
Cc: Johnson, Kari D. (ECY) <KAJO461@ECY.WA.GOV>
Subject: RE: Request for information

Hi Patty,

Here is information for your request:

The attached BACT sheets show detailed information such as "tons removed /year" information; and also what the total "tons per year" emissions would be if tier 4 controls were not included (i.e., hypothetical tier 2 level emissions).

The TSD contains BACT summaries of more easy to follow "cost per ton" information.

The link to the TSDs for the first Oxford permit and the current draft Oxford revisions are available online on our Quincy webpage:

Oxford: Notice of Construction Technical Support Document (8/15/14)
Current draft Oxford: Notice of Construction Technical Support Document (5/28/15)

Please contact Kari Johnson, KAJO461@ECY.WA.GOV, for any other public records requests you might have and thank you for participating in our hearing last Thursday.
Thank you,

Beth Mort
beth.mort@ecy.wa.gov
509.329.3502

-----Original Message-----
From: Patty Martin [mailto:martin@nwi.net]
Sent: Friday, July 10, 2015 8:17 AM
To: Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>
Subject: Request for information

Beth,

I am writing for a copy of the BACT determinations made on Oxford. I saw a summary in the information at the Library and at City Hall, but did not see the actual data as has been provided in the past. This information will state how much NOx, PM, etc. is being reduced and the cost per ton.

Thank you.

Patty

From: Patty Martin [mailto:martin@nwi.net]
Sent: Thursday, June 25, 2015 7:47 PM
To: Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>
Cc: Kadlec, Matthew (ECY) <MKAD461@ECY.WA.GOV>; Palcisko, Gary (ECY) <gpal461@ECY.WA.GOV>; Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>; Koster, Robert (ECY) <RKOS461@ECY.WA.GOV>; Wood, Karen K. (ECY) <KWOO461@ECY.WA.GOV>
Subject: Re: Your Question Re: DEEP to Greg Flibbert

Thanks Beth. I was surprised I got as many questions answered as I did.

Patty

From: Mort, Beth (ECY)
Sent: Thursday, June 25, 2015 4:00 PM

To: Patty Martin <martin@nwi.net>
Cc: Kadlec, Matthew (ECY) <MKAD461@ECY.WA.GOV>; Palcisko, Gary (ECY) <gpal461@ECY.WA.GOV>; Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>; Koster, Robert (ECY) <RKOS461@ECY.WA.GOV>; Wood, Karen K. (ECY) <KWOO461@ECY.WA.GOV>
Subject: RE: Your Question Re: DEEP to Greg Flibbert

Hello Patty,

We appreciate your questions and will respond to them at the close of the comment period with other comments we have received.

Thank you,

Beth Mort

beth.mort@ecy.wa.gov

509.329.3502

From: Patty Martin [mailto:martin@nwi.net]
Sent: Monday, June 22, 2015 3:29 PM
To: Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>
Cc: Kadlec, Matthew (ECY) <MKAD461@ECY.WA.GOV>; Palcisko, Gary (ECY) <gpal461@ECY.WA.GOV>; Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>; Koster, Robert (ECY) <RKOS461@ECY.WA.GOV>; Wood, Karen K. (ECY) <KWOO461@ECY.WA.GOV>
Subject: Re: Your Question Re: DEEP to Greg Flibbert

And was the condensable portion also included in the BACT determination and for compliance with the NSPS?

Patty

From: Patty Martin [mailto:martin@nwi.net]
Sent: Monday, June 22, 2015 3:21 PM
To: Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>
Cc: Kadlec, Matthew (ECY) <MKAD461@ECY.WA.GOV>; Palcisko, Gary (ECY) <gpal461@ECY.WA.GOV>; Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>; Koster, Robert (ECY) <RKOS461@ECY.WA.GOV>; Wood, Karen K. (ECY) <KWOO461@ECY.WA.GOV>
Subject: Re: Your Question Re: DEEP to Greg Flibbert

Could you please cite to a document where that can be proven to me.

Thank you.

Patty

From: Mort, Beth (ECY)
Sent: Monday, June 22, 2015 3:19 PM
To: Patty Martin <martin@nwi.net>
Cc: Kadlec, Matthew (ECY) <MKAD461@ECY.WA.GOV>; Palcisko, Gary (ECY) <gpal461@ECY.WA.GOV>; Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>; Koster, Robert (ECY) <RKOS461@ECY.WA.GOV>; Wood, Karen K. (ECY) <KWOO461@ECY.WA.GOV>
Subject: RE: Your Question Re: DEEP to Greg Flibbert

Hello Patty,

This is in response to your question from June 18 to Robert Koster:

Yes, Ecology did consider both forms of particulate matter in the Oxford permitting. By definition, both contribute to ambient levels of particulate limited by National Ambient Air Quality Standards (NAAQS) and were modeled for comparison to the NAAQS in the Oxford project. Because the toxicity of DEEP is based on only filterable particulate, condensable particulate matter does not have to be included in that analysis. For Oxford it was considered as DEEP anyway. So, yes for both the NAAQS and for DEEP toxicity, the Oxford permitting considered both forms of particulate matter.

Beth Mort

beth.mort@ecy.wa.gov

509.329.3502

From: Patty Martin [mailto:martin@nwi.net]
Sent: Thursday, June 18, 2015 1:23 PM
To: Koster, Robert (ECY) <RKOS461@ECY.WA.GOV>
Cc: Kadlec, Matthew (ECY) <MKAD461@ECY.WA.GOV>; Palcisko, Gary (ECY) <gpal461@ECY.WA.GOV>; Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>
Subject: Re: Your Question Re: DEEP to Greg Flibbert

Robert,

So Ecology considered both filterable and condensable diesel particulate matter in permitting Oxford?

Patty

From: Koster, Robert (ECY)
Sent: Thursday, June 18, 2015 1:09 PM
To: Patty Martin (martin@nwi.net) <martin@nwi.net>
Cc: Kadlec, Matthew (ECY) <MKAD461@ECY.WA.GOV>; Palcisko, Gary (ECY) <gpal461@ECY.WA.GOV>; Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>
Subject: Your Question Re: DEEP to Greg Flibbert

Hello Patty,

Greg Flibbert retired at the end of May and will not be able to answer your questions about server farms. As your technical point of contact here at the Eastern Regional Ecology office, I will try, first with a cut and paste of the e-mail string:

Greg,
I just want to be certain that I understand your response. Are you telling me that Ecology relies upon CCR 93115.14 to regulate diesel particulate matter?
Patty

On 4/30/2015 10:05 AM, Flibbert, Gregory S. (ECY) wrote:

Patty:

In response to your message below:

DEEP is defined by California Code of Regulations § 93115.14 *ATCM for Stationary CI Engines – Test Methods*, as just the filterable portion of particulate.

Greg

The question Greg appears to answer is why the Oxford approval order does not consider condensable particulate matter to be part of DEEP regulated by WAC 173-460. Greg's answer does not indicate that Ecology relies on CCR 93115.14 to regulate diesel particulate matter, but that CCR 93115.14 is a place to find a definition of DEEP consistent with the Oxford Approval order. The development of the WAC 173-460 characterization of the toxicity of DEEP is based on the work done in California which considered only the toxicity of the filterable portion of the particulate matter emitted by diesel engines.

If you have further questions, please contact me.

Robert Koster, P.E.

From: Mort, Beth (ECY)
Sent: Wednesday, June 17, 2015 11:28 AM
To: Patty Martin <martin@nwi.net>
Cc: Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Wood, Karen K. (ECY) <KWOO461@ECY.WA.GOV>
Subject: RE: Oxford's permit

Hi Patty,

Please see Rich's response below.

Thank you,

Beth Mort

beth.mort@ecy.wa.gov

509.329.3502

Beth:

Method 202 is for condensable particulate and Method 5 is used for filterable particulate. Ecology requires filterable and condensable testing for an ambient air quality analysis like a National or state ambient quality standard). Diesel Engine Exhaust Particulate (DEEP) is a state only pollutant. As such we have determined that only a filterable analysis is required to determine compliance because that is the test method that was used in the studies that where the DEEP health risk numbers were developed. Testing for condensable matter would over estimate the DEEP emissions.

I do not recall when we decided to use Method 5 to evaluate emissions of DEEP but I was involved in that decision. Ecology's authority to include testing for pollutants regulated in our New Source Review Program is derived under Chapter 173-400-103, WAC 173-400-105. Additionally WAC 173-460-071 grants Ecology the authority to test sources of toxic air pollutants.

Richard B. Hibbard, P.E. (Rich)

Washington State Department of Ecology

P.O. Box 47600

Olympia, WA 98504-7600

Phone (360) 407-6896

FAX (360) 407-7534

richard.hibbard@ecy.wa.gov

-----Original Message-----
From: Patty Martin [mailto:martin@nwi.net]
Sent: Wednesday, June 17, 2015 9:29 AM
To: Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>
Subject: Re: Oxford's permit

Beth,

Thank you for the information. Please ask Richard Hibbard when Ecology removed the requirement for Method 202 and under what authority.

Patty

-----Original Message-----
From: Mort, Beth (ECY)
Sent: Wednesday, June 17, 2015 7:57 AM
To: martin@nwi.net
Subject: RE: Oxford's permit

Patty,

Matt Kadlec, Gary Huitsing and Gary Palcisko provided information for the response. Richard Hibbard also added that we use EPA Method 5 to measure DEEP.

Beth Mort
beth.mort@ecy.wa.gov
509.329.3502

-----Original Message-----
From: martin@nwi.net [mailto:martin@nwi.net]
Sent: Tuesday, June 16, 2015 6:04 PM
To: Mort, Beth (ECY) <BMOR461@ECY.WA.GOV>
Subject: RE: Oxford's permit

Beth,

I would like the name(s) of the technical staff that provided that information to you.

Thank you.

Patty

From: Mort, Beth (ECY)
Sent: Tuesday, June 16, 2015 3:11 PM
To: Patty Martin <martin@nwi.net>
Cc: Hibbard, Richard (ECY) <rhib461@ECY.WA.GOV>; Kadlec, Matthew (ECY)

<MKAD461@ECY.WA.GOV>; Huitsing, Gary (ECY) <ghui461@ECY.WA.GOV>; Wood, Karen K. (ECY) <KWOO461@ECY.WA.GOV>; Johnson, Jolaine (ECY) <JOLA461@ECY.WA.GOV>
Subject: RE: Oxford's permit

Hello Patty,

The response below is from our technical staff:

The DEEP ASIL was set based on the cancer unit risk factor established by the California Office of Environmental Health Hazard Assessment (OEHHA) for filterable diesel exhaust [1]. OEHHA's Hot Spots Guidance summarized the filterable/condensable vapor issue:

"The complex and potentially variable mix of chemical species in the condensed phase and the vapor phase of diesel exhaust, required the measure of exposure related to carcinogenic risk to be specified. The most commonly used measure of exposure is atmospheric concentration of particles in µg/m3. That measure is obtained from the mass of particles collected on a filter per volume of the air that flowed through the filter. On the basis of its relation to health studies and its general practicality, that measure was used in the diesel exhaust TAC document cancer risk assessment (OEHHA, 1998)".

So using the DEEP Acceptable Source Impact Level (ASIL), Small Quantity Emission Rate (SQER) and de minimis value (DV) listed in WAC 173-460-150, only the filterable portion is regulated, and vapor (gas) phase TAPs in diesel exhaust are covered by other ASILs, SQERs and DVs in WAC 173-460.

[1] Office of Environmental Health Hazard Assessment. 1998. *Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant. Part B: Health Risk Assessment for Diesel Exhaust.* Air Toxicology and Epidemiology Section, Berkeley, CA.

As a measure of diesel engine exhaust, the filterable component of diesel PM emissions is consistent with the methodologies that were used to estimate diesel PM exposure concentrations in the key epidemiological studies supporting the identification of diesel PM as a toxic air contaminant.

Beth Mort
beth.mort@ecy.wa.gov
509.329.3502

From: Patty Martin [mailto:martin@nwi.net]
Sent: Thursday, June 11, 2015 1:17 PM
To: Flibbert, Gregory S. (ECY)
Cc: Hibbard, Richard (ECY); Kadlec, Matthew (ECY); Huitsing, Gary (ECY); Mort, Beth (ECY); Wood, Karen K. (ECY)
Subject: Re: Oxford's permit

Greg,

I just want to be certain that I understand your response. Are you telling me that Ecology relies upon CCR 93115.14 to regulate diesel particulate matter?

Patty

On 4/30/2015 10:05 AM, Flibbert, Gregory S. (ECY) wrote:
Patty:

In response to your message below:

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Greg

From: Patty Martin [mailto:martin@nwi.net]
Sent: Thursday, April 23, 2015 11:27 AM
To: Hibbard, Richard (ECY); Kadlec, Matthew (ECY)
Subject: Oxford's permit

Richard & Matt,

I noticed that Microsoft's latest permit didn't include the condensable portion of the diesel particulate.

http://www.ecy.wa.gov/programs/air/quincydatacenter/docs/Microsoft_Oxford_NOC.pdf (see footnote *a* under the PTE on page 5 of 16).

Is this legal?

Patty

--

Patricia Martin
Safe Food and Fertilizer
617 H St. SW
Quincy, WA 98848

A project of Earth Island Institute.

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Appendix A: Public notices and outreach materials

- Press releases – English & Spanish
- Public Involvement Calendar Entry
- Legal notices – English & Spanish
- Display advertisements – English & Spanish
- Public Comment Period Fact Sheet (publication 15-02-009)
- Spanish version of Fact Sheet (publication 15-02-009ES)
- QUINCY-DATA-CENTERS Listserv emails and Tweets

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Department of Ecology News Release - May 26, 2015

Revising air permit for data center in Quincy

Seeking comments on changes to Microsoft's Oxford facility permit through June 18

CORRECTION: New dates and information have been added to paragraphs 5 and 6 to reflect proposed permit revisions.

SPOKANE – Microsoft Corporation is proposing changes to the way it operates and tests backup generators at its Oxford data center in Quincy. These changes require modification of an existing air permit from the Washington Department of Ecology to ensure human health and the environment are protected.

Data centers house servers that store digital data, handle email, manage instant messages and run applications for computers. Microsoft uses backup generators powered by diesel engines to keep servers functioning in case of power outages.

Diesel engine exhaust contains fine particles that can cause health problems for people who are exposed frequently and at high enough levels.

Ecology approved an air permit for Oxford in August 2014 for construction and operation of the facility.

Microsoft applied to revise the permit before completing construction and beginning operation. Changes to the permit include altering the testing schedule of backup generators and increasing compliance monitoring over a longer time period.

The allowable operating range for the backup generators also was revised. Changes to the operating range allow increased air pollution. Potential increases are within state and federal limits that are set to protect people and the environment.

Microsoft still proposes to install advanced air pollution control equipment that is more than required. Additional conditions in the permit to protect the public from air pollution include limits on fuel and specified hours of operation for the generators.

Public hearing

Ecology is hosting a public hearing on the air permit at 5 p.m. on July 9 at the Quincy Community Center, 115 F St. SW, Quincy, Wash. 98848. The public meeting begins at 5 p.m. and the formal hearing starts at 6:30 p.m.

Submit comments

Comments and questions for the draft air permit should be addressed to Beth Mort, Department of Ecology, Air Quality Program, 4601 N. Monroe, Spokane, WA. 99205.

Comments will be accepted from May 28 through July 13.

Review the revised permit

- Ecology's website: revised permit online
- Ecology's Eastern Regional Office, 4601 N. Monroe, Spokane, WA 99205
- Quincy City Hall, 104 B Street SW, Quincy, WA 98848
- Quincy Library, 208 Central Ave S, Quincy, WA 98848

Contact:

Camille St. Onge, communications manager, camille.st.onge@ecy.wa.gov, 360-407-6932, @ecologywa

Department of Ecology News Release - May 26, 2015

Revising air permit for data center in Quincy

Seeking comments on changes to Microsoft's Oxford facility permit through June 18

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- Quincy Library, 208 Central Ave S, Quincy, WA 98848

Contact:

Camille St. Onge, communications manager, camille.st.onge@ecy.wa.gov, 360-407-6932, @ecologywa

Public Involvement Calendar

CALENDAR
Public Hearings, Meetings, Workshops, Open Houses
Public Comment Periods
More Ecology Events

Public Involvement Calendar

The Public Involvement Calendar is designed to engage the public in our **decision-making process**. We encourage you to read Frequently Asked Questions about Effective Public Commenting.

Activities that are educational only or are co-sponsored by Ecology may be found under the "More Ecology Events" link in the left column of this page. We invite your **feedback** about this Public Involvement Calendar.

Public Hearings, Meetings, Workshops, Open Houses

(Next 21 days. Use the search feature (right) for events beyond 21 days.)

May 28 2015 8:00AM Public Comment Period - Quincy
Jul 13 2015 10:00PM Oxford Data Center Draft Revised Air Permit

Microsoft is proposing changes to the way it operates and tests backup generators at its Oxford data center in Quincy. These changes require modification of an existing air permit that was issued on 8/15/2014. Changes to the permit include altering the testing schedule of backup generators by reducing the number of engines being tested per year and increasing compliance monitoring over a longer time period. You may review and comment on the project documents online at Quincy City Hall and Quincy Library.

More Information: More Information
Location:

Quincy , WA
Sponsor: Ecology
ECY ERO
Contact: Beth Mort
(509) 329-3502 / bmor461@ecy.wa.gov

First 1 Last

Search Calendar

This search feature accesses only **decision-making events.**

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Public Involvement Calendar

CALENDAR

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Public Hearings, Meetings, Workshops, Open Houses

(Next 21 days. Use the search feature (right) for events beyond 21 days.)

Jul 9 2015 5:00PM Public Hearing - Quincy
Jul 9 2015 Oxford Data Center Draft Revised Air Permit

Ecology invites you to attend a public hearing on proposed changes to the way Microsoft operates and tests backup generators at its Oxford data center in Quincy. These changes require modification of an existing air permit that was issued on 8/15/2014. You may review and comment on the project documents online, at Quincy City Hall, and Quincy Library.

More Information: More Information
Location: Quincy Community Center

115 F St SW
Quincy , WA

Sponsor: Ecology
ECY ERO
Contact: Beth Mort
(509) 329-3502 / bmor461@ecy.wa.gov

Public Comment Period - May 28 2015 - Jul 13 2015

First 1 Last

Search Calendar

This search feature accesses only **decision-making events.**

Search

Select date range: Today & Next 21 Days

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Select keyword: All Keywords, 401, Air, Aquifer

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One Front Door to Washington's outdoors

Affidavit of Publication

STATE OF WASHINGTON)
COUNTY OF GRANT) ss.

Tracey Law or Sunshine Didra, being duly sworn on oath, deposes and says that she is the clerk of the Quincy Valley Post-Register, a weekly newspaper, and has been approved as a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the publications hereinafter referred to, published in the English language continually as a weekly newspaper in Quincy, Grant county, Washington, and it is now and during all of said time was printed in an office maintained at the aforesaid place of publication of said newspaper. That the annexed copy is a true copy of Notice of Application to construct a new Air Pollution Source as it was published in regular issues (and not in supplement form) of said newspaper once a week for a period of 1 consecutive weeks, commencing on the 28 day of May, 2015 and ending on the 28 day of May, 2015, both dates inclusive, and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is the sum of

$ 150.78.

Tracey Law

Subscribed and sworn to before me this

28 day of May, 2015

Megan Elise Cordova

Notary Public in and for the State of Washington, County of Grant

Residing at Quincy Washington (Seal)
My commission expires 04-15-17

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY NOTICE OF APPLICATION TO CONSTRUCT A NEW AIR POLLUTION SOURCE

The State of Washington Department of Ecology (Ecology) has received an application to revise a Notice of Construction (NOC) Approval Order for an existing air pollution source. The Microsoft Corporation (MSN) located at One Microsoft Way in Redmond, WA 98052 submitted a NOC air quality permit application on December 11, 2014 to revise NOC Approval Order 14AQ-E537 issued on August 15, 2014. The MSN Oxford Data Center is located at the end of Port Industrial Parkway and west of Road R NW in Quincy, Grant County. The primary air contaminant emission units at the Oxford Data Center are 37 emergency electrical generators powered by diesel engines and 32 cooling towers. Air contaminant emissions from the diesel engines and the cooling towers include criteria and toxic air pollutants below major source thresholds. Changes in the operating conditions requested by Microsoft will increase the potential to emit (PTE) from the diesel engines. Nitrogen oxide emissions will increase by approximately 18.4 tons per year and diesel engine exhaust particulate (DEEP) will increase by approximately 0.19 tons per year. The increase in DEEP emissions was reviewed under a Second Tier Health Impact Assessment to evaluate health risks. After review of the completed Notice of Construction application and other information on file with the agency, Ecology has determined that this project proposal will conform to all requirements as specified in Chapter 173-400 WAC. After review of the Second Tier Health Impact Assessment, Ecology concluded that DEEP impacts to the community due to the Oxford Data Center will meet the protective requirements contained in Chapter 173-460 WAC.

Copies of the Notice of Construction Preliminary Determination, the Second Tier Petition Recommendation, The Notice of Construction application, and other relevant documents are available for public review at Department of Ecology, Eastern Regional Office, 4601 N. Monroe, Spokane, WA 99205-1295, at the City of Quincy, 104 B Street SW, Quincy, WA 98848 and at the Quincy Library, 208 Central Ave S. Quincy, WA, 98848. The public is invited to attend a public hearing that has been scheduled to start at 5:00 PM on July 9, 2015 at the Quincy Community Center located at 115 F St. SW, Quincy, WA. The public hearing will include: meet and greet starting at 5:00pm, followed by presentations and a question and answer session starting at 5:30 PM. Public comment will be taken starting promptly at 6:30 PM. In addition to comments taken at the public hearing, the public is invited to comment on this project proposal prior to the hearing. Written comments will be accepted on this proposal from May 28, 2015 through July 13, 2015. For additional information on the project and to submit comments, contact Beth Mort at Ecology's Spokane Office, 4601 N. Monroe, Spokane, WA 99205-1295, or at beth.mort@ecy.wa.gov, or at 509 329-3502. To request ADA accommodation for disabilities, call Ecology at 509-329-3400. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341. **Para asistencia en Espanol: Gregory Bohn 509-454-4174.**

Published in the Quincy Valley Post-Register on May 28, 2015.

MEGAN ELISE CORDOVA
COMMISSION EXPIRES
NOTARY PUBLIC
04-15-17
STATE OF WASHINGTON

Affidavit of Publication

STATE OF WASHINGTON)
COUNTY OF GRANT) ss.

Tracey Law or Sunshine Didra, being duly ~~sworn on~~ oath, deposes and says that she is the clerk of the Quincy Valley Post-Register, a weekly newspaper, and has been approved as a legal newspaper by order of the superior court in the county in which it is published and is now and has been for more than six months prior to the date of the publications hereinafter referred to, published in the English language continually as a weekly newspaper in Quincy, Grant county, Washington, and it is now and during all of said time was printed in an office maintained at the aforesaid place of publication of said newspaper. That the annexed copy is a true copy of Aviso de aplicacion para construir una nueva fuente de contaminacion del aire as it was published in regular issues (and not in supplement form) of said newspaper once a week for a period of 1 consecutive weeks, commencing on the 28 day of May, 2015 and ending on the 28 day of May, 2015, both dates inclusive, and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is the sum of

$ 177.24.

Tracey Law

Subscribed and sworn to before me this

28 day of May, 2015

Allegan Elise Cordova

Notary Public in and for the
State of Washington, County of Grant

Residing at Quincy Washington (Seal)
My commission expires 04-15-17

FILE COPY

DEPARTAMENTO DE ECOLOGÍA DEL ESTADO DE WASHINGTON
AVISO DE APLICACIÓN PARA CONSTRUIR UNA NUEVA FUENTE DE CONTAMINACIÓN DEL AIRE

El Departamento de Ecología del Estado de Washington (Ecología) ha recibido una aplicación para revisar una Orden de Aprobación del Aviso de Construcción (NOC por sus siglas en inglés) para una fuente existente de contaminación del aire. La Corporación Microsoft (MSN por sus siglas en inglés) ubicada en One Microsoft Way en Redmond, WA 98052 presentó un NOC para una aplicación de per- miso de calidad del aire el 11 de diciembre de 2014 para revisar la Orden de Aprobación NOC 14AQ-E537 emitida el 15 de agosto de 2014. El Centro de Datos Oxford de MSN está ubicado al final de Port Industrial Parkway y al oeste de Road R NW en Quincy, Condado de Grant. Las unidades principales de emisión de contaminantes del aire, en el Centro de Datos Oxford, son 37 generadores de electricidad de emergencia con motores diesel y 32 torres de enfriamiento. Emisiones de contaminantes del aire de los motores diesel y las torres de enfriamiento incluyen contaminantes tóxicos del aire por debajo de los umbrales para fuentes mayores. Cambios en las condiciones de operación solicitados por Microsoft aumentarán el potencial para emitir (PTE por sus siglas en inglés) de los motores diesel. Emisiones de óxido de nitrógeno aumentarán aproximadamente 18.4 toneladas por año y de partículas en suspensión en los gases de los motores diesel (DEEP por sus siglas en inglés) aumentarán aproximadamente 0.19 toneladas por año. El aumento en emisiones DEEP fue revisado según el Segundo Nivel - Evaluación del Impacto a la Salud - para evaluar los riesgos a la salud. Después de revisar la aplicación com- pleta de Aviso de Construcción y otra información en archivo con la agencia, Ecología ha decidido que ésta propuesta de proyecto estará conforme con todos los requisitos como se especifican en Chapter 173-400 WAC. Después de revisar el Segundo Nivel - Evaluación del Impacto a la Salud -, Ecología concluyó que el impacto de las DEEP en la comunidad debido al Centro de Datos Oxford cumplirá con los requisitos de protección contenidos en Chapter 173-460 WAC.

Copias de la Determinación Preliminar del Aviso de Construcción, de la Recomendación de la Petición de Segundo Nivel, la aplicación de Aviso de Construcción, y otros documentos de relevancia están disponibles para revisión pública en la Oficina Regional del Este del Departamento de Ecología, 4601 N. Monroe, Spokane, WA 99205-1295, en la Ciudad de Quincy, 104 B Street SW, Quincy, WA 98848 y en la Biblioteca de Quincy, 208 Central Avenue S., Quincy, WA 98848. Se invita al público a atender una audiencia pública que ha sido programada a comenzar a las 5:00 p.m. el 9 de julio de 2015 en el Quincy Community Center ubicado en 115 F St. SW, Quincy, WA. La audiencia pública incluirá: bienvenida comenzando a las 5:00 p.m., seguida por presentaciones y una sesión de preguntas y respuestas comenzando a las 5:30 p.m. Comentarios del público serán aceptados comenzando puntualmente a las 6:30 p.m. Además de los comentarios públicos aceptados durante la audiencia pública, se in- vita al público a comentar sobre esta propuesta de proyecto antes de la audiencia pública. Comentarios por escrito sobre esta propuesta serán aceptados del 28 de mayo al 13 de julio de 2015. Para obtener información adicional sobre el proyecto y para enviar comentarios, co- muníquese con Beth Mort en la Oficina Regional del Este de Ecología, 4601 N. Monroe, Spokane, WA 99205-1295, o a beth.mort@ecy.wa.gov, o al (509) 329-3502. Para solicitar acomodación ADA para discapacidades, llame a Ecología al (509) 329-3400. Personas con discapacidad auditiva pueden llamar al Servicio de Retransmisión de Washington al 711. Personas con discapacidad del habla pueden lla- mar TTY al (877) 833-6341. **Para asistencia en español: Gregory Bohn 509-454-4174.**

Published in the Quincy Valley Post-Register on May 28, 2015.

PUBLIC
04-15-17
STATE OF WASHINGTON

Estado

Protesta anti-perforación causó daños al medio ambiente

Foto Agencias

SEATTLE (Agencias)— Un funcionario del Departamento de Recursos Naturales del estado dijo que los activistas que protestaban en Seattle por los planes de Shell para perforar en busca de petróleo en el Ártico hicieron un poco de daño ambiental de un parque de bucco popular.

Radio Kiro informó que los activistas dejaron material utilizado para anclar su barcaza para protestar cuando enviaron kayaks a la plataforma petrolera Shell en la bahía de Elliott.

La barcaza conocida como "Plataforma Popular" estaba estacionada sobre el parque de bucco cerca de Seacrest Park. El Portavoz del Departamento de Recursos Naturales Joe Smillie indicó que buzos encontraron bloques de cemento, cables y cadenas utilizados para anclar la barcaza.

El funcionario dije que el daño al parque era mínimo y los manifestantes no serán multados pero van a tener que pagar por la limpieza. El parque de bucco es un lugar popular porque es un hábitat de pulpos.

Acta de nacimiento extemporánea para mexicanos

SEATTLE— Según informó el Consulado de México en esta ciudad, anteriormente era común que los padres registraran a sus hijos mucho tiempo después de su nacimiento, lo cual ocasionaba ciertas complicaciones en términos de validación de identidad de una persona. De acuerdo con la normatividad mexicana, para efectos de obtención del pasaporte, cuando un registro de nacimiento fue hecho después de un cierto periodo después del nacimiento de la persona, ese registro es considerado extemporáneo y el interesado debe presentar un documento que convalide su identidadSe considera extemporáneo todo aquel registro de nacimiento efectuado después de un año de la fecha de nacimiento, con las siguientes excepciones:

- Personas nacidas antes de 1931, extemporaneidad de hasta 50 años
- Personas nacidas entre 1931 y 1940, extemporaneidad de hasta 30 años.
- Personas nacidas entre 1941 y 1950, extemporaneidad de hasta 10 años
- Personas nacidas entre 1951 y 1976, extemporaneidad de hasta 5 años.
- Personas nacidas a partir de 1977, extemporaneidad de hasta 3 años.

Si la fecha de registro que aparece en el acta de nacimiento excede el periodo aceptado para el rango de fechas de tu año de nacimiento, se debera presentar uno de los siguientes documentos para poder tramitar el pasaporte:

1. Certificado o Constancia de Alumbramiento.
2. Partida parroquial o Fe de bautismo asentada dentro del siguiente año de su nacimiento, debidamente cotejada por notario público mexicano.
3. Acta de matrimonio de tus padres, donde se asiente que el matrimonio se efectuó antes de tu nacimiento.
4. Copia certificada por el registro civil de alguno de los padres del interesado, que haya sido registrado dentro del primer año de su nacimiento.
5. Copia certificada por el registro civil del acta de nacimiento de un hermano mayor que haya sido registrado dentro del primer año de su nacimiento.
6. Certificado de estudios de primaria, expedido por la secretaria de educación publica, siempre y cuando esta se haya concluido entre los 12 y 14 años de edad del interesado.
7. Constancia de extemporaneidad (emitida por el registro civil).

Para mayores informaciones, llamar al 206-448-3526 Ext. 119

Equipos de rescate en el Monte Rainier

Foto Agencias

SEATTLE (Agencias)— Como se pone en marcha la temporada de escalada en el Monte Rainier, un equipo de rescate especializado ha estado entrenando para estar listo cuando las cosas puedan ir mal en el pico de 14.411 pies.

El año pasado, cerca de 11.000 personas intentaron escalar la montaña más alta del estado de Washington, sobre todo entre mayo y septiembre. Menos del 60 por ciento de ellos completan la ardua pero popular subida a la cima del volcán glaciar.

A veces, los escaladores se meten en problemas, el deslizamiento en las laderas heladas, cayendo en grietas, perdiéndose o enfermándose en elevaciones más altas.

Investigador de WSU dice que la sequía podría empeorar

Foto Archivo

SPOKANE (Agencias)— Un investigador de la WSU declaró que las condiciones de sequia en el estado que motivaron al gobernador Jay Inslee a declarar una situación de emergencia, es probable que pueda empeorar a causa de un fenómeno de El Niño, patrón de clima tropical que se fortalece en el Océano Pacifico.

El Niño, un fenómeno de calentamieno del océano, puede traer un poco de alivio a la sequía de California, pero es probable que traiga más calor y sequedad al Noroeste, dijo el investigador Gerrit Hoogenboom.

El Niño normalmente trae lluvias al centro y sur de California, pero conduce a un clima más cálido y con menos precipitaciones en el noroeste del Pacífico.

Departamento de Ecología del Estado de Washington

Aviso de aplicación para construir una nueva fuente de contaminación del aire

El Departamento de Ecologia del Estado de Washington (Ecología) ha recibido una aplicación para revisar una Orden de Aprobación del Aviso de Construcción (NOC por sus siglas en inglés) para una fuente existente de contaminación del aire. La Corporación Microsoft (MSN por sus siglas en inglés) ubicada en One Microsoft Way en Redmond, WA 98052 presentó un NOC para una aplicación de permiso de calidad del aire el 11 de diciembre de 2014 para revisar la Orden de Aprobación NOC 14AQ-E537 emitida el 15 de agosto de 2014. El Centro de Datos Oxford de MSN está ubicado al final de Port Industrial Parkway y al oeste de Road R NW en Quincy, Condado de Grant. Las unidades principales de emisión de contaminantes del aire, en el Centro de Datos Oxford, son 37 generadores de electricidad de emergencia con motores diesel y 32 torres de enfriamiento. Emisiones de contaminantes del aire de los motores diesel y las torres de enfriamiento incluyen contaminantes tóxicos del aire por debajo de los umbrales para fuentes mayores. Cambios en las condiciones de operación solicitados por Microsoft aumentarán el potencial para emitir (PTE por sus siglas en inglés) de los motores diesel. Emisiones de óxido de nitrógeno aumentarán aproximadamente 18.4 toneladas por año y de partículas en suspensión en los gases de los motores diesel (DEEP por sus siglas en inglés) aumentarán aproximadamente 0.19 toneladas por año. El aumento en emisiones DEEP fue revisado según el Segundo Nivel - Evaluación del Impacto a la Salud - para evaluar los riesgos a la salud. Después de revisar la aplicación completa de Aviso de Construcción y otra información en archivo con la agencia, Ecologia ha decidido que ésta propuesta de proyecto estará conforme con todos los requisitos como se especifican en Chapter 173-400 WAC. Después de revisar el Segundo Nivel - Evaluación del Impacto a la Salud -, Ecologia concluyó que el impacto de las DEEP en la comunidad debido al Centro de Datos Oxford cumplirá con los requisitos de protección contenidos en Chapter 173-460 WAC.

Copias de la Determinación Preliminar del Aviso de Construcción, de la Recomendación de la Petición de Segundo Nivel, la aplicación de Aviso de Construcción, y otros documentos de relevancia están disponibles para revisión pública en la Oficina Regional del Este del Departamento de Ecologia, 4601 N. Monroe, Spokane, WA 99205-1295, en la Ciudad de Quincy, 104 B Street SW, Quincy, WA 98848 y en la Biblioteca de Quincy, 208 Central Avenue S., Quincy, WA 98848. Se invita al público a atender una audiencia pública que ha sido programada a comenzar a las 5:00 p.m. el 9 de julio de 2015 en el

Quincy Community Center ubicado en 115 F St. SW, Quincy, WA. La audiencia pública incluirá: bienvenida comenzando a las 5:00 p.m., seguida por presentaciones y una sesión de preguntas y respuestas comenzando a las 5:30 p.m. Comentarios del público serán aceptados comenzando puntualmente a las 6:30 p.m. Además de los comentarios públicos aceptados durante la audiencia pública, se invita al público a comentar sobre esta propuesta de proyecto antes de la audiencia pública. Comentarios por escrito sobre esta propuesta serán aceptados del 28 de mayo al 13 de julio de 2015. Para obtener información adicional sobre el proyecto y para enviar comentarios, comuníquese con Beth Mort en la Oficina Regional del Este de Ecologia, 4601 N. Monroe, Spokane, WA 99205-1295, o a beth.mort@ecy.wa.gov, o al (509) 329-3502. Para solicitar acomodación ADA para discapacidades, llame a Ecologia al (509) 329-3400. Personas con discapacidad auditiva pueden llamar al Servicio de Retransmisión de Washington al 711. Personas con discapacidad del habla pueden llamar TTY al (877) 833-6341.

Para asistencia en español: Gregory Bohn 509-454-4174.

PERÍODO DE COMENTARIO PÚBLICO

desde el 28 de mayo hasta el 13 de julio, 2015

Borrador revisado del permiso para emisiones al aire para el sitio Oxford Centro de Datos de Microsoft

Documentos para examinar están disponibles a:

- **Municipalidad** de Quincy, 104 Calle B, SW
- Biblioteca de Quincy, 208 Avenida Central, S
- Sitio Web del Departamento de Ecología: http://www.ecy.wa.gov/programs/air/quincydatacenter

La Oficina de Ecología en la cuidad de Spokane

Presentar sus comentarios a: preguntas@ecy.wa.gov

AUDIENCIA PÚBLICA

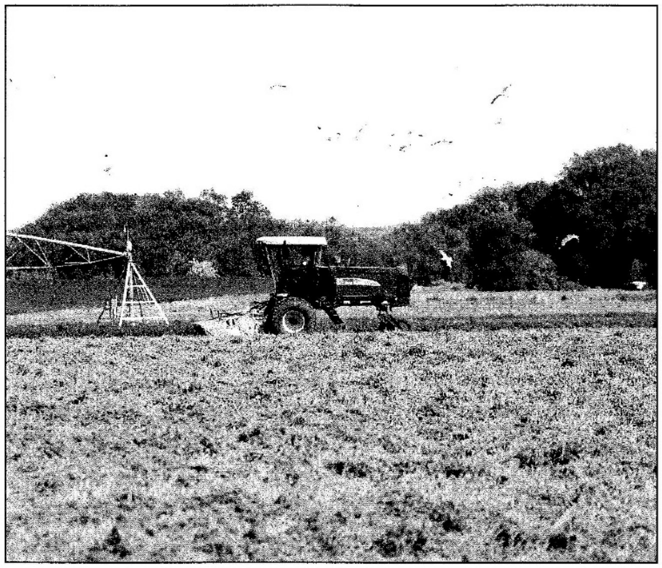
jueves, el 9 de julio, 2015

Centro Comunitario de Quincy
115 Calle F, SW en Quincy, WA

Introducciones y casa abierta a las 5:00 pm
Presentaciones y preguntas a las 5:30 pm
Audiencia Pública Formal a las 6:30 pm

DEPARTMENT OF ECOLOGY
State of Washington

Friendly flock



Kurtis J. Wood/Post-Register

A flock of seagulls gets excited about the first cutting of an alfalfa field east of Quincy. The Quincy Valley is looking at little chance of rain this coming weekend, with temperatures in the high 80s through the weekend. There's even a chance the area will hit 90 degrees for the first time this year on Saturday.

NEWS BRIEFS

Watch for new speed limits on Hwy. 281

The speed limits on Highway 281, south of Quincy, were reduced to accommodate new turning lanes north and south of Road 9 Northwest.

Immediately south of Quincy, the speed limit has been reduced from 60 mph to 50 mph. It was dropped from 50 mph to 35 mph just north of Road 9, state Department of Transportation officials say.

Immediately south of Road 9, the speed limit will be 35 mph. As motorists travel south, the limit will increase to 50 mph and then to the maximum limit of 60 mph.

Special filing period ends on Friday

The Grant County auditor has announced a special three-day filing period that ends on Friday.

The filing period started at 8 a.m. Wednesday and runs through 5 p.m. Friday. However, online filing closes at 4 p.m. on Friday.

This filing is only for offices garnered no candidates during filing week, held earlier this month.

In the Quincy Valley, open seats include the mayor's position on the George City Council, one seat on the Quincy hospital district's board and two seats on the Quincy School Board.

Comments due on CB Island options

Time is running out to get comments into the Grant PUD about whether the golf course at Crescent Bar Island should stay or go.

The utility has proposed two options for redevelopment of recreation on the island. It is taking comments through May 31.

Option A retains the existing nine-hole golf course, while Option B replaces the golf course with expanded day-use picnic areas, parking, and trail systems. Both options include a 55-site RV campground, multi-purpose day-use area, enhanced boat launch and parking lot, moorage, walking trails and a concession area.

Comments can be submitted to www.grantpud.org. PUD commissioners may make a decision in June.

BASIN GARDENING

This rush is not a rush at all

By Dennis L. Clay
Gardening/Outdoor Columnist

Another interesting plant from Martin this week. This noxious weed has a beautiful flower, as do many weeds. *Read on.*

From Martin Blevins of the Noxious Weed Control Board of Grant County:

This week we are going to talk about flowering rush. This is an aquatic plant, so it spreads through water systems such as irrigation canals and rivers. This plant is a main concern coming down the Columbia River system and spreading south.

One interesting fact about flowering rush is that unlike other noxious weeds on our list, this one has its own family just for this one plant. The family name is Butomaceae. Also, the name is a bit misleading as flowering rush isn't even technically a rush at all!

Another interesting fact is that in Russia, the rhizomes are sometimes used as food. In Israel flowering rush is considered an endangered plant due to its dwindling habitat. Flowering rush was introduced to North America as an ornamental waterside plant.

This is a hard plant to control indeed. Flowering rush is a perennial, which means it has a massive rhizome system that new plants come from. It grows in and around water, especially moving water such as rivers and streams. Even the smallest root fragment that is broken off can float downstream and start a whole new colony. And with a fragile root system, that is easy to do.

Flowering rush can grow down to depths of about nine feet. Although this plant has pretty pink flowers, this plant is all but impossible to find when it is not flowering, as the green leaves blend in rather well with rushes, sedges, etc. These pink flowers grow in what is called an umbel, which sort of looks like an upside down umbrella.

Flowering rush is available to buy on the internet, and is likely a significant factor in the spread of this plant. Also, anglers and boaters may spread the plant further by having the plant get caught in fishing hooks or propellers.

Flowering rush was first discovered in North America in 1918 in Michigan. Another problem with this plant compared to other noxious weeds on our list is that it is hard to do chemical applications effectively due to being in moving water. When the herbicides are put in the water, it doesn't stay in place, but moves with the water making it not very effective.

Again, because it is possible for flowering rush to get caught in propellers, it is important to check and wash your boat, if possible, when you exit the water. If pieces of flowering rush do get on a propeller and are not brushed off, they may be spread to other bodies of water when the boat is launched.

Please contact the weed board at our new extension 509-754-2011 Ext. 4710 with questions on identification or control methods for any of the noxious weeds on our list.

Contact Martin Blevins at 509-760-3664.

Dennis note:

Martin's info about the flowering rush caused me to conduct a little research on my own. First, the flower of this plant is striking and beautiful. Second, all states hate the plant.

Here's what King County says about flowering rush: It is currently known from only a few locations in Washington State, including a large infestation on Silver Lake in Whatcom County. It impacts both the ecological and recreational values of shallow water and shorelines.

Public and private landowners are required by state law to eradicate this plant when it occurs on their property. It is a Class A Noxious Weed in Washington due to its limited distribution in the state and the potential for significant impact to state resources.

This species is also on the Washington quarantine list, which is also known as the prohibited plants list and it is prohibited to transport, buy, sell, offer for sale, or to distribute plants or plant parts of this species, into or within the state of Washington. It is further prohibited to intentionally transplant wild plants and/or plant parts of this species within the state of Washington.

Because of the difficulty in distinguishing this plant from native rushes and bulrushes when not blooming, it is recommended the noxious weed board be contacted for positive identification before removing.

The bloom time is June to August, so if readers spot flowering rush around the basin, report the location.

Courtesy photos

The flowering rush provides a striking and beautiful flower, coming in various shades of pink. However this plant is a noxious weed and the locations where spotted need to be reported to the Noxious Weed Control Board.

Six Community Garden plots still available

Yes, some will say it is too late to plant a garden, but it really isn't too late. For example: Buy some cucumber plants at your favorite gardening store, plant them in a community garden plot and you will enjoy cucumbers in a few weeks. There are other plants in this category as well. And you are in luck, as there are still a few plots available. *Read on.*

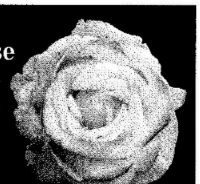
Some plots rented, but others still available at Moses Lake Community Gardens. Susan's report on available gardening plots is below. *Read on.*

Susan Schwiesow of the Moses Lake Parks & Recreation Department reports: We have the following gardening plots available to rent as of this week:

$15 plots, 8x12 – 1, 8x14 – 2; $20 Plots, 10x20 – 1, 12x20 – 1 and 14x20 – 1.

Contact the Moses Lake Parks and Recreation Department at 764-3805. Anyone in the department can help you with the procedure to rent a plot.

Garnet's Peace Rose



This peace rose appeared in Garnet's garden this week. I wanted to cut it as a bud and bring it inside. Garnet wanted to leave it on the bush. The flower continues to add color to the garden.

Dennis L. Clay photo

MORE people read Shopper Want Ads every day than any other advertising in the Basin. When you have something to buy sell or trade, call 765-4561.

MANUFACTURED

Small trailer for rent in RV park. Located between Moses Lake and Warden. Call (509) 760-4115.

COMMERCIAL

Office space available! 936 sq. ft. with 2 offices and 2 large open rooms and a bathroom that is as is. Also a shared lunch area for $600 a month. There is also a garage that is approximately 256 sq. ft. for an additional charge of $125. If you are interested in taking a look, please call (509)707-1770 and ask for Jim.

PETS & ANIMALS

PETS

2 Puppies For Sale! One female and one male. Female: light brown/white, Male: black/brown/white. Given their first shot. Asking $100 each. Call (509) 793-8928.

IT'S EASY
To Place
A
WANT AD
Just Phone
765-4561

Free Kittens! 5 kittens. 6 to 7 weeks old. 2 Grey & 3 Black. Call (509)765-2551.

TRANSPORTATION

BOATS & MOTORS

Unsinkable 1980 14' Boston WAH4R. 30 HP Evinrude. 45 thrust remote control Minnkota electric motor. Hummingbird color fish locater, stand up weatherproof top. Dual batteries and many more accessories appraised at over $5,000. Asking $3,200. Call (480)326-6645.

NEED extra cash? Sell your ununsed items FAST with Shopper Classified advertising.

Very safe fishing and ski boat. 14' Livingston. 40 HP Johnson motor. Runs perfect Minnkota remote 45 thrust electric motor, fold up deck with bass seat, stand up canopy, 2 batteries, EZ-Load drive on trailer, Buddy hubs, 2 fish locaters and many more accessories. Great Buy! Asking $4,500. Call (480)326-6645.

RECREATION VEHICLES

2005 Viking Legend tent trailer. 2 King beds, toilet, shower, sink & refrigerator. Spacious inside! Immaculate condition. $5,500 or best offer. Call James at (509) 989-8745 or Bethine at (509) 868-5928.

27 ft. Wildwood LE camp trailer. Very good condition. Never been smoked in. 15 ft. tip out. Asking $12,000. Call (509)750-3898.

'01 Cougar 5th wheel, 2 slide outs. Excellent condition. 28 ft. long, weighs 8600 lbs. empty. Asking $8,500. Call (509)765-3026.

'78 Toyota RV. $6000. '86 Southwind RV. $6,500. '92 Bounder RV. $8,000. Horse trailer sold as is. $400. Call (509) 762-2990.

AUTO SUPPLIES & SERVICE

Jeep soft top. 2-door. Fits 2007-2010. Includes all hardware. Asking $300. Call (509)760-8412.

AUTOS

CASH for VINTAGE CARS Mercedes convertibles, Porsche, Jaguar, Alfa, Lancia, Ferrari, Corvettes, Mustangs. Early Japanese Cars (714)267-3436 rstevensjr@gmail.com Other collector cars of significant value desired. (PNDC)

'03 Honda Accord EXL. $10,000. Stk. #J0219K. Call Bud Clary Honda of Moses Lake for more details at (509) 765-4551 DLR.

Bud Clary

'13 Toyota Camry. 23k miles. $19,684. Stk.# 42036. Call Andy at (509) 925-1200 DLR.

PUBLIC COMMENT PERIOD

May 28 - July 13, 2015

Microsoft's draft *revised* air permit for the

Oxford Data Center

Documents are available for review at:

Quincy City Hall, 104 B Street SW

Quincy Library, 208 Central Ave. S

WA State Dept. of Ecology Spokane office or on Ecology's website.

http://www.ecy.wa.gov/programs/air/quincydatacenter

Submit comments to: beth.mort@ecy.wa.gov

PERÍODO DE COMENTARIO PÚBLICO

desde el 28 de mayo hasta el 13 de julio, 2015

Borrador revisado del permiso para emisiones al aire para el sitio

Oxford Centro de Datos de Microsoft

Documentos para examinar están disponibles a:

· Municipalidad de Quincy, 104 Calle B, SW

· Biblioteca de Quincy, 208 Avenida Central, S

· Sitio Web del Departamento de Ecología: http://www.ecy.wa.gov/programs/air/quincydatacenter

La Oficina de Ecología en la cuidad de Spokane

Presentar sus comentarios a: preguntas@ecy.wa.gov

PUBLIC HEARING

July 9, 2015

Quincy Community Center
115 F Street SW, Quincy, WA

5:00pm Meet and Greet
5:30pm Presentations/Q&A
6:30pm Formal Hearing

DEPARTMENT OF ECOLOGY
State of Washington

AUDIENCIA PÚBLICA

jueves, el 9 de julio, 2015

Centro Comunitario de Quincy
115 Calle F, SW en Quincy, WA

Introducciones y casa abierta a las 5:00 pm
Presentaciones y preguntas a las 5:30 pm
Audiencia Pública Formal a las 6:30 pm

Spot o' color

'Tribute' dahlia garden takes root behind Pybus

By Christine Pratt
World staff writer

World photos/Christine Pratt

Left: Dahlia expert Linda Holmes-Cook digs holes Tuesday for the dahlia "tribute" garden she's planting behind Pybus Public Market. **Above:** Holmes-Cook took a break to accept a bag of morel mushrooms from an old Wenatchee High School chum, John Malissos. She traded the morels for a bag of home-grown dalhia tubers.

WENATCHEE — "Crazy Legs" will be poking through the soil soon, not far from "Horsefeathers" in Linda Holmes-Cook's second "tribute" dahlia garden behind Pybus Public Market.

Sometime in August, these dahlias will be swaddled in waves of color bursting from the 70 varieties she's planted there, under the somewhat suspicious eyes of a pair of osprey nursing eggs atop a nesting platform in Wenatchee Riverfront Park.

Now equipped with a more complete irrigation system, she expects big things from the small garden on the river side of the market's rear parking lot.

Some of this year's blooms will be 10 inches or more across.

"This garden is for anyone who is fascinated by dahlias," said Holmes-Cook, using a shovel to make holes for the flowers she'll plant this week.

She's a dahlia expert, active blogger for the NCW Dahlia Society and a regular gardening columnist for The Wenatchee World.

Before the season is out, she'll plant 350 to 400 dahlias at home, at a demonstration garden on Wenatchee's Emerson Avenue and at Pybus.

The gardens give dahlia fanciers a look at the dizzying variety of blooms available, so they'll know what to ask for at the society's tuber sales. Her plantings even produce enough tubers for a little gainful bartering on the side.

An old Wenatchee High School chum, John Malissos, now of Ellensburg, swung buy the Pybus garden Tuesday to swap a giant bag of morel mushrooms he'd gathered for a bag of her home-grown tubers. A good trade.

Holmes-Cook's dad was Tony DeRooy, the landscape supervisor at Rocky Reach Dam who during his 1964 to 1982 tenure won awards for his colorful mass plantings — a tradition that crews there have continued to this day.

In the years before his death in 2006, she and her sisters cared for his own beloved dahlia garden, and their passion for the blooms was born.

"We had to be his hands and feet," she said. "When you're doing something like that with someone who's so passionate, you can't help but catch that passion yourself."

For more information on the tribute garden or dahlia shows and sales, contact Holmes-Cook at ncwdahlia@aol.com.

Briefly

WATERVILLE

County has two openings on planning commission

Douglas County commissioners are planning to appoint two members to the seven-member Douglas County Planning Commission next month.

Those appointed serve four-year terms.

Anyone interested can fill out an application on the Douglas County website: douglascountywa.net.

Anyone uncertain of their district can contact Dayna Prewitt, clerk of the board, at 745-8537.

—K.C. Mehaffey, World staff

WATERVILLE

Lab: Man died from overdose

A Rock Island man whose body was discovered seven weeks after his disappearance died from an overdose of methamphetamine, according to toxicology reports.

Douglas County Coroner Steve Clem said Luis Leonardo "Mousie" Fernandez, 32, died from acute methamphetamine intoxication. The Washington State Patrol Crime Lab certified the cause of death in a report issued in late April.

Fernandez was reported missing the week before Christmas. His body was discovered Feb. 9 near Rock Island Grade Road, about 100 yards from where his vehicle had been parked.

Luis Leonardo "Mousie" Fernandez
Found dead Feb. 9

At the time of his disappearance, Fernandez was taking classes to become a drug and alcohol counselor. He had struggled with addiction and involvement with gang crime in his youth, but had not been arrested since completing a five-year prison term for burglary and assault in 2011.

His probation for that offense concluded in 2014, with an excellent recommendation from his state Department of Corrections supervisor.

Family members said Fernandez had lost his job not long before his disappearance. He was a father of three.

—Jefferson Robbins, World staff

Lobby hours: Monday-Friday, 8:00 a.m. to 5:00 p.m.
Circulation phone hours: Monday-Friday, 9:00 a.m. to 5:00 p.m. Sunday 6:30 a.m. to 10:30 a.m.
Call: 663-5161 or 1-800-572-4433
Fax: 662-5413
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Newsroom: 665-1164

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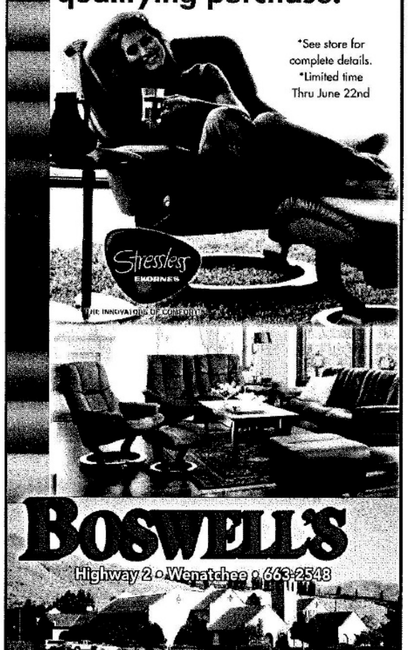

School board asks: Is a new high school in Quincy's future?

Board tackles question of how QSD should grow

BY JILL FITZSIMMONS
editor@qvpr.com

Faced with a growing student population, the Quincy School Board aims to put a bond levy before voters early next year.

However, what the school board still must decide is if the price of a new high school will be included on that bond levy.

The Quincy School Board on Tuesday was presented with a recommendation from a facilities committee that's been meeting monthly since April. The committee was charged with recommending what improvements should be made at this time to the district's schools and what bond rate district taxpayers would support to pay for these improvements.

The committee was formed to look at these issues because of pressure on the district's schools to accommodate a growing student population.

A survey of the school district and its future growth shows that in 2007 the district had 2,392 students. Today, enrollment is at 2,851 students, for an average growth of 65 students a year.

Growth pressures in the QSD will become "acute over the next five years," with a projected increase of 372 students by the year 2019, the survey states. This is a 13 percent increase overall for a projected 3,223 students in 2019.

The facilities committee, made up of about 20 community members and school officials, recommended the school board consider a $92.6 million construction and renovation project that would include nearly $13 million in matching funds from the state, for a cost of about $79 million to district taxpayers.

The recommendation includes eight construction projects that would impact all of the district's schools. Those projects and their estimated costs are:

- Construction of a new junior high: $43.8 million
- Construction of a new elementary school: $19.4 million
- The addition of eight classrooms at George Elementary School: $4 million
- The addition of a gym at George, Pioneer and Mountain View elementary schools: $7.6 million
- Minor capital improvements: $3 million
- Improvements to Quincy High School: $14.8 million

These improvements amount to an estimated bond rate of about $1.95 per $1,000 of assessed property value, said Steve McNutt of NAC Architecture, a Seattle firm that's been helping the district through this process.

Among the reasons the committee did not recommend building a high school is because the high school is not eligible for state funding assistance for modernization or replacement; the junior high is eligible for about $10.2 million in state assistance, Superintendent John Boyd said.

However, school board members decided they would like to see more details about the costs associated with building a new high school and moving junior high students to the current high school. The school district owns 58 acres on the north side of town that could be the site of both a new high school and elementary school.

An option that includes building a new high school and completing other upgrades at the elementary schools and junior high would cost about $112 million, McNutt said. Or, about $2.75 per $1,000 of assessed property value, he said.

The facilities committee previously decided that district taxpayers would tolerate a bond rate of between $1.75 and $2 per $1,000 of assessed property value, McNutt said.

However, school board members questioned whether those costs would reach $2.75 in the coming years because of the growing tax base in the school district.

The school district's tax base has more than doubled since 2007, McNutt said. Today, the tax base is valued at $2.3 million, he said.

On top of that, more than half the taxpayers in the district are large commercial enterprises, McNutt added. This puts the school district in a position where a bond levy has less impact on individual homeowners, he said.

While the Grant County Assessor's Office is conservatively estimating Quincy will see another $50 million increase in its tax base in the near future, some people believe that number will be closer to $1 billion.

Board President Alex Ybarra said the tax base may reach as much as $3.5 billion in the near future when some of the ongoing data center expansions, including the Oxford Data Center that Microsoft is building, come online. And that would drive the bond levy rate down, Ybarra said.

The school board is expected to meet with bond finance professionals in July to further talk about the two options. If a decision is made next month, a bond levy committee would begin to meet in August and prepare for a Feb. 9 election.

NEWS BRIEFS

Quincy man critically injured in car accident

A 57-year-old Quincy man was critically injured Monday in a single-vehicle accident southeast of Quincy.

Daniel Lee lost control of a 1968 Chevrolet pickup while driving east on Road 8 NW, according to the Grant County Sheriff's Office. Lee's truck left the road to the south, struck an embankment and rolled once. Lee was ejected and landed in an irrigation canal. The accident was reported at 5:30 p.m.

Lee was transported by ambulance to Quincy Valley Medical Center and later flown by MedStar to Providence Sacred Heart Medical Center in Spokane, where his injuries are said to be life-threatening. He remains in critical condition there.

The accident is under investigation by the Grant County Sheriff's Motor Traffic Unit.

Bystander hurt in Quincy plane crash

A small plane attempting to take off from a roadway in the 6000 block of Road R Northwest failed to get of the ground about 6:40 a.m. Friday and crashed into a yard, injuring a bystander, said a report from the Grant County Sheriff's Office.

Sheriff Tom Jones said Rebecca J. Gregg of Quincy, 57, was injured when the plane -- a homemade Zenith CH701 single-engine light aircraft -- hit a row of arborvitae bushes and veered into the woman, who was standing nearby taking pictures of the attempted flight.

Gregg was transported to Quincy Valley Medical Center and treated for non-life threatening injuries.

The plane was piloted by Randall W. Grandpre of Osburn, Idaho. He was attempting to use Road R NW as a runway. A field that he would have normally used as a runway was muddy, Grandpre said. He was not injured. A 13-year-old female passenger in the plane received a minor leg injury and was treated and released at the scene, Jones said. The plane never lifted off the ground before it crashed into the yard at 6141 Road R NW.

Wildfire, from page 2

"We will have crews out all day reinforcing those (fire) lines," Fortier said.

A caller reported in the fire on Monument Hill at 10:50 p.m. Tuesday. The fire quickly spread over the hill, which is covered in dry sage brush and grass. It was driven by winds of 10 to 15 mph.

Fortier, at a press conference, described the terrain as "rocky, dusty and dirty." The hill is fairly steep, and crews are able to drive vehicles on only about 75 percent of the terrain, he said.

Shortly after midnight, Level 3 evacuation orders were given to residents living on Road 13 Northwest near Adams Road. About 24 homes were given evacuation orders, Foreman said.

A Level 3 evacuation notice means residents are in immediate danger and must leave the area.

Law enforcement officials with the Washington State Patrol, Grant County Sheriff's Office and Quincy Police Department went door to door, evacuating people.

Level 2 evacuation orders followed at about 1:20 a.m. to all homes from Road K Northwest to Martin Road near Quincy.

A Level 2 evacuation indicates there is a significant risk to an area and a mandatory evacuation order may be issued at any time. Resident should either voluntarily leave the area, or be ready to leave at a moment's notice.

Firefighters were able to do some "pre-burning of fuels around the homes" to ward off the fire, Fortier said. About 4 a.m. Wednesday, winds reduced and crews were able to form a line about 95 percent around the fire, he said.

"What we all advocate is be prepared," Foreman said of the fire season. "Have your evacuation plan already in your head."

A temporary shelter for evacuees was established at Quincy Junior High School; however, no one from the public opted to use the shelter, said Amanda Appel, disaster program specialist with the American Red Cross.

Red Cross provided breakfast to about 80 firefighters at the school, Appel said.

Those evacuation orders were lifted at about 7:30 a.m. on Wednesday because there were no longer any threats to any homes.

Fire departments from throughout Grant County, as well as those in Chelan and Douglas counties, responded to the fire, Foreman said.

The Monument Hill fire is the fourth wildland fire in four days that local firefighters have responded to, Fortier said. On Sunday, firefighters sent a truck and crew to the Sleepy Hollow Fire in Wenatchee, which destroyed 28 homes and erupted in the commercial district.

Firefighters also responded to small wildfires in the Frenchman Hills area on Monday and at Road R and Martin Road at 8:30 p.m. on Tuesday.

Firefighters are seeing "mid-August" conditions around the Quincy Valley, Fortier said. And, with the July 4th holiday quickly approaching, the fire chief asked people to refrain from using fireworks.

"I wish they wouldn't. I wish they would save them for New Year's," he said. "Because it is terribly, terribly dry out there and it doesn't take much (to start a fire)."

Watch for updates at www.qvpr.com.

COME TO THE PUBLIC HEARING!
JULY 9, 2015
Learn about and comment on
draft revisions to Microsoft's air permit for the
Oxford Data Center

Quincy Community Center
115 F Street SW, Quincy, WA

5:00 pm - Meet and Greet
5:30 pm - Presentations and Q&A
6:30 pm - Formal Hearing

¡VEN A LA AUDIENCIA PÚBLICA!
el 9 de julio, 2015
Aprenda más sobre este proyecto y haga sus comentarios acerca del borrador de las revisiones del permiso para emisiones al aire para el sitio
Oxford Centro de Datos de Microsoft

Centro Comunitario de Quincy
115 Calle F, SW en Quincy, WA

Introducciones y casa abierta a las *5:00 pm*
Presentaciones y preguntas a las *5:30 pm*
Audiencia Pública Formal a las 6:30 pm

SUBMIT COMMENTS BY
July 13, 2015
Contact Beth Mort for more information at 509-329-3502
http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html

DEPARTMENT OF ECOLOGY
State of Washington

ACEPTAREMOS SUS COMENTARIOS ANTES
¡del 13 de julio!
Para más información, por favor contactar a Beth Mort a 509-329-3502
http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html

Public Comment Period

DEPARTMENT OF ECOLOGY
State of Washington

Air Quality Program **May 2015**

Ecology Seeks Comments on Draft Revisions to Microsoft's Oxford Data Center Air Permit

Este boletín incluye información sobre el Centro de Datos "Oxford" localizado en Quincy, Washington. El boletín también está disponible en español. Si usted necesita más información en español sobre este proyecto, por favor contáctenos al (360) 407-6084 o a preguntas@ecy.wa.gov.

Washington State Department of Ecology (Ecology) issued a permit to Microsoft (Approval Order No. 14AQ-E537) on August 15, 2014. The permit allowed Microsoft to install and operate equipment at a new data center called Oxford Data Center (Oxford).

Before completing construction and beginning operation of the data center, Microsoft applied to change the permit. **Ecology is seeking public comment only on the changes to the permit.**

Microsoft's Requested Changes

Microsoft asked for flexibility in how they operate their emergency back-up diesel engine generators. This would more accurately reflect the range of situations in which the engines will operate.

Emergency engines need flexibility when operating because power needs for data centers vary significantly throughout the day. The engines will most often operate between 25 and 75 percent of capacity, but flexibility to run betwen 10 and 100 percent capacity is needed during unplanned outages as well as during other planned situations.

While this flexibility could result in an increase in the amount of air pollution, the potential emissions will still be in compliance with state and federal air quality standards.

In addition, Microsoft requested changes to how they show they are complying with permit limits. The new permit allows them to reduce the minimum number of engines being tested *per year* from two to one. However, it extends the minimum number of years they must test and requires one more engine be tested overall. The effect of these changes increases the minimum number of engines tested from eight to nine and the minimum number of years Mircrosoft will be required to test the engines from 10 years to 25 years.

Public Comment Period
May 28 – July 13, 2015

Public Hearing
July 9, 2015
Quincy Community Center
115 "F" Street SW
Quincy, WA 98848

Agenda
5:00 p.m. Meet and Greet
5:30 p.m. Presentations/Q&A
6:30 p.m. Formal Hearing

Documents available at:
http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html

Quincy City Hall
104 "B" Street SW
Quincy, WA 98848

Quincy Library
208 Central Avenue South
Quincy, WA 98848

Washington Dept of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205

Submit comments to
Beth Mort
Washington Dept. of Ecology
4601 North Monroe Street
Spokane, WA 99205
(509) 329-3502
beth.mort@ecy.wa.gov

Contact information
Greg Flibbert, Permit Manager
(509) 329-3452
greg.flibbert@ecy.wa.gov

Ecology Wants Your Comments

You may review and comment on the proposed revisions to the draft air permit through July 13, 2015. This public comment period presents an opportunity to have your ideas and comments heard by Ecology.

Documents for review are available at Quincy City Hall and the Quincy Library. A public hearing is also being held at the Quincy Community Center (115 "F" Street SW) on July 9, 2015. This is an opportunity to learn about the project, and to voice your comments or concerns. See the side bar on the front of this document for details about the public hearings and other ways to submit comments.

How did Ecology Evaluate the Impacts of Data Center Air Pollution?

Ecology used a process called 'Community Modeling'. To do this, a computer model adds any new data center emissions to those from other air pollution sources and determines if the total emissions are likely to be harmful to human health. Ecology reviews the results from the computer models to determine air quality impacts and assess possible health risks. Community modeling was used in this case because there are so many data centers located in Quincy.

The Health Risks of Diesel Exhaust

The toxic air pollutants in diesel exhaust include nitrogen dioxide, carbon monoxide, organic compounds, and tiny particles called diesel exhaust particulates. Ecology evaluated the levels of these pollutants during the permit review process. Diesel exhaust particles and nitrogen dioxide are the pollutants most likely to be produced in high enough amounts to potentially affect health. For more information about the health effects of these pollutants, read Ecology's publication "*Focus on Diesel Exhaust Health Risks.*" This is available in English and Spanish.

For ADA accommodations or documents in alternate format, call (509) 329-3502, 711 (relay service), or 877-833-6341 (TTY).

Período de Comentario Público

DEPARTMENT OF ECOLOGY
State of Washington

Programa de calidad del aire **mayo 2015**

Ecología solicita comentarios al borrador de revisiones del permiso de emisiones al aire para el Centro de Datos Oxford de Microsoft

El Departamento de Ecología del estado de Washington (Ecología) expidió un permiso a Microsoft (Orden de Aprobación No. 14AQ-E537) el 15 de agosto de 2014. El permiso permitirá a Microsoft a instalar y operar equipo en su nuevo centro de datos llamado Centro de Datos Oxford (Oxford).

Antes de completar la contrucción del centro de datos y de comenzar su operación, Microsoft solicitó hacer cambios al permiso. **Ecología está solicitando comentarios del público sólamente sobre los cambios al permiso.**

Cambios solicitados por Microsoft

Microsoft solicitó incrementar la flexibilidad en la manera en la que operan sus generadores de emergencia de motor diesel. El cambio en flexibilidad reflejará más fielmente la serie de situaciones en las cuales los motores operarían.

Los motores de emergencia necesitan flexibilidad en su operación debido a que las necesidades de electricidad en los centros de datos varían significativamente durante el dia. Los motores casi siempre operarán entre el 25 y el 75 por ciento de capacidad, pero flexibilidad de operar entre el 10 y el 100 por ciento de capacidad es necesario durante interrupcciones eléctricas inesperadas asi como durante otras situaciones planeadas.

Aunque esta flexibilidad pudiese resultar en un aumento en la cantidad de contaminación al aire, la cantidad potencial de emisiones todavía se mantendrá dentro de la normas de calidad del aire estipuladas en las leyes estatales y federales.

Además, Microsoft solicitó cambios en la manera en la cuál presentar como están cumpliendo con los límites del permiso. El permiso nuevo les permite reducir el número mínimo de motores a ser examinados *al año* de dos a uno. Sin embargo, extiende el número mínimo de años que deben examinar los motores y en general requiere examinar un motor adicional. El efecto de estos cambios incrementa el número mínimo de motores examinados al año de ocho a nueve, y el número de años que Microsoft será requerido a examinar los motores de 10 años a 25 años.

Período de Comentario Público

28 de mayo al 13 de julio de 2015

Vista Pública

9 de julio de 2015

Quincy Community Center
115 "F" Street SW
Quincy, WA 98848

Agenda

5:00 p.m. Conocer y Saludar
5:30 p.m. Presentaciones/Preguntas & Respuestas
6:30 p.m. Audiencia Formal

Documentos disponibles en:

http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html

Quincy City Hall
104 "B" Street SW
Quincy, WA 98848

Quincy Library
208 Central Avenue South
Quincy, WA 98848

Washington Dept of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205

Someta sus comentarios a

Beth Mort
Washington Dept. of Ecology
4601 North Monroe Street
Spokane, WA 99205
(509) 329-3502
beth.mort@ecy.wa.gov

Información del Contacto

Greg Bohn, (509) 454-4174 o
Richelle Perez, (360) 407-6084
preguntas@ecy.wa.gov

Ecología quiere sus comentarios

Usted puede examinar y comentar sobre los propuestos cambios al borrador del permiso del aire hasta el 13 de julio del 2015. Este período de comentario público le provee la oportunidad de hacer que sus ideas y comentarios sean escuchados por Ecología.

Los documentos están disponibles para examinar en la Alcaldía de Quincy (Quincy City Hall) y en la Biblioteca de Quincy (Quincy Library). También, una audiencia o vista pública se celebrará en el Centro Comunitario de Quincy (Quincy Community Center -115 "F" Street SW) el 9 de julio del 2015. Esta es una oportunidad par aprender acerca de el proyecto y compartir sus comentarios y preocupaciones. Para más detalles acerca de las vistas públicas y de otras maneras de someter comentarios, vea el recuadro en el frente de este documento.

¿Cómo Ecología evaluó los impactos de la contaminación del aire del Centro de Datos?

Ecología usó un proceso llamado "Modelando la Comunidad." Para hacer esto, un modelo en computadoras añade cualquier nueva emisión del centro de datos a emisiones de otras fuentes de contaminación al aire en el área y determina si el total de las emisiones puede ser dañino a la salud humana. Ecología examina los resultados de los modelos en computadoras para determinar los impactos a la calidad del aire y evalúa los posibles riesgos a la salud. El proceso de Modelando la Comunidad fué utilizado en este caso porque hay muchos centros de datos localizados en Quincy.

Los riesgos a la salud de los escapes de motores diesel

Los contaminantes tóxicos que salen por los sistemas de escape de motores diesel incluyen dióxido de nitrógeno, monóxido de carbono, compuestos orgánicos, y pequeñas partículas llamadas particulados de escape de diesel. Ecología evaluó los niveles de estos contaminantes durante el proceso de revisión del permiso. Particulados de escape de diesel y dióxido de nitrógeno son los contaminantes que con más certeza se producirían en cantidades suficientemente grandes para potencialmente afectar la salud. Para más información acerca de los effectos a la salud de estos contaminantes, lea la publicacón de Ecología titulada "Enfoque en los riesgos a la salud de el escape de diesel" ("*Focus on Diesel Exhaust Health Risks)*." Esta publicación está disponible en inglés y en español.

MANTENTE AL CORRIENTE

PERMISOS DE AIRE QUINCY

síguenos en @ecyQuincyAir

Textea ecyQuincyAir al 40404 para recibir mensajes de alerta de texto

www.ecy.wa.gov
Busca palabra clave Quincy

Actualizando correo electrónico
listserv.wa.gov
"Quincy-data-centers"

Para documentos en formatos alternos o acomodaciones especiales bajo la Ley sobre Estadounidenses con Discapacidades (ADA, siglas en inglés) llame al
(509) 329-3502, 711 (servicio de transferencia), o 877-833-6341 (TTY).

Emails sent to the Quincy Data Center Listserv

From: Mort, Beth (ECY)
Sent: Monday, June 29, 2015 3:56 PM
To: 'QUINCY-DATA-CENTERS@LISTSERV.WA.GOV'
Subject: Reminder! Public Hearing on July 9th!!! / ¡Recordatorio! ¡Habrá una Audiencia Pública formal el 9 de julio!

Hello Interested Parties,

The comment period for revisions to the Oxford Data Center closes on July 13th.

Don't forget to come to the Public Hearing on the Oxford Data Center on July 9th at the Quincy Community Center. This is an opportunity to learn about the project, ask questions to Ecology staff and Microsoft staff, and give formal public comment.

We have a fact sheet about the Oxford Data Center that is available at Quincy City Hall, Quincy Library and several other locations around town. You can also access HERE at our website.

****

Hola Partes Interesadas,

El periodo de comentario público para el borrador revisado del permiso para emisiones al aire para el sitio Oxford Centro de Datos se abrirá el 28 de mayo y terminará el 13 de julio.

No olvida venir a la Audiencia Pública acerca de sitio Oxford Centro de Datos en el 9 de julio en el Centro Comunitario de Quincy. Este es una oportunidad para aprender más sobre el proyecto, para hacer preguntas a los representantes de Ecología y Microsoft, y presentar sus comentarios públicos formales.

Tenemos una hoja informativa sobre el Oxford Centro de Datos que está disponible en la Municipalidad de Quincy, la Biblioteca de Quincy, y también a otros lugares en Quincy. También usted puede leer más al nuestro sitio Web.

Visit our Quincy Data Centers webpage for more information.
Text "Follow ecyQuincyAir" to 40404 to receive updates.
Tips on Effective Public Commenting.
Find out what is happening in your city on our Public Involvement Calendar.
Sign up for the Quincy Data Centers Listserv.

Mande por texto "Follow ecyQuincyAir" a 40404 para alertas de texto
Visite nuestro página web Quincy Data Centers webpage para más información.
Infórmese de lo que pasa en su ciudad en nuestro calendario Public Involvement Calendar buscando por su ciudad.
Obtenga consejos sobre haciendo comentarios públicos eficaces Effective Public Commenting.
Inscríbase para obtener información electrónica Quincy Data Centers Listserv.

Beth Mort | Community Outreach & Environmental Education
Air Quality Program | Dept of Ecology Eastern Office
beth.mort@ecy.wa.gov | 509.329.3502
Office Hours: M-Th 7am-4pm

From: Mort, Beth (ECY)
Sent: Tuesday, June 30, 2015 7:32 AM
To: 'QUINCY-DATA-CENTERS@LISTSERV.WA.GOV'
Subject: Correction on hyperlink

Hello All,

The hyperlinks in the email I sent out yesterday were not active. Below I have corrected the links.

Thank you!

Hello Interested Parties,

The comment period for revisions to the Oxford Data Center closes on July 13th.

Don't forget to come to the Public Hearing on the Oxford Data Center on July 9th at the Quincy Community Center. This is an opportunity to learn about the project, ask questions to Ecology staff and Microsoft staff, and give formal public comment.

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****

Hola Partes Interesadas,

El periodo de comentario público para el borrador revisado del permiso para emisiones al aire para el sitio Oxford Centro de Datos se abrirá el 28 de mayo y terminará el 13 de julio.

No olvida venir a la Audiencia Pública acerca de sitio Oxford Centro de Datos en el 9 de julio en el Centro Comunitario de Quincy. Este es una oportunidad para aprender más sobre el proyecto, para hacer preguntas a los representantes de Ecología y Microsoft, y presentar sus comentarios públicos formales.

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Infórmese de lo que pasa en su ciudad en nuestro calendario Public Involvement Calendar buscando por su ciudad.
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Inscríbase para obtener información electrónica Quincy Data Centers Listserv.

Beth Mort | Community Outreach & Environmental Education
Air Quality Program | Dept of Ecology Eastern Office
beth.mort@ecy.wa.gov | 509.329.3502
Office Hours: M-Th 7am-4pm

From: Mort, Beth (ECY)
Sent: Wednesday, July 08, 2015 10:47 AM
To: Quincy Community Center
Subject: Come to the Public Hearing! / ¡Ven a la Audiencia Pública!

Don't forget to attend Oxford hearing on July 9, 2015 at Quincy Community Center!
Quincy Community Center
115 F Street SW, Quincy, WA
5:00 pm - Meet and Greet
5:30 pm - Presentations and Q&A
6:30 pm - Formal Hearing

¡No olvide asistir la audiencia pública "Oxford" el 9 de julio en el Centro Comunitario de Quincy!
AUDIENCIA PÚBLICA: jueves, el 9 de julio, 2015
Centro Comunitario de Quincy
115 Calle F, SW en Quincy, WA
Introducciones y casa abierta a las *5:00 pm*
Presentaciones y preguntas a las *5:30 pm*
Audiencia Pública Formal a las 6:30 pm

Visit our Quincy Data Centers webpage for more information.
Text "Follow ecyQuincyAir" to 40404 to receive updates.
Tips on Effective Public Commenting.
Find out what is happening in your city on our Public Involvement Calendar.
Sign up for the Quincy Data Centers Listserv.

Mande por texto "Follow ecyQuincyAir" a 40404 para alertas de texto
Visite nuestro página web Quincy Data Centers webpage para más información.
Infórmese de lo que pasa en su ciudad en nuestro calendario Public Involvement Calendar buscando por su ciudad.
Obtenga consejos sobre haciendo comentarios públicos eficaces Effective Public Commenting.
Inscríbase para obtener información electrónica Quincy Data Centers Listserv.

Beth Mort | Community Outreach & Environmental Education
Air Quality Program | Dept of Ecology Eastern Office
beth.mort@ecy.wa.gov | 509.329.3502
Office Hours: M-Th 7am-4pm

This communication is public record and may be subject to disclosure as per the Washington State Public Records Act, RCW 42.56.

Este mensaje es registro público y puede estar sujeto a descubrimiento por la Ley de Registros Públicos de Washington (Washington State Public Records Act, RCW 42.56).

Twitter messages:

Quincy Air
@ecyQuincyAir
Jul 8
¡No olvide asistir la audiencia pública "Oxford" el 9 de julio en el Centro Comunitario de Quincy! 5pm
View details·

Quincy Air
@ecyQuincyAir
Jul 8
Don't forget to attend Oxford hearing on July 9, 2015 at Quincy Community Center, 5pm
View details·

Quincy Air
@ecyQuincyAir
Jul 7
Examinar el permiso de emisiones al aire y otros documentos en la Biblioteca de Quincy o en la Municipalidad de Quincy a #QuincyWA.
View details·

Quincy Air
@ecyQuincyAir
Jul 7
Review draft air permits and documents for data centers at #QuincyWA Library or Quincy City Hall.
View details·

Quincy Air
@ecyQuincyAir
Jul 7
Habrá una audiencia pública para el permiso de emisiones al aire para el Oxford Centro de Datos, 5pm, el 9 de julio a Centro Comunitario.
View details·

Quincy Air
@ecyQuincyAir
Jul 7
Come. Listen. Learn. Comment. Oxford Data Center air permit public hearing July 9, 2015 a
#QuincyWA Community Center, 5 pm.
View details·

Quincy Air
@ecyQuincyAir
Jun 29
Se aceptará comentarios para el Oxford Centro de Datos hasta el 13 de juli
View details·

Quincy Air
@ecyQuincyAir
Jun 29
Comments for Oxford data center accepted through July 13, 201

View details·

Quincy Air
@ecyQuincyAir
May 27
¡No olvide asistir la audiencia pública “Oxford” el 9 de julio en el Centro Comunitario de Quincy! bit.ly/ECYquincy1

View details·

Quincy Air
@ecyQuincyAir
May 27
Don’t forget to attend Oxford hearing on July 9, 2015 at Quincy Community Center! bit.ly/ECYquincy1

View details·

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Appendix B: Public Comments

05/28/15 – Cris Sherman, Quincy High School
07/08/15 – John Ford, Sabey
07/10/15 – Brett Muhlestein
07/13/15 – Patty Martin, Quincy, WA
07/13/15 – Danna Dal Porto, Quincy, WA

This page is purposely left blank.

From: Sherman, Cristopher F. / Ext. 3783 [mailto:csherman@qsd.wednet.edu]
Sent: Thursday, May 28, 2015 2:20 PM
To: Mort, Beth (ECY)
Subject: Oxford Data Center Air Permit?

I lived in the town of Quincy for one year. After experiencing the lack of quality from the air, I chose to move to the country six miles out of town. I could actually see color in the air and I didn't want to be breathing whatever it is that was in the air.

My question is, why is there a concern over an air permit for a data center when the quality of air in Quincy is already very poor?

As I drive to teach at the high school in the morning, I can observe colored clouds coming from a plant that is located right behind the high school. I have even come out of school to find my car covered with some type of fine debris a couple of times due to the emissions from this plant.

So again I ask, who cares about an air permit for a data center? It is my personal observation that there are bigger fish to fry when it comes to air quality in the town of Quincy. And they are polluting right next to our schools where kids are being expose daily.

Cris Sherman
Quincy High School Music Teacher

From: John Ford [mailto:JohnF@sabey.com]
Sent: Wednesday, July 08, 2015 5:45 PM
To: Mort, Beth (ECY); QUINCY-DATA-CENTERS@LISTSERV.WA.GOV
Subject: RE: Come to the Public Hearing! / ¡Ven a la Audiencia Pública!

Beth, I may (or may not) be able to attend. If it matters, I am in support of approving the Oxford generator/air permit.
Thank you!

John D. Ford
Vice-President
Sabey Data Center Properties
Intergate.Quincy
2200 M Street NE
Quincy, WA 98848
O-206-281-8700, C-206-419-0915
www.sabey.com
SABEY
Data Center Properties

From: Brett Muhlestein [mailto:sbmuhles@hotmail.com]
Sent: Friday, July 10, 2015 11:17 AM
To: Mort, Beth (ECY)
Subject: July 9th Public Hearing - Microsoft's Proposed Revisions to the Oxford Data Center Air Quality Permit

Hello Beth,

I would like the following to be included as official comments for the Microsoft's proposed air quality permit:

Microsoft is holding themselves to a higher standard and is being responsible with the environment. As mentioned in the meeting, a worst case scenario for all pollutants combined as was used for the permit amendment is not even possible and yet it still meets the federal and state standards. That speaks to me on how Microsoft is being responsible and holding themselves to a higher standard as a good citizen to the community, the world, and the environment. I support ecology's determination of safety on this permit amendment application.

Thanks,

Brett Muhlestein

Comments submitted by Patty Martin, Quincy, WA.

July 13, 2015

Washington State Department of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205

RE: Oxford comments

Dear Ms. Mort:

Please accept my questions and comments on the Oxford permit, of which there are many.

Let me begin by stating that this permitting process has helped to highlight many past misrepresentations by Ecology, and/or the industry, and clarify areas of deficiencies in past Ecology permitting within the City of Quincy. All the "conservative estimates" made by Jim Wilder using the Tier 2 standards without consideration of the condensable "back-half" of the particulate matter, or without accurate "cold start" factors, suggest that prior permits may have been impermissibly issued and that federally mandated New Source Performance Standards (NSPS) and National Ambient Air Quality Standards (NAAQS) may have been violated. The haze that now lingers over our community throughout the year (after the arrival of the data centers) is most probably the consequence of underestimating PM2.5 and PM10 emissions, and manipulating engine load modeling to comply with the 1-hour NO2 standards.

Oxford and Ecology are once again underestimating emissions from these engines, in spite of the "added safety factor" of 20%. Microsoft's earlier *independent* engine test in Tukwila demonstrated that the worst case scenario for particulate matter is the 10% load, not the 25% load claimed by Matt Cohen during the Public Hearing or the actual 50% load used during modeling. See attached NC Power Final Report, Tables 13, 15 and 17. The issue with the permit this time appears to be NOx, and as Jim Wilder had admitted to in earlier permits, there is a NOx problem in the Quincy area.

Microsoft's attorney, in the presence of Ecology and without dispute from the agency, stated that the modeling conducted was done under the worst case scenarios. As mentioned previously, this is not correct. Carbon monoxide is highest at low load, not at the 100% load for which testing is required in the permit. Particulate matter is highest at low-load, not the 50% assumed in the permit. Volatile organic compounds (VOCs) are also highest at low-load, not the 50% for which testing is required in the permit. These misrepresentations underestimate exposure and risk to our community, and testing at these loads – which is not worst case scenario – will not be representative of what is actually being emitted by these engines.

Additionally, the assumptions in "TABLE 2 UNCONTROLLED (EPA TIER 2-COMPLIANT) GENERATOR EMISSION RATES" for the 2.5 MW engine particulate matter closely approximates the emission rates from Microsoft's source test in Tukwila which did not include cold starts. Again, the emission estimates appear to underestimate risk. Testing requirements in the original 2014 Oxford NOC permit 14AQ-E537 should be retained in the 2015 permit.

The agency should also require that the purpose of every engine operation be included in the permit. Without this requirement the agency cannot discern between discretionary and necessary engine runtime.

Using emission rates from Microsoft's Tukwila performance test, it appears that Oxford has underestimated the uncontrolled emissions of NOx. Oxford's claimed "cold start factors in the NOC Appendix C, *Table 2 - 2500 kWe Generators Curve Fits* are nearly identical to the warmed up engine emissions from Tukwila. See attached NC Power Final Report, Tables 1, 5 and 9. The "cold start" emissions should reflect numbers in excess of those from the Tukwila performance test, not less than it. Again, using the Tukwila engine emissions, it appears that Oxford would have been a major facility for NOx. Failure to use appropriate emission estimates inflates the cost of BACT making it appear unachievable.

After the Public Hearing I asked Gary Huitsing whether Oxford would be a major facility if they did not use emission controls. When he didn't answer directly with a "yes or no", I asked again, and again. I mentioned I believed Oxford to designate as major based on emitting over 100 tpy of NOx, to which he replied that "the 100 tpy only applied to 28 specific sources", and that to be major Oxford would have to exceed 250 tpy for all emissions. That is not my understanding of the definition of a major source. Please clarify for the record when a source becomes major for the purposes of the federal CAA.

As for compliance with NSPS, it must be met at all loads, not an average of loads as suggested in the Five-load weighted averages in Table 4 of NOC Approval Order 14AQ-E537.

The modeling of "3x this" and "20% that" appears to be a "smoke and mirrors" to obscure the reality that Microsoft's Oxford facility would have been a major facility for NOx emissions without the use of controls, and was therefore required to use them, if for no other reason than to avoid regulation under Title V. As one of two facilities under the common control of Microsoft, operating within the same industrial classification, and in close enough proximity to be considered under Common Control for purposes of the federal CAA, I believe that Microsoft's Columbia Data Center is also subject to the Tier 4F NSPS.

As I mentioned at the Public Hearing, data centers locating in Quincy are circumventing the CAA by purchasing large parcels of property and measuring ambient concentrations at the fence line. The NAAQS, for purposes of Washington State, and as codified in the SIP, is measured in the "surrounding outside air". WAC 173-400-030(6).

As for emergency engines, the State of WA does not recognize the exemption under the statute or in the SIP. Additionally, a challenge by Delaware has found that the 100 hour exemption is arbitrary and capricious.

Those are some of my comments. Here are questions I would appreciate are answered by Ecology:

1. Would the Oxford facility be a major facility if it were not using catalyzed DPFs and SCRs? Would it emit over 100 tpy of NOx without the use of Tier 4F controls?
2. At what loads will the engines at Microsoft be operating and for how many hours per load? Why isn't this information in the 2015 permit?
3. Why is Ecology only requiring Method 5 or Method 201a for compliance testing the engines against the NSPS emission limitation? Why isn't each of the load specific performance tests reviewed against the NSPS emission limitations?
4. Why is Ecology only reporting the filterable portion of the diesel particulate matter (PM2.5) in Table 2.1 "*Criteria Pollutants Potential to Emit*"?
5. Did Ecology and Microsoft include emissions – NOx, VOCs, PM, etc. -- from Amway's boilers in their modeling?
6. Did Ecology and Microsoft include particulate emissions from ConAgra, and from Columbia's cooling towers?
7. Can the Oxford engines meet the Tier 4 NSPS of 0.03 g/kW-hr for particulate matter (filterable plus condensable) with the controls they are installing?
8. Where in the regulations is a 5-load weighted average of engine emissions required?
9. In estimating compliance with the NAAQS, did Ecology consider the "condensable" portion of diesel emissions from the Columbia Data Center and Dell? From Yahoo!, Vantage, Sabey and Intuit?
10. Where in the regulations is a 3-year rolling average allowed?
11. Table C1-1, C1-2 and C1-3 in the NOC Application uses "TOTAL NOx (as NO2)". Please correct this report to reflect total NOx which is what is used for BACT purposes. Representing it as NO2 is useless for purposes of BACT, and misleads the reader regarding NOx emission levels.
12. Why is the "regional background" for 1-hr NO2 lower now (15.6 ug/m3) than it was during the permitting of Dell (29 ug/m3)? See attached *Regional Background*.

The level of trust between the public and Ecology is soured when a Public Hearing starts off with the misrepresentation that this permit is the result of a permit amendment, rather than the appeal of the permit by Microsoft. It is always best when the agency strives for transparency.

Thank you for considering my comments and in advance for answering my questions.

Respectfully submitted,

Patricia Martin
Quincy, WA 98848

Table C1-1 (Corrected to Include Black Puff Factors)
Caterpillar 3516C HD 2,500 ekW Generator (DM8266)
RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN	EKW	2,500	1,875	1,250	625	250
ENGINE POWER	BHP	3,633	2,760	1,889	1,029	497
PERCENT LOAD	%	100%	75%	50%	25%	10%
Exhaust Temperature	C	491	459	455	444	342
TOTAL NOX (AS NO2)	LB/HR	50.59	31.1	15.4	7.87	7.02
Estimated Reduction	%	85%	90%	90%	90%	85%
Post Catalyst NOx (as NO2)	LB/HR	7.59	3.11	1.54	0.79	1.05
Post-Catalyst Plus 20% Safety Factor	LB/HR	9.11	3.73	1.85	0.94	1.26
TOTAL CO	LB/HR	6.01	2.88	2.41	3.30	4.62
Black Puff Factor		1.56	1.56	1.56	1.56	1.56
Cold-Start Incl. Black Puff Factor		9.38	4.49	3.76	5.15	7.21
Estimated Reduction	%	80%	80%	80%	80%	80%
Post Catalyst CO	LB/HR	1.20	0.58	0.48	0.66	0.92
Post-Catalyst Plus 20% Safety Factor	LB/HR	1.44	0.69	0.58	0.79	1.11
TOTAL HC	LB/HR	1.10	1.10	1.20	0.90	0.96
Black Puff Factor		1.26	1.26	1.26	1.26	1.26
Cold-Start Incl. Black Puff Factor		1.39	1.39	1.51	1.13	1.21
Estimated Reduction	%	85%	80%	80%	80%	70%
Post Catalyst HC	LB/HR	0.165	0.220	0.240	0.180	0.288
Post-Catalyst Plus 20% Safety Factor	LB/HR	0.20	0.26	0.29	0.22	0.35
PART MATTER	LB/HR	0.41	0.27	0.29	0.31	0.31
Estimated Reduction	%	85%	85%	85%	85%	85%
Post Catalyst PM	LB/HR	0.062	0.041	0.044	0.047	0.047
COLD-START PART MATTER FRONT HALF (Front Half = 1.26 Black Puff x Post-DPF PSV)	LB/HR	0.077	0.051	0.055	0.059	0.059
COLD-START PART MATTER BACK HALF (2x Post-Catalyst HC)	LB/HR	0.33	0.44	0.48	0.36	0.576
COLD-START PART MATTER (Front & Back, Incl. Black Puff Factor)	**LB/HR**	0.407	0.491	0.535	0.419	0.635
WARMED-UP PART MATTER (Front & Back)	**LB/HR**	**0.227**	**0.261**	**0.284**	**0.227**	**0.335**
WARMED-UP PM; Added Safety Factor*	**20%**	**0.272**	**0.313**	**0.340**	**0.272**	**0.401**

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Table C1-2 (Corrected to Include Black Puff Factors)
Caterpillar 3516C 2,000 ekW Generator (DM8263)
RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN	EKW	2,000	1,500	1,000	500	200
ENGINE POWER	BHP	2,937	2,212	1,521	839	411
PERCENT LOAD	%	100%	75%	50%	25%	10%
Exhaust Temperature	C	400	363	346	339	289
TOTAL NOX (AS NO2)	LB/HR	42.10	22.52	12.78	9.30	6.46
Estimated Reduction	%	92%	93%	93%	90%	0%
Post Catalyst NOx (as NO2)	LB/HR	3.37	1.58	0.89	0.93	6.46
Post-Catalyst Plus 20% Safety Factor	LB/HR	4.04	1.89	1.07	1.12	7.75
TOTAL CO	LB/HR	3.45	1.87	2.00	3.91	3.95
Black Puff Factor		1.56	1.56	1.56	1.56	1.56
Cold-Start Incl. Black Puff Factor		5.38	2.92	3.12	6.10	6.16
Estimated Reduction	%	80%	80%	80%	80%	80%
Post Catalyst CO	LB/HR	0.69	0.37	0.40	0.78	0.79
Post-Catalyst Plus 20% Safety Factor	LB/HR	0.83	0.45	0.48	0.94	0.95
TOTAL HC	LB/HR	0.93	1.13	1.13	0.90	0.98
Black Puff Factor		1.26	1.26	1.26	1.26	1.26
Cold-Start Incl. Black Puff Factor		1.17	1.42	1.42	1.13	1.23
Estimated Reduction	%	85%	80%	80%	80%	70%
Post Catalyst HC	LB/HR	0.140	0.226	0.226	0.180	0.294
Post-Catalyst Plus 20% Safety Factor	LB/HR	0.17	0.27	0.27	0.22	0.35
PART MATTER	LB/HR	0.23	0.22	0.27	0.57	0.45
Estimated Reduction	%	85%	85%	85%	85%	85%
Post Catalyst PM	LB/HR	0.035	0.033	0.041	0.086	0.068
COLD-START PART MATTER FRONT HALF (Front Half = 1.26 Black Puff x Post-DPF PSV)	LB/HR	0.043	0.042	0.051	0.108	0.085
COLD-START PART MATTER BACK HALF (2x Post-Catalyst HC)	LB/HR	0.33	0.44	0.48	0.36	0.576
COLD-START PART MATTER (Front & Back, Incl. Black Puff Factor)	**LB/HR**	0.373	0.482	0.531	0.468	0.661
PART MATTER (Front & Back)	**LB/HR**	**0.174**	**0.259**	**0.267**	**0.266**	**0.362**
Added Safety Factor*	**20%**	**0.209**	**0.311**	**0.320**	**0.319**	**0.434**

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Table C1-3

Caterpillar C27 750 ekW Generator (DM9071)

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN	EKW	750	563	375	188	75
ENGINE POWER	BHP	1,141	878	618	361	201
PERCENT LOAD	%	100%	75%	50%	25%	10%
Exhaust Temperature	C	509	489	452	366	278
TOTAL NOX (AS NO2)	LB/HR	15.83	9.17	5.82	4.02	2.89
Estimated Reduction	%	93%	92%	92%	90%	0%
Post Catalyst NOx (as NO2)	LB/HR	1.11	0.73	0.47	0.40	2.89
Post-Catalyst Plus 20% Safety Factor	LB/HR	1.33	0.88	0.56	0.48	3.47
TOTAL CO	LB/HR	1.15	1.51	1.45	1.19	1.22
Estimated Reduction	%	80%	80%	80%	80%	70%
Post Catalyst CO	LB/HR	0.23	0.30	0.29	0.24	0.37
Post-Catalyst Plus 20% Safety Factor	LB/HR	0.28	0.36	0.35	0.29	0.44
TOTAL HC	LB/HR	0.12	0.18	0.21	0.19	0.22
Estimated Reduction	%	85%	80%	80%	70%	60%
Post Catalyst HC	LB/HR	0.018	0.036	0.042	0.057	0.088
Post-Catalyst Plus 20% Safety Factor	LB/HR	0.02	0.04	0.05	0.07	0.11
PART MATTER	LB/HR	0.10	0.13	0.33	0.26	0.17
Estimated Reduction	%	85%	85%	85%	85%	85%
Post Catalyst PM	LB/HR	0.015	0.020	0.050	0.039	0.026
COLD-START PART MATTER FRONT HALF (Front Half = 1.26 Black Puff x	LB/HR	0.019	0.025	0.062	0.049	0.032
COLD-START PART MATTER BACK HALF (2x Post-Catalyst HC)	LB/HR	0.33	0.44	0.48	0.36	0.576
COLD-START PART MATTER (Front & Back, Incl. Black Puff Factor)	LB/HR	0.349	0.465	0.542	0.409	0.608
PART MATTER (Front & Back)	**LB/HR**	**0.033**	**0.056**	**0.092**	**0.096**	**0.114**
Added Safety Factor*	**20%**	**0.040**	**0.067**	**0.110**	**0.115**	**0.136**

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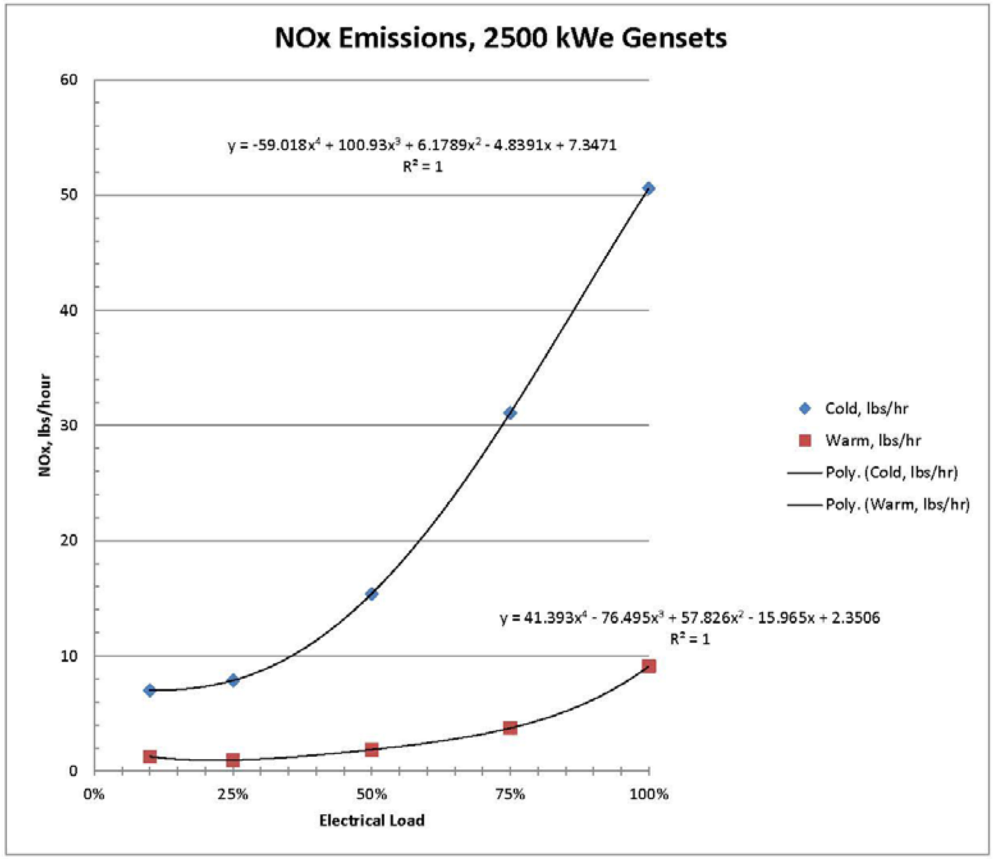
Table 2 - 2500 kWe Generators Curve Fits

Load		Cold, lbs/hr	Warm, lbs/hr
	10%	7.02	1.26
	25%	7.87	0.94
	50%	15.4	1.85
	75%	31.1	3.73
	100%	50.6	9.11
		-59.018	41.393
		100.93	-76.495
		6.1789	57.826
		-4.8391	-15.965
		7.3471	2.3506
	90%	42.9	6.2
	85%	38.9	5.2
	80%	34.9	4.4
	95%	46.8	7.5
	100%	50.6	9.1



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3. SUMMARY OF RESULTS

3.1 Tables of Results:

Table 1

Caterpillar 3516 Diesel Engine, DOC Inlet – 10% Load

Gaseous Testing Results

Test Date: Sept 27, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		09:52	13:08	15:52	
End Time		11:49	14:32	17:32	
Sampling Time	min	84	60	84	76
Gaseous Sampling Results					
CO Concentration	ppmv	205	199	197	201
Mass Rate (EPA 2)	lb-CO/hr	2.7	2.6	2.6	2.6
Mass Rate (EPA 19)	lb-CO/hr	2.7	2.6	2.5	2.6
Energy Basis (EPA 2)	g-CO/kWm-hr	1.9	1.8	1.9	1.9
Energy Basis (EPA 19)	g-CO/kWm-hr	1.9	1.8	1.8	1.8
NO Concentration	ppmv	247	251	253	250
Mass Rate (EPA 2)	lb-NO/hr	3.5	3.5	3.6	3.5
Mass Rate (EPA 19)	lb-NO/hr	3.5	3.4	3.5	3.5
Energy Basis (EPA 2)	g-NO/kWm-hr	2.4	2.4	2.6	2.5
Energy Basis (EPA 19)	g-NO/kWm-hr	2.5	2.4	2.4	2.4
NO_2 Concentration	ppmv	38	36	35	37
Mass Rate (EPA 2)	lb-NO_2/hr	0.81	0.77	0.78	0.79
Mass Rate (EPA 19)	lb-NO_2/hr	0.81	0.77	0.74	0.77
Energy Basis (EPA 2)	g-NO_2/kWm-hr	0.57	0.54	0.55	0.55
Energy Basis (EPA 19)	g-NO_2/kWm-hr	0.57	0.54	0.53	0.54
NO_x Concentration	ppmv	284	287	288	287
Mass Rate (EPA 2)	lb-NO_2/hr	6.1	6.1	6.3	6.2
Mass Rate (EPA 19)	lb-NO_2/hr	6.2	6.0	6.0	6.1
Energy Basis (EPA 2)	g-NO_2/kWm-hr	4.3	4.3	4.5	4.4
Energy Basis (EPA 19)	g-NO_2/kWm-hr	4.3	4.2	4.3	4.3
Source Parameters					
O_2	%	15.5	15.3	15.3	15.4
CO_2	%	4.1	4.1	4.1	4.1
Flow Rate (Actual)	acf/min	5,870	5,790	6,050	5,910
EPA 2 Flow Rate (Standard)	dscf/min	3,000	2,960	3,070	3,010
EPA 19 Flow Rate (Standard)	dscf/min	3,020	2,930	2,930	2,960
Temperature	°F	548	549	553	550
Moisture	%	3.9	3.7	4.1	3.9

Table 2

Caterpillar 3516 Diesel Engine, DOC Inlet – 10% Load

PM Testing Results – Elemental & Organic Carbon

Test Date: Sept 27, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		09:52	13:08	15:52	
End Time		11:49	14:32	17:32	
Sampling Time	min	84	60	84	76
EC/OC Sampling Results					
Elemental Carbon Conc.	gr/dscf	0.0061	0.0059	0.0059	0.0060
EC Mass Rate (EPA 2)	lb/hr	0.16	0.15	0.15	0.15
EC Mass Rate (EPA 19)	lb/hr	0.16	0.15	0.15	0.15
EC Energy Basis (EPA 2)	g/kWm-hr	0.11	0.10	0.11	0.11
EC Energy Basis (EPA 19)	g/kWm-hr	0.11	0.10	0.10	0.11
Organic Carbon Conc.	gr/dscf	0.0010	0.00061	0.00095	0.00087
OC Mass Rate (EPA 2)	lb/hr	0.027	0.016	0.025	0.022
OC Mass Rate (EPA 19)	lb/hr	0.027	0.015	0.024	0.022
OC Energy Basis (EPA 2)	g/kWm-hr	0.019	0.011	0.018	0.016
OC Energy Basis (EPA 19)	g/kWm-hr	0.019	0.011	0.017	0.016
Sample Volume	dscf	40.8	41.9	41.7	41.5
Sample Weight, EC	mg	16.2	15.9	15.9	16.0
Sample Weight, OC	mg	2.8	1.7	2.6	2.3
Sample Weight, Total Carbon	mg	19.0	17.6	18.5	18.3
Percent Isokinetic	%	99	98	99	98
Source Parameters					
O_2	%	15.5	15.3	15.3	15.4
CO_2	%	4.1	4.1	4.1	4.1
Flow Rate (Actual)	acf/min	5,870	5,790	6,050	5,910
EPA 2 Flow Rate (Standard)	dscf/min	3,000	2,960	3,070	3,010
EPA 19 Flow Rate (Standard)	dscf/min	3,020	2,930	2,930	2,960
Temperature	°F	548	549	553	550
Moisture	%	3.9	3.7	4.1	3.9

Table 3

Caterpillar 3516 Diesel Engine, DOC Outlet – 10% Load

Gaseous Testing Results

Test Date: Sept 27, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		09:52	13:08	15:52	
End Time		11:49	14:32	17:32	
Sampling Time	min	84	60	84	76
Gaseous Sampling Results					
CO Concentration	ppmv	0	0	0	0
Mass Rate (EPA 2)	lb-CO/hr	0.0	0.0	0.0	0.0
Mass Rate (EPA 19)	lb-CO/hr	0.0	0.0	0.0	0.0
Energy Basis (EPA 2)	g-CO/kWm-hr	0.0	0.0	0.0	0.0
Energy Basis (EPA 19)	g-CO/kWm-hr	0.0	0.0	0.0	0.0
NO Concentration	ppmv	207	224	229	220
Mass Rate (EPA 2)	lb-NO/hr	2.8	3.0	3.1	3.0
Mass Rate (EPA 19)	lb-NO/hr	2.8	3.1	3.2	3.0
Energy Basis (EPA 2)	g-NO/kWm-hr	2.0	2.1	2.2	2.1
Energy Basis (EPA 19)	g-NO/kWm-hr	2.0	2.2	2.2	2.1
NO_2 Concentration	ppmv	70	56	53	59
Mass Rate (EPA 2)	lb-NO_2/hr	1.5	1.1	1.1	1.2
Mass Rate (EPA 19)	lb-NO_2/hr	1.5	1.2	1.1	1.3
Energy Basis (EPA 2)	g-NO_2/kWm-hr	1.0	0.80	0.77	0.86
Energy Basis (EPA 19)	g-NO_2/kWm-hr	1.0	0.83	0.78	0.88
NO_x Concentration	ppmv	276	280	282	279
Mass Rate (EPA 2)	lb-NO_2/hr	5.8	5.7	5.8	5.8
Mass Rate (EPA 19)	lb-NO_2/hr	5.8	5.9	6.0	5.9
Energy Basis (EPA 2)	g-NO_2/kWm-hr	4.0	4.0	4.1	4.1
Energy Basis (EPA 19)	g-NO_2/kWm-hr	4.1	4.2	4.2	4.2
Source Parameters					
O_2	%	15.4	15.4	15.4	15.4
CO_2	%	4.3	4.3	4.3	4.3
Flow Rate (Actual)	acf/min	5,640	5,570	5,630	5,610
EPA 2 Flow Rate (Standard)	dscf/min	2,910	2,850	2,890	2,880
EPA 19 Flow Rate (Standard)	dscf/min	2,950	2,940	2,950	2,950
Temperature	°F	539	538	543	540
Moisture	%	3.6	4.3	3.4	3.8

Table 4

Caterpillar 3516 Diesel Engine, DOC Outlet – 10% Load

PM Testing Results – Elemental & Organic Carbon

Test Date: Sept 27, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		09:52	13:08	15:52	
End Time		11:49	14:32	17:32	
Sampling Time	min	84	60	84	76
EC/OC Sampling Results					
Elemental Carbon Conc.	gr/dscf	0.0051	0.0046	0.0058	0.0051
EC Mass Rate (EPA 2)	lb/hr	0.13	0.11	0.14	0.13
EC Mass Rate (EPA 19)	lb/hr	0.13	0.12	0.15	0.13
EC Energy Basis (EPA 2)	g/kWm-hr	0.090	0.079	0.10	0.090
EC Energy Basis (EPA 19)	g/kWm-hr	0.091	0.081	0.10	0.092
Organic Carbon Conc.	gr/dscf	0.00043	0.00042	0.00052	0.00046
OC Mass Rate (EPA 2)	lb/hr	0.011	0.010	0.013	0.011
OC Mass Rate (EPA 19)	lb/hr	0.011	0.011	0.013	0.012
OC Energy Basis (EPA 2)	g/kWm-hr	0.0075	0.0072	0.0091	0.0079
OC Energy Basis (EPA 19)	g/kWm-hr	0.0076	0.0074	0.0093	0.0081
Sample Volume	dscf	38.8	42.4	38.4	39.9
Sample Weight, EC	mg	12.9	12.6	14.3	13.3
Sample Weight, OC	mg	1.1	1.1	1.3	1.2
Sample Weight, Total Carbon	mg	14.0	13.7	15.6	14.5
Percent Isokinetic	%	99	98	99	99
Source Parameters					
O_2	%	15.4	15.4	15.4	15.4
CO_2	%	4.3	4.3	4.3	4.3
Flow Rate (Actual)	acf/min	5,640	5,570	5,630	5,610
EPA 2 Flow Rate (Standard)	dscf/min	2,910	2,850	2,890	2,880
EPA 19 Flow Rate (Standard)	dscf/min	2,950	2,940	2,950	2,950
Temperature	°F	539	538	543	540
Moisture	%	3.6	4.3	3.4	3.8

Table 5

Caterpillar 3516 Diesel Engine, DOC Inlet – 40% Load

Gaseous Testing Results

Test Dates: Sept 28-29, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Date		Sept 28	Sept 29	Sept 29	
Start Time		18:27	08:14	10:28	
End Time		19:47	09:26	12:56	
Sampling Time	min	60	60	60	60
Gaseous Sampling Results					
CO Concentration	ppmv	71	71	72	72
Mass Rate (EPA 2)	lb-CO/hr	1.8	1.7	1.5	1.7
Mass Rate (EPA 19)	lb-CO/hr	1.4	1.4	1.4	1.4
Energy Basis (EPA 2)	g-CO/kWm-hr	0.66	0.62	0.56	0.62
Energy Basis (EPA 19)	g-CO/kWm-hr	0.51	0.51	0.51	0.51
NO Concentration	ppmv	308	282	310	300
Mass Rate (EPA 2)	lb-NO/hr	8.3	7.0	7.0	7.4
Mass Rate (EPA 19)	lb-NO/hr	6.4	5.8	6.3	6.1
Energy Basis (EPA 2)	g-NO/kWm-hr	3.1	2.6	2.6	2.8
Energy Basis (EPA 19)	g-NO/kWm-hr	2.3	2.2	2.3	2.3
NO_2 Concentration	ppmv	18	15	14	16
Mass Rate (EPA 2)	lb-NO_2/hr	0.73	0.58	0.48	0.60
Mass Rate (EPA 19)	lb-NO_2/hr	0.56	0.48	0.43	0.49
Energy Basis (EPA 2)	g-NO_2/kWm-hr	0.27	0.22	0.18	0.22
Energy Basis (EPA 19)	g-NO_2/kWm-hr	0.20	0.18	0.16	0.18
NO_x Concentration	ppmv	326	297	324	316
Mass Rate (EPA 2)	lb-NO_2/hr	13.5	11.3	11.2	12.0
Mass Rate (EPA 19)	lb-NO_2/hr	10.3	9.4	10.0	9.9
Energy Basis (EPA 2)	g-NO_2/kWm-hr	5.0	4.3	4.1	4.5
Energy Basis (EPA 19)	g-NO_2/kWm-hr	3.8	3.5	3.7	3.7
Source Parameters					
O_2	%	13.0	13.1	12.9	13.0
CO_2	%	6.0	5.8	6.0	5.9
Flow Rate (Actual)	acf/min	13,500	12,100	11,400	12,400
EPA 2 Flow Rate (Standard)	dscf/min	5,790	5,300	4,810	5,300
EPA 19 Flow Rate (Standard)	dscf/min	4,410	4,390	4,340	4,380
Temperature	°F	744	713	754	737
Moisture	%	5.6	5.2	5.5	5.4

Table 6

Caterpillar 3516 Diesel Engine, DOC Inlet – 40% Load

PM Testing Results – Elemental & Organic Carbon

Test Dates: Sept 28-29, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Date		Sept 28	Sept 29	Sept 29	
Start Time		18:27	08:14	10:28	
End Time		19:47	09:26	12:56	
Sampling Time	min	60	60	60	60
EC/OC Sampling Results					
Elemental Carbon Conc.	gr/dscf	0.0037	0.0042	0.0040	0.0040
EC Mass Rate (EPA 2)	lb/hr	0.19	0.19	0.17	0.18
EC Mass Rate (EPA 19)	lb/hr	0.14	0.16	0.15	0.15
EC Energy Basis (EPA 2)	g/kWm-hr	0.068	0.072	0.062	0.067
EC Energy Basis (EPA 19)	g/kWm-hr	0.052	0.060	0.056	0.056
Organic Carbon Conc.	gr/dscf	0.00024	0.00025	0.00024	0.00024
OC Mass Rate (EPA 2)	lb/hr	0.012	0.011	0.010	0.011
OC Mass Rate (EPA 19)	lb/hr	0.0089	0.0092	0.0090	0.0091
OC Energy Basis (EPA 2)	g/kWm-hr	0.0043	0.0042	0.0037	0.0041
OC Energy Basis (EPA 19)	g/kWm-hr	0.0033	0.0035	0.0033	0.0034
Sample Volume	dscf	47.4	48.1	43.7	46.4
Sample Weight, EC	mg	11.5	13.2	11.4	12.0
Sample Weight, OC	mg	0.7	0.8	0.7	0.7
Sample Weight, Total Carbon	mg	12.2	14.0	12.1	12.7
Percent Isokinetic	%	101	100	100	100
Source Parameters					
O_2	%	13.0	13.1	12.9	13.0
CO_2	%	6.0	5.8	6.0	5.9
Flow Rate (Actual)	acf/min	13,500	12,100	11,400	12,400
EPA 2 Flow Rate (Standard)	dscf/min	5,790	5,300	4,810	5,300
EPA 19 Flow Rate (Standard)	dscf/min	4,410	4,390	4,340	4,380
Temperature	°F	744	713	754	737
Moisture	%	5.6	5.2	5.5	5.4

Table 7

Caterpillar 3516 Diesel Engine, DOC Outlet – 40% Load

Gaseous Testing Results

Test Dates: Sept 28-29, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Date		Sept 28	Sept 29	Sept 29	
Start Time		18:27	08:14	10:22	
End Time		19:47	09:26	12:56	
Sampling Time	min	60	60	60	60
Gaseous Sampling Results					
CO Concentration	ppmv	0.0	0.1	0.2	0.1
Mass Rate (EPA 2)	lb-CO/hr	0.0	0.002	0.004	0.002
Mass Rate (EPA 19)	lb-CO/hr	0.0	0.002	0.004	0.002
Energy Basis (EPA 2)	g-CO/kWm-hr	0.0	0.0008	0.001	0.001
Energy Basis (EPA 19)	g-CO/kWm-hr	0.0	0.0008	0.001	0.001
NO Concentration	ppmv	225	199	216	213
Mass Rate (EPA 2)	lb-NO/hr	5.0	4.3	4.7	4.7
Mass Rate (EPA 19)	lb-NO/hr	4.6	4.1	4.4	4.3
Energy Basis (EPA 2)	g-NO/kWm-hr	1.9	1.6	1.7	1.7
Energy Basis (EPA 19)	g-NO/kWm-hr	1.7	1.5	1.6	1.6
NO_2 Concentration	ppmv	79	77	83	80
Mass Rate (EPA 2)	lb-NO_2/hr	2.7	2.6	2.8	2.7
Mass Rate (EPA 19)	lb-NO_2/hr	2.5	2.4	2.6	2.5
Energy Basis (EPA 2)	g-NO_2/kWm-hr	1.0	0.96	1.0	0.99
Energy Basis (EPA 19)	g-NO_2/kWm-hr	0.91	0.91	0.94	0.92
NO_x Concentration	ppmv	304	276	299	293
Mass Rate (EPA 2)	lb-NO_2/hr	10.4	9.1	10.0	9.9
Mass Rate (EPA 19)	lb-NO_2/hr	9.5	8.7	9.2	9.1
Energy Basis (EPA 2)	g-NO_2/kWm-hr	3.8	3.4	3.7	3.7
Energy Basis (EPA 19)	g-NO_2/kWm-hr	3.5	3.3	3.4	3.4
Source Parameters					
O_2	%	12.8	13.1	12.8	12.9
CO_2	%	6.1	5.9	6.1	6.0
Flow Rate (Actual)	acf/min	11,100	10,500	10,900	10,800
EPA 2 Flow Rate (Standard)	dscf/min	4,780	4,630	4,660	4,690
EPA 19 Flow Rate (Standard)	dscf/min	4,340	4,380	4,300	4,340
Temperature	°F	729	696	725	717
Moisture	%	5.4	5.0	5.5	5.3

Table 8

Caterpillar 3516 Diesel Engine, DOC Outlet – 40% Load

PM Testing Results – Elemental & Organic Carbon

Test Dates: Sept 28-29, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Date		Sept 28	Sept 29	Sept 29	
Start Time		18:27	08:14	10:22	
End Time		19:47	09:26	12:56	
Sampling Time	min	60	60	60	60
EC/OC Sampling Results					
Elemental Carbon Conc.	gr/dscf	0.0043	0.0041	0.0047	0.0043
EC Mass Rate (EPA 2)	lb/hr	0.18	0.16	0.19	0.18
EC Mass Rate (EPA 19)	lb/hr	0.16	0.15	0.17	0.16
EC Energy Basis (EPA 2)	g/kWm-hr	0.064	0.061	0.070	0.065
EC Energy Basis (EPA 19)	g/kWm-hr	0.058	0.058	0.064	0.060
Organic Carbon Conc.	gr/dscf	0.00013	0.00013	0.00015	0.00014
OC Mass Rate (EPA 2)	lb/hr	0.0053	0.0051	0.0058	0.0054
OC Mass Rate (EPA 19)	lb/hr	0.0048	0.0048	0.0054	0.0050
OC Energy Basis (EPA 2)	g/kWm-hr	0.0020	0.0019	0.0022	0.0020
OC Energy Basis (EPA 19)	g/kWm-hr	0.0018	0.0018	0.0020	0.0019
Sample Volume	dscf	43.3	45.1	42.3	43.6
Sample Weight, EC	mg	12.0	11.9	12.9	12.3
Sample Weight, OC	mg	0.36	0.37	0.40	0.38
Sample Weight, Total Carbon	mg	12.4	12.3	13.3	12.7
Percent Isokinetic	%	99	100	99	99
Source Parameters					
O_2	%	12.8	13.1	12.8	12.9
CO_2	%	6.1	5.9	6.1	6.0
Flow Rate (Actual)	acf/min	11,100	10,500	10,900	10,800
EPA 2 Flow Rate (Standard)	dscf/min	4,780	4,630	4,660	4,690
EPA 19 Flow Rate (Standard)	dscf/min	4,340	4,380	4,300	4,340
Temperature	°F	729	696	725	717
Moisture	%	5.4	5.0	5.5	5.3

Table 9

Caterpillar 3516 Diesel Engine, DOC Inlet – 85% Load

Gaseous Testing Results

Test Date: Sept 28, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		08:40	10:47	15:50	
End Time		10:03	15:01	17:04	
Sampling Time	min	60	60	60	60
Gaseous Sampling Results					
CO Concentration	ppmv	58	60	62	60
Mass Rate (EPA 2)	lb-CO/hr	2.3	2.2	2.2	2.2
Mass Rate (EPA 19)	lb-CO/hr	1.7	1.7	1.8	1.7
Energy Basis (EPA 2)	g-CO/kWm-hr	0.47	0.47	0.47	0.47
Energy Basis (EPA 19)	g-CO/kWm-hr	0.35	0.36	0.37	0.36
NO Concentration	ppmv	599	647	659	635
Mass Rate (EPA 2)	lb-NO/hr	25.1	25.9	25.4	25.5
Mass Rate (EPA 19)	lb-NO/hr	18.5	19.7	20.0	19.4
Energy Basis (EPA 2)	g-NO/kWm-hr	5.3	5.5	5.3	5.4
Energy Basis (EPA 19)	g-NO/kWm-hr	3.9	4.2	4.2	4.1
NO_2 Concentration	ppmv	27	29	33	30
Mass Rate (EPA 2)	lb-NO_2/hr	1.8	1.8	2.0	1.8
Mass Rate (EPA 19)	lb-NO_2/hr	1.3	1.4	1.5	1.4
Energy Basis (EPA 2)	g-NO_2/kWm-hr	0.37	0.38	0.41	0.39
Energy Basis (EPA 19)	g-NO_2/kWm-hr	0.27	0.29	0.32	0.29
NO_x Concentration	ppmv	626	677	692	665
Mass Rate (EPA 2)	lb-NO_2/hr	40.2	41.6	41.0	40.9
Mass Rate (EPA 19)	lb-NO_2/hr	29.7	31.6	32.2	31.1
Energy Basis (EPA 2)	g-NO_2/kWm-hr	8.4	8.8	8.6	8.6
Energy Basis (EPA 19)	g-NO_2/kWm-hr	6.2	6.7	6.7	6.5
Source Parameters					
O_2	%	11.2	11.1	10.9	11.0
CO_2	%	7.3	7.4	7.5	7.4
Flow Rate (Actual)	acf/min	21,500	20,900	20,400	20,900
EPA 2 Flow Rate (Standard)	dscf/min	8,960	8,580	8,260	8,600
EPA 19 Flow Rate (Standard)	dscf/min	6,620	6,520	6,490	6,540
Temperature	°F	790	808	817	805
Moisture	%	6.2	6.3	6.8	6.4

Table 10

Caterpillar 3516 Diesel Engine, DOC Inlet – 85% Load

PM Testing Results – Elemental & Organic Carbon

Test Date: Sept 28, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		08:40	10:47	15:50	
End Time		10:03	15:01	17:04	
Sampling Time	min	60	60	60	60
EC/OC Sampling Results					
Elemental Carbon Conc.	gr/dscf	0.0026	0.0021	0.0029	0.0026
EC Mass Rate (EPA 2)	lb/hr	0.20	0.16	0.21	0.19
EC Mass Rate (EPA 19)	lb/hr	0.15	0.12	0.16	0.14
EC Energy Basis (EPA 2)	g/kWm-hr	0.042	0.033	0.043	0.039
EC Energy Basis (EPA 19)	g/kWm-hr	0.031	0.025	0.034	0.030
Organic Carbon Conc.	gr/dscf	0.00034	0.00018	0.00040	0.00031
OC Mass Rate (EPA 2)	lb/hr	0.026	0.013	0.028	0.023
OC Mass Rate (EPA 19)	lb/hr	0.020	0.010	0.022	0.017
OC Energy Basis (EPA 2)	g/kWm-hr	0.0056	0.0028	0.0059	0.0048
OC Energy Basis (EPA 19)	g/kWm-hr	0.0041	0.0021	0.0047	0.0036
Sample Volume	dscf	57.6	46.7	40.7	48.3
Sample Weight, EC	mg	9.8	6.4	7.7	8.0
Sample Weight, OC	mg	1.3	0.55	1.1	0.96
Sample Weight, Total Carbon	mg	11.1	7.0	8.8	9.0
Percent Isokinetic	%	99	101	101	100
Source Parameters					
O_2	%	11.2	11.1	10.9	11.0
CO_2	%	7.3	7.4	7.5	7.4
Flow Rate (Actual)	acf/min	21,500	20,900	20,400	20,900
EPA 2 Flow Rate (Standard)	dscf/min	8,960	8,580	8,260	8,600
EPA 19 Flow Rate (Standard)	dscf/min	6,620	6,520	6,490	6,540
Temperature	°F	790	808	817	805
Moisture	%	6.2	6.3	6.8	6.4

Table 11

Caterpillar 3516 Diesel Engine, DOC Outlet – 85% Load

Gaseous Testing Results

Test Date: Sept 28, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		08:40	10:47	15:50	
End Time		10:03	15:02	17:04	
Sampling Time	min	60	60	60	60
Gaseous Sampling Results					
CO Concentration	ppmv	0.9	0.5	0.3	0.6
Mass Rate (EPA 2)	lb-CO/hr	0.03	0.01	0.01	0.02
Mass Rate (EPA 19)	lb-CO/hr	0.03	0.01	0.01	0.02
Energy Basis (EPA 2)	g-CO/kWm-hr	0.005	0.003	0.002	0.003
Energy Basis (EPA 19)	g-CO/kWm-hr	0.005	0.003	0.002	0.003
NO Concentration	ppmv	467	501	515	494
Mass Rate (EPA 2)	lb-NO/hr	14.2	15.8	16.0	15.3
Mass Rate (EPA 19)	lb-NO/hr	14.4	15.2	15.6	15.1
Energy Basis (EPA 2)	g-NO/kWm-hr	3.0	3.3	3.4	3.2
Energy Basis (EPA 19)	g-NO/kWm-hr	3.0	3.2	3.3	3.2
NO_2 Concentration	ppmv	115	124	131	124
Mass Rate (EPA 2)	lb-NO_2/hr	5.4	6.0	6.3	5.9
Mass Rate (EPA 19)	lb-NO_2/hr	5.5	5.8	6.1	5.8
Energy Basis (EPA 2)	g-NO_2/kWm-hr	1.1	1.3	1.3	1.2
Energy Basis (EPA 19)	g-NO_2/kWm-hr	1.2	1.2	1.3	1.2
NO_x Concentration	ppmv	582	625	646	618
Mass Rate (EPA 2)	lb-NO_2/hr	27.2	30.2	30.8	29.4
Mass Rate (EPA 19)	lb-NO_2/hr	27.6	29.0	30.0	28.9
Energy Basis (EPA 2)	g-NO_2/kWm-hr	5.7	6.4	6.5	6.2
Energy Basis (EPA 19)	g-NO_2/kWm-hr	5.8	6.1	6.3	6.1
Source Parameters					
O_2	%	11.1	11.0	10.9	11.0
CO_2	%	7.3	7.4	7.5	7.4
Flow Rate (Actual)	acf/min	15,700	16,300	16,300	16,100
EPA 2 Flow Rate (Standard)	dscf/min	6,510	6,750	6,660	6,640
EPA 19 Flow Rate (Standard)	dscf/min	6,610	6,490	6,480	6,530
Temperature	°F	776	793	798	789
Moisture	%	6.5	5.4	6.2	6.0

Table 12

Caterpillar 3516 Diesel Engine, DOC Outlet – 85% Load

PM Testing Results – Elemental & Organic Carbon

Test Date: Sept 28, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		08:40	10:47	15:50	
End Time		10:03	15:02	17:04	
Sampling Time	min	60	60	60	60
EC/OC Sampling Results					
Elemental Carbon Conc.	gr/dscf	0.0022	0.0020	0.0019	0.0020
EC Mass Rate (EPA 2)	lb/hr	0.12	0.11	0.11	0.11
EC Mass Rate (EPA 19)	lb/hr	0.13	0.11	0.11	0.11
EC Energy Basis (EPA 2)	g/kWm-hr	0.026	0.024	0.023	0.024
EC Energy Basis (EPA 19)	g/kWm-hr	0.026	0.023	0.022	0.024
Organic Carbon Conc.	gr/dscf	0.00011	0.00012	0.00018	0.00014
OC Mass Rate (EPA 2)	lb/hr	0.0063	0.0071	0.010	0.0080
OC Mass Rate (EPA 19)	lb/hr	0.0064	0.0069	0.010	0.0078
OC Energy Basis (EPA 2)	g/kWm-hr	0.0013	0.0015	0.0022	0.0017
OC Energy Basis (EPA 19)	g/kWm-hr	0.0013	0.0014	0.0020	0.0016
Sample Volume	dscf	47.9	56.3	46.0	50.1
Sample Weight, EC	mg	6.9	7.1	5.7	6.6
Sample Weight, OC	mg	0.35	0.45	0.55	0.45
Sample Weight, Total Carbon	mg	7.3	7.6	6.3	7.1
Percent Isokinetic	%	107	101	100	103
Source Parameters					
O_2	%	11.1	11.0	10.9	11.0
CO_2	%	7.3	7.4	7.5	7.4
Flow Rate (Actual)	acf/min	15,700	16,300	16,300	16,100
EPA 2 Flow Rate (Standard)	dscf/min	6,510	6,750	6,660	6,640
EPA 19 Flow Rate (Standard)	dscf/min	6,610	6,490	6,480	6,530
Temperature	°F	776	793	798	789
Moisture	%	6.5	5.4	6.2	6.0

Table 13

Caterpillar 3516 Diesel Engine, DOC Inlet – 10% Load

EPA 5/202 PM Testing Results

Test Date: Sept 27, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		09:52	13:08	15:52	
End Time		11:49	14:32	17:32	
Sampling Time	min	84	60	84	76
Sampling Results					
EPA 5 Filterable PM	gr/dscf	0.015	0.013	0.015	0.015
Mass Rate (EPA 2)	lb/hr	0.39	0.34	0.40	0.38
Mass Rate (EPA 19)	lb/hr	0.39	0.34	0.38	0.37
Energy Basis (EPA 2)	g/kWm-hr	0.27	0.24	0.28	0.26
Energy Basis (EPA 19)	g/kWm-hr	0.27	0.24	0.27	0.26
EPA 202 Condensable PM	gr/dscf	0.019	0.021	0.020	0.020
Mass Rate (EPA 2)	lb/hr	0.49	0.53	0.52	0.51
Mass Rate (EPA 19)	lb/hr	0.49	0.53	0.50	0.51
Energy Basis (EPA 2)	g/kWm-hr	0.34	0.37	0.37	0.36
Energy Basis (EPA 19)	g/kWm-hr	0.34	0.37	0.35	0.36
Total PM	gr/dscf	0.034	0.034	0.035	0.034
Mass Rate (EPA 2)	lb/hr	0.88	0.87	0.92	0.89
Mass Rate (EPA 19)	lb/hr	0.88	0.87	0.88	0.87
Energy Basis (EPA 2)	g/kWm-hr	0.62	0.61	0.65	0.63
Energy Basis (EPA 19)	g/kWm-hr	0.62	0.61	0.62	0.62
Sample Volume	dscf	40.8	41.9	41.7	41.5
Sample Weight, Filterable	mg	40.0	36.5	40.8	39.1
Sample Weight, Condensable	mg	50.2	56.9	53.6	53.6
Sample Weight, Total PM	mg	90.2	93.4	94.4	92.7
Percent Isokinetic	%	99	98	99	98
Source Parameters					
O_2	%	15.5	15.3	15.3	15.4
CO_2	%	4.1	4.1	4.1	4.1
Flow Rate (Actual)	acf/min	5,870	5,790	6,050	5,910
EPA 2 Flow Rate (Standard)	dscf/min	3,000	2,960	3,070	3,010
EPA 19 Flow Rate (Standard)	dscf/min	3,020	2,930	2,930	2,960
Temperature	°F	548	549	553	550
Moisture	%	3.9	3.7	4.1	3.9

Table 14

Caterpillar 3516 Diesel Engine, DOC Outlet – 10% Load

EPA 5/202 PM Testing Results

Test Date: Sept 27, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		09:52	13:08	15:52	
End Time		11:49	14:32	17:32	
Sampling Time	min	84	60	84	76
Sampling Results					
EPA 5 Filterable PM	gr/dscf	0.0097	0.012	0.051	0.024
Mass Rate (EPA 2)	lb/hr	0.24	0.30	1.3	0.60
Mass Rate (EPA 19)	lb/hr	0.25	0.31	1.3	0.62
Energy Basis (EPA 2)	g/kWm-hr	0.17	0.21	0.90	0.43
Energy Basis (EPA 19)	g/kWm-hr	0.17	0.22	0.92	0.44
EPA 202 Condensable PM	gr/dscf	0.00089	0.0012	0.0010	0.0011
Mass Rate (EPA 2)	lb/hr	0.022	0.030	0.026	0.026
Mass Rate (EPA 19)	lb/hr	0.022	0.031	0.026	0.026
Energy Basis (EPA 2)	g/kWm-hr	0.016	0.021	0.018	0.018
Energy Basis (EPA 19)	g/kWm-hr	0.016	0.022	0.018	0.019
Total PM	gr/dscf	0.011	0.013	0.052	0.025
Mass Rate (EPA 2)	lb/hr	0.26	0.33	1.3	0.63
Mass Rate (EPA 19)	lb/hr	0.27	0.34	1.3	0.64
Energy Basis (EPA 2)	g/kWm-hr	0.19	0.23	0.92	0.44
Energy Basis (EPA 19)	g/kWm-hr	0.19	0.24	0.94	0.45
Sample Volume	dscf	38.8	42.4	38.4	39.9
Sample Weight, Filterable	mg	24.4	33.6	127.9	62.0
Sample Weight, Condensable	mg	2.2	3.4	2.6	2.7
Sample Weight, Total PM	mg	26.6	37.0	130.5	64.7
Percent Isokinetic	%	99	98	99	99
Source Parameters					
O_2	%	15.4	15.4	15.4	15.4
CO_2	%	4.3	4.3	4.3	4.3
Flow Rate (Actual)	acf/min	5,640	5,570	5,630	5,610
EPA 2 Flow Rate (Standard)	dscf/min	2,910	2,850	2,890	2,880
EPA 19 Flow Rate (Standard)	dscf/min	2,950	2,940	2,950	2,950
Temperature	°F	539	538	543	540
Moisture	%	3.6	4.3	3.4	3.8

Table 15

Caterpillar 3516 Diesel Engine, DOC Inlet – 40% Load

EPA 5/202 PM Testing Results

Test Dates: Sept 28-29, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Date		Sept 28	Sept 29	Sept 29	
Start Time		18:27	08:14	10:28	
End Time		19:47	09:26	12:56	
Sampling Time	min	60	60	60	60
Sampling Results					
EPA 5 Filterable PM	gr/dscf	0.0093	0.043	0.0067	0.020
Mass Rate (EPA 2)	lb/hr	0.46	1.9	0.28	0.89
Mass Rate (EPA 19)	lb/hr	0.35	1.6	0.25	0.74
Energy Basis (EPA 2)	g/kWm-hr	0.17	0.73	0.10	0.33
Energy Basis (EPA 19)	g/kWm-hr	0.13	0.60	0.093	0.28
EPA 202 Condensable PM	gr/dscf	0.0077	0.0075	0.0063	0.0072
Mass Rate (EPA 2)	lb/hr	0.38	0.34	0.26	0.33
Mass Rate (EPA 19)	lb/hr	0.29	0.28	0.24	0.27
Energy Basis (EPA 2)	g/kWm-hr	0.14	0.13	0.097	0.12
Energy Basis (EPA 19)	g/kWm-hr	0.11	0.11	0.087	0.10
Total PM	gr/dscf	0.017	0.050	0.013	0.027
Mass Rate (EPA 2)	lb/hr	0.84	2.3	0.54	1.2
Mass Rate (EPA 19)	lb/hr	0.64	1.9	0.49	1.0
Energy Basis (EPA 2)	g/kWm-hr	0.31	0.86	0.20	0.46
Energy Basis (EPA 19)	g/kWm-hr	0.24	0.71	0.18	0.38
Sample Volume	dscf	47.4	48.1	43.7	46.4
Sample Weight, Filterable	mg	28.6	133.2	19.0	60.3
Sample Weight, Condensable	mg	23.6	23.3	17.9	21.6
Sample Weight, Total PM	mg	52.2	156.5	36.9	81.9
Percent Isokinetic	%	101	100	100	100
Source Parameters					
O_2	%	13.0	13.1	12.9	13.0
CO_2	%	6.0	5.8	6.0	5.9
Flow Rate (Actual)	acf/min	13,500	12,100	11,400	12,400
EPA 2 Flow Rate (Standard)	dscf/min	5,790	5,300	4,810	5,300
EPA 19 Flow Rate (Standard)	dscf/min	4,410	4,390	4,340	4,380
Temperature	°F	744	713	754	737
Moisture	%	5.6	5.2	5.5	5.4

Table 16

Caterpillar 3516 Diesel Engine, DOC Outlet – 40% Load

EPA 5/202 PM Testing Results

Test Dates: Sept 28-29, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Date		Sept 28	Sept 29	Sept 29	
Start Time		18:27	08:14	10:22	
End Time		19:47	09:26	12:56	
Sampling Time	min	60	60	60	60
Sampling Results					
EPA 5 Filterable PM	gr/dscf	0.0057	0.0054	0.0067	0.0059
Mass Rate (EPA 2)	lb/hr	0.23	0.22	0.27	0.24
Mass Rate (EPA 19)	lb/hr	0.21	0.20	0.25	0.22
Energy Basis (EPA 2)	g/kWm-hr	0.086	0.081	0.099	0.089
Energy Basis (EPA 19)	g/kWm-hr	0.078	0.077	0.092	0.082
EPA 202 Condensable PM	gr/dscf	0.00011	0.00041	0.00018	0.00023
Mass Rate (EPA 2)	lb/hr	0.0047	0.016	0.0070	0.0094
Mass Rate (EPA 19)	lb/hr	0.0043	0.016	0.0065	0.0088
Energy Basis (EPA 2)	g/kWm-hr	0.0017	0.0062	0.0026	0.0035
Energy Basis (EPA 19)	g/kWm-hr	0.0016	0.0058	0.0024	0.0033
Total PM	gr/dscf	0.0058	0.0059	0.0069	0.0062
Mass Rate (EPA 2)	lb/hr	0.24	0.23	0.28	0.25
Mass Rate (EPA 19)	lb/hr	0.22	0.22	0.25	0.23
Energy Basis (EPA 2)	g/kWm-hr	0.088	0.087	0.10	0.092
Energy Basis (EPA 19)	g/kWm-hr	0.080	0.083	0.094	0.085
Sample Volume	dscf	43.3	45.1	42.3	43.6
Sample Weight, Filterable	mg	16.0	15.9	18.4	16.8
Sample Weight, Condensable	mg	0.32	1.2	0.48	0.67
Sample Weight, Total PM	mg	16.3	17.1	18.9	17.4
Percent Isokinetic	%	99	100	99	99
Source Parameters					
O_2	%	12.8	13.1	12.8	12.9
CO_2	%	6.1	5.9	6.1	6.0
Flow Rate (Actual)	acf/min	11,100	10,500	10,900	10,800
EPA 2 Flow Rate (Standard)	dscf/min	4,780	4,630	4,660	4,690
EPA 19 Flow Rate (Standard)	dscf/min	4,340	4,380	4,300	4,340
Temperature	°F	729	696	725	717
Moisture	%	5.4	5.0	5.5	5.3

Table 17
Caterpillar 3516 Diesel Engine, DOC Inlet – 85% Load
EPA 5/202 PM Testing Results

Test Date: Sept 28, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		08:40	10:47	15:50	
End Time		10:03	15:01	17:04	
Sampling Time	min	60	60	60	60
Sampling Results					
EPA 5 Filterable PM	gr/dscf	0.011	0.0034	0.0066	0.0071
Mass Rate (EPA 2)	lb/hr	0.86	0.25	0.47	0.53
Mass Rate (EPA 19)	lb/hr	0.64	0.19	0.37	0.40
Energy Basis (EPA 2)	g/kWm-hr	0.18	0.053	0.098	0.11
Energy Basis (EPA 19)	g/kWm-hr	0.13	0.040	0.077	0.084
EPA 202 Condensable PM	gr/dscf	0.0041	0.0033	0.0039	0.0038
Mass Rate (EPA 2)	lb/hr	0.32	0.24	0.28	0.28
Mass Rate (EPA 19)	lb/hr	0.24	0.18	0.22	0.21
Energy Basis (EPA 2)	g/kWm-hr	0.067	0.051	0.058	0.059
Energy Basis (EPA 19)	g/kWm-hr	0.049	0.039	0.046	0.045
Total PM	gr/dscf	0.015	0.0067	0.011	0.011
Mass Rate (EPA 2)	lb/hr	1.2	0.50	0.75	0.81
Mass Rate (EPA 19)	lb/hr	0.87	0.38	0.59	0.61
Energy Basis (EPA 2)	g/kWm-hr	0.25	0.10	0.16	0.17
Energy Basis (EPA 19)	g/kWm-hr	0.18	0.079	0.12	0.13
Sample Volume	dscf	57.6	46.7	40.7	48.3
Sample Weight, Filterable	mg	41.9	10.4	17.5	23.3
Sample Weight, Condensable	mg	15.4	10.0	10.3	11.9
Sample Weight, Total PM	mg	57.3	20.4	27.8	35.2
Percent Isokinetic	%	99	101	101	100
Source Parameters					
O_2	%	11.2	11.1	10.9	11.0
CO_2	%	7.3	7.4	7.5	7.4
Flow Rate (Actual)	acf/min	21,500	20,900	20,400	20,900
EPA 2 Flow Rate (Standard)	dscf/min	8,960	8,580	8,260	8,600
EPA 19 Flow Rate (Standard)	dscf/min	6,620	6,520	6,490	6,540
Temperature	°F	790	808	817	805
Moisture	%	6.2	6.3	6.8	6.4

Table 18

Caterpillar 3516 Diesel Engine, DOC Outlet – 85% Load

EPA 5/202 PM Testing Results

Test Date: Sept 28, 2011	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		08:40	10:47	15:50	
End Time		10:03	15:02	17:04	
Sampling Time	min	60	60	60	60
Sampling Results					
EPA 5 Filterable PM	gr/dscf	0.0036	0.0045	0.0046	0.0042
Mass Rate (EPA 2)	lb/hr	0.20	0.26	0.26	0.24
Mass Rate (EPA 19)	lb/hr	0.21	0.25	0.26	0.24
Energy Basis (EPA 2)	g/kWm-hr	0.043	0.055	0.055	0.051
Energy Basis (EPA 19)	g/kWm-hr	0.043	0.053	0.054	0.050
EPA 202 Condensable PM	gr/dscf	0.0015	0.00062	0.0018	0.0013
Mass Rate (EPA 2)	lb/hr	0.086	0.036	0.10	0.075
Mass Rate (EPA 19)	lb/hr	0.087	0.034	0.10	0.074
Energy Basis (EPA 2)	g/kWm-hr	0.018	0.0075	0.022	0.016
Energy Basis (EPA 19)	g/kWm-hr	0.018	0.0072	0.021	0.016
Total PM	gr/dscf	0.0052	0.0051	0.0064	0.0056
Mass Rate (EPA 2)	lb/hr	0.29	0.30	0.37	0.32
Mass Rate (EPA 19)	lb/hr	0.29	0.29	0.36	0.31
Energy Basis (EPA 2)	g/kWm-hr	0.061	0.062	0.077	0.067
Energy Basis (EPA 19)	g/kWm-hr	0.062	0.060	0.075	0.065
Sample Volume	dscf	47.9	56.3	46.0	50.1
Sample Weight, Filterable	mg	11.3	16.4	13.7	13.8
Sample Weight, Condensable	mg	4.8	2.3	5.4	4.2
Sample Weight, Total PM	mg	16.1	18.7	19.1	18.0
Percent Isokinetic	%	107	101	100	103
Source Parameters					
O_2	%	11.1	11.0	10.9	11.0
CO_2	%	7.3	7.4	7.5	7.4
Flow Rate (Actual)	acf/min	15,700	16,300	16,300	16,100
EPA 2 Flow Rate (Standard)	dscf/min	6,510	6,750	6,660	6,640
EPA 19 Flow Rate (Standard)	dscf/min	6,610	6,490	6,480	6,530
Temperature	°F	776	793	798	789
Moisture	%	6.5	5.4	6.2	6.0

Con-Agra, which run 24 hours per day and 7days per week (24/7), routine plant operations were accounted for. These are listed in Table D-2 along with the number of days per year associated with each event.

Table D-2. Microsoft, Celite and Con-Agra Emissions Scenarios/Events and Number of Days Included in the Monte Carlo Analysis for the Dell Data Center.

Scenario/Event	Number of Days per Year Included in the Monte Carlo Analysis
Microsoft full power outage	2
Microsoft monthly testing	24
Microsoft electrical bypass	30
Celite routine operations	365/366
Con-Agra routine operations	365/366

The two days of power outage are the same days for both the Dell and Microsoft facility. Emissions from the Yahoo and Intuit facilities which are further away were not included. Previous analysis (performed in support of Dell's original submittal) confirmed that the contributions from these facilities to the area of maximum impact from Dell are very small.

All software used for this application was provided by Ecology, and applied according to their recommended procedures.

Multiple-Facility Results

For the multiple-facility analysis, the Monte-Carlo-based estimate of the three-year average 98th percentile 1-hour NO_2 value (for the receptor location with the maximum value) is 95.0 µg/m^3. This includes local background (from the Microsoft, Celite, and Con-Agra facilities). After accounting for regional background, the NO_2 impact at or beyond the project boundary is 124.0 µg/m^3, and is lower than the NAAQS:

Parameter	Concentration (µg/m^3)
Three-year average 98th percentile 1-hour NO_2 increment (no background)	95.0
Regional background	29.0
NO_2: Increment plus background	124.0
NAAQS Limit	188

The location of the estimated multiple-facility maximum 3-year average 98th percentile 1-hour NO_2 concentration is near the southeast corner of the Dell property, along the

Comments submitted by Danna Dal Porto, Quincy, WA.

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Department of Ecology
Eastern Regional Office

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Comments for the Microsoft Oxford Public Hearing, July 9, 2015.

I have followed the numerous data center construction projects in Quincy since the first public hearing for Microsoft Columbia. The circumstances surrounding this 2105 Microsoft Oxford Permit Appeal seem different than all the others. From many aspects the 2014 Permit Application and subsequent 2015 Appeal seem very rushed and not as well prepared or professional as permit applications from other data centers. The 2014 Oxford permit application gives the impression that Microsoft was in a really big hurry to construct this facility. It is also troubling that for the Public Hearing in Quincy, July 9, 2015, that Microsoft sent their lawyer, Matt Cohen, to answer questions rather than send a qualified engineer or, better yet, send James Wilder, the consultant who prepared most of the 2014 permit application. (Exhibit 1)

I will start my comments with the observation that the July 9, 2015 Public Hearing in Quincy was not satisfactory and very disappointing. The prepared agenda planned for the public to have 30 minutes for questions and answers. (Exhibit 1) The public got 10 minutes for questions and very few answers. Although Matt Cohen spoke to explain that he was present at the last minute on the unexplained absence (vacation was mentioned) of the "spokesperson" (name not given), it is important to note that the prepared and printed agenda has Matt Cohen's name so Ecology knew enough in advance to print that agenda and bring the agenda with them to this meeting away from their office. What major corporation has their primary engineer/consultant absent for a Public Hearing on a major facility? Matt Cohen spoke "around" most of the questions and, to be honest, how can I believe or trust his answers to technical operational inquiries? Matt Cohen is a very good lawyer and a smart guy but he is not a data center engineer or a recognized expert in air quality matters. Now that I think about it, I would like to hear a recorded tape of this meeting and study his answers. As an audience member, I was confused and caught off guard by his representation of Microsoft at this Public Hearing, which was intended for the public to learn specific facts about Oxford operations. In summary, the meeting was a failure partly because Microsoft did not allow for a qualified company engineer to interact with the public for technical questions and answers. The meeting did not provide adequate time for questions and answers. The two Ecology spokespersons spent too much time doing a repetitive and long overview of information not really pertinent to the Permit Appeal. Although Karen Wood was listed as a Panel member on the agenda, she did not sit at the table or present herself at that formal time for questions, although she did stand in the general area. Because everything was so rushed, this meeting did not satisfy my need for specific data center operational information and I would consider this not a good faith effort by Ecology to interact with the public.

Actually the official notification for this Public Hearing was not a reflection of the facts. It states that Microsoft requested "changes" to the permit. (Exhibit 2) In fact, Microsoft has appealed the 2014 Permit with the Pollution Control Hearing Board, PCHB No. 14-104, and these changes are now in litigation. I will mention that Matt Cohen, representing Microsoft at this July 9, 2015 Hearing is also the lawyer representing Microsoft before the Pollution Control Hearings Board. (Exhibit 3) This is not a request for changes; it is an appeal of the original permit. The issues in this Permit Appeal are too important to be treated in this haphazard manner.

The Public Comment Period fact sheet, Publication Number: 15-02-009 makes this statement: "Ecology is seeking public comment only on the changes to the permit." (Exhibit 2) I have gone back to the Public Comments of July 24, 2014 because that document has the same issues but with much more information than the official publication fact sheet or the list of Proposed Legal Issues from the PCHB No. 14-104. (Exhibit 3)

To begin thinking about my comments for the Public Hearing, I went back to reading the comments from the Public Hearing, July 24, 2014. Many of the first 9 of 19 comments by Microsoft representative, John Radick, are requests for changes to the document Microsoft just presented for theirermit. The changes John Radick proposes are not insignificant and it is odd for the developer to be requesting these changes right after they submitted their permit documents. Why didn't Microsoft make these important technical recommendations before they prepared their original paperwork for the permit? Microsoft is asking for significant changes to the manner in which Ecology sets up diesel engine tests and assesses engine performance. Ecology has not been given an opportunity to make adjustments to their procedures and yet Microsoft is taking them into legal action.

Referencing Responsiveness Document, Comment 9, John Radick; language that Radick proposes is that Microsoft "voluntarily" proposed to equip all of Oxford's diesel engines with control devices that achieve EPA's Tier 4 standards and exceed the Best Available Control Technology (BACT). "Microsoft believes it is important that the permit contain findings on these key details of the project." (Exhibit 4) The Ecology Response states that the Tier 4 controls are not "voluntary" and that these controls are required to reduce emissions to below BACT. (Exhibit 4) Please explain to me the importance of the word "voluntary" in this discussion. Why is Microsoft requesting the language to reflect that they are "voluntarily" adding controls to reach Tier 4 status when that is not true? Correspondence I had with Ecology clearly states that "Microsoft cannot meet emission conditions in the permit unless they use these controls for each engine" (Exhibit 5) I have another specific question about the Tier 4 level. The Oxford permit lists use of SCR's and DPF's alone to achieve Tier 4 and other paperwork I have see states Vantage Tier 4 engines use DOC's, DPF's and SCR's. Explain to me if this is correct, and how the Tier 4 set-up can vary in emission controls. How does the difference in the controls on these Tier 4 engines change the emission levels? I understood that the designation "Tier 4" had everything to do with the emission controls. Are the Vantage and Oxford Tier 4 engine operations, with different controls, performing the same level of emission control?

John Radick Responsiveness Comment 10 is a recommendation to change the basic method Ecology uses for the testing of engines and Microsoft wants to operate the engines in "load ranges" instead of the bank load testing of 0, 80, and 100. I read this comment and got very confused with the side comment that "it is useful to specify that "load" means electrical load (as opposed to mechanical load)." (Exhibit 6) I want an explanation of this concept. Please explain to me how "load" is used when the Permit discusses load limits. When I look at the Caterpillar Cat 3516C 2000 ekW Tier 2 Generator fact sheet, I see a column that is titled "Engine Load" and that correlates to different emission categories such as NOx, PM, and CO. (Exhibit 7) I understand this load as a mechanical load. Please explain how "load" is used as an electrical load. The Ecology comment is load ranges should have been introduced during the NOC review and not during the public comment period. This is an example of the odd and unusual disorganization I found in the Microsoft Response to Comments as well as the permit application. (Exhibit 6)

John Radick, Comment 11, is making another request for changes to the permit; the hour limits on load limits. Ecology response was that Ecology cannot evaluate this request because it has implications for the modeling and emission impacts. This is another example of not addressing this issue with the NOC, instead changing it during the Comment Period. (Exhibit 6)

John Radick, Comment 13, is requesting changes in load ranges for testing and again Ecology has not tested for alternate load modeling. This issue should have been addressed in the permit application, not the Comment Period. (Exhibit 8)

John Radick of Microsoft continues in his comments (Comment 14-19) for the Public comment period with very technical and detailed changes and modifications to the Oxford permit that is under consideration. Comment 14 references engine hours for source test and that item is part of the Permit Appeal. Comment 16 and 17 also addresses engine testing. It was very confusing to me why these specific items were not part of the original permit review. (Exhibit 9 is pages 14-19 of the Public Comments)

Comment 18, John Radick focuses on Recordkeeping and Reporting. His comment and Ecology's response indicate that consideration is being given to public requests for information on operating records. The Ecology response sounds as if public requests for operational information are being discussed. (Exhibit 10) I would like Ecology to tell me how that discussion is proceeding and when and how the public can expect to access some operational data.

I have questions on the Proposed Legal issues that are part of the appeal before the Pollution Control Hearing Board, PCHB No. 14-104. (Exhibit 3) This appeal isolates four of the requests Microsoft listed in the comments for the Public Hearing, July 24, 2014. Proposed Legal Issue 1 is an argument over detailed test protocols. Proposed Legal Issue 2 is based on Condition 4.4 and Table 4 of the Approval Order and this order regards the costly and time-consuming source testing necessary to document compliance with EPA performance standards. (Exhibit 3) I want to know if these tests mentioned in Issue 2 are being required because Microsoft Oxford is being tested as a "major facility"? Is this because Microsoft would now be required to measure filterable and condensable emissions? Is this testing normal for any data center using Tier 4 engines? Why is Microsoft objecting to this source testing if it is normally required for Tier 4 engines?

Proposed Legal Issue 3 in the appeal PCHB No. 14-104 (Exhibit 3) is a complaint because Ecology is limiting Oxford Data Center to three specified load levels. Ecology has always set load limits for data center operations. The three load recommendations have never been an issue with any other operational permit, even Microsoft Columbia that just went through a permit modification. If Microsoft wants to request load modifications they will have to put forward an entirely new operating permit and show how that would work through modeling the emission impacts.

Proposed Legal issue 4 on the appeal PCHB No. 14-104 (Exhibit 3) describes how Microsoft does no want to maintain a record of the "reason for operating" each of the 37 engines at Oxford, each time that an engine starts up. I think requiring a record of operation is necessary and important for Ecology to know. I would like to know why the engines run as a member of the local community. I am requesting access to the operational records of the engines at Oxford and I think the record should include each and every time the engine runs and the reason for that operation.

I reviewed the documents available for study and comment at the July 9, 2015, Public Hearing. One of the Landau documents, Signed Air Permit Revision Application Form, Revised January 2013, (red lined version) had a variety of charts. I have included three of these charts and I need clarification about terminology used on each of these charts. Each chart has items labeled "Cherry Picked". I want an explanation of how the term "cherry picked" is used in relation to technical documents for data center permits. (Exhibit 11)

I have a document from the Landau Associates Final NOC report June 2014 and this is Table 13, 1-Hour NO2 NAAQS Compliance Modeling Results. The document uses Modeling years 2001-2005. The Local Background lists only partial sources of NO2 and does not list the effects of the trains, trucks and the nearby Amway source. (Exhibit 12) I want to know if Microsoft can use old and incomplete data for modeling the levels of emissions. I would like updated information to be used to model the effects of data center emissions.

I am requesting two physical air monitors for Quincy. As was mentioned at the Hearing, Quincy is certainly getting more data centers. The 2015 Republican budget had a line item in the document that provides for tax relief for data center construction and the document mentions from 8 to 12 data companies that can build in Quincy. I do not know if that includes the expansions that are predicted for data centers already here. It is well known that Yahoo plans an expansion and perhaps others. Sabey is already expanding. The number of diesel generators in town will quickly exceed many more than 200 units and even the Spokane office of Ecology should recognize that is a huge number of huge generators in a small community. I think a real case can be made for installing air monitors in Quincy. I do not believe that telling residents that there is no money to install monitors will hold up under scrutiny. This is a matter of public health and it is time to know the accurate levels of toxic components in the air instead of guessing.

I challenge any and all metrological assumptions about the weather in Quincy because Ecology uses weather data from Moses Lake. Quincy has distinct weather events because of the hills around the town as well as weather coming down the Columbia River from the north. Quincy needs accurate weather data to go along with the air monitors that must be installed in town. Ecology must do the right thing and not guess about air or weather.

I am requesting another area overlay map showing air quality. I respectfully ask that the map be larger, in a horizontal format, use distinct colors (not blurred shades of blue and green) and extend further to the east and south to show the effects of the bad air. Please do not make the map with the little wiggly lines around the impact areas. The wiggly line map is too difficult to read. The map that was in answer to the request from the 2014 Oxford Public Hearing was not that useful. (Exhibit 13) The residents to the east and south of town need to know how their air is being affected.

My final comments are that the proposed changes to the Oxford operational permit should not be allowed. Microsoft has not allowed Ecology to adjust their testing and emission modeling information to allow for these changes and therefore the Quincy Community would not be safe without adequate regulations to protect the air and the environment. Microsoft is asking to change horses in the middle of the stream. If Microsoft wants these changes, they should be required to start all over again with a new permit application that provides the revised data and provides the time necessary for Ecology to modify their methods to study the proposed changes to procedure and the effects on emissions.

Hanna Dal Porto
July 13, 2015

July 9, 2015
Public Hearing Agenda
Microsoft's Proposed Revisions to the
Oxford Data Center Air Quality Permit

DEPARTMENT OF ECOLOGY
State of Washington

For assistance in Spanish please see **Greg Bohn**, Spanish Interpreter, Water Quality, Program, Ecology

5:00 – 5:30 *Meet and Greet*

Informal opportunity to learn about project, meet Ecology and Microsoft staff, and view poster boards of project and process.

Introductions

Hearings Officer: **Victoria Leuba**, Water Resources Program, Ecology
Meeting Facilitator: **Beth Mort**, Air Quality Outreach and Education, Ecology

5:30– 5:40 *Presentation: Oxford Data Center Revisions Overview*

Matt Cohen, Stoel Rives, Representing Microsoft

5:40 – 5:50 *Presentation: Ecology's Process*

Gary Huitsing, Air Quality Engineer, Ecology

5:50 – 6:00 *Presentation: Air Quality and Human Health*

Gary Palcisko, Toxicologist, Air Quality, Ecology

6:00 – 6:25 *Question and Answer Session*

This is an open forum to ask questions about this project. During the formal hearing, Ecology and Oxford will not able to respond to comments made for the record, so please ask any questions requiring an immediate response during this time.

Panel members:
Karen Wood, Air Quality Section Manager, Ecology
Gary Huitsing, Senior Air Quality Engineer, Ecology
Gary Palcisko, Toxicologist, Air Quality, Ecology
Matt Cohen, Stoel Rives, Representing Microsoft

6:30pm *Formal Hearing*

During the formal hearing, we will be taking comments for the formal record. No response can be given tonight, but a written responsiveness summary will be available on our website 30 days after closing date.

Exhibit 1

Ecology will be taking comments for this project until July 13th, 2015.
Please send all comments to Beth Mort at 4601 N. Monroe, Spokane, WA 99205.
Comments may also be faxed to (509) 329-3529 or emailed to Beth at beth.mort@ecy.wa.gov.

Ecology Seeks Comments on Draft Revisions to Microsoft's Oxford Data Center Air Permit

Este boletín incluye información sobre el Centro de Datos "Oxford" localizado en Quincy, Washington. El boletín también está disponible en español. Si usted necesita más información en español sobre este proyecto, por favor contáctenos al (360) 407-6084 o a preguntas@ecy.wa.gov.

Washington State Department of Ecology (Ecology) issued a permit to Microsoft (Approval Order No. 14AQ-E537) on August 15, 2014. The permit allowed Microsoft to install and operate equipment at a new data center called Oxford Data Center (Oxford).

Before completing construction and beginning operation of the data center, Microsoft applied to change the permit. **Ecology is seeking public comment only on the changes to the permit.**

Microsoft's Requested Changes

Microsoft asked for flexibility in how they operate their emergency back-up diesel engine generators. This would more accurately reflect the range of situations in which the engines will operate.

Emergency engines need flexibility when operating because power needs for data centers vary significantly throughout the day. The engines will most often operate between 25 and 75 percent of capacity, but flexibility to run betwen 10 and 100 percent capacity is needed during unplanned outages as well as during other planned situations.

While this flexibility could result in an increase in the amount of air pollution, the potential emissions will still be in compliance with state and federal air quality standards.

In addition, Microsoft requested changes to how they show they are complying with permit limits. The new permit allows them to reduce the minimum number of engines being tested *per year* from two to one. However, it extends the minimum number of years they must test and requires one more engine be tested overall. The effect of these changes increases the minimum number of engines tested from eight to nine and the minimum number of years Mircrosoft will be required to test the engines from 10 years to 25 years.

Public Comment Period
May 28 – July 13, 2015

Public Hearing
July 9, 2015
Quincy Community Center
115 "F" Street SW
Quincy, WA 98848

Agenda
5:00 p.m. Meet and Greet
5:30 p.m. Presentations/Q&A
6:30 p.m. Formal Hearing

Documents available at:
http://www.ecy.wa.gov/programs/air/quincydatacenter/index.html

Quincy City Hall
104 "B" Street SW
Quincy, WA 98848

Quincy Library
208 Central Avenue South
Quincy, WA 98848

Washington Dept of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205

Submit comments to
Beth Mort
Washington Dept. of Ecology
4601 North Monroe Street
Spokane, WA 99205
(509) 329-3502
beth.mort@ecy.wa.gov

Contact information
Greg Flibbert, Permit Manager
(509) 329-3452
greg.flibbert@ecy.wa.gov

Exhibit 2

Ecology Wants Your Comments

You may review and comment on the proposed revisions to the draft air permit through July 13, 2015. This public comment period presents an opportunity to have your ideas and comments heard by Ecology.

Documents for review are available at Quincy City Hall and the Quincy Library. A public hearing is also being held at the Quincy Community Center (115 "F" Street SW) on July 9, 2015. This is an opportunity to learn about the project, and to voice your comments or concerns. See the side bar on the front of this document for details about the public hearings and other ways to submit comments.

How did Ecology Evaluate the Impacts of Data Center Air Pollution?

Ecology used a process called 'Community Modeling'. To do this, a computer model adds any new data center emissions to those from other air pollution sources and determines if the total emissions are likely to be harmful to human health. Ecology reviews the results from the computer models to determine air quality impacts and assess possible health risks. Community modeling was used in this case because there are so many data centers located in Quincy.

The Health Risks of Diesel Exhaust

The toxic air pollutants in diesel exhaust include nitrogen dioxide, carbon monoxide, organic compounds, and tiny particles called diesel exhaust particulates. Ecology evaluated the levels of these pollutants during the permit review process. Diesel exhaust particles and nitrogen dioxide are the pollutants most likely to be produced in high enough amounts to potentially affect health. For more information about the health effects of these pollutants, read Ecology's publication "*Focus on Diesel Exhaust Health Risks.*" This is available in English and Spanish.

STAY CURRENT
DATA CENTER AIR PERMITS

DEPARTMENT OF ECOLOGY State of Washington

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Presiding Member: Kay Brown

POLLUTION CONTROL HEARINGS BOARD
STATE OF WASHINGTON

MICROSOFT CORPORATION Appellant, v. WASHINGTON DEPARTMENT OF ECOLOGY Respondent.	PCHB No. 14-104 MICROSOFT CORPORATION'S PRELIMINARY LIST OF WITNESSES, EXHIBITS, AND LEGAL ISSUES

Microsoft Corporation ("Microsoft") submits its preliminary statement of legal issues, witnesses, and exhibits. These issues, witnesses, and exhibits have been prepared prior to any discovery in this appeal. The issues, witnesses, and exhibits presented at the hearing on the merits may differ significantly from those stated below, and Microsoft specifically reserves the right to amend its list of issues, witnesses, and exhibits during and after the completion of discovery.

I. PROPOSED LEGAL ISSUES

1. Are Conditions 3.3.2 and 4.4 of the Oxford Data Center Approval Order No. 14AQ-E537 ("the Approval Order") unjust or unlawful because they allow fewer hours for

STOEL RIVES LLP
ATTORNEYS
600 University Street, Suite 3600, Seattle, WA 98101
Telephone (206) 624-0900

Exhibit 3

source testing than required to implement the detailed source test protocols mandated by the Approval Order?

2. Are Condition 4.4 and Table 4 of the Approval Order unjust, unlawful and environmentally harmful because they mandate a program of costly and time-consuming source testing to document compliance with EPA performance standards that rely on methods other than source testing to assure compliance?

3. Is Condition 3.2 of the Approval Order unjust and unlawful because it limits operation of the engines at the Oxford Data Center to three specified load levels, notwithstanding Microsoft's need to run the engines at loads other than those specified in Condition 3.2 to ensure the security of the power supply to the Data Center?

4. Is Condition 8.5 of the Approval Order unjust and unlawful by requiring Microsoft to maintain a record of the "reason for operating" each of the 37 engines at the Data Center, each time that an engine starts up?

II. WITNESSES

1. David Fierbaugh, Senior Mechanical Engineer, Columbia Data Center
2. Jim Wilder, ICF International
3. Greg Flibbert, Washington Department of Ecology
4. Gary Huitsing, Washington Department of Ecology
5. Experts who Microsoft will identify to testify about various issues related to this appeal.

Microsoft reserves the right to: (1) add to or delete from this preliminary list of witnesses based upon further inquiry and discovery at any time prior to the submission of its final list of witnesses; (2) call witnesses identified on the preliminary and final lists of witnesses named by the other parties to this action; and (3) call additional witnesses for rebuttal purposes.

III. EXHIBITS

1. Approval Order No. 14AQ-E537.

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Ecology Response:
This comment questions the use of diesel engines to run the generators for emergency power and the use of chilled water cooling towers for temperature control inside the buildings. The role of the AQP is to review projects to ensure that air contaminate emissions meet applicable state and federal requirements. Ecology cannot dictate engine fuel outside of federal standards or require any specific air cooling technology. Revised Code of Washington 70.94.152(6) does not allow Ecology to require the use of equipment of any particular type or manufacturer. The AQP is authorized to protect the environment and public health by minimizing air contaminate emissions from the equipment that is being proposed for installation. If the equipment does not meet state and federal air quality standards, Ecology can either require changes to the project or deny the project.

John Radick, Microsoft, comments 9-19
COMMENT 9, JOHN RADICK:
1. Determinations, Paragraph 2
The Proposed Order includes information about the number and size of the diesel engines that Ecology is permitting, and Table 2a.I on page 5 describes those engines as "EPA Tier 2 certified engines." These statements create the misleading impression that the engines installed at the Oxford Data Center will feature no emission controls beyond those required by EPA for Tier 2 engines. Microsoft recently received a letter from a Quincy resident who noted that the Proposed Order does not mention emission controls. She wanted to know whether Microsoft plans to equip the engines with controls. *See* attached email, Attachment A to these comments.

The Oxford engines will be equipped with SCR for NOx and with catalyzed diesel particulate filters to control particulate matter, VOCs and CO. Further, the emission limits that Ecology has included in Table 4 are EPA Tier 4 limits. In Table 4 of the Proposed Order Ecology will require Microsoft to source test the engines to demonstrate compliance with EPA Tier 4 limits.

The Proposed Order should include findings that Microsoft voluntarily proposed to equip all of the diesel engines at the Oxford Data Center with control devices that can achieve EPA's Tier 4 standards, and that those engines will exceed the Best Availability Control Technology ("BACT") determinations in Table 2a.1. Microsoft believes it is important that the permit contain findings on these key details of the project. Our proposed edits to Paragraph 2 on page 5 incorporate a short version of these findings into the permit.

Microsoft's comments on the TSD for the Proposed Order provide more detail on the controls specified for the engines, and the basis for the conclusion that they exceed BACT requirements. *See* attached red line of the draft TSD at 2, 8, 10, etc.

Ecology Response:
The installation of Tier 4 controls on the Microsoft Oxford engines is not voluntary, and the word "voluntarily" will not be inserted into the final permit. It is recognized that the Tier 4 air pollution control equipment required on the Microsoft Oxford emergency engines will reduce emissions to below BACT. The AQP will reword this section to avoid any confusion about the

I am sort of confused. The SEPA I refer to states that Oxford will have emission controls. Those controls are clearly listed by name and type. In the permitting documents on file, there is nothing about controls. The BACT is listed as Tier 2 engines. Can you sort out this difference in information? I really did think that this huge data center would have controls. I had a meeting in February with Kevin Williams and was presented a slide show and told that controls would be place on the engines. This month when I looked at the permit document I felt really sandbagged. I was really sad to think that I had been totally misled and deceived. I need you to tell me what is the truth and, if controls are to be installed, that information needs to be part of the written permit. Without the actual listing of controls in the permit, the public has no way to know what is happening. The public has only the permit as the standard that will be in place for operation of the facility.

I appreciate all the efforts Beth has taken to advertise this hearing. I appreciate the listing of the public notice in the Quincy paper, I appreciate the 40 day comment period and I really appreciate having the documents at the library. In the past when we needed to read the paperwork, Stephanie in the City office had to find us a table (move it into the small office) or give up her desk and we had to read the stuff during City Hall hours. The library is much better.
I am afraid that not many people will show up but having the Community Center as a meeting space will be better. Especially if it stays as hot as it is today.

Thanks for sorting this out for me.

Danna Dal Porto
Quincy, WA

From: Mort, Beth (ECY)
Sent: Wednesday, July 16, 2014 1:58 PM
To: 'ddalporto@smwireless.net'
Cc: Flibbert, Gregory S. (ECY)
Subject: Oxford data center questions

Hello Danna,

Greg asked me to respond to your questions. I have included your original email below.
Regarding your first question, you can simply reference the SEPA and indicate which statements came from that document in your public comments and do not need to submit the SEPA document in its entirety.

Regarding your second question, Microsoft is putting controls on its Oxford engines. The engines will be Tier IV equivalents with SCR and oxidizing DPF. Microsoft can't meet the emission conditions in the permit unless they use these controls for each engine. References to the controls are currently located in the TSD in section 3.4.1 on page 7, and the Catalyst Delay Cold Start Adjustments Table on page 5. Patty Martin also sent us an email and brought to our attention that this is not clearly spelled out in the PD. We agree that the requirement for SCR and DPF should be clearly stated in the permit conditions not just the TSD. This comment as well as Patty's will be included in the Response to Comments document where we can address this addition to the PD.

It sounds like the library has been a good place for you to review the documents but just in case, here is the link for the Oxford preliminary determination:

BACT determination which is based on cost per ton of pollutant and the requirement that the Microsoft Oxford Data Center engines must meet EPA Tier 4 emission standards. This administrative clarification to the preliminary determination does not require an additional public comment period. Any attachments referred to in Mr. Radick's comments are available in Appendix B.

COMMENT 10, JOHN RADICK:

2. Load ranges, Condition 3.2

Microsoft recommends that the approval order allocate engine hours to load ranges (e.g. 0 to 10 percent electrical load), rather than to specific load levels. The main reason for this recommendation is that certain operations, e.g. load bank testing, require operation at load levels other than 0, 80 and 100 percent. In addition, it is useful to specify that "load" means electrical load (as opposed to mechanical load). We included in the proposed brackets an allowance for the fact that engines may operate within 2 percent of the targeted 80 percent load level.

Ecology Response:

Microsoft would like the AQP to replace loads with load ranges in Condition 3.2. Microsoft should have identified this request during the NOC application review process and not during the public comment period. While the AQP understands Microsoft's concerns regarding load ranges, the AQP did not receive sufficient information in the application to fully evaluate impacts due to load ranges in the current modeling. The AQP cannot make these changes without additional information and further NOC application review.

COMMENT 11, JOHN RADICK:

3. Engine hour limits for load levels, Conditions 3.2.2.1 and 3.2.3

These two conditions limit the engine runtime hours for specific loads: no more than 40 hours per year at 80% load (or 1 1% to 82% load per Comment 2 above) and 17.5 hours per year at 100% load (or in excess of 82% load per Comment 2). In the aggregate, the Proposed Order authorizes each engine to operate a total of 57.5 hours per year at these two load ranges.

Microsoft recommends modifying Condition 3.2.2.1 to authorize up to 57.5 hours per year at 80% load (or 11%-82% load). Condition 3.2.3 will still limit the runtime at 100% load (or in excess of 82% load) to 17.5 hours per year, but the engine hours operated at this load level will count towards the 57.5 hours per year authorized in Condition 3.2.2.1. Monthly, semi-annual and corrective testing required in the Proposed Order will be done at a wide range of loads (0%-1 00%). This proposed change provides Microsoft with the flexibility to operate at either the 80% load (11 %-82%) or 100% load (greater than 82%) level, while still limiting the overall engine runtime hours to 57.5 hours per year and maintaining the 17.5 hour per year limit at the highest load level.

Ecology Response:

Microsoft would like Ecology to aggregate hours of operation for 80% and 100% load. The AQP has not fully evaluated whether aggregation was considered in the modeling. Because of the unknown implications to modeling and emission impacts, the AQP cannot make this change to the permit.

Exhibit 6

CATERPILLAR

Cat 3516C 2000 ekW Tier 2 Generator, DM8263

SCR Operation Status	TMI Potential Site Variation Data						Estimated Reduction at % Load							
	Engine Load	Exhaust Temp	NOx	CO	HC	PM	NOx		CO		HC		PM	
	%	deg C	g/bkW-hr	g/bkW-hr	g/bkW-hr	g/bkW-hr	Reduction %	g/bkW-hr	Reduction %	g/bkW-hr	Reduction %	g/bkW-hr	Reduction %	g/bkW-hr
On	100%	400	8.77	0.72	0.20	0.05	92%	0.70	80%	0.14	85%	0.03	85%	0.01
On	75%	363	6.22	0.51	0.31	0.07	93%	0.44	80%	0.10	80%	0.06	85%	0.01
On	50%	346	5.12	0.80	0.46	0.11	93%	0.36	80%	0.16	80%	0.09	85%	0.02
On	25%	339	6.76	2.84	0.66	0.42	90%	0.68	80%	0.57	80%	0.13	85%	0.06
OFF	10%	289	9.56	5.84	1.45	0.66	80%	1.91	80%	1.17	70%	0.43	85%	0.10

**SCR in operation above 330 deg C*

Using 80% NOx Reduction @ 10% load for D2 Calculations

Estimated EPA D2 Cycle 5 Mode Weighted Average

Engine Load	D2 Cycle Weight	NOx		CO		HC		PM	
%	%	Pre g/bkW-hr	Post g/bkW-hr	Pre g/bkW-hr	Post g/bkW-hr	Pre g/bkW-hr	Post g/bkW-hr	Pre g/bkW-hr	Post g/bkW-hr
100%	5%	0.438	0.035	0.036	0.007	0.010	0.002	0.003	0.000
75%	25%	1.555	0.109	0.127	0.025	0.077	0.015	0.017	0.003
50%	30%	1.536	0.108	0.241	0.048	0.137	0.027	0.032	0.005
25%	30%	2.027	0.203	0.853	0.171	0.197	0.039	0.125	0.019
10%	10%	0.956	0.191	0.584	0.117	0.145	0.043	0.066	0.010
D2 Average:		6.512	0.645	1.842	0.368	0.566	0.127	0.242	0.036
EPA Tier 4 Final:			0.670		3.500		0.190		0.030

Caterpillar: Confidential Green

14022801RW-E 3516C 2000kw Microsoft.xlsx

Exhibit 7

COMMENT 12, JOHN RADICK:

4. Daily Energy Generation, Condition 3.2.2.2

This condition sets a daily cap on electric power generated in a day. It includes an exception for emergency power outages. The condition should be clarified to state that the exception applies during up to four days *per year* of emergency power outage, and that the limit applies to each calendar day. The latter edit minimizes what could otherwise be a major recordkeeping burden.

Ecology Response:

Microsoft would like to clarify how the daily cap is applied in the proposed permit. Ecology can make this change to the permit since it does not increase emissions and is not considered substantive. This administrative clarification to the preliminary determination does not require an additional public comment period.

COMMENT 13, JOHN RADICK:

5. Power outage exception for high load range limit, Condition 3.2.3

This condition limits the number of engines that can simultaneously operate at 100% load. In Comment 10 above, Microsoft proposed to change the specific load of 100% to a load range of 82% to 100%. During an emergency power outage, it is possible that an engine could operate at a load level slightly higher than 82% (e.g. 83% or 84%). Accordingly, Microsoft proposes to include "emergency power outages" in the description of operational scenarios for this load range. If an emergency power outage occurs, more than three engines may need to be run at a load range of between 82%-100% to power the data center. Microsoft recommends adding language to Condition 3.2.3 to clarify that more than three engines may run simultaneously during an emergency power outage.

Ecology Response:

Ecology does not object to MSN's requested option of borrowing engine runtime hours at 100% load from those allocated for 80% load. However, because the AQP has not fully evaluated how load ranges and aggregation were addressed in the modeling, Ecology does not approve of redefining the 80% load range and aggregating the 80% and 100% loads as explained in Response to Comment No. 3. Similarly, operation of more than three engines at 100% load for power outages was not evaluated by the AQP because the applicant's modeling considered power outages at the 80% load but not at the 100% load. If Ecology approved the option to subtract hours from the 80% load for use at the 100% load, but denied the other requests, MSN would be subtracting from the currently approved 40 hours at 80% load instead of from their requested 57.5 hours. Because Ecology does not believe this is MSN's intent, and because these requests hinge on previous requests which were denied, Ecology will not make these changes.

COMMENT 14, JOHN RADICK:

6. Engine hours for source testing, Condition 3.3.2

Table 4 and Condition 4.4 of the Proposed Order demand that Microsoft source test engines at periodic intervals using a protocol that mandates source testing at six different engine loads, with a minimum of three one hour test runs at each load, and two different test methods for particulate matter. Condition 4.4 defines all of this testing on one engine as a "single testing event." Condition 3.3 .2 of the Proposed Order proposes to allow only 30 hours of engine run time per testing event.

Microsoft requests that Ecology revise Condition 3.3.2 to allow 45 hours per testing event. Source testing experience at other data centers demonstrates that Ecology's requested six load test will require more than 30 hours per generator. A six-load test requires 18 test runs, three runs per load. Each test run is required to be an hour long, which equates to an actual sampling duration of 18 hours per testing event. The 60 minute duration of each run is necessary to ensure that the particulate test captures enough material to accurately represent the emission rate from the engine.

In addition to the actual sampling time, generators require additional runtime during testing for pre-test velocity traversing to create cyclonic flow (2-3 hours), start-up and warm-up of the generator to reach the necessary temperature and stabilization between loads, changing out the Method 5 sampling train between each run, stabilization of the NOx, VOC and CO monitors, recalibration of the monitors when switching loads and cool-down of the generator at the end of the day. If small glitches occur during testing, which is always a possibility, additional unplanned runtime may be needed to adjust and calibrate the gaseous monitors, to fine tune the generator to achieve the load required for each test or to adjust the load bank, among other potential problems.

Actual source test experience documents the truth of these observations. The T-Mobile data center conducted a five-load test in October 2013 which required 35 hours of actual generator runtime. 1 Landau Associates estimates that a six-load test at T-Mobile would have required 42 runtime hours per generator. The Columbia Data Center conducted a five-load source test on one of its generators in May 2013 which lasted 5 days and required 44.2 hours of run time. Some of these hours may be attributable to learning curve delays, but a six-load test requires more hours than a five-load test. Given that the Proposed Order mandates source testing and prescribes a detailed protocol for the performance of these tests it must allow enough engine operating time per testing event to perform the operations required by the permit.

The NOC application for the Oxford Data Center modeled ambient DEEP impacts from engine source testing on the conservative assumption that Microsoft would run each of the 36 2.5 MW generators for 1.25 hours each year for source testing. *See* Microsoft's NOC Supporting Information Report for Project Oxford at Table 1 (Mar. 13, 2014). This equates to 68 hours per engine per triennial testing event.2 Over the 70 year interval studied in the Health Impact Assessment Microsoft modeled roughly 500 more hours of source testing than the proposed 45 hour per test event limit would allow.

To model compliance with the annual NAAQS for NOx and PM2.5 Appendix C of Microsoft's NOC Supporting Information Report calculated the "worst-case 12 month emissions" by assuming that the maximum annual source testing event would consist of testing two generators in any given year with an allocated fuel consumption of 14,299 gallons/year for stack testing; that fuel usage corresponds to 74 hours per testing event for each of the two generators. *See* Microsoft's NOC Supporting Information Report for Project Oxford at App. C, Table 7 (Mar. 13, 2014). The requested source testing allowance of 45 hours pr testing event is considerably less than the conservatively high runtime Microsoft's consultant modeled.

Microsoft also requests that Ecology delete from Condition 3.3.2 the phrase "no more than two generators shall be tested per year, every three years..." This phrase duplicates the source test frequency provisions from Table 4, and it conflicts with Condition 4.4, which requires testing of three generators in the event that a source test shows non-compliance with any emission limit.

Ecology Response:
Microsoft would like to increase engine runtime during testing from 30 hours/year to 45 hours/year. Microsoft requested 30 hours of testing runtime for each engine in the NOC application. The amount of testing runtime for Tier 4 engines may have been underestimated. It is unknown if any Tier 4 engines in the northwest have been tested in a way consistent with the requirements in the Preliminary Determination, so it is not clear whether the Microsoft runtime estimates are reasonable. It is also unclear in the NOC application whether modeling has completely evaluated 45 hours/year for engine testing runtime. The AQP cannot make this change at this time.

COMMENT 15, JOHN RADICK:
7. Purpose of Source Testing, Condition 4.3
Condition 4.3 is confusing, because it suggests that the emission limits in Table 4 are Tier 2 limits. In fact the limits in Table 4 are EPA Tier 4 limits, and the main purpose of the testing is to show that the engines meet the stringent limits in Table 4, not the more lenient Tier 2 limits. The condition would be simpler and provide more valuable information if Ecology deletes the reference to "applicable emission standards for the Tier 2 certified engines" in the first sentence of Condition 4.3. Microsoft requests that Ecology revise the Proposed Order as indicated in the attached red line to clarify the purpose of the testing.

Ecology Response:
Microsoft would like Ecology to clarify the engine emission limits in the permit. The engines at the Microsoft Oxford Data Center are required to meet EPA Tier 4 emission limits. Ecology has revised the Preliminary Determination in several sections to make it clear that the engines must meet Tier 4 limits. This administrative clarification to the preliminary determination does not require an additional public comment period.

COMMENT 16, JOHN RADICK:
8. General Testing and Maintenance Requirements, Condition 4.4
Microsoft requests that Ecology clarify that any re-testing required in the event that a source test shows non-compliance with an emission standard is a *separate* testing event for that engine. Comment 6 above documents that the test runs specified for a single testing event require more than 30 hours of engine run time to perform. Designating the re-test as a second testing event would enable Microsoft to run two tests on the same engine, as required by Condition 4.4, without violating the operating hour limit in Condition 3.3.2.

Ecology Response:
Microsoft would like to consider any repeat test on the same engine as a second testing event. Additional testing runtime was not included in the modeling, and engine testing runtime will not be added by this change. Condition 3.3.2 provides a path for Microsoft to pursue if they find

the need to retest engines and request additional testing runtime hours. Ecology cannot make this change to the permit without further application review.

COMMENT 17, JOHN RADICK:

9. Source Test Intensity, Condition 4.4 and Table 4

Microsoft requests that Ecology reduce the intensity of the source testing requirements in Condition 4.4. Ecology's proposed Condition 4.4 requires Microsoft to test each of the Oxford Data Center engines using two different load methods, a single-load method and a five-load weighted average method to demonstrate compliance with the emission limits in Table 4 of the Proposed Order. These tests are to be performed on two engines within 12 months of startup and then two engines every three years thereafter. Microsoft requests that Ecology reduce the intensity of the testing requirements to test one engine within 12 months of startup and then one engine every three years thereafter.

First, the testing proposed by Ecology is expensive and time-consuming. Six-load testing requires 18 test runs per generator. As indicated in Comment 6 above, the Columbia Data Center underwent five days of testing on one generator in 2013. That was for a five load test, using test methods that do not require recovery of back half particulate emissions. The May 20 13 test cost $84,800.3 A six load test that requires capture of back half particulate will be more costly. Testing two engines at a time obviously would increase the total cost, although there would be savings from shared mobilization costs.

Second, all of the engines of a given capacity are identical. There is no reason to expect that emission rates will vary between two identical off the shelf Caterpillar engines. That is why EPA does not require owners of Subpart 1111 engines to test them at all. The Proposed Order, however, requires Microsoft to test *two* engines in year one and every three years thereafter. The number of EPA five load tests demanded by the Proposed Order is unprecedented. Microsoft has data centers in seven states and the territory of Puerto Rico. None other than Washington require owners of NSPS Subpart IIII engines to source test their engines to show compliance with Subpart IIII emission standards. Ecology has only intermittently required such testing for Washington data centers. Table 1 summarizes the generator testing requirements in other Washington data center permits. Only two other Washington data centers, T-Mobile and Microsoft's Columbia Data Center, are required to perform any five-load weighted average testing. The T -Mobile data center approval order requires two five-load EPA source tests in the first ten years of operation. The Columbia Data Center approval order demands four five load EPA tests in the first ten years of operation. The Proposed Order demands *eight* EPA five load source tests in the first ten years of operation.

Third, the five-load weighted average testing is not necessary to monitor compliance with BACT. Ecology determined BACT for the Oxford Data Center engines to be installation of Tier 2 certified engines. *(See* Proposed Order No. 14AQ-E537 at Table 2a.1). Because Microsoft voluntarily equipped the engines with Tier 4 controls, there is an enormous compliance margin between BACT and the control efficiency of the engines.

Microsoft is not requesting that Ecology delete all five-load weighted average testing from the Oxford Data Center approval order. We do ask that Ecology reconsider the intensity of the proposed testing based on the factors noted above. The red line of the Proposed Order attached to these comments requests no reduction in the frequency of source testing, but that Ecology specify one (rather than two) engines to be tested during each source test event. One test per event, coupled with the requirement in Condition 4.4 to source test three engines in the event of a source test failure, will give Ecology ample assurance that the Oxford engines meet the applicable emission limits.

Ecology Response:
Microsoft is requesting that the AQP change the number of engines to be tested every three years from two to one. Ecology was made aware of this request earlier in the public comment period and the request appears reasonable. It has been proposed that a reduction in the number of engines to be tested every three years would not relax the permit if the total number of engines to be tested was increased and the length of time testing takes place is extended from 10 to 26 years. The Microsoft request does include an emissions increase above what was allowed in the Preliminary Determination. However, it is unclear whether the modeling has adequately addressed this testing runtime operating scenario, and this request should have been addressed during NOC application review. Ecology will not make this change at this time.

COMMENT 18, JOHN RADICK:
10. Recordkeeping and Reporting, Conditions 8 and 9
At the public hearing on July 24, 2014 citizens requested that the permit include recordkeeping and reporting requirements for the operating limits in Section 3. Microsoft supports this request. We propose to add subsections to Conditions 8 and 9 to require Microsoft to document compliance with the operating hour and maximum electrical generation limits in Section 3.

Ecology Response:
Microsoft has requested that the recordkeeping and reporting requirements in the permit be changed consistent with public comment, and has recommended changes to Conditions 8 and 9. The AQP will further evaluate the public comments, and will determine how best to respond to the concerns raised by the public. The AQP agrees that changes to Conditions 8 and 9 should be made, and will consider the Microsoft changes. However, the AQP will revise the Preliminary Determination in a way that will best address public concerns. Changes to include engine operating load rates will be made to Conditions 8 and 9. This administrative clarification to the preliminary determination does not require an additional public comment period.

COMMENT 19, JOHN RADICK:
11. NSPS Recordkeeping Requirements, Condition 8.6
Condition 8.6 lists "Applicable recordkeeping for emergency engines required by 40 CFR Part 60, Subpart IIII." This language poses compliance challenges for data center managers who must interpret and comply with it. Like other EPA regulations Subpart 1111 is dense and full of cross references. It imposes recordkeeping requirements that vary with the age, size and function of the engines. The requirements ofthe Proposed Order will remain in effect for decades, potentially outlasting the consultants and regulators who worked on the language of the Proposed Order.

E. 1-HOUR CO-NAAQS DURING POWER OUTAGE (Ultra-Worst Case 100%)

Original June-2014 Application CO-NAAQS During Facility-Wide Power Outage at 80% Load

Gen Size	Engine Temp	No. of Gens	Lbs/hour	Duration, hours	Subtotal Emissions	Emission Units
2.5 Mwe	Cold Start	32	23.4	0.167	125.0	lbs/hr
	Warmed Up	32	15.04	0.833	400.9	lbs/hr
2.0 Mwe	Cold Start	4	15.7	0.167	10.5	lbs/hr
	Warmed Up	4	10.12	0.833	33.7	lbs/hr
750 kWe	Cold Start	1	5.8	0.167	1.0	lbs/hr
	Warmed Up	1	1.5	0.833	1.2	lbs/hr
Facility-Wide Emissions					572.4	lbs/hr

Cherry-Picked CO-NAAQS During Facility-Wide Power Outage; Ultra-Worst Case at 100% Load

Corrected 1-13-15 for CO black puff factor

Gen Size	Engine Temp	No. of Gens	Lbs/hour	Duration, hours	Subtotal Emissions	Emission Units
2.5 Mwe	Cold Start	32	9.38	0.167	50.1	lbs/hr
	Warmed Up	32	1.44	0.833	38.4	lbs/hr
2.0 Mwe	Cold Start	4	6.16	0.167	4.1	lbs/hr
	Warmed Up	4	0.95	0.833	3.2	lbs/hr
750 kWe	Cold Start	1	1.9	0.167	0.3	lbs/hr
	Warmed Up	1	0.44	0.833	0.4	lbs/hr
Facility-Wide Emissions					96.5	lbs/hr

Exhibit 11

D. 24-HOUR PM2.5 NAAQS (4-GEN ELECTRICAL BYPASS) (Cherry-Picked Maximum 10-75%; max = 10%)

Original June-2014 PM2.5 NAAQS During 4-Gen Electrical Bypass Transformer Maintenance at 80% Load

Gen Size	Engine Temp	No. of Gens	Lbs/hour	Duration, hours	Subtotal Emissions	Emission Units
2.5 Mwe	Cold Start	4	0.42	0.25	0.4	lbs/day
	Warmed Up	4	0.29	23.75	27.6	lbs/day
	Facility-Wide Emissions				28.0	lbs/day

Cherry-Picked PM2.5 NAAQS During 4-Gen Electrical Bypass at 10% Load

Gen Size	Engine Temp	No. of Gens	Lbs/hour	Duration, hours	Subtotal Emissions	Emission Units
2.5 Mwe	Cold Start	4	0.635	0.25	0.6	lbs/day
	Warmed Up	4	0.401	23.75	38.1	lbs/day
	Facility-Wide Emissions				38.7	lbs/day

9.68 lbs/gen/day

Calculate allowable PM2.5 emission rate to just satisfy the 35 ug/m3 PM2.5-NAAQS

NAAQS minus 1 ug/m3 buffer	34.0	ug/m3
Minus regional background	21.0	
Minus "local background" (Oxford cooling towers + Dell + CDC)	0.71	
Allowable PM2.5 increment caused solely by Oxford	12.3	ug/m3
1st-high 24-hr dispersion factor	0.187	(ug/m3)/(facility lbs/day)
Allowable facility-wide PM2.5 emission rate	65.7	facility lbs/day

Target PM2.5 Rate to Meet 34 ug/m3 NAAQS (69.5 lbs/day): Cherry-Picked PM2.5 NAAQS During 4-Gen Electrical Bypass at 10% Load

Gen Size	Engine Temp	No. of Gens	Lbs/hour	Duration, hours	Subtotal Emissions	Emission Units
2.5 Mwe	Cold Start	6.8	0.635	0.25	1.1	lbs/day
	Warmed Up	6.8	0.401	23.75	64.8	lbs/day
	Facility-Wide Emissions				65.8	lbs/day

9.68 lbs/gen/day

Daily generator usage limit = 6.8 gens x 24 hours/day = 163 gen-hours runtime per calendar day.

P:\1409\001\010\WIP\T\Emission Calcs\Preliminary Emissions Provided to Ecology & URS\[Revised-Corrected Cold-Start PM25-Cat-Stoel-Reccomended Emission Calculations 1-15-2015.xlsx]T5-Cherry Pick NAAQS ASIL100%

C. 1-HOUR NO2-NAAQS (4-GEN ELECTRICAL BYPASS) (Cherry-Picked Max 100%)

Original Jun-2014 Application, NOx-NO2 NAAQS During 4-Gen Electrical Bypass Transformer Maintenance at 80% Load

Gen Size	Engine Temp	No. of Gens	Lbs/hour	Duration, hours	Subtotal Emissions	Emission Units
	Cold Start	4	40.95	0.167	27.4	lbs/hr
2.5 Mwe @ 80%	Warmed Up	4	3.37	0.833	11.2	lbs/hr
Facility-Wide Emissions					38.6	lbs/hr

Jun-2014 AERMOD NO2 increment at 38.6 lbs/hr NOx = 160 ug/m3
Allowable NO2 increment to just meet NAAQS = 172 ug/m3
Allowable Plant Site Emission Limit (PSEL) to just meet NAAQS = 38.6 lbs/hr x (172/160) = 42 lbs/hr NOx during 4-generator bypass

Cherry-Picked NOx-NO2 ASIL During 4-Gen Electrical Bypass at 85%-95% Load

Gen Size	Engine Temp	No. of Gens	Lbs/hour	Duration, hours	Subtotal Emissions	Emission Units	
	Cold Start	1	46.8	0.1667	7.8	lbs/hr	10-minute SCR delay at 85% load?
	Warmed Up	1	7.5	0.8333	6.3	lbs/hr	
2.5 Mwe @ 95%	Warmed Up	2	7.5	1	15.0	lbs/hr	
2.5 Mwe @ 85%	Warmed Up	2	5.2	1	10.4	lbs/hr	
Facility-Wide Emissions					39.5	lbs/hr	PSEL Emission < 42 lbs/hr will just meet the NAAQS

Conclusion: Only 3 of the 4 generators can be run at > 85% load during electrical bypass, to keep the NOx emissions below the PSEL of 42 lbs/hr.

TABLE 13
1-HOUR NO_2 NAAQS COMPLIANCE MODELING RESULTS
MICROSOFT PROJECT OXFORD DATA CENTER
QUINCY, WASHINGTON

Modeling Year	1st-Highest 1-Hour NO_2 Concentration (µg/m^3)
2001-2003 Project Oxford-Only (1st-Highest 1-hour)	160
2002-2004 Project Oxford-Only (1st-Highest 1-hour)	160
2003-2005 Project Oxford-Only (1st-Highest 1-hour)	160
1st-Highest 3-Year Average Project Oxford-Only Impact	160
Regional Background	15.6
Local Background (Columbia Data Center, Dell Data Center, and ConAgra Boilers)	0.28
Total NO_2 Impact	176
NAAQS Limit	188

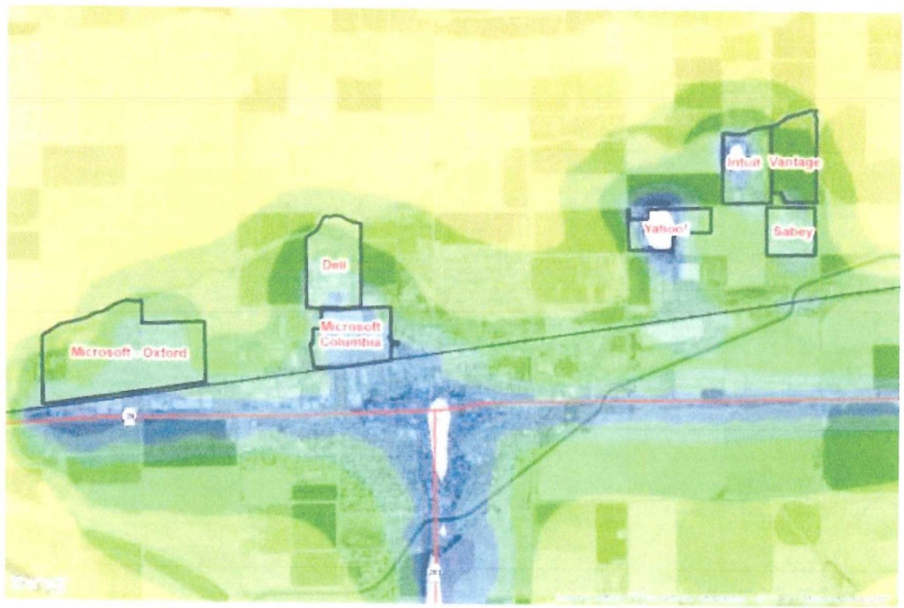
Amway – trains – trucks?

How about old data? 2001 – 2003

Total NO_2 is being increased by Oxford.

Has this been updated?

Exhibit 12



Cumulative Annual DEEP Concentration
(# times ASIL [ASIL = 0.00333 ug/m3])
Model Run - April 2014

<u>COMMENT 6, DANNA DAL PORTO:</u>
I repeat myself in requesting air quality monitoring in Quincy. Our community is adding many industrial facilities, many more trains on the Intermodal, many more trucks and traffic that all raise the background emissions, especially DEEP. Modeling can only go so far in assessing accurate particulates in the air. We need to know and stop guessing about the reality of air quality. Air monitoring is necessary and once again I am requesting permanent air monitoring equipment be installed at Mountain View School and at Lazy Acres, east of town, to provide accurate information on 24/7 air quality levels. I want the emission records to be kept on file with Ecology, validated, reported to the EPA and available to the public in a format that can be reviewed and easily understood.

Ecology Response:
Ecology is aware of Ms. Dal Porto's interest in monitoring and cause and effect studies for the Quincy area ambient air. At Ecology's March 2014 Monitoring Advisory Committee {MAC) this issue was discussed. It was determined during the March meeting that due to limited staffing and fiscal resources as well as the low impacts to the community, air quality monitoring studies cannot be conducted in the area at this time.

Exhibit 13

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Appendix C: Public Hearing, July 9, 2015

- Hearing Agenda
- Sign in Sheet
- Transcripts from the Hearing

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July 9, 2015
Public Hearing Agenda
Microsoft's Proposed Revisions to the
Oxford Data Center Air Quality Permit

DEPARTMENT OF
ECOLOGY
State of Washington

For assistance in Spanish please see **Greg Bohn**, Spanish Interpreter, Water Quality, Program, Ecology

5:00 – 5:30 *Meet and Greet*
Informal opportunity to learn about project, meet Ecology and Microsoft staff, and view poster boards of project and process.

Introductions
Hearings Officer: **Victoria Leuba**, Water Resources Program, Ecology
Meeting Facilitator: **Beth Mort**, Air Quality Outreach and Education, Ecology

5:30– 5:40 *Presentation: Oxford Data Center Revisions Overview*
Matt Cohen, Stoel Rives, Representing Microsoft

5:40 – 5:50 *Presentation: Ecology's Process*
Gary Huitsing, Air Quality Engineer, Ecology

5:50 – 6:00 *Presentation: Air Quality and Human Health*
Gary Palcisko, Toxicologist, Air Quality, Ecology

6:00 – 6:25 *Question and Answer Session*
This is an open forum to ask questions about this project. During the formal hearing, Ecology and Oxford will not be able to respond to comments made for the record, so please ask any questions requiring an immediate response during this time.

Panel members:
Karen Wood, Air Quality Section Manager, Ecology
Gary Huitsing, Senior Air Quality Engineer, Ecology
Gary Palcisko, Toxicologist, Air Quality, Ecology
Matt Cohen, Stoel Rives, Representing Microsoft

6:30pm *Formal Hearing*
During the formal hearing, we will be taking comments for the formal record. No response can be given tonight, but a written responsiveness summary will be available on our website 30 days after closing date.

Ecology will be taking comments for this project until July 13th, 2015.
Please send all comments to Beth Mort at 4601 N. Monroe, Spokane, WA 99205.
Comments may also be faxed to (509) 329-3529 or emailed to Beth at beth.mort@ecy.wa.gov.

ECOLOGY PUBLIC HEARING
Sign-In Sheet

DEPARTMENT OF ECOLOGY State of Washington

Subject: Draft Revisions for Microsoft's Oxford Data Center Air Quality Permit

Location: Quincy Community Center, 115 F Street SW, Quincy, WA **Date: July 9, 2015**

PLEASE PRINT

Name	Representing	Address	City, State	Zip	Telephone	E-mail	Will you testify? Yes/No	
JONATHAN SMITH	GRANT COUNTY EDC	6594 PATTON BLVD NE	MOSES LAKE, WA	98837	509-764-6579	jonathan@grantedc.com	YES	1
SEAN WASHBURN	MICROSOFT	811 COUNTRY AVE NE	QUINCY WA	98848	206-498-3600	seanwas@microsoft.com	NO	
NICK PARKER	PORT OF QUINCY	840 F ST SW	QUINCY, WA	98848	509-787-3715	NICK@PORTOFQUINCY.ORG	NO	
BRETT MUHLESTEIN	MICROSOFT	3551 HUNDLEY RD	CLE ELUM, WA	98922	425-765-5681	SBMUHLES@MICROSOFT	NO	
Irene Plenefisch	Microsoft	One MSFT Way	Redmond WA	98052	425 705 6673	irenep@microsoft.com	NO	
Gigi Lowry	Microsoft	9418 Yakima Lane	Quincy, WA	98848	—	gigil@microsoft.com	No	
Danna DalPorto	MYTAPN	16651 Rd 3 NW	Quincy, WA	98848	509-989-7444	dkdp44@gmail.com	Yes	2
Patricia Martin	MYTAPN	617 H St. SW	Quincy, WA	98848	(509) 787-4275	martin@nwi.net	Yes	3
Curt A Morris	Port of Quincy	840 F St. S.W.	Quincy, WA	98848	509 787-3715	CAMORRIS@martinmorris.com	No	
Jack Eaton		1214 1st St.	Wenatchee	98801	509 888 2913		NO	
Mark Johnson	Vantage	2181 M St NE	Quincy WA	98801	509-470-2085	mjohnson@vantagedatacenters.com	NO	
Scott Carr	City of Quincy	205 W. Sixth Ave	Ritzville WA	99169	509-659-1366		NO	
Jim Hemberry	City of Quincy	510 M ST SW	Quincy, WA	98848	509-787-3523	jhemberry@quincywashington.us	YES	4

Page _____ of _______

ECOLOGY PUBLIC HEARING
Sign-In Sheet

DEPARTMENT OF ECOLOGY
State of Washington

Subject: Draft Revisions for Microsoft's Oxford Data Center Air Quality Permit

Location: Quincy Community Center, 115 F Street SW, Quincy, WA

Date: July 9, 2015

PLEASE PRINT

Name	Representing	Address	City, State	Zip	Telephone	E-mail	Will you testify? Yes/No
Jill FitzSimmons	QVPR		Quincy		787-4511	editor@qvpr.com	NO
Debbie Koehnen	community	PO Box 185	Quincy WA	98848	787-3676	mdfek87@yahoo.com	Yes 5
TERRY LEAS	BBCC	7662 Chanute St. NE	MOSES LAKE	98837	793-2001	TERRYL@Bigbend.edu	NO
Mick Qualls	QAL	3975 DODSON	EPHRATA	98823	787-4210 x 16	mqualls@[illegible]	NO
Lisa Karstetter	YAHOO!						
Tom Flint	GCPUD	5442 Rd 2 NW	Ephrata	98823	787-2003	tomFlint1@yahoo.com	6 yes 6
CATHY FLINT	FLINT FARMS	5842 Rd 2NW	EPHRATA	98823	787-2003	cathflint1@yahoo.com	

Page _____ of _______

Hearing sign-in sheet.doc
6/24/15

WASHINGTON STATE DEPARTMENT OF ECOLOGY

DATE ______

ATTENDANCE REGISTER

NAME Jim Hemberry
Please Print

ADDRESS ______

CITY ______ STATE/ZIP ______

ORGANIZATION ______

If you would like to make public comment, please indicate. ☐

ECY 010-32 (4/92)

4

WASHINGTON STATE DEPARTMENT OF ECOLOGY

DATE July 9 2015

ATTENDANCE REGISTER

NAME JONATHAN SMITH
Please Print

ADDRESS 6594 PATTON BLVD NE

CITY MOSES LAKE STATE/ZIP WA 98837

ORGANIZATION GRANT COUNTY EOC

If you would like to make public comment, please indicate. ☑

ECY 010-32 (4/92)

1

WASHINGTON STATE DEPARTMENT OF ECOLOGY

DATE 7-9-15

ATTENDANCE REGISTER

NAME DANNA DAL PORTO
Please Print

ADDRESS 16651 Rd 3NW

CITY Quincy STATE/ZIP 98848

ORGANIZATION MYTAPN

If you would like to make public comment, please indicate. ☒

ECY 010-32 (4/92)

2

WASHINGTON STATE DEPARTMENT OF ECOLOGY

DATE July 9, 2015

ATTENDANCE REGISTER

NAME Patricia Martin
Please Print

ADDRESS 617 H St. SW

CITY Quincy STATE/ZIP 98848

ORGANIZATION MYTAPN

If you would like to make public comment, please indicate. ☑

ECY 010-32 (4/92)

3

WASHINGTON STATE DEPARTMENT OF ECOLOGY

DATE

ATTENDANCE REGISTER

NAME Tom Flint
Please Print

ADDRESS

CITY STATE/ZIP

ORGANIZATION

If you would like to make public comment, please indicate. ☐

ECY 010-32 (4/92)

6

WASHINGTON STATE DEPARTMENT OF ECOLOGY

DATE

ATTENDANCE REGISTER

NAME Debbie Koehnen
Please Print

ADDRESS

CITY STATE/ZIP

ORGANIZATION

If you would like to make public comment, please indicate. ☐

ECY 010-32 (4/92)

5

Transcripts from July 9, 2015 public hearing

Anywhere the transcription company misspelled names or acronyms, the corrected spelling has been put in parentheses next to the misspelling.

Department of Ecology Meeting 7/9/2015 - 15070905

00:00:04	Victoria Leuba: So I'm Victoria Leuba, hearings officer for this evening's hearing. So we're here to conduct a hearing on the amendments to the air quality permit for the Oxford Data Center. Let the record show that it's 6:32 p.m. on Thursday, July 9th, and this hearing is being held in the Quincy Community Center at 115 F Street SW in Quincy. In addition to the notices of the hearing -- in addition, notices of the hearing were posted in Quincy at 14 locations, email notices were sent to 115 people, 19 Twitter and text alert subscribers were notified, and a news release was issued on May 14th.
00:00:53	Notice was also published as a legal advertisement on the 28th of May in the Quincy Valley Post-Register both in English and in Spanish. When I call your name, please step forward to this microphone, state your name and address for the record. We'll begin with Jonathan Smith. Jonathan Smith? I'm going to set that for five minutes, and when it runs out, you'll know.
00:01:25	Jonathan Smith: So I've got five whole minutes. I've got some good jokes written here -- no, Jonathan Smith with the -- address is 1604 E. Truman Dr, Moses Lake, Washington, and just want to thank the opportunity to be able to make comment on this permit. And my comment is that I think it's very proactive. Microsoft decided that they wanted to hold themselves to a higher standard. It shows also accountability. The generators that they put in are a higher standard than what is typically used in data centers of this kind. They just meet a higher threshold for removing particulates and things out of the air.
00:02:07	And then also I believe that they were very proactive; as soon as they recognized, hey, wait, this permit says we're at 10, 80, 100, whatever those things were, and we might be doing something different, they addressed that thing right away and said, you know, we recognize that there's something in this permit that's, you know, not in line, so very proactive, very responsible that way. Advised by Ecology to do this through another open, public forum like this, and they took that route. Very responsible in doing that because the permits meet the requirements of all of the state and national worst-case scenarios.
00:02:46	And then I appreciated that the comment was made earlier about how a worst-case scenario could never be achieved because a worst case scenario for each of the particulates or each of the pollutants, so to speak, occurs at a different low level, running that generator, and you can't get the maximum amount of pollutants in one category if it's running at 50% that you could in 100, and so very -- I want to say very responsible and very accountable of Microsoft to say, what is the very

worst thing that could happen in the entire world, and do we meet the threshold if that happens?

00:03:25 Are we still being safe and are we still being responsible and are we still being good citizens to not just Quincy but to the environment and to the community, because the -- because it's impossible to actually do what the permit says they're allowed to do. I mean, you just physically can't run the generators that way, and so -- but they held themselves to a high standard and the accountability and responsibility and proactiveness and transparency of the whole process is something that we appreciate. I also work for the Economic Development Council, and so we encourage business growth, but first and foremost, I live in the community, and I am a citizen of the community.

00:04:05 And we represent the community to businesses. We do not represent businesses to the community. And so it's very gratifying to see a business that has the community's best interests at heart and holds itself to a high standard and does everything possible that it can to meet and exceed all of the state and federal requirements for human health and safety in its projects. And that's all I have. I even had two minutes left.

00:04:41 Victoria Leuba: Before we get to the next testimony, we have a correction for the press release on the project was May 27th, not previously stated date. Testimony from Dana DelPuerto (Danna Dal Porto). Please remember to state your name, any organization you represent, and your address.

00:05:05 Dana DelPuerto (Danna Dal Porto): I've got a little [indistinct]. Can I use this?

Victoria Leuba: Absolutely. I can share.

Dana DelPuerto (Danna Dal Porto): Thank you. My name is -- [indistinct]. Thank you very much.
Dana DelPuerto (Danna Dal Porto), 16651 Road Three NW, Quincy, Washington. Yeah, there's a bunch of things that I would like to discuss.

00:05:33 And I'm afraid I have questions as part of my thing, and so I'm going to put those in as part of my public comment. One of the comments or questions I have is that in terms of discussing these engines, we've discussed emergency engines. My understanding is that how can you use emergency as a descriptor for these diesel generators when that descriptor is not recognized? It's an EPA designation is not recognized in the state of Washington. So I'd like to have some of that clarified.

00:06:06 I think you can use "backup," but you can't use "emergency." As far as the proposed legal definitions or questions, so my reading of it says condition number one under proposed legal issues, 3.3.2 and 4.4, you want to allow fewer hours for source testing than required because you want to implement different source result? So you don't want to -- you want to reduce hours of testing. So when you get down to the second condition, 4.4, you want to mand-- you're saying that you don't want to do, mandate these costly and time-consuming source testings because they want to document compliance with EPA performance standards.

00:06:59 Is that because you would be required to measure filterable and condensable emissions, therefore making you a major source, not a minor source? Item number three, you want to limit these engines to three speci-- you don't want to limit these engines to three specific load levels, and that would ignore your need to run these engines to assure security for your power supply.

00:07:27 When John Radich (Radick) talked about load in the comments for the original permit, he made comment number 10, page number 13. He says that it is important to specify that load means the electrical load as opposed to the mechanical load. That's not the way I understood load at all. When I look at this fact sheet from Caterpillar, it's talking about engine load. It's talking about the mechanical load on that diesel generator.

00:08:03 So I don't understand, if you are talking about load, are you talking about how hard the engine is working, how much RPM, so to speak that this engine is using? Why is John Radich (Radick) referring to it as an electrical load? I tried to make an analogy with a car. So you put the car in first gear and you rev it up, and then you shift it into second gear and you rev it up. You're increasing the speed of your car, but you're also changing the RPMs by changing the gear that you're using. Is that what he's meaning by electrical load?

00:08:40 I really would like to have that clarified. What really is interesting is that this has never been an issue with any other data center, including Microsoft Columbia. So all of a sudden you have this big load issue, but we've had six other data permits granted, but this load has never been brought up. So why is it being brought up now? On the fourth point of the appeal, it says you don't want to maintain a record for your reason of operating for each of these 37 engines.

00:09:14 Well, my question is what else do you have to do? Your servers run themselves. The Economic Development Council has said through the media that there are 1,000 people being employed by the data centers. Certainly you can have one of those people keep track of engines' operation. I would like -- I've been requesting at every meeting that we have access to the operational records of the data centers, and that has not been available to us. So I would disagree with your appeal of number four.

00:09:55 There were some other things in the permit. There was a Landau report from December of '14, which would've been post-permit, that table C15 that says these items were "cherry-picked" for receiving data for estimates. How can somebody who's supposed to be technically competent use the term "cherry-picked" in terms of using data for a formal report? So I would like to have an answer from Microsoft on that.

00:10:34 Every time I have one of these meetings, I request actual monitors in Quincy. Everything that you're hearing has been done by a computer model. They don't have any kind of the little machines sitting out by the side of the data center or over by Mountain View sucking up the air and telling us what we really have in terms of emissions.

00:10:52 Victoria Leuba: That's just to let you know you've had five minutes.

00:10:54 Dana DelPuerto (Danna Dal Porto): I told you I'd go over.

00:10:56 Woman: You have two minutes, because he didn't use…

Dana DelPuerto (Danna Dal Porto): Oh, okay. I'm almost done. Anyway, I want some monitors. I've been told by Ecology every single time that they're too expensive. I don't understand why, if we have -- we're all the way up to 46 cancers in a million people. That's more than anybody -- we have more diesel generators in this town than any other city in Washington State. 198, 7? And I don't know if everybody knows, but as part of the budget that was just passed, we're going to get some more.

00:11:32 We might get as many as 6 more. So we're going to have -- if we have 6 and we have 35 diesel generators per thing, and everybody's going to expand, we're going to have a lot -- we're going to have a lot of generators here. We need monitors. This modeling is ridiculous. And the other thing is I would like to challenge every single meteorological assumption, because Ecology uses weather from Moses Lake. Moses Lake is not Quincy. It does not have the contour of the land, it does not have the backup of the mountains, it does not have the weather off of the river.

00:12:07 And so every time they're talking about meteorological information for this -- for all of these data centers, they're using information that is flawed. So that's what I have. Thank you very much.

00:12:27 Victoria Leuba: Patricia Martin.

Patricia Martin: That's me. How are you?

Victoria Leuba: I'm good, and you?

Patricia Martin: Do you remember me from years ago?

Victoria Leuba: Of course. Do you want this?

00:12:35 Patricia Martin: Oh, no, that's fine. Well, I'm very intimidated by those things. All right, so first I'd just like to clarify a couple things that Dana (Danna) brought up that didn't really get discussed, is, one, Microsoft actually appealed their permit when it was issued last year, and that's what has reinvigorated this discussion on the permit. This wasn't something that was just an amendment. This was a challenge to the permit as it was issued last year.

00:13:01 And I also wanted to clarify something that Dana (Danna) brought up about emergency engines. The state of Washington does not recognize the emergency engine exemption, okay? This federal rule for emergency engines has been adopted into the WAC 173-400-930, but I -- was not adopted into the federally enforceable state implementation plan, so it's not a federally enforceable -- actually, let's do this again. It's federally enforceable to apply back (BACT) to all sources and -- the emergency exemption is not recognized. We've had that discussion many times.

00:13:45 And I'm going to hold to that. The state of Washington has a more stringent definition for ambient air than the federal definition. When the -- Ecology responded to my question about ambient air, they gave a definition that EPA has crafted that says something about, you know, the fence line or where people have access -- the public has access. Ambient air by definition under the state is the outside surrounding air. So it's the point you have a source, the air that's around that source is the ambient air, and that's the point at which the National Ambient Air Quality Standards must be compliant.

00:14:21 Not at the fence line. So as the data centers come in and they buy these huge pieces of property and then you're modeling and you're looking at ambient air at the fence line, that is not an appropriate mechanism for satisfying the compliance with the National Ambient Air Quality Standards. I raised the issue of common control before. I'm going to raise that issue again. That will be in my comments again. This is an issue of common control. Microsoft has both the Columbia data center and the Oxford Center.

00:14:55 By definition, it's considered in the same industrial classification. It is also adjacent for purposes of the act. I have several questions. I would like to know -- it's mentioned in the response and in the permit -- no, not in the permit. It's mentioned in the response to comments that the tier 4 engines were required by Microsoft, but it never says why, okay? Now, this could be that Microsoft has agreed that these are not emergency engines and they're going to comply with the intent of the law, which is that back (BACT) with -- the tier 4 engines would be required.

00:15:38 Or it could be, just possibly, that Microsoft needed to use these controls because Microsoft at this point would be a major facility at the Oxford Center. So my question is, would Oxford have been a major facility if it wasn't using the catalyzed DPF SCRs? You answered the question about the loads. In the permit, you're requiring method 5 or method 200-1-A for compliance testing the engines against the NSPS, or at least that's the implication. And the National -- or the New

Source Performance Standards requires both condensable and filterable, which would require method 202.

00:16:28 Do Ecology and Microsoft include emissions, the NOCs (NOx), the VOCs, and any particulate from Amway's boilers? Dana (Danna) has one of the documents, and they mention ConAgra, Dell, and the Columbia Data Center, but Amway is there, and they have boilers, and that's a production of NOCs (NOx), and we are very, very, very, very close to failing the one-hour NO2 standard.

00:17:00 I also would like to know if the Oxford engines can meet the tier 4 NSPS of 0.03 grams per kilowatt hour for particulate matter. That's the filterable plus condensable with the controls they're installing. Some of the numbers that I looked at seem to suggest that maybe even with the tier 4 engines, they can't meet the New Source Performance Standard. I also would like to know where in the regulations is the five-load weighted average of engine emissions. Where is the citation for where those can be used? And my question of common control, if this is an issue of common control, which I will argue it is, then the NSPS not only applies to Oxford, but it applies to -- for the Columbia Data Center as well, which would imply that they would also have to use tier 4 engines. Thank you.

[exclamations as timer goes off]

00:18:03 Victoria Leuba: Jim Hemberry.

[indistinct cross-talk]

00:18:17 Jim Hemberry: Good evening, I'm Jim Hemberry. I'm the mayor of your city of Quincy. I live at 510 M Street SW. I had a nice little speech ready to go, and then Jonathan stole a lot of the things I was going to say. I do want to echo the things that Jonathan said. I think Microsoft is being very responsible in their permitting process, and I certainly support their efforts. One of the things I kind of was going to refer to was some of the things that are benefits of having the data centers here, but I think that goes back on overall data center activity, not just the Oxford project.

00:18:47 So in closing, I'm just going to keep mine nice and short for you. After reviewing all of the documentation, I support Ecology's approval and recommendation and their determination that there will be no adverse effects on our community.

00:19:08 Victoria Leuba: Debbie Corn?

Debbie Canan (Koehnen): Canan.

[indistinct cross-talk]

00:19:27 Debbie Canan (Koehnen): I'm Debbie Canan (Koehnen) at 11443 Road P NW, and I'm representing the human face out there that actually lives here in Quincy. And I just wanted to tell you some stuff. I actually have MS, a rare form of it called Devic's. And the nice thing -- well, it attacks my optic nerve and my spinal column. Yay, it doesn't attack my brain; good job. But my body can still fall apart. And the really sad thing about Devic's is that the majority of those people, many of them die from respiratory failure. So you know I'm that person that everybody's talking about with respiratory problems. I'm at risk.

00:20:02 And also I've worked for Quincy School District for 23 years. This year in my class of 21 kids, I had 5 of them with inhalers. That's, you know, 25% of my class with inhalers. One child was so bad that he missed 27 days of school. That's 30% -- well, actually 33. It's a third, 33% of the school. Wow. No, wait, the number's wrong. 20%, almost 20%. But still, would you have a job if you missed 20% of your days because you were sick? Doubtful.

00:20:40 So I'm representing not just the cancers people but the other people, the respiratory-problem people. So I had tough year, and, you know, really wanted to think about what makes me happy. And what makes me happy is being outside. So I spent a lot of time this year outside, starting last fall. Outside. [indistinct] because my mom died, and so she was born in Quincy. She, you know, went to school here. When she went away to college, she got married. They had another career, but she came back. They came back when my sister was a senior in high school.

00:21:17 So she -- they've lived here ever since, in this-- in this area. And so when we were looking at her life, we looked at -- health changes in her life, progress here, things -- how Quincy's changed. Because we talked about that at the funeral. And then that made me look at my life and the progress and what's changed. When I've been here, I've been living here for 25 years. I was born here, but since I was an adult, 25 years. So my family likes movies. And every time -- especially my husband.

00:21:46 And when a movie comes, gets a little piece of paper with a number on it, says put this number in, and, wow, you can watch it on any of your technological devices that you have anywhere you go. And then my family's also into books, and especially my daughter. Summer reading program, I push it hard. Go to the library, wow, you can get two free books, e-books or something. I'd love for the summer reading program -- one for like teenage and one for adults. So if you haven't done that, you can do that.

00:22:13 Very cool. So we can read more. But where do these things go when you put in that number? They go here to Quincy. Everywhere, people do that. They go here to Quincy. Data storage centers, they're storing all of our data. That's what they store. It's a great thing, but it's a big business. And it's only going to get bigger. Pretty soon we're not going to have a little silver disc. They're just going to send us the number. Publishers aren't going to spend all that money to publish books. They're just going to go on e-books. Why would you do that if you had to spend money if you could just send a piece of thick paper and the computer?

00:22:45 So that's kind of -- it's -- two weeks ago, the school district wanted a levy. We need more schools. You know, the city of Quincy, our tax base is going to go up. I just about fell off the couch when I saw how much they projected our tax base was going to go up by the year 2018. Is that true? Is this really true? But since we're going to get six data storage centers coming up, probably. Also this week, the -- you know, all the people employed. Wow, is that true? Wow. High school graduates are making more getting out of high school, I guess, than I am with my 23 years of teaching. Wow.

00:23:26 Wow, is that really true? You know, but what are the drawbacks of this progress? Because, you know, when I looked at my mom's life, there were always drawbacks to that progress. So it's a love/hate relationship. Here's some of the drawbacks. My insurance company, Premera Blue Cross hacked. People might have access to my stuff. Intuit, right here, hacked. I feel bad for those people. They thought this was those [indistinct] right there. American Airlines this week, [indistinct]. Oooh, got to hate that.

00:23:55 New York Stock Exchange -- I didn't even -- I didn't hear what happened to that, but it was down. I took my husband to the hospital, medical records, we needed to get them, right? Oh, that was before we put it online. We don't have it on the computer. So we don't have access to that. I'm thinking, really, before you had computers, you sent someone down to the basement and get it. But now since we have computers, we can't do that. It has to be online or we don't have it. And then the last one -- I'm going to talk for a couple more seconds because he was fast.

00:24:21 The fire evacuation. When we had to evacuate these fires, I did not realize that now that people don't have landlines, when they go to get those people out of those houses, they don't know. They have to knock on the doors because everybody has their cell phone, and the cell phones aren't attached to your address. So now there's a system on the computer, you have -- if you have -- don't have a landline, get in there, put your address in there, and then if there's evacuation, they'll notify you. But guess where that stuff is? Quincy data storage centers. It's a computer thing. They're saving all your information for you, good and bad.

00:24:57 Here's what I'd like to say, because I spend so much time outside, I'm looking at the quality of our sky and smoke ring, smog ring around Quincy. And I wish I'd started taking pictures way back when the first data storage center came, because then I would have the, you know, litmus test or whatever it's called to show how it's getting -- being affected and how awful it is. Colockum Ridge, ,Frenchman Hills, [indistinct], the smog line that they used to have only in Los Angeles, but it's in Seattle, and then now we're getting it here. Somebody must be taking data. What does that look like?

00:25:32 I wish it would be here from Quincy, the data, not from someplace else. The bad (BACT), the cost considerations, are you seriously still using the economic visibility? If you have plans to expand and expand and expand, you probably are making some money there and you probably want to maybe protect our environment, our air, our people. When people look back at you, what is your environmental footstep going to look like? Because that's what I did when my mom died. I went back. What does Microsoft and all these people in Ecology, what do you want your environmental footstep to look like? And then not just the risk of cancer, but all the people like me who has a respiratory problem.

00:26:14 It doesn't look like you're using the Microsoft parent company as the lump sum of the emissions, but you're looking at each facility for the emissions, the total maximum, and I'm afraid that you're going to set a precedent, it sounds like we already have, for a loophole where, geez, I want to build a new facility but I know I'm very close to the top; I'll just give it a new name, and now I can go over my emissions for -- because at the first meeting, I thought they said that companies were going to have to stay under a maximum emission.

00:26:47 I would love that overlay. There's no overlay, again, of the whole thing. So I'd love that map to be included. With -- I know Microsoft went to those really cool engines. Thank you so much. But now that we're moving on here, I wish they'd grandfather in -- put those -- you know, retrofit those old generators at Columbia to help keep those overall emissions down. And last summer we had a -- there was a proposal to use less water, but that leave higher emissions. I'm not sure we ever addressed that ever. So I'd really like to know how that affected the air quality input.

00:27:27 Here's my last thing. Worst-case scenario: who would've ever thought that we'd have a crack in our dam? What if we hadn't caught that and it had gone? That's where we get all of our electricity. So that little [indistinct] space, I know they said they could transfer it someplace else in the world or state or whatever, but worst-case scenarios, they might happen. It's a good thing they caught that, otherwise we probably wouldn't have as much electricity right now. So I think that ends my presentation, proposal, whatever. Thank you very much.

00:28:02 Victoria Leuba: Tom Flint.

[indistinct cross-talk]

00:28:28 Tom Flint: All right. I'm Tom Flint, 5842 Road 2 NW, Ephrata, Washington. I want to thank you for the opportunity to testify tonight. I'm a Grant County PUD commissioner and also a farmer. And my experience with the data centers have been very good. They've been very professional and very proactive in everything that they've done. And there may be some debate here about generators, but in my world, they're emergency generators. And with our PDP and with the Ecology, the maps, and specifically the Washington State Particulate Matter map and the DEP map, when all these generators in operation, it hardly makes a difference.

00:29:32 So from my perspective, knowing that we have a reliability factor of 99.9% power in Grant County, these are emergency generators. I know they need to be exercised, but I don't think they're going to be used very much. And in addition to that, most all the data centers have redundant line service to them which even makes it more reliable. So my conclusion, I support Microsoft's Oxford Data Center air quality permit, and I look forward to hearing more about this. Thank you.

00:30:24 Victoria Leuba: Is there anyone else who would like to provide testimony for the record tonight? I remind you that testimony will be accepted in writing through the 13th of July. You can send those comments to Beth Mort at the Washington State Department of Ecology, 4601 N Monroe Street in Spokane, Washington. Her phone number and address are also on the literature that's available on the table. All testimony received at this hearing and all written comments received or postmarked by July 13, 2015 will be part of the official hearing record for this amendment to the permit.

00:31:08 Ecology will send notice about the availability of the response to comments to everyone that provided written comments or oral testimony on this permit amendment, everyone that signed in for today's hearing and provided an email address, and other interested parties or agencies on the mailing list for this draft permit. The response to comments will, among other things, contain the agency's response to questions and issues of concern that were raised during the public comment period. If you would like to receive notice about availability of the response to comments and did not sign in for the meeting, please see me after this hearing.

00:31:47 The next step is to consider the comments and make a determination whether to issue the amendment. Ecology's Air Quality Program and Karen Wood will look at the public comments, the response to comments, other appropriate documentation and staff recommendations and will make a decision about adopting the permit amendments. Currently Ecology's expecting to issue an amended permit for the Oxford Data Center around August 10th.

00:32:12 I don't see Karen looking confused by that, so I think that's correct. If we can be of further help to you, please do not hesitate to ask or you can contact Beth Mort if you have other questions. On behalf of the Department of Ecology, thank you for coming. I appreciate your cooperation and your courtesy. Let the record show that this hearing is adjourned at 7:00p.m.

[end of recording]

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Appendix D:
Redline Documents

Redline documents display the edits made to the original drafts of the Technical Support Document and the Preliminary Determination (now the Approval Order), which were provided for public review during the Public Comment Period.

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~~TECHNICAL SUPPORT DOCUMENT~~
~~FOR PRELIMINARY DETERMINATION OF APPROVAL ORDER NO. XX~~
~~MICROSOFT MWH DATA CENTER~~

TECHNICAL SUPPORT DOCUMENT
APPROVAL ORDER NO. 17AQ-E002
MICROSOFT MWH DATA CENTER

1. PROJECT DESCRIPTION

On January 27, 2014, Ecology received a Notice of Construction (NOC) application submittal from the Microsoft Corporation (Microsoft~~)~~), the permittee, requesting approval for a permit application for ~~phases~~Phases 1 and 2 of a new facility originally named the Oxford Data Center (Oxford) located at Industrial Park #5, west of Road R NW at the end of Port Industrial Parkway in Quincy, WA.

The NOC application was determined to be incomplete, and an incompleteness letter was issued on February 26, 2014. A revised NOC application was received on March 17, 2014, and the application was considered complete on June 3, 2014. After a public comment period from ~~6/~~June 19~~/~~, 2014, through ~~7/~~July 29~~/~~, 2014, with a hearing and public meeting held in Quincy on ~~7/~~July 24~~/~~, 2014, Approval Order 14AQ-E537 was issued on August 15, 2014. Microsoft appealed the permit on September 1, 2014. Microsoft worked with Ecology through the NOC application process to address the concerns of their appeal and withdrew their appeal on September 22, 2015, before the appeal hearing date scheduled for January 2016.

On December 11, 2014, Ecology received ~~a Notice of Construction (~~an NOC~~)~~ application submittal from ~~the~~ Microsoft ~~Corporation (Microsoft)~~ requesting revisions to Approval Order 14AQ-E537. The NOC application was determined to be incomplete, and on January 7, 2015, Ecology issued an incompleteness letter to Microsoft. On February 2, 2015, Microsoft provided a revised NOC application to Ecology. The application was considered complete on March 17, 2015. Ecology provided a public comment period from ~~5/~~May 18~~/~~, 2015, through ~~7/~~July 13~~/~~, 2015, with a hearing and public meeting held in Quincy on ~~7/~~July 9~~/~~, 2015. Ecology received comments during the comment period and Ecology prepared responses to the comments. In September 2015, Ecology was prepared to issue the comments along with Approval Order 15AQ-E609 to replace Approval Order 14AQ-~~-~~E537, but at Microsoft's request, Ecology did not issue the permit. Microsoft informed Ecology of additional changes that the facility was making from what was previously requested. Microsoft informed Ecology they were going to request those additional changes in another NOC application.

On January 13, 2016, Ecology received ~~a Notice of Construction (~~NOC~~)~~ application submittal from the Microsoft Corporation (MSN) requesting revisions to Approval Order 14AQ-E537 (dated August 15, 2014), for the newly named MWH Data Center (FKA: Oxford) located at Industrial Park #5, west of Road R NW at the end of Port Industrial Parkway in Quincy, WA. The NOC application was determined to be incomplete, and on March 10, 2016, Ecology issued an incompleteness letter to Microsoft. On April 13, 2016, Ecology received a revised NOC application from Microsoft, with supplementary materials provided on September 9, 2016. The NOC application was considered complete on September 20, 2016.

The following information comprises the legal description of the facility provided by the applicant:

LOTS 2, 3, 4, 5, AND TRACT A, AMENDED PORT DISTRICT INDUSTRIAL PARK NO. 6 BINDING SITE PLAN, ACCORDING TO THE BINDING SITE PLAN THEREOF FILED IN VOLUME 2 OF BINDING SITE PLANS, PAGES 64 AND 65, RECORDS OF GRANT COUNTY, WASHINGTON. FARM UNITS 216 AND 217, IRRIGATION BLOCK 73, OXFORD BASIN PROJECT, ACCORDING TO THE PLAT THEROF FILED NOVEMBER 29, 1951, RECORDS OF GRANT COUNTY, WASHINGTON. STARTING AT THE NORTHWEST CORNER OF SAID FARM UNIT 216, IRRIGATION BLOCK 73, THE TRUE POINT OF BEGINNING, THENCE 173 (feet) EAST ALONG THE NORTH LINE OF SAID FARM UNIT; THENCE 242 FEET SOUTH OF A LINE PERPENDICULAR TO THE NORTH LINE OF SAID FARM UNIT; THENCE WEST 173 FEET; THENCE NORTH 242 FEET TO THE TRUE POINT OF BEGINNING.

In the revised permit, Ecology has concluded that this project has satisfied all NOC requirements including those regarding second tier analysis for two toxic air pollutants (TAPs) (diesel engine exhaust particulate ~~or~~ (DEEP~~,~~) and nitrogen dioxide (NO_2~~).~~)). The previous Approval Order (14AQ-E537) is rescinded and replaced entirely with this Approval Order~~ (#TBD).~~.

MWH will contain four ~~phase~~Phase 1 activity zone (AZ) buildings designated AZA, AZB, AZC, AZD, four core network room (CNR) buildings, an administrative building, and four ~~phase~~Phase 2 activity zone buildings designated AZA, AZB, AZC, AZD. MWH ~~phases~~Phases 1 & 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.

Each cooling tower has four cells and four fans. Each of the eight activity zone building will have four cooling towers for a total of thirty~~ ~~-two (32) SPX-Marley model MD5008PAF2 cooling towers. Each of the thirty~~ ~~-two individual cooling towers has a design recirculation rate of 950 gallons per minute (gpm) and an ~~air flow~~airflow rate of 143,600 cubic feet per minute (cfm).

~~1.1~~1.1. Potential to Emit for Criteria Pollutants and ~~Toxic Air Pollutants (~~TAPS~~)~~

Table 1 contains potential to emit (PTE) estimates. To achieve these emissions levels as listed in the permit, the permit requires that each engine must be equipped with selective catalytic reduction (SCR) and catalyzed diesel particulate filter (DPF) air pollution controls to meet the emission requirements of EPA Tier 4 engines.

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Table 1. Potential To Emit For Phases 1 & 2 (TPY)			
Pollutant	**Emission Factor**	**Facility Potential to Emit**	**References**
Criteria Pollutants	**Units = g/kW-hr (except where noted)**	**(TPY)**	(a)
NO_x	(0.67) and Caterpillar based emission factors	33.0	(b),(e)
VOC	(0.19) and Caterpillar based emission factors	1.033	(a),(b),(e)
CO	(3.5) and Caterpillar based emission factors	7.3	(b)
$PM_{2.5}$	(0.03) and Caterpillar based emission factors (See note j for cooling towers)	3.8	(b),(j)
PM_{10}	NA (See note j for cooling towers)	13.6	(f),(j)
SO_2	15 ppm	0.069	(c)
Lead	NA	Negligible	(d)
Ozone	NA	NA	(e)
Toxic Air Pollutants (TAPS)	**Units = ~~lbs~~lb/MMBTU (except where noted)**		(a)
Primary NO_2	(0.67 g/Kw-hr) and Caterpillar based emission factors.	3.3	(b),(h)
Ammonia	15ppmv	1.14	(b),(g)
Diesel Engine Exhaust Particulate (DEEP)	(0.03 g/kW-hr) and Caterpillar based emission factors	0.814	(b),(f)
Carbon monoxide	(3.5 g/kW-hr) and Caterpillar based emission factors	7.3	(b)
Sulfur dioxide	15 ppm	0.069	(c)
Benzene	7.76E-04	3.5E-03	(i)
Toluene	2.81E-04	1.3E-03	(i)
Xylenes	1.93E-04	8.6E-04	(i)
1,3 Butadiene	3.91E-05	1.8E-04	(i)
Formaldehyde	7.89E-05	3.5E-04	(i)
Acetaldehyde	2.52E-05	1.1E-04	(i)
Acrolein	7.88E-06	3.5E-05	(i)
Benzo(a)Pyrene	2.57E-07	1.2E-06	(i)
Benzo(a)anthracene	6.22E-07	2.8E-06	(i)
Chrysene	1.53E-06	6.9E-06	(i)
Benzo(b)fluoranthene	1.11E-06	5.0E-06	(i)
Benzo(k)fluoranthene	2.18E-07	9.8E-07	(i)
Dibenz(a,h)anthracene	3.46E-07	1.6E-06	(i)
Ideno(1,2,3-cd)pyrene	4.14E-07	1.9E-06	(i)
Napthalene	1.30E-04	5.8E-04	(i)
Propylene	2.79E-03	1.3E-02	(i)
Fluoride	0.31 mg/L	4.8E-03	(j)
Manganese	0.03 mg/L	4.6E-04	(j)
Copper	0.01 mg/L	1.6E-04	(j)
Chloroform	0.0004 mg/L	2.6E-04	(k)
Bromodichloromethane	0.0004 mg/L	2.6E-04	(k)
Bromoform	0.0105 mg/L	6.9E-03	(k)

(a) The list of EPA criteria pollutants that have related National Ambient Air Quality Standards (NAAQS). VOC is not a criteria ~~-~~pollutant but is included here per note (e). Toxic Air Pollutants (TAPs) are defined as those in WAC 173-460. Greenhouse gas is not a criteria pollutant or a TAP and is exempt from minor New Source Review requirements per WAC 173-400-110(5)(b).
(b) Potential to Emit (PTE) estimates are based on one or more of the following: manufacturer 5-load final Tier 4 compliant engine test data (for NOx, VOC, CO, and PM2.5), Caterpillar test data, 1.20 safety factor, and applicable cold start (CS) factors for catalyst warm-up periods and black puff factors from California Energy Commission's *Air Quality Implications of Backup Generators in California"* CEC-500-2005-049; July 2005 (see section 2.1.2).
(c) Applicants estimated emissions based on fuel sulfur mass balance assuming 0.00150 weight percent sulfur fuel.
(d) EPA's AP-42 document does not provide an emission factor for lead emissions from diesel-powered engines. Lead emissions are presumed to be negligible.
~~(e)~~ Ozone is not emitted directly into the air, but is created when its two primary components, volatile organic compounds (VOC) and oxides of nitrogen (NOx), combine in the presence of sunlight. *Final Ozone NAAQS Regulatory Impact Analysis EPA-452/R-08-003,*
(e) March 2008, Chapter 2.1. ~~http://www.epa.gov/ttnecas1/regdata/RIAs/452_R_08_003.pdf~~ http://www.epa.gov/ttnecas1/regdata/RIAs/452_R_08_003.pdf
(f) All PM emissions from the generator engines ~~is~~are considered $PM_{2.5}$, and all $PM_{2.5}$ from the generator engines is considered DEEP.
(g) Based on 15 parts per million volume-dry (ppmvd) emission factor and facility operating parameters. ~~.~~
(h) NO2 is assumed to be 10% of total NOx emitted.
(i) EPA AP-42 § 3.3 or 3.4 from: Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors ~~http://www.epa.gov/ttn/chief/ap42/.~~http://www.epa.gov/ttn/chief/ap42/.
(j) Trace metals in city industrial wastewater as provided in application for cooling tower emissions. Total particulate matter from cooling towers based on the following study: *Calculating Realistic PM10 Emissions from Cooling Towers", Reisman and Frisbie, Environmental Progress, July 2002.*
(k) Concentration in cooling tower makeup water as provided in application for cooling tower emissions.

~~1.2~~1.2. Maximum Operation Scenarios Based on Final Tier 4 Compliant Engines

Cold start adjustment factors are used to approximate the additional emissions from cold engines burning off the accumulated fuel and crankcase oil on cold cylinders. The VOC cold start factor adjustments for these calculations are provided below:

VOC Black Puff Cold-Start Adjustment Factors				
Load	Spike Area (ppm-sec)	Steady-State Area (ppm-sec)	Total Area (ppm-sec)	Black Puff Factor
10%	6300	27000	33300	1.189
80%	6300	18000	24300	1.259
100%	6300	18000	24300	1.259

The CO cold start factor adjustments for these calculations are provided below:

CO Black Puff Cold-Start Adjustment Factors				
Load	Spike Area (ppm-sec)	Steady-State Area (ppm-sec)	Total Area (ppm-sec)	Black Puff Factor
10%	15000	18000	33000	1.455
80%	15000	12000	27000	1.556
100%	15000	12000	27000	1.556

A ~~NOx~~NO_X cold start factor of 1.0 was assumed because California Energy Commission tests (see "*Air Quality Implications of Backup Generators in California*" CEC-500-2005-049; July 2005); do not show short~~-~~-term ~~NOx~~NO_X spikes during cold starts.

Other cold-start related adjustments were also included in the application to account for heat-up times for catalysts in the add-on controls (see ~~section~~Section 4 regarding add-on controls) listed below~~:~~.

Catalyst Delay Cold Start Adjustment		
Control Device	Applicability	Adjustment

SCR catalyst and DPF oxidation catalyst	• Cold start under idle load (less than or equal to 10%) for VOC, CO, and ~~NOx~~ NO_X	15 minutes at emission levels equivalent of generator equipped with Tier 2 level emission controls followed by final Tier 4 compliant emissions
	• Cold start under high load for VOC, CO, and NO_X	10 minutes at emission levels equivalent of generator equipped with Tier 2 level emission controls followed by final Tier 4 compliant emissions

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~~catalyst~~		~~Tier 2 level emission controls followed by final Tier 4 compliant emissions~~
	~~• Cold start under high load for VOC, CO, and NOx~~	~~10 minutes at emission levels equivalent of generator equipped with Tier 2 level emission controls followed by final Tier 4 compliant emissions~~

Ecology also asked Microsoft to demonstrate compliance with the NAAQS during a worst-year scenario with the following set of assumptions:

- All primary emergency generators operating for 256 hours in the single worst-case year (three times the permitted 3-year rolling value of 86 hours per year).
- All reserve emergency generators operating for 120 hours for scheduled testing in the single worst-case year (three times the permitted 3-year rolling value of 40 hours per year).
- Commissioning of 18 generators in the single worst-case year.
- Conducting four stack emission test in the single worst-case year.

Although this scenario is unlikely and would only occur in one year, Microsoft has shown that the facility emissions would still comply with the NAAQS (See Section 5 of this TSD).

2. APPLICABLE REQUIREMENTS

The proposal by Microsoft 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 MWH Data Center is regulated by the requirements specified in:

~~2.1~~2.1. Chapter 70.94 Revised Code of Washington (RCW), Washington Clean Air Act,

~~2.2~~2.2. Chapter 173-400 Washington Administrative Code (WAC), General Regulations for Air Pollution Sources,

~~2.3~~2.3. Chapter 173-460 WAC, Controls for New Sources of Toxic Air Pollutants, and

~~2.4~~2.4. 40 CFR Part 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ* (* See section 3.4.2)

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.

~~2.4.1~~2.4.1. Support for permit Approval Condition 2.1 regarding applicability of ~~40CFR~~40 CFR Part 60 Subpart IIII:

As noted in the applicability section of 40CFR1039 (part 1039.1.c), that regulation applies to non-road compression ignition (diesel) engines and; *(c) The definition of nonroad engine in 40 CFR 1068.30 excludes certain engines used in stationary applications.* According to the definition in 40CFR1068.30(2)(ii): *An internal combustion engine is not a nonroad* *engine if it meets any of the following criteria: The engine is regulated under 40 CFR part 60, (or otherwise regulated by a federal New*

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Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. 7411)). Because the engines at MWH are regulated under 40CFR60 subpart IIII (per 40CFR60.4200), they are not subject to 40CFR1039 requirements except as specifically required within 40CFR60.

Some emergency engines with lower power rating are required by 40CFR60 to meet 40CFR1039 Tier 4 emission levels, but not emergency engines with ratings that will be used at MWH (0.750 MWe, 2.0 MWe, and 2.5 MWe). Instead, 40CFR60 requires the engines at MWH to meet the Tier 2 emission levels of 40CFR89.112 (see section 4 with respect to add-on controls). The applicable sections of 40CFR60 for engine owners are pasted below in italics with bold emphasis on the portions requiring Tier 2 emission factors for emergency generators such as those at MWH:

§60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

> *(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in*
>
> *§60.4202* (see below), *for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.*

(Note: Based on information provided by the applicant, MWH will use the following engines specifications: August, 2013 Caterpillar Model C27ATAAC rated 0.75 MWe; February~~,~~ 2013 Caterpillar Model 3516C-TA rated 2.0 MWe; November 2012, Caterpillar Model 3516C-HD-TA rated 2.5 MWe. Based on these specifications, the 0.750 MWe engine has 27.03 liters displacement over 12 cylinders, or 2.25 liters per cylinder; the 2.0 MWe engines have 69.00 liters displacement over 16 cylinders, or 4.31 liters per cylinder; and the 2.5 MWe engines have 78.08 liters displacement over 16 cylinders, or 4.88 liters per cylinder. Thus, because the specified engines at MWH will all have a displacement of less than 30 liters per cylinder, and are for emergency purposes only, they are required to meet *§60.4202* manufacturer requirements listed below).

§60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?

> ~~*(a)*~~ *(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power* ***less than or equal to 2,237 KW*** *(3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (a)(1) through (2) of this section.*
>
> ~~*(1)*~~ *(1) For engines with a maximum engine power less than 37 KW (50 HP):*

~~(i)~~ (i) *The certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants for model year 2007 engines, and*

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~~(ii)~~ (ii) The certification emission standards for new nonroad CI engines in 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, 40 CFR 1039.115, and table 2 to this subpart, for 2008 model year and later engines.

(2) For engines with a maximum engine power greater than or equal to 37 KW (50 HP), the certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants beginning in model year 2007.

(Note: Thus, as outlined in previous note, and based on the power ratings listed in *40 CFR 60.4202(a)*, the 0.75 MWe and 2.0 MWe engines at MWH are required to meet the applicable ~~40CFR89~~40 CFR 89 Tier 2 emission standards.)

~~(b)~~ (b) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power ***greater than 2,237 KW*** *(3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (b)(1) through (2) of this section.*

~~(1)~~ (1) For 2007 through 2010 model years, the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.

(2) For 2011 model year and later, the certification emission standards for new nonroad CI engines for engines of the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants.

(Note: Thus, as outlined previously, and based on the power ratings listed in *40 CFR 60.4202(b)*, the 2.5 MWe engines at MWH are required to meet the applicable 40CFR89 Tier 2 emission standards.)

~~2.4.2~~2.4.2. Support for permit Approval Condition 1.2 regarding applicability of 40 CFR 60.4211(f):

The emergency engine generators approved for operation by the Order are to be used solely for those purposes authorized for emergency generators under 40 CFR 60, Subpart

~~I~~III. The permit allows emergency use consistent with 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. Operating generators for uses beyond what is allowed in Approval Condition 1.2 goes beyond the intended use of emergency generators for data center back-up power only. Approval Condition 1.2 is consistent with the provisions of other data center permits in Quincy.

~~1.2 goes beyond the intended use of emergency generators~~

Support for ~~data center back-up power only.~~ **Approval Condition** ~~1.2 is consistent with the provisions of other data center permits in Quincy.~~

~~2.4.3~~**2.4.3.** ~~Support for Approval~~ **8.5.3. This Condition** ~~8.5.3. This Condition is~~ **is required for the following reasons (but not necessarily limited to these reasons only):**

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Recording the reason for operating engines is consistent with the provisions of other data center permits in Quincy. In order to demonstrate compliance with 40 CFR 60.4211(f), this Approval Condition requires that Microsoft record the reason for operating the engines at the MWH Data Center (including for emergency use). In addition to demonstrating compliance ~~40CFR60~~40 CFR 60.4211(f), this condition is also required to show compliance with Approval Conditions 1.2 and 3.2., and because of its importance to Ecology and the Quincy community. Condition 8.6.3 simplifies recording the purpose of engine use to recording only the following reasons for operating: EMERGENCY SITUATIONS, STACK TESTING, COMMISSIONING, MAINTENANCE CHECKS, READINESS TESTING, DEVIATION OF VOLTAGE OR FREQUENCY, or UNSPECIFIED NON-EMERGENCY SITUATIONS. ~~40CFR60~~40 CFR 60.4211(f)(2), allows up to

100 hours of engine operation per calendar year. Per ~~40CFR60~~40 CFR 60.4211(f)(3), up to 50 hours of engine operation per calendar year of "UNSPECIFIED NON-EMERGENCY SITUATIONS" can be used, but those hours must be borrowed from the 100 hours allowed under 40CFR60.4211(f)(2).

2.4.4. Support for complying with 40 CFR 63 Subpart ZZZZ from Section 3 of TSD:

~~2.4.4~~ According to section 40 CFR 63 Subpart ZZZZ section 636590 part (c) and (c)(1), sources such as this facility, are required to meet the requirements of 40 CFR 60 IIII and "*no further requirements apply for such engines under this* (40 CFR 63 Subpart ZZZZ) *part.*"

3. SOURCE TESTING

Source testing requirements and test method options outlined in Table 4 of the Approval Order requires a five-load test for PM, ~~NOx~~NO_X, CO, and VOC. PM is considered to be DEEP at size $PM_{2.5}$ or smaller, which tests only for the filterable particulate matter to be consistent with California Code of Regulations § 93115.14 *ATCM for Stationary CI Engines – Test Methods* (measuring front half particulate only).

Ecology is including a conditional test method (CTM) option for ammonia in the permit, because it is an EPA method (EPA CTM-027) that Ecology considers a viable test option to review performance of SCR catalyst beds and ammonia injection (slip).

Ecology also includes the partial dilution probe method from ~~40CFR1065~~40 CFR 1065 as an option. Use of this test more closely simulates the test that manufacturers are required to use to meet NSPS requirements, and will potentially reduce testing time compared to other test options. By reducing testing time, engine emissions from stack testing will be reduced.

For this permit, engine selection testing will be determined as follows:

~~**3.1 NEW ENGINE STACK TESTING:**~~

3.1. New Engine Stack Testing

Because Microsoft can utilize multiple engine manufacturer and make options, Conditions 4.2 and 4.3 require testing of at least one engine from each manufacturer and each size engine from each manufacturer, immediately after commissioning any new proposed engine. These

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conditions apply in addition to the testing Microsoft has performed on existing engines already installed at the time of this permit. Because Microsoft tested multiple 2.5 MWe engines in 2016, Ecology did not require additional 2.5 MWe engine testing except for at least one reserve engine as described in Condition 4.4.9. In addition, Ecology is requiring that at least one 2.0 MWe engine and the 0.75 MWe engine be tested within 12 months of the date of the permit.

~~PERIODIC STACK TESTING:~~

3.2. Periodic Stack Testing

~~3.2~~

Every 60 months after the first testing performed starting with engines tested after the date of this permit, 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.

~~3.3 AUDIT SAMPLING~~

3.3. Audit Sampling

According to Condition 4.2, audit sampling per 40 CFR 60.8(g), may be required by Ecology at their discretion. Ecology will not require audit samples for test methods specifically exempted in 40 CFR 60.8(g) such as Methods, 7E, 10, 18, 25A, and 320. For non-exempted test methods, according to 40 CFR 60.8(g):

"The compliance authority responsible for the compliance test may waive the requirement to include an audit sample if they believe that an audit sample is not necessary."

Although Ecology believes that audit sampling is not necessary for certified engines, Ecology may choose at any time to require audit sampling for any stack tests conducted. Audit sampling could include, but would not necessarily be limited to, the following test methods: Methods 5, 201A, or 202.

4. ~~4.~~ SUPPORT FOR BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

As noted in Condition 2.2 of the Approval Order, 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. Ecology does not consider this control equipment to be Best Available Control Technology (BACT) at MWH because of the reasons outlined in this section. BACT cost estimates were updated as of April 2016.

> BACT is defined[1] as "*an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of the "best available control technology" result in emissions of any pollutants which*

~~[1] RCW 70.94.030(7) and WAC 173-400-030(12)~~

[1] RCW 70.94.030(7) and WAC 173-400-030(12).

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will exceed the emissions allowed by any applicable standard under 40 CFR Part 60 and Part 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.

For this project, Ecology is implementing the "top-down" approach for determining BACT for the proposed diesel engines. The first step in this approach is to determine, for each proposed emission unit, the most stringent control available for a similar or identical emission unit. If that review can show that this level of control is not technically or economically feasible for the proposed source (based upon the factors within the BACT definition), then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.~~[2]~~.[2] The "top-down" approach shifts the burden of proof to the applicant to justify why the proposed source is unable to apply the best technology available. The BACT analysis must be conducted for each pollutant that is subject to new source review.

The proposed diesel engines and/or cooling towers will emit the following regulated pollutants which are subject to BACT review: nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide~~.~~ (SO_2). BACT for toxics (tBACT) is included in Section 4.5.

~~**4.1 BACT ANALYSIS FOR NOx FROM DIESEL ENGINE EXHAUST**~~

4.1. BACT Analysis for NO_X from Diesel Engine Exhaust

Microsoft reviewed EPA's RACT/BACT/LAER Clearinghouse (RBLC) database to look for controls recently installed on internal combustion engines. The RBLC provides a listing of BACT determinations that have been proposed or issued for large facilities within the United States, Canada, and Mexico.

4.1.1. ~~*4.1.1*~~ BACT ~~*Options*~~options for ~~*NOx*~~NO_X

Microsoft's review of the RBLC found that urea -based selective catalytic reduction (SCR) was the most stringent add-on control option demonstrated on diesel engines. The application of the SCR technology for ~~NOx~~NO_X control was therefore considered the top-case control technology and evaluated for technical feasibility and cost-effectiveness. The most common BACT determination identified in the RBLC for ~~NOx~~NO_X control was compliance with EPA Tier 2 standards using engine design, including exhaust gas recirculation (EGR) or fuel injection timing retard with turbochargers. Other ~~NOx~~NO_X control options identified by Ecology through a literature review include~~:~~ selective non-catalytic reduction (SNCR), non-selective catalytic reduction (NSCR), water injection, as well as emerging technologies. Ecology reviewed these options and addressed them below.

[2] J. Craig Potter, EPA Assistant Administrator for Air and Radiation memorandum to EPA Regional Administrators, "Improving New Source Review (NSR) Implementation", December 1, 1987.

~~[2] J. Craig Potter, EPA Assistant Administrator for Air and Radiation memorandum to EPA Regional Administrators, "Improving New Source Review (NSR) Implementation", December 1, 1987.~~

4.1.1.1. ~~*4.1.1.1*~~ Selective ~~*Catalytic Reduction.*~~ catalytic reduction

The SCR system functions by injecting a liquid reducing agent, such as urea, through a catalyst into the exhaust stream of the diesel engine. The urea reacts with the exhaust stream converting nitrogen oxides into nitrogen and water. SCR can reduce ~~NOx~~NO_X emissions by approximately 90 percent.

For SCR systems to function effectively, exhaust temperatures must be high enough (about 200 to 500°C) to enable catalyst activation. For this reason, SCR control efficiencies are expected to be relatively low during the initial minutes after engine start up, especially during maintenance, testing, and storm avoidance loads. Minimal amounts of the urea-nitrogen reducing agent injected into the catalyst does not react, and is emitted as ammonia. Optimal operating temperatures are needed to minimize excess ammonia (ammonia slip) and maximize ~~NOx~~NO_X reduction. SCR systems are costly. Most SCR systems operate in the range of 290°C to 400°C. Platinum catalysts are needed for low temperature range applications (175°C~~—~~–290°C); zeolite can be used for high temperature applications (560°C); and conventional SCRs (using vanadium pentoxide, tungsten, or titanium dioxide) are typically used for temperatures from 340°C to 400°C.

Microsoft has evaluated the cost effectiveness of installing and operating SCR systems on each of the proposed diesel engines. Assuming no direct annual maintenance, labor, and operation costs, the analysis indicates that the use of SCR systems would have a lower cost range of approximately $12,000 to $16,000 per ton of ~~NOx~~NO_X removed from the exhaust stream each year; or higher, if taking into account California Area Resource Board (CARB) estimated operation, labor, and maintenance costs, which could potentially be up to $423,000 per year. If SCR is combined with a Tier 4 capable integrated control system, which includes SCR, as well as control technologies for other pollutants such PM, CO, and VOC (see ~~section~~Section 4.3), the cost estimate would be approximately $24,000 to $33,700 for ~~NOx~~$NO_X$ alone or $20,000 to $28,800 per ton of combined pollutants removed per year.

Ecology concludes that while SCR is a demonstrated emission control technology for diesel engines, and preferred over other ~~NOx~~NO_X control alternatives described in subsection 4.1.1.3., it is not economically feasible for this project. Furthermore, although NOx is a criteria pollutant, the only ~~NOx~~NO_X that currently have NAAQS is NO_2. Cost per ton removal of NO_2 is an order of magnitude more expensive than for ~~NOx~~NO_X, and is addressed under tBACT in ~~section~~Section 4.5.

Therefore, Ecology agrees with the applicant that this ~~NOx~~NO_X control option can be excluded as BACT (both as SCR alone and as part of Tier 4 capable integrated control system, which includes a combination of SCR with other control technologies for other pollutants).

4.1.1.2. Combustion ~~*Controls*~~controls, Tier 2 ~~*Compliance*~~compliance, and ~~*Programming Verification.*~~programming verification

Diesel engine manufacturers typically use proprietary combustion control methods to achieve the overall emission reductions needed to meet applicable EPA tier standards. Common general controls include fuel injection timing retard, turbocharger, a low-temperature aftercooler, use of EPA Tier-2 certified engines operated as emergency engines as defined in 40 CFR §60.4219, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII. Although it may lead to higher fuel consumption, injection timing retard reduces the peak flame temperature and resulting NOx emissions. While good combustion practices are a common BACT approach, for the MWH Data Center engines however, a more specific approach, based on input from Ecology inspectors after inspecting similar data centers, is to obtain written verification from the engine manufacturer that each engine of the same make, model, and rated capacity installed at a facility use the same electronic Programmable System Parameters, i.e., configuration parameters, in the electronic engine control unit. These BACT options are considered further in ~~section~~Section 4.1.2.

4.1.1.3. Other ~~*Control Options.*~~ control options

Other ~~NOx~~NO_X control options listed in this subsection were considered but rejected for the reasons ~~*4.1.1.3.*~~specified:

4.1.1.3.1. Selective ~~*Non-Catalytic Reduction*~~ non-catalytic reduction (SNCR~~):~~)

~~*4.1.1.3.1.*~~ This technology is similar to that of an SCR but does not use a catalyst. Initial applications of Thermal DeNOx, an ammonia based SNCR, achieved 50 percent ~~NOx~~NO_X reduction for some stationary sources. This application is limited to new stationary sources because the space required to completely mix ammonia with exhaust gas needs to be part of the source design. A different version of SNCR called ~~NOxOUT,~~NO_XOUT uses urea, and has achieved 50~~-~~–70 percent ~~NOx~~NO_X reduction. Because the SNCR system does not use a catalyst, the reaction between ammonia and ~~NOx~~NO_X occurs at a higher temperature than with an SCR, making SCR applicable to more combustion sources. Currently, the preferred technology for back-end ~~NOx~~NO_X control of reciprocating internal combustion engine (RICE) diesel applications~~,~~ appears to be SCR with a system to convert urea to ammonia.

4.1.1.3.2. Non-~~*Selective Catalytic Reduction*~~selective catalytic reduction (NSCR~~):~~)

~~*4.1.1.3.2.*~~ This technology uses a catalyst without a reagent and requires zero excess air. The catalyst causes ~~NOx~~NO_X to give up its oxygen to products of incomplete combustion (PICs), CO, and hydrocarbons, causing the pollutants to destroy each other. However, if oxygen is present, the PICs will burn up without destroying the ~~NOx.~~NO_X. While NSCR is used on most gasoline automobiles, it is not immediately applicable to diesel engines because diesel exhaust oxygen levels vary widely depending on engine load. NSCR might be more applicable to boilers. Currently, the preferred technology for back-end ~~NOx~~NO_X control of reciprocating internal combustion engine (RICE) diesel applications~~,~~ appears to be SCR with a system to convert urea to ammonia. See also Section 4.2.1.3 (Three-Way Catalysts).

4.1.1.3.3. Water ~~*Injection:*~~ injection

~~*4.1.1.3.3.*~~ Water injection is considered a ~~NOx~~NO_X formation control approach and not a back-end ~~NOx~~NO_X control technology. It works by reducing the peak flame temperature and therefore reducing ~~NOx~~NO_X formation. Water injection involves emulsifying the fuel with water and increasing the size of the injection system to handle the mixture. This technique has minimal affect on CO emissions but can increase hydrocarbon emissions. This technology is rejected because there is no indication that it is commercially available and/or effective for new large diesel engines.

4.1.1.3.4. Other ~~*Emerging Technologies:*~~ emerging technologies

~~*4.1.1.3.4.*~~ Emerging technologies include~~: NOx~~ NO_X adsorbers, RAPER-~~NOx~~NO_X, ozone injection, and activated carbon absorption.

- ***~~NO_x~~NO_X* Adsorbers:** ~~NO_x~~ NO_X adsorbing technologies (some of which are known as ~~$SCONO_x$~~$SCONO_X$ or EMx[GT]) use a catalytic reactor method similar to SCR. ~~$SNONO_x$~~ $SNONO_X$ uses a regenerated catalytic bed with two materials, a precious metal oxidizing catalyst (such as platinum) and potassium carbonate. The platinum oxidizes the NO into NO_2, which can be adsorbed onto the potassium carbonate. While this technology can achieve ~~NO_x~~NO_X reductions up to 90~~%~~ percent (similar to an SCR), it is rejected because it has significantly higher capital and operating costs than an SCR. Additionally, it requires a catalyst wash every 90 days, and has issues with diesel fuel applications, (the GT on EMx[GT] indicates gas turbine application). A literature search did not reveal any indication that this technology is commercially available for stationary backup diesel generators.

- **Raper-~~*NO_x*:~~NO_X:** This technology consists of passing exhaust gas through cyanic acid crystals, causing the crystals to form isocyanic acid, which reacts with the ~~NO_x~~NO_X to form CO_2, nitrogen, and water. This technology is considered a form of SNCR, but questions about whether stainless steel tubing acted as a catalyst during development of this technology, would make this another form of SCR. To date, it appears this technology has never been offered commercially.

- **Ozone Injection:** Ozone injection technologies, some of which are known as LoTOx or BOC, use ozone to oxidize NO to NO_2 and further to NO_3. NO_3 is soluble in water and can be scrubbed out of the exhaust. As noted in the literature, ozone injection is a unique approach because while ~~NO_x~~NO_X is in attainment in many areas of the United States (including Quincy, WA), the primary reason to control ~~NO_x~~NO_X is ~~because~~that it is a precursor to ozone. Due to high additional costs associated with scrubbing, this technology is rejected.

- **Activated Carbon Absorption with Microwave Regeneration~~.~~:** This technology consists of using alternating beds of activated carbon by conveying exhaust gas through one carbon bed, while regenerating the other carbon bed with microwaves. This technology appears to be successful in reducing ~~NO_x~~NO_X from diesel engine exhaust. However, it is not progressing to commercialization and is therefore rejected.

4.1.2. ~~4.1.2.~~ BACT determination for ~~NO_x~~NO_X

Ecology determines that BACT for ~~NO_x~~NO_X is the use of EPA Tier-2 certified engines operated as emergency engines as defined in 40 CFR§60.4219, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII. In addition, 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. “Installed at the facility” could mean at the manufacturer or at the data farm because the engine manufacturer service technician sometimes makes the operational parameter modification/correction to the electronic engine controller at the data farm. Microsoft will install engines consistent with this BACT determination. Ecology believes this is a reasonable approach in that this BACT requirement replaces a more general, common but related BACT requirement of “good combustion practices.”

Note: Because control options for PM, CO, and VOCs, are available as discussed in BACT ~~section~~Section 4.2., which are less costly per ton than the Tier 4 capable integrated control system option for those pollutants, both the SCR-only option as well as the Tier 4 capable integrated control system option are not addressed further within BACT.

~~4.2~~4.2. BACT ~~ANALYSIS FOR~~Analysis for PM, CO ~~AND~~, and VOC ~~FROM DIESEL ENGINE EXHAUST~~from Diesel Engine Exhaust

Microsoft reviewed the available published literature and the RBLC and identified the following demonstrated technologies for the control of ~~particulate matter (~~PM~~), carbon monoxide (~~, CO~~)~~, and ~~volatile organic compounds (~~VOC~~)~~ emissions from the proposed diesel engines:

4.2.1. BACT ~~*Options*~~options for PM, CO, and VOC from diesel engine exhaust

~~*4.2.1.*~~4.2.1.1. Diesel ~~*Engine Exhaust*~~particulate filters

~~*4.2.1.1 **Diesel Particulate Filters (DPFs).***~~ These add-on devices include passive and active DPFs, depending on the method used to clean the filters (i.e., regeneration). Passive filters rely on a catalyst while active filters typically use continuous heating with a fuel burner to clean the filters. The use of DPFs to control diesel engine exhaust particulate emissions has been demonstrated in multiple engine installations worldwide. Particulate matter reductions of up to 85~~%~~ percent or more have been reported. Therefore, this technology was identified as the top case control option for diesel engine exhaust particulate emissions from the proposed engines.

Microsoft has evaluated the cost effectiveness of installing and operating DPFs on each of the proposed diesel engines. The analysis indicates that the use of DPFs would cost approximately $304,000 to $352,000 per ton of engine exhaust particulate removed from the exhaust stream at MWH each year. DPFs also remove CO and VOCs at costs of approximately $76,000 to $131,000 and $440,000 to $614,000 per ton per year respectively. If the cost effectiveness of DPF use is evaluated using the total amount of PM, CO, and VOCs reduced, the cost estimate would be approximately $53,500 to $82,900 per ton of pollutants removed per year.

~~$82,900 per ton of pollutants removed per year.~~

These annual estimated costs (for DPF use alone) provided by Microsoft are conservatively low estimates that take into account installation, tax, and shipping capital costs but assume a lower bound estimate for operational, labor and maintenance costs of $0, whereas an upper bound CARB estimate could potentially amount to an additional $282,000/year.

~~$0, whereas an upper bound CARB estimate could potentially amount to an additional~~

~~$282,000/year.~~

Ecology concludes that use of DPF is not economically feasible for this project. Therefore, Ecology agrees with the applicant that this control option can be rejected as BACT.

4.2.1.2. Diesel ~~Oxidation Catalysts.~~ oxidation catalysts

~~4.2.1.2.~~This method utilizes metal catalysts to oxidize carbon monoxide, particulate matter, and hydrocarbons in the diesel exhaust. Diesel oxidation catalysts (DOCs) are commercially available and reliable for controlling particulate matter, carbon monoxide, and hydrocarbon emissions from diesel engines. While the primary pollutant controlled by DOCs is carbon monoxide, DOCs have also been

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demonstrated to reduce diesel engine exhaust particulate emissions, and ~~also~~ hydrocarbon emissions.

Microsoft has evaluated the cost effectiveness of installing and operating DOCs on each of the proposed diesel engines. The following DOC BACT cost details are provided as an example of the BACT and tBACT cost process that Microsoft followed for engines within this application (including for SCR-only, DPF-only, and Tier 4 capable integrated control system technologies).

- Microsoft obtained the following recent DOC equipment costs from a vendor on November 11, 2013: ($52,100 for a stand-alone catalyzed DOC per single 2.~~5MWe~~5 MWe generator; add scaled amounts of $25,299 for a single 0.750 MWe generator, and $45,571 for four 2.0 MWe generators). For forty (40) 2.~~5MWe~~5 MWe generators, four (4) 2.~~0MWe~~0 MWe generators, and one (1) 0.750 MWe generators, this amounts to $2,291,585. According to the vendor, DOC control efficiencies for this unit are CO, HC, and PM are 90%, 80%, and 20~~%~~%, respectively.

- The subtotal becomes $2,555,117 after accounting for shipping ($114,579), WA sales tax ($148,953), and direct on-site installation ($63,878).

- After adding indirect installation costs, the total capital investment amounts to~~:~~ $3,092,383. Indirect installation costs include but are not limited to~~:~~ startup fees, contractor fees, and performance testing.

- Annualized over 25 years and included with direct annual costs based on EPA manual EPA/452/B-02-001, the total annual cost (capital recovery and direct annual costs) is estimated to be $321,639.

- At the control efficiencies provided from the vendor, the annual tons per year (tpy) of emissions for CO (11.6 tpy), HC (2.26 tpy), and PM (3.07 tpy) become 10.4 tpy, 1.8 tpy, and 0.61 tpy removed, respectively.

- The last step in estimating costs for a BACT analysis is to divide the total annual costs by the amount of pollutants removed ($321,639 divided by 10.4 tpy for CO, etc~~.).~~.).

The corresponding annual DOC cost~~-~~-effectiveness value for ~~carbon monoxide~~CO destruction alone is approximately $30,800 to $40,500 per ton. If ~~particulate matter~~PM and hydrocarbons ~~are~~were individually considered, the cost~~-~~-effectiveness values would be equal to or exceed $524,000 and $178,000 per ton of pollutant removed annually, respectively. If the cost~~-~~-effectiveness of using DOC is evaluated using the total amount of ~~carbon monoxide, particulate matter~~CO, PM, and hydrocarbons reduced, the cost estimate would be approximately $25,000 to $40,500 per ton of pollutants removed per year.

These annual estimated costs (for DOC use alone) provided by Microsoft are conservatively low estimates that take into account installation, tax, shipping, and other capital costs as mentioned above, but assume a lower bound estimate for operational, labor and maintenance costs of $0, whereas an upper bound CARB estimate could potentially amount to an additional $28,000 per year.

Ecology concludes that use of DOC is not economically feasible for this project. Therefore, Ecology agrees with the applicant that these control option can be rejected as BACT.

4.2.1.3. ~~4.2.1.3~~ Three-~~Way Catalysts.~~way catalysts

Three~~-~~-way catalyst (TWC) technology can control CO, VOC, and ~~NOx~~ NO_X in gasoline engines. However, Ecology concludes that a three-way catalyst is not feasible for this project and can be rejected as BACT based on a review of the following literature~~[3].~~:[3]

> "The TWC catalyst, operating on the principle of non-selective catalytic reduction of NOx by CO and HC, requires that the engine is operated at a nearly stoichiometric air to- fuel (A/F) ratio… In the presence of oxygen, the three-way catalyst becomes ineffective in reducing NOx. For this reason, three-way catalysts cannot be employed for NOx control on diesel applications, which, being lean burn engines, contain high concentrations of oxygen in their exhaust gases at all operating conditions."

4.2.2. ~~4.2.2.~~ BACT ~~Determination~~determination for PM, CO, and VOC

Ecology determines BACT for particulate matter, carbon monoxide and volatile organic compounds is restricted operation of EPA Tier-2 certified engines operated as emergency engines as defined in 40 CFR §60.4219, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII. Microsoft will install engines consistent with this BACT determination.

~~4.3 BACT ANALYSIS FOR SULFUR DIOXIDE FROM DIESEL ENGINE EXHAUST~~

4.3. BACT Analysis for Sulfur Dioxide from Diesel Engine Exhaust

4.3.1. BACT ~~Options~~options for SO_2

Microsoft did not find any add-on control options commercially available and feasible for controlling sulfur dioxide emissions from diesel engines. Microsoft's proposed BACT for sulfur dioxide is the use of ultra-low sulfur diesel fuel (15 ppm by weight of sulfur).

[3] DieselNet, an online information service covering technical and business information for diesel engines, published by Ecopoint Inc. of Ontario, Canada (https://www.dieselnet.com).

4.3.2. BACT ~~*Determination*~~determination for ~~*Sulfur Dioxide*~~SO_2

Ecology determines that BACT for sulfur dioxide is the use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

~~4.4~~4.4. BACT ~~ANALYSIS FOR~~Analysis for PM ~~FROM COOLING TOWERS~~from Cooling Towers

The direct contact between the cooling water and air results in entrainment of some of the liquid water into the air. The resulting drift droplets contain total dissolved solids (TDS) in the cooling tower water, which can evaporate into air as particulate matter. For the MWH facility, the recirculation water in the cooling towers will be pre-softened using the proprietary Water Conservation Technology International (WCTI) "pre-treatment system" to replace scale-forming mineral compounds (e.g., calcium and magnesium) with other non-toxic, non-scaling mineral

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~~[3] DieselNet, an online information service covering technical and business information for diesel engines, published by Ecopoint Inc. of Ontario, Canada (https://www.dieselnet.com)~~

compounds (e.g., sodium), which will allow the cooling towers to be operated with very high “cycles of concentration.” Microsoft analyzed the industrial wastewater used in the cooling towers, which includes trace metals and chlorine disinfection byproducts, and estimates that cooling tower TAP emissions from all cooling towers combined (after implementing their proposed BACT in ~~section~~Section 4.4.1.1) will not exceed the respective small quantity emission rates (SQERs) for any TAP.

4.4.1. BACT ~~*Options*~~options for PM from ~~*Cooling Towers*~~cooling towers

Microsoft reviewed the available published literature and the RBLC and identified drift eliminators as demonstrated technologies for the control of ~~particulate matter (~~PM~~),~~ from the proposed cooling towers. Drift eliminators can reduce the amount of drift, and therefore the amount of particulate matter released into the air.

4.4.1.1. Cooling ~~*Towers*~~towers with 0.0005 ~~*Percent Drift Efficiency*~~percent drift efficiency

Microsoft proposes to use high-efficiency drift eliminators that will achieve a liquid droplet drift rate of no more than 0.0005 percent of the recirculation flow rate within each cooling tower. Microsoft estimates that by using a 0.0005 percent drift rate and a total dissolved solids (TDS) concentration of 69,000 mg/L, only 13 percent of the solid evaporated drift particles will be smaller than 2.5 microns in diameter ($PM_{2.5}$), and 56 percent will be smaller than PM_{10} (based on sizing approach presenting in: “*Calculating Realistic PM10 Emissions from Cooling Towers", Reisman and Frisbie, Environmental Progress, July 2002).* Microsoft’s original application dated January 17, 2014, stated that a cooling tower with 0.0005 percent drift efficiency is the most efficient drift eliminator that is commercially available.

4.4.1.2. Cooling ~~*Towers*~~towers with 0.0003 ~~*Percent Drift Efficiency*~~percent drift efficiency

In Ecology’s ~~2/~~February 26~~/~~, 2014, incompleteness letter for the original January 2014 Microsoft “Oxford” application (the name at the time~~),~~); Ecology noted that a cooling tower with 0.0003 percent drift rate was in use at the Harquahala power plant in Arizona, which is regulated by the Maricopa County Air Pollution Control District (APCD). Because of this, Ecology asked Microsoft to defend or revise the claim in the original application stating that a cooling tower with 0.0005 percent drift efficiency is the most efficient drift eliminator that is commercially available. Upon review, Microsoft’s consultant (Landau Associates) learned that the 0.0003 percent drift cooling tower at Harquahala is custom built for that large utility electric power plant. It has a water recirculation rate of 15,000 gpm, and is not comparable to what is needed at MWH, which has a water recirculation rate of only 950 gpm. When Microsoft requested price quotes for cooling towers with 0.0003 percent drift efficiency for the cooling towers to be used at the MWH Data Center, venders responded that a cooling tower with 0.0003 percent drift efficiency is not a commercially available product because it is below field measurement capabilities, and could not be proven. According to EPA’s BACT/LAER Clearinghouse database, Microsoft found BACT levels for cooling towers from 0.005 percent and 0.0005 percent. Of 30 cooling towers identified between 2003-2013, twenty-four had BACT determinations of 0.0005~~%,~~ percent, and six had BACT determinations from between 0.005 percent to 0.0005 percent.

Thus, Ecology considers this information to be a reasonable justification to accept high efficiency drift eliminators rated at 0.0005 percent drift to be the most efficient drift eliminators that are commercially available for the induced-draft mechanical cooling towers to be used at MWH. Therefore, no other control options are considered.

4.4.2. ~~4.4.2.~~ BACT ~~Determination~~determination for PM from ~~Cooling Towers~~cooling towers

Ecology accepts as BACT for particulate matter, cooling tower drift eliminators that can achieve a 0.0005 percent rate. These are the most efficient drift eliminators that are commercially available for the induced-draft mechanical cooling towers to be used at MWH. As noted in this Technical Support Document (~~section~~Section 4), federal regulations require that BACT decisions are made on a *case-by-case* basis. This specific BACT decision is based on the information provided in ~~section~~Section (4.4~~),~~); including consideration of the high TDS content resulting from the anti-scaling WCTI approach used by MWH.

~~4.5 BEST AVAILABLE CONTROL TECHNOLOGY FOR TOXICS~~

4.5. Best Available Control Technology for Toxics

Best Available Control Technology for Toxics (tBACT) means BACT, as applied to ~~toxic air pollutants (~~TAPs~~).[4]~~.[4] One of the TAPs, Ammonia, is used as part of the SCR control technology described in ~~section~~Section 4.1.1.1. Another data center in Quincy has used a tBACT for ammonia of 15 ~~per million volume dry (~~ppmvd~~)~~ at 15~~% Oxygen~~ percent oxygen (O_2) per engine to address ammonia slip. Although BACT and tBACT are considered on a case-by-case basis as described in ~~section~~Section 4, Ecology has decided, and Microsoft has agreed on a similar tBACT for ammonia as listed in Table 4.5. For the rest of the TAPs that exceed small quantity emission rates (SQERs), the procedure for determining tBACT followed the same procedure used above for determining BACT. Of the technologies Microsoft considered for BACT, the minimum estimated costs as applied to tBACT are as follows:

- The minimum estimated costs to control diesel engine exhaust particulate (DEEP) is estimated to be $300,000 per ton removed.
- The minimum estimated ~~costs~~cost to control NO_2 is estimated to be $116,000 per ton removed.
- The minimum estimated ~~costs~~cost to control CO is estimated to be $31,000 per ton removed.
- The minimum estimated costs to control acrolein, which could be treated with the VOC treatment listed under BACT, ~~is~~are estimated to be greater than approximately $200 million per ton.
- The minimum estimated costs to control benzene, which could be treated with the VOC treatment listed under BACT, ~~is~~are estimated to be greater than approximately $2 million per ton.

Under state rules, tBACT is required for all toxic air pollutants for which the increase in emissions will exceed de minimis emission values as found in WAC 173-460-150. Based on the information presented in this TSD, Ecology has determined that Table 4.5 below represents tBACT for the proposed project.

[4] WAC 173-460-020.

~~**Table 4.5. tBACT Determination**~~

~~[4] WAC 173-460-020~~

Table 4.5. tBACT Determination	
Toxic Air Pollutant	**tBACT**
Primary NO_2	Compliance with the NOx BACT requirement
Diesel Engine Exhaust Particulate	Compliance with the PM BACT requirement
Carbon monoxide	Compliance with the CO BACT requirement
Sulfur dioxide	Compliance with the SO_2 BACT requirement
Ammonia	Ammonia emissions shall not exceed 15 per million volume-dry (ppmvd) at 15% Oxygen (O2) per engine.
Benzene	Compliance with the VOC BACT requirement
Toluene	Compliance with the VOC BACT requirement
Xylenes	Compliance with the VOC BACT requirement
1,3 Butadiene	Compliance with the VOC BACT requirement
Formaldehyde	Compliance with the VOC BACT requirement
Acetaldehyde	Compliance with the VOC BACT requirement
Acrolein	Compliance with the VOC BACT requirement
Benzo(a)Pyrene	Compliance with the VOC BACT requirement
Benzo(a)anthracene	Compliance with the VOC BACT requirement
Chrysene	Compliance with the VOC BACT requirement
Benzo(b)fluoranthene	Compliance with the VOC BACT requirement
Benzo(k)fluoranthene	Compliance with the VOC BACT requirement
Dibenz(a,h)anthracene	Compliance with the VOC BACT requirement
Ideno(1,2,3-cd)pyrene	Compliance with the VOC BACT requirement
Napthalene	Compliance with the VOC BACT requirement
Propylene	Compliance with the VOC BACT requirement
Fluoride	Compliance with PM Cooling Tower BACT requirement
Manganese	Compliance with PM Cooling Tower BACT requirement
Copper	Compliance with PM Cooling Tower BACT requirement
Chloroform	Compliance with PM Cooling Tower BACT requirement
Bromodichloromethane	Compliance with PM Cooling Tower BACT requirement
Bromoform	Compliance with PM Cooling Tower BACT requirement

5. AMBIENT AIR MODELING

Ambient air quality impacts at and beyond the property boundary were modeled using EPA's AERMOD dispersion model, with EPA's PRIME algorithm for building downwash.

The AERMOD model used the following data and assumptions:

~~5.1~~5.1. Five years of sequential hourly meteorological data from Moses Lake Airport were used. Twice-daily upper air data from Spokane were used to define mixing heights.

~~5.2~~5.2. The AMS/EPA Regulatory Model Terrain Pre-processor (AERMAP) was used to obtain height scale, receptor base elevation, and to develop receptor grids with terrain effects. For area topography required for AERMAP, Digital topographical data (in the form of Digital Elevation Model files) were obtained from ~~www.webgis.com.~~www.webgis.com.

5.3. Each 2.5 MWe generator was modeled with a stack height of 40~~-~~ feet above local ground; each 2.0 MWe generator was modeled with a stack height of 40~~-~~ feet above local ground; the 0.750 MWe generator was modeled with a stack height of 35~~-~~ feet above local ground;
~~5.3~~

~~5.4~~**5.4.** The data center buildings, in addition to the individual generator enclosures were included to account for building downwash.

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5.5. The receptor grid for the AERMOD modeling was established using a 10-meter grid spacing along the facility boundary extending to a distance of 350 meters from each facility boundary. A grid spacing of 25 meters was used for distances of 350 meters to 800 meters from the boundary. A grid spacing of 50 meters was used for distances from 500 meters to 2000 meters from the boundary. A grid spacing of 100 meters was used for distances beyond 2000 meters from the boundary.

~~5.5~~

~~5.6~~**5.6.** Dispersion modeling is sensitive to the assumed stack parameters (i.e., flowrate and exhaust temperature). The stack temperature and stack exhaust velocity at each generator stack were set to values corresponding to the engine loads for each type of testing and power outage.

~~1~~

5.7. One-hour NO_2 concentrations at and beyond the facility boundary were modeled using the Plume Volume Molar Ratio Method (PVMRM) module, with default concentrations of 49 parts per billion (ppb) of background ozone, and an equilibrium NO_2 to ~~NOx~~ NO_X ambient ratio of 90~~%.~~ percent.

~~5.7~~

~~5.8~~**5.8.** As described in the application, AERMOD modeling results showed the highest 1-hour NO_2 impact occurs at the unpopulated northern property line of the facility. In order for the MWH Data Center to exceed the 1-hour NO_2 NAAQS on any given day at any given receptor location, the following events must occur simultaneously:

- The generators must be operating with a high ~~NOx~~ NO_X emission rate during a facility-wide power outage affecting all 45 generators simultaneously.
- The wind must be blowing directly toward the given receptor location.
- The atmospheric dispersion conditions must be unusually poor.

~~The Washington State Department of~~ Ecology's ~~(Ecology's)~~ stochastic Monte Carlo statistical package was used to evaluate the 8th-highest daily 1-hour NO_2 impacts caused by randomly occurring emissions distributed throughout the data center. The stochastic Monte Carlo analysis considered conservatively high occurrences of two runtime events (power outages and maintenance activities).

5.8.1. Power ~~*Outage –*~~ outage – 1-hour NO_2 NAAQS ~~*Compliance*~~ compliance

As described in the application: A conservatively high ~~4~~ four calendar days per year of facility-wide power outages (with the 37 primary generators operating at 100 percent load while the eight new reserve generators operate at 10 percent load). In reality, power outages at the Quincy data centers occur infrequently, so a facility-wide power outage is unlikely to actually occur more than ~~1~~ one day per year. The emission rates assume every generator is subject to a cold start.

5.8.2. Maintenance – 1-hour NO_2 NAAQS ~~*Compliance*~~ compliance

As described in the application: 16 days per year of electrical bypass maintenance randomly distributed at various locations within the data center (with each day of electrical bypass consisting of four generators at 100 percent load). This frequency is equivalent to ~~2~~ two days per year of electrical bypass at each of the eight AZ buildings. That frequency is conservatively high, because Microsoft plans its transformer and switchgear maintenance in a manner so no AZ building is likely to require more than 1 day per year of electrical bypass. Furthermore, Microsoft plans to conduct transformer and switchgear maintenance at each building on a 3-year cycle, rather than annually as modeled for this analysis. The emission rates assume every generator is subject to a cold start.~~Furthermore,~~

~~Microsoft plans to conduct transformer and switchgear maintenance at each building on a 3-year~~

~~20~~

~~cycle, rather than annually as modeled for this analysis.~~

~~The emission rates assume every generator is subject to a cold start.~~

5.8.3. Monte Carlo ~~Results~~results for 1-hour NO_2 NAAQS ~~Compliance~~compliance

Using conservative assumptions, the Monte Carlo model predicts the data center will comply with the 98th percentile NO_2 NAAQS:

- MWH-only 98th percentile impact 100 µg/m3
- Regional plus local background 16 µg/m3
- Cumulative impact 116 µg/m3
- Allowable NAAQS limit 188 µg/m3

Using more realistic operation assumptions, the Monte Carlo model predicts the data center will comply with an even greater margin below the 98th percentile NO_2 NAAQS:

~~comply with an even greater margin below the 98th-percentile NO2 NAAQS:~~

- MWH-only 98th percentile impact 27 µg/m3
- Regional plus local background 16 µg/m3
- Cumulative impact 43 µg/m3
- Allowable NAAQS limit 188 µg/m3

5.9. AERMOD Meteorological Pre-processor (AERMET) was used to estimate boundary layer parameters for use in AERMOD.
~~5.8~~

~~5.9~~5.10. AERSURFACE was used to determine the percentage of land use type around the facility based on albedo, Bowen ratio, and surface roughness parameters.

Except for diesel engine exhaust particulate, which is predicted to exceed its ASIL, AERMOD model results show that no NAAQS or ASIL will be exceeded at or beyond the property boundary. The modeling results as listed in the application are provided below:

Criteria Pollutant	Standards in µg/m³ NAAQS(d) Primary	Standards in µg/m³ NAAQS(d) Secondary	Maximum Ambient Impact Concentration (µg/m³)	AERMOD Filename	Background Concentrations (µg/m³) (a)	Maximum Ambient Impact Concentration Added to Background (µg/m³) (If Available)
Particulate Matter (PM_{10})						
1st-Highest 24-hour average during power outage with cooling towers	150	150	26.6	PM10_081915	89	116
Particulate Matter ($PM_{2.5}$)						
Annual average	12	15	0.152	DEEP_081815	6.75	6.9

Criteria Pollutant	Standards in μg/m³ NAAQS(d) Primary	Secondary	Maximum Ambient Impact Concentration (μg/m³)	AERMOD Filename	Background Concentrations (μg/m³) (a)	Maximum Ambient Impact Concentration Added to Background (μg/m³) (If Available)
1st-highest 24-hour average for cooling towers and electrical bypass	35	35	8.4	PM25_081915(a-e)	21.7	30.2
Carbon Monoxide (CO)						
8-hour average	10,000		205	CO_081915	482	687
1-hour average	40,000		421	CO_081915	842	1,263
Nitrogen Oxides (NO_2)						
Annual average (b),(c)	100	100	19.4	NO2_081915	2.8	22.2
1-hour average	188	--	100	NO2-NAAQS Monte Carlo	16	116
Sulfur Dioxide (SO_2)						

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~~8-hour average~~	~~10,000~~		~~205~~	~~CO_081915~~	~~482~~	~~687~~
~~1-hour average~~	~~40,000~~		~~421~~	~~CO_081915~~	~~842~~	~~1,263~~
~~Nitrogen Oxides (NO_2)~~						
~~Annual average (b),(c)~~	~~100~~	~~100~~	~~19.4~~	~~NO2_081915~~	~~2.8~~	~~22.2~~
~~1-hour average~~	~~188~~	~~--~~	~~100~~	~~NO2-NAAQS Monte Carlo~~	~~16~~	~~116~~
~~Sulfur Dioxide (SO_2)~~						
3-hour average	--	1,300	NA	NA	NA	<1,300
1-hour average	195	--	NA	NA	NA	<195

Toxic Air Pollutant	ASIL (µg/m^3)	Averaging Period	1st-Highest Ambient Concentration (µg/m^3)	AERMOD Filename
DEEP	0.00333	Annual average	0.152	DEEP_081815
NO_2	470	1-hour average	606	NO2_081915
CO	23,000	1-hour average	1,263	CO_081915
Ammonia	70.8	24-hour average	25	CO_081915
Acrolein	0.06	24-hour average	0.001	CO_081915
Benzene	0.0345	Annual Average	0.001	CO_081915

Notes:
N/A = not applicable and/or not provided
µg/m^3 = Micrograms per cubic meter.
ppm = Parts per million.
ASIL = Acceptable source impact level.
DEEP = Diesel engine exhaust, particulate
(a) Sum of "regional background" plus "local background" values. Regional background concentrations obtained from WSU NW Airquest website. Local background concentrations derived from AERMOD modeling and include emissions from~~:~~ Con Agra Foods, Microsoft Columbia Data Center, and the Dell Data Center.
(b) For ~~the purpose of~~ determining the 3-year average, five separate models were run (one for each year of meteorological data) to determine the 98th percentile concentration for each year based on the NAAQS.
(c) Annually averaged concentrations are based on the theoretical maximum annual concentration, which assumes the worst-case scenario that the 3-year rolling average permit limit is released entirely within a single year.
(d) Ecology interprets compliance with the National Ambient Air Quality Standards (NAAQS) as demonstrating compliance with the Washington Ambient Air Quality Standards (WAAQS).

Microsoft has demonstrated compliance with the ~~national ambient air quality standards (~~NAAQS~~)~~ and ~~acceptable source impact levels (~~ASILs~~)~~ except for DEEP. As required by WAC 173-460-090, emissions of DEEP are further evaluated in the following section of this document.

6. SECOND TIER REVIEW FOR DIESEL ENGINE EXHAUST PARTICULATE

Proposed emissions of ~~diesel engine exhaust, particulate (~~DEEP~~)~~ and NO_2 from the thirty-~~-~~seven (37) MWH engines exceed the regulatory trigger level for ~~toxic air pollutants~~TAPs (also called an ~~Acceptable Source Impact Level, (~~ASIL~~)).~~). A second tier review was required for DEEP and NO_2 in accordance with WAC 173-460-090, and MWH was required to prepare a health impact assessment (HIA). The HIA presents an evaluation of both ~~non-cancer~~noncancer hazards and increased cancer risk attributable to MWH's increased emissions of all identified carcinogenic compounds (including DEEP, NO_2, and numerous other constituents), ammonia, carbon monoxide, benzene, and acrolein. MWH also reported the DEEP and NO_2 cumulative risks associated with MWH and prevailing sources in their HIA document based on a cumulative modeling approach. The MWH cumulative risk study is based on proposed generators, nearby existing permitted data center sources, and other background sources including highways and railroads. ~~The MWH HIA~~The MWH HIA document along with a brief summary of Ecology's review will be available on Ecology's website.

~~22~~

~~document along with a brief summary of Ecology's review will be available on Ecology's website.~~

7. CONCLUSION

Based on the above analysis, Ecology concludes that operation of the 45 generators and 32 cooling towers will not have an adverse impact on air quality. Ecology finds that Microsoft's MWH Data Center has satisfied all requirements for NOC approval.

~~****END OF MICROSOFT MWH TSD ****~~

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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A NEW)
AIR CONTAINANT SOURCE FOR)~~Preliminary Determination~~APPROVAL ORDER
MICROSOFT CORPORATION) NO. 17AQ-E002
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	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	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, napthalene, benzo(b)fluoranthene, propylene, dibenz(a,h)anthracene, Ideno(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 IIII. 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 IIII 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 (Method 2 is not required if 40 CFR 1065 is used). 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 40 CFR 1065. Each run must last at least 60 minutes except as allowed by the sampling protocol from 40 CFR 1065. 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~~ models or manufacturers 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 within 12 months of operation. ~~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 follow 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 PM_{10}, $PM_{2.5}$, CO, NO_x, VOC, SO_2, DEEP, NO_2, 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 NO_x emissions from all engines operating in any hour shall not exceed 575 lb~~s~~. Actual NO_x emissions shall be based on algebraic equations of the most accurate load-specific NO_x 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 electrical power in MWe 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 IIII 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.

9 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 NO_x emission rate for all operating engines during each hour in which the NO_x emission rate exceeds 575 lb~~s~~/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~~ is 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 **Pollution Control Hearings Board** 1111 Israel Road SW, Suite 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk P.O. Box 47608 Olympia, WA 98504-7608 **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~~ 26th day of January ~~2016~~2017, at Spokane, Washington.

Prepared By:

Gary J. Huitsing, P.E.
Science and Engineering Section
Air Quality Program
Department of Ecology
State of Washington

Approved By:

~~Karen K. Wood, Section Manager~~
~~Regional Air Quality Section~~
~~Eastern Regional Office~~
~~Department of Ecology~~
~~State of Washington~~

Kathy Taylor, Deputy Program Manager
Air Quality Program
Department of Ecology
State of Washington

Appendix E:
Approval Order

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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47600 • Olympia, WA 98504-7600 • 360-407-6000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

January 26, 2017

Mr. Brett Muhlestein
Data Center Operations Manager
Microsoft Corporation
1515 Port Industrial Parkway
Quincy, WA 98848

Dear Mr. Muhlestein:

Ecology has processed your air quality permit (Notice of Construction) application for the installation of forty-five (45) electric generators powered by diesel engines to provide emergency backup power for the MWH Data Center in Quincy.

Please review the enclosed Approval Order (Order) carefully, as you are required to comply with all of its conditions. You may appeal the Order. The appeal procedures are described in the Order.

Ecology is committed to streamlining our permitting procedures and to maintaining a high level of staff responsiveness and assistance to permit applicants. We encourage you to provide Ecology with feedback. To help us provide better service to you and our applicants, please complete the short survey online at:

www.ecy.wa.gov/programs/air/permit_register/Permitting_Feedback.htm

If you have any questions, please contact me at kathy.taylor@ecy.wa.gov or (360) 407-7115.

Sincerely,

Kathy Taylor, Ph.D.
Air Quality Deputy Program Manager

Enclosure

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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A NEW	)	
AIR CONTAMINANT SOURCE FOR	)	**APPROVAL ORDER**
MICROSOFT CORPORATION	)	**NO. 17AQ-E002**
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	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	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	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	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, napthalene, benzo(b)fluoranthene, propylene, dibenz(a,h)anthracene, Ideno(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, the applicant has submitted a second tier health risk analysis for DEEP and NO_2 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 IIII. 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 IIII 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 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 (Method 2 is not required if 40CFR1065 is used). 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 40 CFR 1065. Each run must last at least 60 minutes except as allowed by the sampling protocol from 40 CFR 1065. 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 models or manufacturers 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 tested within 12 months of operation. 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 follow 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 PM_{10}, $PM_{2.5}$, CO, NO_X, VOC, SO_2, DEEP, NO_2, 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 NO_X emissions from all engines operating in any hour shall not exceed 575 lb. Actual NO_X emissions shall be based on algebraic equations of the most accurate load-specific NO_X 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, airflow, 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 electrical power in MWe 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 IIII 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.

9. 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 NO_X emission rate for all operating engines during each hour in which the NO_X emission rate exceeds 575 lb/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 is 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 26th day of January 2017, at Spokane, Washington.

Prepared By:

GARY J. HUITSING
STATE OF WASHINGTON
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REGISTERED
PROFESSIONAL ENGINEER

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Approved By:

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Air Quality Program
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Appendix F:
Final Technical Support Document

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TECHNICAL SUPPORT DOCUMENT
APPROVAL ORDER NO. 17AQ-E002
MICROSOFT MWH DATA CENTER

1. PROJECT DESCRIPTION

On January 27, 2014, Ecology received a Notice of Construction (NOC) application submittal from the Microsoft Corporation (Microsoft), the permittee, requesting approval for a permit application for Phases 1 and 2 of a new facility originally named the Oxford Data Center (Oxford) located at Industrial Park #5, west of Road R NW at the end of Port Industrial Parkway in Quincy, WA.

The NOC application was determined to be incomplete, and an incompleteness letter was issued on February 26, 2014. A revised NOC application was received on March 17, 2014, and the application was considered complete on June 3, 2014. After a public comment period from June 19, 2014, through July 29, 2014, with a hearing and public meeting held in Quincy on July 24, 2014, Approval Order 14AQ-E537 was issued on August 15, 2014. Microsoft appealed the permit on September 1, 2014. Microsoft worked with Ecology through the NOC application process to address the concerns of their appeal and withdrew their appeal on September 22, 2015, before the appeal hearing date scheduled for January 2016.

On December 11, 2014, Ecology received an NOC application submittal from Microsoft requesting revisions to Approval Order 14AQ-E537. The NOC application was determined to be incomplete, and on January 7, 2015, Ecology issued an incompleteness letter to Microsoft. On February 2, 2015, Microsoft provided a revised NOC application to Ecology. The application was considered complete on March 17, 2015. Ecology provided a public comment period from May 18, 2015, through July 13, 2015, with a hearing and public meeting held in Quincy on July 9, 2015. Ecology received comments during the comment period and Ecology prepared responses to the comments. In September 2015, Ecology was prepared to issue the comments along with Approval Order 15AQ-E609 to replace Approval Order 14AQ-E537, but at Microsoft's request, Ecology did not issue the permit. Microsoft informed Ecology of additional changes that the facility was making from what was previously requested. Microsoft informed Ecology they were going to request those additional changes in another NOC application.

On January 13, 2016, Ecology received NOC application submittal from the Microsoft Corporation (MSN**)** requesting revisions to Approval Order 14AQ-E537 (dated August 15, 2014), for the newly named MWH Data Center (FKA: Oxford) located at Industrial Park #5, west of Road R NW at the end of Port Industrial Parkway in Quincy, WA. The NOC application was determined to be incomplete, and on March 10, 2016, Ecology issued an incompleteness letter to Microsoft. On April 13, 2016, Ecology received a revised NOC application from Microsoft, with supplementary materials provided on September 9, 2016. The NOC application was considered complete on September 20, 2016.

The following information comprises the legal description of the facility provided by the applicant:

LOTS 2, 3, 4, 5, AND TRACT A, AMENDED PORT DISTRICT INDUSTRIAL PARK NO. 6 BINDING SITE PLAN, ACCORDING TO THE BINDING SITE PLAN THEREOF FILED IN VOLUME 2 OF BINDING SITE PLANS, PAGES 64 AND 65, RECORDS OF GRANT COUNTY, WASHINGTON. FARM UNITS 216 AND 217, IRRIGATION BLOCK 73, OXFORD BASIN PROJECT, ACCORDING TO THE PLAT THEROF FILED NOVEMBER 29, 1951, RECORDS OF GRANT COUNTY, WASHINGTON. STARTING AT THE NORTHWEST CORNER OF SAID FARM UNIT 216, IRRIGATION BLOCK 73, THE TRUE POINT OF BEGINNING, THENCE 173 (feet) EAST ALONG THE NORTH LINE OF SAID FARM UNIT; THENCE 242 FEET SOUTH OF A LINE PERPENDICULAR TO THE NORTH LINE OF SAID FARM UNIT; THENCE WEST 173 FEET; THENCE NORTH 242 FEET TO THE TRUE POINT OF BEGINNING.

In the revised permit, Ecology has concluded that this project has satisfied all NOC requirements including those regarding second tier analysis for two toxic air pollutants (TAPs) (diesel engine exhaust particulate (DEEP) and nitrogen dioxide (NO_2)). The previous Approval Order (14AQ-E537) is rescinded and replaced entirely with this Approval Order.

MWH will contain four Phase 1 activity zone (AZ) buildings designated AZA, AZB, AZC, AZD, four core network room (CNR) buildings, an administrative building, and four Phase 2 activity zone buildings designated AZA, AZB, AZC, AZD. MWH Phases 1 & 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.

Each cooling tower has four cells and four fans. Each of the eight activity zone building will have four cooling towers for a total of thirty-two (32) SPX-Marley model MD5008PAF2 cooling towers. Each of the thirty-two individual cooling towers has a design recirculation rate of 950 gallons per minute (gpm) and an airflow rate of 143,600 cubic feet per minute (cfm).

1.1. Potential to Emit for Criteria Pollutants and TAPS

Table 1 contains potential to emit (PTE) estimates. To achieve these emissions levels as listed in the permit, the permit requires that each engine must be equipped with selective catalytic reduction (SCR) and catalyzed diesel particulate filter (DPF) air pollution controls to meet the emission requirements of EPA Tier 4 engines.

Table 1. Potential To Emit For Phases 1 & 2 (TPY)			
Pollutant	**Emission Factor**	**Facility Potential to Emit**	**References**
Criteria Pollutants	**Units = g/kW-hr (except where noted)**	**(TPY)**	(a)
NO_x	(0.67) and Caterpillar based emission factors	33.0	(b),(e)
VOC	(0.19) and Caterpillar based emission factors	1.033	(a),(b),(e)
CO	(3.5) and Caterpillar based emission factors	7.3	(b)
$PM_{2.5}$	(0.03) and Caterpillar based emission factors (See note j for cooling towers)	3.8	(b),(j)
PM_{10}	NA (See note j for cooling towers)	13.6	(f),(j)
SO_2	15 ppm	0.069	(c)
Lead	NA	Negligible	(d)
Ozone	NA	NA	(e)
Toxic Air Pollutants (TAPS)	**Units = lb/MMBTU (except where noted)**		(a)
Primary NO_2	(0.67 g/Kw-hr) and Caterpillar based emission factors.	3.3	(b),(h)
Ammonia	15ppmv	1.14	(b),(g)
Diesel Engine Exhaust Particulate (DEEP)	(0.03 g/kW-hr) and Caterpillar based emission factors	0.814	(b),(f)
Carbon monoxide	(3.5 g/kW-hr) and Caterpillar based emission factors	7.3	(b)
Sulfur dioxide	15 ppm	0.069	(c)
Benzene	7.76E-04	3.5E-03	(i)
Toluene	2.81E-04	1.3E-03	(i)
Xylenes	1.93E-04	8.6E-04	(i)
1,3 Butadiene	3.91E-05	1.8E-04	(i)
Formaldehyde	7.89E-05	3.5E-04	(i)
Acetaldehyde	2.52E-05	1.1E-04	(i)
Acrolein	7.88E-06	3.5E-05	(i)
Benzo(a)Pyrene	2.57E-07	1.2E-06	(i)
Benzo(a)anthracene	6.22E-07	2.8E-06	(i)
Chrysene	1.53E-06	6.9E-06	(i)
Benzo(b)fluoranthene	1.11E-06	5.0E-06	(i)
Benzo(k)fluoranthene	2.18E-07	9.8E-07	(i)
Dibenz(a,h)anthracene	3.46E-07	1.6E-06	(i)
Ideno(1,2,3-cd)pyrene	4.14E-07	1.9E-06	(i)
Napthalene	1.30E-04	5.8E-04	(i)
Propylene	2.79E-03	1.3E-02	(i)

Table 1. Potential To Emit For Phases 1 & 2 (TPY)			
Pollutant	**Emission Factor**	**Facility Potential to Emit**	**References**
Fluoride	0.31 mg/L	4.8E-03	(j)
Manganese	0.03 mg/L	4.6E-04	(j)
Copper	0.01 mg/L	1.6E-04	(j)
Chloroform	0.0004 mg/L	2.6E-04	(k)
Bromodichloromethane	0.0004 mg/L	2.6E-04	(k)
Bromoform	0.0105 mg/L	6.9E-03	(k)

(a) The list of EPA criteria pollutants that have related National Ambient Air Quality Standards (NAAQS). VOC is not a criteria pollutant but is included here per note (e). Toxic Air Pollutants (TAPs) are defined as those in WAC 173-460. Greenhouse gas is not a criteria pollutant or a TAP and is exempt from minor New Source Review requirements per WAC 173-400-110(5)(b).
(b) Potential to Emit (PTE) estimates are based on one or more of the following: manufacturer 5-load final Tier 4 compliant engine test data (for NOx, VOC, CO, and PM2.5), Caterpillar test data, 1.20 safety factor, and applicable cold start (CS) factors for catalyst warm-up periods and black puff factors from California Energy Commission's *Air Quality Implications of Backup Generators in California"* CEC-500-2005-049; July 2005 (see section 2.1.2).
(c) Applicants estimated emissions based on fuel sulfur mass balance assuming 0.00150 weight percent sulfur fuel.
(d) EPA's AP-42 document does not provide an emission factor for lead emissions from diesel-powered engines. Lead emissions are presumed to be negligible.
(e) Ozone is not emitted directly into the air, but is created when its two primary components, volatile organic compounds (VOC) and oxides of nitrogen (NOx), combine in the presence of sunlight. *Final Ozone NAAQS Regulatory Impact Analysis EPA-452/R-08-003*, March 2008, Chapter 2.1. http://www.epa.gov/ttnecas1/regdata/RIAs/452_R_08_003.pdf
(f) All PM emissions from the generator engines are considered $PM_{2.5}$, and all $PM_{2.5}$ from the generator engines is considered DEEP.
(g) Based on 15 parts per million volume-dry (ppmvd) emission factor and facility operating parameters.
(h) NO2 is assumed to be 10% of total NOx emitted.
(i) EPA AP-42 § 3.3 or 3.4 from: Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors http://www.epa.gov/ttn/chief/ap42/.
(j) Trace metals in city industrial wastewater as provided in application for cooling tower emissions. Total particulate matter from cooling towers based on the following study: *Calculating Realistic PM10 Emissions from Cooling Towers", Reisman and Frisbie, Environmental Progress, July 2002.*
(k) Concentration in cooling tower makeup water as provided in application for cooling tower emissions.

1.2. Maximum Operation Scenarios Based on Final Tier 4 Compliant Engines

Cold start adjustment factors are used to approximate the additional emissions from cold engines burning off the accumulated fuel and crankcase oil on cold cylinders. The VOC cold start factor adjustments for these calculations are provided below:

VOC Black Puff Cold-Start Adjustment Factors				
Load	Spike Area (ppm-sec)	Steady-State Area (ppm-sec)	Total Area (ppm-sec)	Black Puff Factor
10%	6300	27000	33300	1.189
80%	6300	18000	24300	1.259
100%	6300	18000	24300	1.259

The CO cold start factor adjustments for these calculations are provided below:

CO Black Puff Cold-Start Adjustment Factors				
Load	Spike Area (ppm-sec)	Steady-State Area (ppm-sec)	Total Area (ppm-sec)	Black Puff Factor
10%	15000	18000	33000	1.455
80%	15000	12000	27000	1.556
100%	15000	12000	27000	1.556

A NO_X cold start factor of 1.0 was assumed because California Energy Commission tests (see "*Air Quality Implications of Backup Generators in California"* CEC-500-2005-049; July 2005); do not show short-term NO_X spikes during cold starts.

Other cold-start related adjustments were also included in the application to account for heat-up times for catalysts in the add-on controls (see Section 4 regarding add-on controls) listed below.

Catalyst Delay Cold Start Adjustment		
Control Device	**Applicability**	**Adjustment**
SCR catalyst and DPF oxidation catalyst	• Cold start under idle load (less than or equal to 10%) for VOC, CO, and NO_X	15 minutes at emission levels equivalent of generator equipped with Tier 2 level emission controls followed by final Tier 4 compliant emissions
	• Cold start under high load for VOC, CO, and NO_X	10 minutes at emission levels equivalent of generator equipped with Tier 2 level emission controls followed by final Tier 4 compliant emissions

Ecology also asked Microsoft to demonstrate compliance with the NAAQS during a worst-year scenario with the following set of assumptions:

- All primary emergency generators operating for 256 hours in the single worst-case year (three times the permitted 3-year rolling value of 86 hours per year).
- All reserve emergency generators operating for 120 hours for scheduled testing in the single worst-case year (three times the permitted 3-year rolling value of 40 hours per year).
- Commissioning of 18 generators in the single worst-case year.
- Conducting four stack emission test in the single worst-case year.

Although this scenario is unlikely and would only occur in one year, Microsoft has shown that the facility emissions would still comply with the NAAQS (See Section 5 of this TSD).

2. APPLICABLE REQUIREMENTS

The proposal by Microsoft 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 MWH Data Center is regulated by the requirements specified in:

2.1. Chapter 70.94 Revised Code of Washington (RCW), Washington Clean Air Act,

2.2. Chapter 173-400 Washington Administrative Code (WAC), General Regulations for Air Pollution Sources,

2.3. Chapter 173-460 WAC, Controls for New Sources of Toxic Air Pollutants, and

2.4. 40 CFR Part 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ* (* See section 3.4.2)

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.

2.4.1. Support for permit Approval Condition 2.1 regarding applicability of 40 CFR Part 60 Subpart IIII:

As noted in the applicability section of 40CFR1039 (part 1039.1.c), that regulation applies to non-road compression ignition (diesel) engines and; *(c) The definition of nonroad engine in 40 CFR 1068.30 excludes certain engines used in stationary applications.* According to the definition in 40CFR1068.30(2)(ii): *An internal combustion engine is not a nonroad engine if it meets any of the following criteria: The engine is regulated under 40 CFR part 60, (or otherwise regulated by a federal New Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. 7411)).* Because the engines at MWH are regulated under 40CFR60 subpart IIII (per 40CFR60.4200), they are not subject to 40CFR1039 requirements except as specifically required within 40CFR60.

Some emergency engines with lower power rating are required by 40CFR60 to meet 40CFR1039 Tier 4 emission levels, but not emergency engines with ratings that will be used at MWH (0.750 MWe, 2.0 MWe, and 2.5 MWe). Instead, 40CFR60 requires the engines at MWH to meet the Tier 2 emission levels of 40CFR89.112 (see section 4 with respect to add-on controls). The applicable sections of 40CFR60 for engine owners are pasted below in italics with bold emphasis on the portions requiring Tier 2 emission factors for emergency generators such as those at MWH:

§60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?

> *(b) Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202* (see below), *for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE.*

(Note: Based on information provided by the applicant, MWH will use the following engines specifications: August, 2013 Caterpillar Model C27ATAAC rated 0.75 MWe; February 2013 Caterpillar Model 3516C-TA rated 2.0 MWe; November 2012, Caterpillar Model 3516C-HD-TA rated 2.5 MWe. Based on these specifications, the 0.750 MWe engine has 27.03 liters displacement over 12 cylinders, or 2.25 liters per cylinder; the 2.0 MWe engines have 69.00 liters displacement over 16 cylinders, or 4.31 liters per cylinder; and the 2.5 MWe engines have 78.08 liters displacement over 16 cylinders, or 4.88 liters per cylinder. Thus, because the specified engines at MWH will all have a displacement of less than 30 liters per cylinder, and are for emergency purposes only, they are required to meet *§60.4202* manufacturer requirements listed below).

§60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?

> *(a) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power* ***less than or equal to 2,237 KW*** *(3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (a)(1) through (2) of this section.*
>
> *(1) For engines with a maximum engine power less than 37 KW (50 HP):*
>
> *(i) The certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants for model year 2007 engines, and*
>
> *(ii) The certification emission standards for new nonroad CI engines in 40 CFR 1039.104, 40 CFR 1039.105, 40 CFR 1039.107, 40 CFR 1039.115, and table 2 to this subpart, for 2008 model year and later engines.*
>
> ***(2) For engines with a maximum engine power greater than or equal to 37 KW (50 HP), the certification emission standards for new nonroad CI engines for the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants beginning in model year 2007.***

(Note: Thus, as outlined in previous note, and based on the power ratings listed in *40 CFR 60.4202(a)*, the 0.75 MWe and 2.0 MWe engines at MWH are required to meet the applicable 40 CFR 89 Tier 2 emission standards.)

> *(b) Stationary CI internal combustion engine manufacturers must certify their 2007 model year and later emergency stationary CI ICE with a maximum engine power* ***greater than 2,237 KW*** *(3,000 HP) and a displacement of less than 10 liters per cylinder that are not fire pump engines to the emission standards specified in paragraphs (b)(1) through (2) of this section.*
>
> *(1) For 2007 through 2010 model years, the emission standards in table 1 to this subpart, for all pollutants, for the same maximum engine power.*
>
> ***(2) For 2011 model year and later, the certification emission standards for new nonroad CI engines for engines of the same model year and maximum engine power in 40 CFR 89.112 and 40 CFR 89.113 for all pollutants.***

(Note: Thus, as outlined previously, and based on the power ratings listed in *40 CFR 60.4202(b)*, the 2.5 MWe engines at MWH are required to meet the applicable 40CFR89 Tier 2 emission standards.)

2.4.2. Support for permit Approval Condition 1.2 regarding applicability of 40 CFR 60.4211(f):

The emergency engine generators approved for operation by the Order are to be used solely for those purposes authorized for emergency generators under 40 CFR 60, Subpart IIII. The permit allows emergency use consistent with 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. Operating generators for uses beyond what is allowed in Approval Condition 1.2 goes beyond the intended use of emergency generators for data center back-up power only. Approval Condition 1.2 is consistent with the provisions of other data center permits in Quincy.

2.4.3. Support for Approval Condition 8.5.3. This Condition is required for the following reasons (but not necessarily limited to these reasons only):

Recording the reason for operating engines is consistent with the provisions of other data center permits in Quincy. In order to demonstrate compliance with 40 CFR 60.4211(f), this Approval Condition requires that Microsoft record the reason for operating the engines at the MWH Data Center (including for emergency use). In addition to demonstrating compliance 40 CFR 60.4211(f), this condition is also required to show compliance with Approval Conditions 1.2 and 3.2., and because of its importance to Ecology and the Quincy community. Condition 8.6.3 simplifies recording the purpose of engine use to recording only the following reasons for operating: EMERGENCY SITUATIONS, STACK TESTING, COMMISSIONING, MAINTENANCE CHECKS, READINESS TESTING, DEVIATION OF VOLTAGE OR FREQUENCY, or UNSPECIFIED NON-EMERGENCY SITUATIONS. 40 CFR 60.4211(f)(2), allows up to 100 hours of engine operation per calendar year. Per 40 CFR 60.4211(f)(3), up to 50 hours of engine operation per calendar year of “UNSPECIFIED NON-EMERGENCY SITUATIONS” can be used, but those hours must be borrowed from the 100 hours allowed under 40CFR60.4211(f)(2).

2.4.4. Support for complying with 40 CFR 63 Subpart ZZZZ from Section 3 of TSD:

According to section 40 CFR 63 Subpart ZZZZ section 636590 part (c) and (c)(1), sources such as this facility, are required to meet the requirements of 40 CFR 60 IIII and “*no further requirements apply for such engines under this* (40 CFR 63 Subpart ZZZZ) *part.”*

3. SOURCE TESTING

Source testing requirements and test method options outlined in Table 4 of the Approval Order requires a five-load test for PM, NO_X, CO, and VOC. PM is considered to be DEEP at size $PM_{2.5}$ or smaller, which tests only for the filterable particulate matter to be consistent with California Code of Regulations § 93115.14 *ATCM for Stationary CI Engines – Test Methods* (measuring front half particulate only).

Ecology is including a conditional test method (CTM) option for ammonia in the permit, because it is an EPA method (EPA CTM-027) that Ecology considers a viable test option to review performance of SCR catalyst beds and ammonia injection (slip).

Ecology also includes the partial dilution probe method from 40 CFR 1065 as an option. Use of this test more closely simulates the test that manufacturers are required to use to meet NSPS requirements, and will potentially reduce testing time compared to other test options. By reducing testing time, engine emissions from stack testing will be reduced.

For this permit, engine selection testing will be determined as follows:

3.1. New Engine Stack Testing

Because Microsoft can utilize multiple engine manufacturer and make options, Conditions 4.2 and 4.3 require testing of at least one engine from each manufacturer and each size engine from each manufacturer, immediately after commissioning any new proposed engine. These conditions apply in addition to the testing Microsoft has performed on existing engines already installed at the time of this permit. Because Microsoft tested multiple 2.5 MWe engines in 2016, Ecology did not require additional 2.5 MWe engine testing except for at least one reserve engine as described in Condition 4.4.9. In addition, Ecology is requiring that at least one 2.0 MWe engine and the 0.75 MWe engine be tested within 12 months of the date of the permit.

3.2. Periodic Stack Testing

Every 60 months after the first testing performed starting with engines tested after the date of this permit, 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.

3.3. Audit Sampling

According to Condition 4.2, audit sampling per 40 CFR 60.8(g), may be required by Ecology at their discretion. Ecology will not require audit samples for test methods specifically exempted in 40 CFR 60.8(g) such as Methods, 7E, 10, 18, 25A, and 320. For non-exempted test methods, according to 40 CFR 60.8(g):

"The compliance authority responsible for the compliance test may waive the requirement to include an audit sample if they believe that an audit sample is not necessary."

Although Ecology believes that audit sampling is not necessary for certified engines, Ecology may choose at any time to require audit sampling for any stack tests conducted. Audit sampling could include, but would not necessarily be limited to, the following test methods: Methods 5, 201A, or 202.

4. SUPPORT FOR BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION

As noted in Condition 2.2 of the Approval Order, 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. Ecology does not consider this control equipment to be Best Available Control Technology (BACT) at MWH because of the reasons outlined in this section. BACT cost estimates were updated as of April 2016.

BACT is defined[1] as "*an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant. In no event shall application of the "best available control technology" result in emissions of any pollutants which will exceed the emissions allowed by any applicable standard under 40 CFR Part 60 and Part 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.*

For this project, Ecology is implementing the "top-down" approach for determining BACT for the proposed diesel engines. The first step in this approach is to determine, for each proposed emission unit, the most stringent control available for a similar or identical emission unit. If that review can show that this level of control is not technically or economically feasible for the proposed source (based upon the factors within the BACT definition), then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical,

[1] RCW 70.94.030(7) and WAC 173-400-030(12).

environmental, or economic objections.[2] The "top-down" approach shifts the burden of proof to the applicant to justify why the proposed source is unable to apply the best technology available. The BACT analysis must be conducted for each pollutant that is subject to new source review.

The proposed diesel engines and/or cooling towers will emit the following regulated pollutants which are subject to BACT review: nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM_{10} and $PM_{2.5}$), and sulfur dioxide (SO_2). BACT for toxics (tBACT) is included in Section 4.5.

4.1. BACT Analysis for NO_X from Diesel Engine Exhaust

Microsoft reviewed EPA's RACT/BACT/LAER Clearinghouse (RBLC) database to look for controls recently installed on internal combustion engines. The RBLC provides a listing of BACT determinations that have been proposed or issued for large facilities within the United States, Canada, and Mexico.

4.1.1. BACT options for NO_X

Microsoft's review of the RBLC found that urea -based selective catalytic reduction (SCR) was the most stringent add-on control option demonstrated on diesel engines. The application of the SCR technology for NO_X control was therefore considered the top-case control technology and evaluated for technical feasibility and cost-effectiveness. The most common BACT determination identified in the RBLC for NO_X control was compliance with EPA Tier 2 standards using engine design, including exhaust gas recirculation (EGR) or fuel injection timing retard with turbochargers. Other NO_X control options identified by Ecology through a literature review include selective non-catalytic reduction (SNCR), non-selective catalytic reduction (NSCR), water injection, as well as emerging technologies. Ecology reviewed these options and addressed them below.

4.1.1.1. Selective catalytic reduction

The SCR system functions by injecting a liquid reducing agent, such as urea, through a catalyst into the exhaust stream of the diesel engine. The urea reacts with the exhaust stream converting nitrogen oxides into nitrogen and water. SCR can reduce NO_X emissions by approximately 90 percent.

For SCR systems to function effectively, exhaust temperatures must be high enough (about 200 to 500^oC) to enable catalyst activation. For this reason, SCR control efficiencies are expected to be relatively low during the initial minutes after engine start up, especially during maintenance, testing, and storm avoidance loads. Minimal amounts of the urea-nitrogen reducing agent injected into the catalyst does not react, and is emitted as ammonia. Optimal operating temperatures are needed to minimize excess ammonia (ammonia slip) and maximize NO_X reduction. SCR systems are costly. Most SCR systems operate in the range of 290^oC to 400^oC.

[2] J. Craig Potter, EPA Assistant Administrator for Air and Radiation memorandum to EPA Regional Administrators, "Improving New Source Review (NSR) Implementation", December 1, 1987.

Platinum catalysts are needed for low temperature range applications (175°C–290°C); zeolite can be used for high temperature applications (560°C); and conventional SCRs (using vanadium pentoxide, tungsten, or titanium dioxide) are typically used for temperatures from 340°C to 400°C.

Microsoft has evaluated the cost effectiveness of installing and operating SCR systems on each of the proposed diesel engines. Assuming no direct annual maintenance, labor, and operation costs, the analysis indicates that the use of SCR systems would have a lower cost range of approximately $12,000 to $16,000 per ton of NO_X removed from the exhaust stream each year; or higher, if taking into account California Area Resource Board (CARB) estimated operation, labor, and maintenance costs, which could potentially be up to $423,000 per year. If SCR is combined with a Tier 4 capable integrated control system, which includes SCR, as well as control technologies for other pollutants such PM, CO, and VOC (see Section 4.3), the cost estimate would be approximately $24,000 to $33,700 for NO_X alone or $20,000 to $28,800 per ton of combined pollutants removed per year.

Ecology concludes that while SCR is a demonstrated emission control technology for diesel engines, and preferred over other NO_X control alternatives described in subsection 4.1.1.3., it is not economically feasible for this project. Furthermore, although NOx is a criteria pollutant, the only NO_X that currently have NAAQS is NO_2. Cost per ton removal of NO_2 is an order of magnitude more expensive than for NO_X, and is addressed under tBACT in Section 4.5.

Therefore, Ecology agrees with the applicant that this NO_X control option can be excluded as BACT (both as SCR alone and as part of Tier 4 capable integrated control system, which includes a combination of SCR with other control technologies for other pollutants).

4.1.1.2. Combustion controls, Tier 2 compliance, and programming verification

Diesel engine manufacturers typically use proprietary combustion control methods to achieve the overall emission reductions needed to meet applicable EPA tier standards. Common general controls include fuel injection timing retard, turbocharger, a low-temperature aftercooler, use of EPA Tier-2 certified engines operated as emergency engines as defined in 40 CFR §60.4219, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII. Although it may lead to higher fuel consumption, injection timing retard reduces the peak flame temperature and resulting NOx emissions. While good combustion practices are a common BACT approach, for the MWH Data Center engines however, a more specific approach, based on input from Ecology inspectors after inspecting similar data centers, is to obtain written verification from the engine manufacturer that each engine of the same make, model, and rated capacity installed at a facility use the same electronic Programmable System Parameters, i.e., configuration parameters, in the electronic engine control unit. These BACT options are considered further in Section 4.1.2.

4.1.1.3. Other control options

Other NO_X control options listed in this subsection were considered but rejected for the reasons specified:

4.1.1.3.1. Selective non-catalytic reduction (SNCR)

This technology is similar to that of an SCR but does not use a catalyst. Initial applications of Thermal DeNOx, an ammonia based SNCR, achieved 50 percent NO_X reduction for some stationary sources. This application is limited to new stationary sources because the space required to completely mix ammonia with exhaust gas needs to be part of the source design. A different version of SNCR called NO_XOUT uses urea, and has achieved 50–70 percent NO_X reduction. Because the SNCR system does not use a catalyst, the reaction between ammonia and NO_X occurs at a higher temperature than with an SCR, making SCR applicable to more combustion sources. Currently, the preferred technology for back-end NO_X control of reciprocating internal combustion engine (RICE) diesel applications appears to be SCR with a system to convert urea to ammonia.

4.1.1.3.2. Non-selective catalytic reduction (NSCR)

This technology uses a catalyst without a reagent and requires zero excess air. The catalyst causes NO_X to give up its oxygen to products of incomplete combustion (PICs), CO, and hydrocarbons, causing the pollutants to destroy each other. However, if oxygen is present, the PICs will burn up without destroying the NO_X. While NSCR is used on most gasoline automobiles, it is not immediately applicable to diesel engines because diesel exhaust oxygen levels vary widely depending on engine load. NSCR might be more applicable to boilers. Currently, the preferred technology for back-end NO_X control of reciprocating internal combustion engine (RICE) diesel applications appears to be SCR with a system to convert urea to ammonia. See also Section 4.2.1.3 (Three-Way Catalysts).

4.1.1.3.3. Water injection

Water injection is considered a NO_X formation control approach and not a back-end NO_X control technology. It works by reducing the peak flame temperature and therefore reducing NO_X formation. Water injection involves emulsifying the fuel with water and increasing the size of the injection system to handle the mixture. This technique has minimal affect on CO emissions but can increase hydrocarbon emissions. This technology is rejected because there is no indication that it is commercially available and/or effective for new large diesel engines.

4.1.1.3.4. Other emerging technologies

Emerging technologies include NO_X adsorbers, RAPER-NO_X, ozone injection, and activated carbon absorption.

- **NO_X Adsorbers:** NO_X adsorbing technologies (some of which are known as $SCONO_X$ or EMx^{GT}) use a catalytic reactor method similar to SCR. $SNONO_X$ uses a regenerated catalytic bed with two materials, a precious metal oxidizing catalyst (such as platinum) and potassium carbonate. The platinum oxidizes the NO into NO_2, which can be adsorbed onto the potassium carbonate. While this technology can achieve NO_X reductions up to 90 percent (similar to an SCR), it is rejected because it has significantly higher capital and operating costs than an SCR. Additionally, it requires a catalyst wash every 90 days, and has issues with diesel fuel applications, (the GT on EMx^{GT} indicates gas turbine application). A literature search did not reveal any indication that this technology is commercially available for stationary backup diesel generators.

- **Raper-NO_X:** This technology consists of passing exhaust gas through cyanic acid crystals, causing the crystals to form isocyanic acid, which reacts with the NO_X to form CO_2, nitrogen, and water. This technology is considered a form of SNCR, but questions about whether stainless steel tubing acted as a catalyst during development of this technology, would make this another form of SCR. To date, it appears this technology has never been offered commercially.

- **Ozone Injection:** Ozone injection technologies, some of which are known as LoTOx or BOC, use ozone to oxidize NO to NO_2 and further to NO_3. NO_3 is soluble in water and can be scrubbed out of the exhaust. As noted in the literature, ozone injection is a unique approach because while NO_X is in attainment in many areas of the United States (including Quincy, WA), the primary reason to control NO_X is that it is a precursor to ozone. Due to high additional costs associated with scrubbing, this technology is rejected.

- **Activated Carbon Absorption with Microwave Regeneration:** This technology consists of using alternating beds of activated carbon by conveying exhaust gas through one carbon bed, while regenerating the other carbon bed with microwaves. This technology appears to be successful in reducing NO_X from diesel engine exhaust. However, it is not progressing to commercialization and is therefore rejected.

4.1.2. BACT determination for NO_X

Ecology determines that BACT for NO_X is the use of EPA Tier-2 certified engines operated as emergency engines as defined in 40 CFR§60.4219, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII. In addition, 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. “Installed at the facility” could mean at the manufacturer or at the data farm because the engine manufacturer service technician sometimes makes the operational parameter modification/correction to the electronic engine controller at the data farm. Microsoft will install engines consistent with this BACT determination. Ecology believes this is a reasonable approach in that this BACT requirement replaces a more general, common but related BACT requirement of "good combustion practices."

Note: Because control options for PM, CO, and VOCs, are available as discussed in BACT Section 4.2., which are less costly per ton than the Tier 4 capable integrated control system option for those pollutants, both the SCR-only option as well as the Tier 4 capable integrated control system option are not addressed further within BACT.

4.2. BACT Analysis for PM, CO, and VOC from Diesel Engine Exhaust

Microsoft reviewed the available published literature and the RBLC and identified the following demonstrated technologies for the control of PM, CO, and VOC emissions from the proposed diesel engines:

4.2.1. BACT options for PM, CO, and VOC from diesel engine exhaust

4.2.1.1. Diesel particulate filters

These add-on devices include passive and active DPFs, depending on the method used to clean the filters (i.e., regeneration). Passive filters rely on a catalyst while active filters typically use continuous heating with a fuel burner to clean the filters. The use of DPFs to control diesel engine exhaust particulate emissions has been demonstrated in multiple engine installations worldwide. Particulate matter reductions of up to 85 percent or more have been reported. Therefore, this technology was identified as the top case control option for diesel engine exhaust particulate emissions from the proposed engines.

Microsoft has evaluated the cost effectiveness of installing and operating DPFs on each of the proposed diesel engines. The analysis indicates that the use of DPFs would cost approximately $304,000 to $352,000 per ton of engine exhaust particulate removed from the exhaust stream at MWH each year. DPFs also remove CO and VOCs at costs of approximately $76,000 to $131,000 and $440,000 to $614,000 per ton per year respectively. If the cost effectiveness of DPF use is evaluated using the total amount of PM, CO, and VOCs reduced, the cost estimate would be approximately $53,500 to $82,900 per ton of pollutants removed per year.

These annual estimated costs (for DPF use alone) provided by Microsoft are conservatively low estimates that take into account installation, tax, and shipping capital costs but assume a lower bound estimate for operational, labor and maintenance costs of $0, whereas an upper bound CARB estimate could potentially amount to an additional $282,000/year.

Ecology concludes that use of DPF is not economically feasible for this project. Therefore, Ecology agrees with the applicant that this control option can be rejected as BACT.

4.2.1.2. Diesel oxidation catalysts

This method utilizes metal catalysts to oxidize carbon monoxide, particulate matter, and hydrocarbons in the diesel exhaust. Diesel oxidation catalysts (DOCs) are commercially available and reliable for controlling particulate matter, carbon monoxide, and hydrocarbon emissions from diesel engines. While the primary pollutant controlled by DOCs is carbon monoxide, DOCs have also been demonstrated to reduce diesel engine exhaust particulate emissions, and hydrocarbon emissions.

Microsoft has evaluated the cost effectiveness of installing and operating DOCs on each of the proposed diesel engines. The following DOC BACT cost details are provided as an example of the BACT and tBACT cost process that Microsoft followed for engines within this application (including for SCR-only, DPF-only, and Tier 4 capable integrated control system technologies).

- Microsoft obtained the following recent DOC equipment costs from a vendor on November 11, 2013: ($52,100 for a stand-alone catalyzed DOC per single 2.5 MWe generator; add scaled amounts of $25,299 for a single 0.750 MWe generator, and $45,571 for four 2.0 MWe generators). For forty (40) 2.5 MWe generators, four (4) 2.0 MWe generators, and one (1) 0.750 MWe generators, this amounts to $2,291,585. According to the vendor, DOC control efficiencies for this unit are CO, HC, and PM are 90%, 80%, and 20%, respectively.

- The subtotal becomes $2,555,117 after accounting for shipping ($114,579), WA sales tax ($148,953), and direct on-site installation ($63,878).

- After adding indirect installation costs, the total capital investment amounts to $3,092,383. Indirect installation costs include but are not limited to startup fees, contractor fees, and performance testing.

- Annualized over 25 years and included with direct annual costs based on EPA manual EPA/452/B-02-001, the total annual cost (capital recovery and direct annual costs) is estimated to be $321,639.

- At the control efficiencies provided from the vendor, the annual tons per year (tpy) of emissions for CO (11.6 tpy), HC (2.26 tpy), and PM (3.07 tpy) become 10.4 tpy, 1.8 tpy, and 0.61 tpy removed, respectively.

- The last step in estimating costs for a BACT analysis is to divide the total annual costs by the amount of pollutants removed ($321,639 divided by 10.4 tpy for CO, etc.).

The corresponding annual DOC cost-effectiveness value for CO destruction alone is approximately $30,800 to $40,500 per ton. If PM and hydrocarbons were individually considered, the cost-effectiveness values would be equal to or exceed $524,000 and $178,000 per ton of pollutant removed annually, respectively. If the cost-effectiveness of using DOC is evaluated using the total amount of CO, PM, and hydrocarbons reduced, the cost estimate would be approximately $25,000 to $40,500 per ton of pollutants removed per year.

These annual estimated costs (for DOC use alone) provided by Microsoft are conservatively low estimates that take into account installation, tax, shipping, and other capital costs as mentioned above, but assume a lower bound estimate for operational, labor and maintenance costs of $0, whereas an upper bound CARB estimate could potentially amount to an additional $28,000 per year.

Ecology concludes that use of DOC is not economically feasible for this project. Therefore, Ecology agrees with the applicant that these control option can be rejected as BACT.

4.2.1.3. Three-way catalysts

Three-way catalyst (TWC) technology can control CO, VOC, and NO_X in gasoline engines. However, Ecology concludes that a three-way catalyst is not feasible for this project and can be rejected as BACT based on a review of the following literature:[3]

> "The TWC catalyst, operating on the principle of non-selective catalytic reduction of NOx by CO and HC, requires that the engine is operated at a nearly stoichiometric air to-fuel (A/F) ratio… In the presence of oxygen, the three-way catalyst becomes ineffective in reducing NOx. For this reason, three-way catalysts cannot be employed for NOx control on diesel applications, which, being lean burn engines, contain high concentrations of oxygen in their exhaust gases at all operating conditions."

4.2.2. BACT determination for PM, CO, and VOC

Ecology determines BACT for particulate matter, carbon monoxide and volatile organic compounds is restricted operation of EPA Tier-2 certified engines operated as emergency engines as defined in 40 CFR §60.4219, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII. Microsoft will install engines consistent with this BACT determination.

4.3. BACT Analysis for Sulfur Dioxide from Diesel Engine Exhaust

4.3.1. BACT options for SO_2

Microsoft did not find any add-on control options commercially available and feasible for controlling sulfur dioxide emissions from diesel engines. Microsoft's proposed BACT for sulfur dioxide is the use of ultra-low sulfur diesel fuel (15 ppm by weight of sulfur).

[3] DieselNet, an online information service covering technical and business information for diesel engines, published by Ecopoint Inc. of Ontario, Canada (https://www.dieselnet.com).

4.3.2. BACT determination for SO_2

Ecology determines that BACT for sulfur dioxide is the use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

4.4. BACT Analysis for PM from Cooling Towers

The direct contact between the cooling water and air results in entrainment of some of the liquid water into the air. The resulting drift droplets contain total dissolved solids (TDS) in the cooling tower water, which can evaporate into air as particulate matter. For the MWH facility, the recirculation water in the cooling towers will be pre-softened using the proprietary Water Conservation Technology International (WCTI) “pre-treatment system” to replace scale-forming mineral compounds (e.g., calcium and magnesium) with other non-toxic, non-scaling mineral compounds (e.g., sodium), which will allow the cooling towers to be operated with very high “cycles of concentration.” Microsoft analyzed the industrial wastewater used in the cooling towers, which includes trace metals and chlorine disinfection byproducts, and estimates that cooling tower TAP emissions from all cooling towers combined (after implementing their proposed BACT in Section 4.4.1.1) will not exceed the respective small quantity emission rates (SQERs) for any TAP.

4.4.1. BACT options for PM from cooling towers

Microsoft reviewed the available published literature and the RBLC and identified drift eliminators as demonstrated technologies for the control of PM from the proposed cooling towers. Drift eliminators can reduce the amount of drift, and therefore the amount of particulate matter released into the air.

4.4.1.1. Cooling towers with 0.0005 percent drift efficiency

Microsoft proposes to use high-efficiency drift eliminators that will achieve a liquid droplet drift rate of no more than 0.0005 percent of the recirculation flow rate within each cooling tower. Microsoft estimates that by using a 0.0005 percent drift rate and a total dissolved solids (TDS) concentration of 69,000 mg/L, only 13 percent of the solid evaporated drift particles will be smaller than 2.5 microns in diameter ($PM_{2.5}$), and 56 percent will be smaller than PM_{10} (based on sizing approach presenting in: “*Calculating Realistic PM10 Emissions from Cooling Towers", Reisman and Frisbie, Environmental Progress, July 2002).* Microsoft’s original application dated January 17, 2014, stated that a cooling tower with 0.0005 percent drift efficiency is the most efficient drift eliminator that is commercially available.

4.4.1.2. Cooling towers with 0.0003 percent drift efficiency

In Ecology’s February 26, 2014, incompleteness letter for the original January 2014 Microsoft “Oxford” application (the name at the time); Ecology noted that a cooling tower with 0.0003 percent drift rate was in use at the Harquahala power plant in Arizona, which is regulated by the Maricopa County Air Pollution Control District (APCD). Because of this, Ecology asked

Microsoft to defend or revise the claim in the original application stating that a cooling tower with 0.0005 percent drift efficiency is the most efficient drift eliminator that is commercially available. Upon review, Microsoft's consultant (Landau Associates) learned that the 0.0003 percent drift cooling tower at Harquahala is custom built for that large utility electric power plant. It has a water recirculation rate of 15,000 gpm, and is not comparable to what is needed at MWH, which has a water recirculation rate of only 950 gpm. When Microsoft requested price quotes for cooling towers with 0.0003 percent drift efficiency for the cooling towers to be used at the MWH Data Center, venders responded that a cooling tower with 0.0003 percent drift efficiency is not a commercially available product because it is below field measurement capabilities, and could not be proven. According to EPA's BACT/LAER Clearinghouse database, Microsoft found BACT levels for cooling towers from 0.005 percent and 0.0005 percent. Of 30 cooling towers identified between 2003-2013, twenty-four had BACT determinations of 0.0005 percent, and six had BACT determinations from between 0.005 percent to 0.0005 percent.

Thus, Ecology considers this information to be a reasonable justification to accept high efficiency drift eliminators rated at 0.0005 percent drift to be the most efficient drift eliminators that are commercially available for the induced-draft mechanical cooling towers to be used at MWH. Therefore, no other control options are considered.

4.4.2. BACT determination for PM from cooling towers

Ecology accepts as BACT for particulate matter, cooling tower drift eliminators that can achieve a 0.0005 percent rate. These are the most efficient drift eliminators that are commercially available for the induced-draft mechanical cooling towers to be used at MWH. As noted in this Technical Support Document (Section 4), federal regulations require that BACT decisions are made on a *case-by-case* basis. This specific BACT decision is based on the information provided in Section (4.4); including consideration of the high TDS content resulting from the anti-scaling WCTI approach used by MWH.

4.5. Best Available Control Technology for Toxics

Best Available Control Technology for Toxics (tBACT) means BACT, as applied to TAPs.[4] One of the TAPs, Ammonia, is used as part of the SCR control technology described in Section 4.1.1.1. Another data center in Quincy has used a tBACT for ammonia of 15 ppmvd at 15 percent oxygen (O_2) per engine to address ammonia slip. Although BACT and tBACT are considered on a case-by-case basis as described in Section 4, Ecology has decided, and Microsoft has agreed on a similar tBACT for ammonia as listed in Table 4.5. For the rest of the TAPs that exceed small quantity emission rates (SQERs), the procedure for determining tBACT followed the same procedure used above for determining BACT. Of the technologies Microsoft considered for BACT, the minimum estimated costs as applied to tBACT are as follows:

- The minimum estimated costs to control diesel engine exhaust particulate (DEEP) is estimated to be $300,000 per ton removed.

[4] WAC 173-460-020.

- The minimum estimated cost to control NO_2 is estimated to be $116,000 per ton removed.

- The minimum estimated cost to control CO is estimated to be $31,000 per ton removed.

- The minimum estimated costs to control acrolein, which could be treated with the VOC treatment listed under BACT, are estimated to be greater than approximately $200 million per ton.

- The minimum estimated costs to control benzene, which could be treated with the VOC treatment listed under BACT, are estimated to be greater than approximately $2 million per ton.

Under state rules, tBACT is required for all toxic air pollutants for which the increase in emissions will exceed de minimis emission values as found in WAC 173-460-150. Based on the information presented in this TSD, Ecology has determined that Table 4.5 below represents tBACT for the proposed project.

Table 4.5. tBACT Determination

Toxic Air Pollutant	tBACT
Primary NO_2	Compliance with the NOx BACT requirement
Diesel Engine Exhaust Particulate	Compliance with the PM BACT requirement
Carbon monoxide	Compliance with the CO BACT requirement
Sulfur dioxide	Compliance with the SO_2 BACT requirement
Ammonia	Ammonia emissions shall not exceed 15 per million volume-dry (ppmvd) at 15% Oxygen (O2) per engine.
Benzene	Compliance with the VOC BACT requirement
Toluene	Compliance with the VOC BACT requirement
Xylenes	Compliance with the VOC BACT requirement
1,3 Butadiene	Compliance with the VOC BACT requirement
Formaldehyde	Compliance with the VOC BACT requirement
Acetaldehyde	Compliance with the VOC BACT requirement
Acrolein	Compliance with the VOC BACT requirement
Benzo(a)Pyrene	Compliance with the VOC BACT requirement
Benzo(a)anthracene	Compliance with the VOC BACT requirement
Chrysene	Compliance with the VOC BACT requirement
Benzo(b)fluoranthene	Compliance with the VOC BACT requirement
Benzo(k)fluoranthene	Compliance with the VOC BACT requirement
Dibenz(a,h)anthracene	Compliance with the VOC BACT requirement
Ideno(1,2,3-cd)pyrene	Compliance with the VOC BACT requirement
Napthalene	Compliance with the VOC BACT requirement
Propylene	Compliance with the VOC BACT requirement

Table 4.5. tBACT Determination	
Toxic Air Pollutant	**tBACT**
Fluoride	Compliance with PM Cooling Tower BACT requirement
Manganese	Compliance with PM Cooling Tower BACT requirement
Copper	Compliance with PM Cooling Tower BACT requirement
Chloroform	Compliance with PM Cooling Tower BACT requirement
Bromodichloromethane	Compliance with PM Cooling Tower BACT requirement
Bromoform	Compliance with PM Cooling Tower BACT requirement

5. AMBIENT AIR MODELING

Ambient air quality impacts at and beyond the property boundary were modeled using EPA's AERMOD dispersion model, with EPA's PRIME algorithm for building downwash.

The AERMOD model used the following data and assumptions:

5.1. Five years of sequential hourly meteorological data from Moses Lake Airport were used. Twice-daily upper air data from Spokane were used to define mixing heights.

5.2. The AMS/EPA Regulatory Model Terrain Pre-processor (AERMAP) was used to obtain height scale, receptor base elevation, and to develop receptor grids with terrain effects. For area topography required for AERMAP, Digital topographical data (in the form of Digital Elevation Model files) were obtained from www.webgis.com.

5.3. Each 2.5 MWe generator was modeled with a stack height of 40 feet above local ground; each 2.0 MWe generator was modeled with a stack height of 40 feet above local ground; the 0.750 MWe generator was modeled with a stack height of 35 feet above local ground;

5.4. The data center buildings, in addition to the individual generator enclosures were included to account for building downwash.

5.5. The receptor grid for the AERMOD modeling was established using a 10-meter grid spacing along the facility boundary extending to a distance of 350 meters from each facility boundary. A grid spacing of 25 meters was used for distances of 350 meters to 800 meters from the boundary. A grid spacing of 50 meters was used for distances from 500 meters to 2000 meters from the boundary. A grid spacing of 100 meters was used for distances beyond 2000 meters from the boundary.

5.6. Dispersion modeling is sensitive to the assumed stack parameters (i.e., flowrate and exhaust temperature). The stack temperature and stack exhaust velocity at each generator stack were set to values corresponding to the engine loads for each type of testing and power outage.

5.7. One-hour NO_2 concentrations at and beyond the facility boundary were modeled using the Plume Volume Molar Ratio Method (PVMRM) module, with default concentrations of 49 parts per billion (ppb) of background ozone, and an equilibrium NO_2 to NO_X ambient ratio of 90 percent.

5.8. As described in the application, AERMOD modeling results showed the highest 1-hour NO_2 impact occurs at the unpopulated northern property line of the facility. In order for the MWH Data Center to exceed the 1-hour NO_2 NAAQS on any given day at any given receptor location, the following events must occur simultaneously:

- The generators must be operating with a high NO_X emission rate during a facility-wide power outage affecting all 45 generators simultaneously.
- The wind must be blowing directly toward the given receptor location.
- The atmospheric dispersion conditions must be unusually poor.

Ecology's stochastic Monte Carlo statistical package was used to evaluate the 8th highest daily 1-hour NO_2 impacts caused by randomly occurring emissions distributed throughout the data center. The stochastic Monte Carlo analysis considered conservatively high occurrences of two runtime events (power outages and maintenance activities).

5.8.1. Power outage – 1-hour NO_2 NAAQS compliance

As described in the application: A conservatively high four calendar days per year of facility-wide power outages (with the 37 primary generators operating at 100 percent load while the eight new reserve generators operate at 10 percent load). In reality, power outages at the Quincy data centers occur infrequently, so a facility-wide power outage is unlikely to actually occur more than one day per year. The emission rates assume every generator is subject to a cold start.

5.8.2. Maintenance – 1-hour NO_2 NAAQS compliance

As described in the application: 16 days per year of electrical bypass maintenance randomly distributed at various locations within the data center (with each day of electrical bypass consisting of four generators at 100 percent load). This frequency is equivalent to two days per year of electrical bypass at each of the eight AZ buildings. That frequency is conservatively high, because Microsoft plans its transformer and switchgear maintenance in a manner so no AZ building is likely to require more than 1 day per year of electrical bypass. Furthermore, Microsoft plans to conduct transformer and switchgear maintenance at each building on a 3-year cycle, rather than annually as modeled for this analysis. The emission rates assume every generator is subject to a cold start.

5.8.3. Monte Carlo results for 1-hour NO_2 NAAQS compliance

Using conservative assumptions, the Monte Carlo model predicts the data center will comply with the 98th percentile NO_2 NAAQS:

- MWH-only 98th percentile impact 100 μg/m3
- Regional plus local background 16 μg/m3
- Cumulative impact 116 μg/m3
- Allowable NAAQS limit 188 μg/m3

Using more realistic operation assumptions, the Monte Carlo model predicts the data center will comply with an even greater margin below the 98th percentile NO_2 NAAQS:

- MWH-only 98th percentile impact 27 μg/m3
- Regional plus local background 16 μg/m3
- Cumulative impact 43 μg/m3
- Allowable NAAQS limit 188 μg/m3

5.9. AERMOD Meteorological Pre-processor (AERMET) was used to estimate boundary layer parameters for use in AERMOD.

5.10. AERSURFACE was used to determine the percentage of land use type around the facility based on albedo, Bowen ratio, and surface roughness parameters.

Except for diesel engine exhaust particulate, which is predicted to exceed its ASIL, AERMOD model results show that no NAAQS or ASIL will be exceeded at or beyond the property boundary. The modeling results as listed in the application are provided below:

Criteria Pollutant	Standards in μg/m³ NAAQS(d) Primary	Standards in μg/m³ NAAQS(d) Secondary	Maximum Ambient Impact Concentration (μg/m³)	AERMOD Filename	Background Concentrations (μg/m³) (a)	Maximum Ambient Impact Concentration Added to Background (μg/m³) (If Available)
Particulate Matter (PM_{10})						
1st-Highest 24-hour average during power outage with cooling towers	150	150	26.6	PM10_081915	89	116
Particulate Matter ($PM_{2.5}$)						
Annual average	12	15	0.152	DEEP_081815	6.75	6.9
1st-highest 24-hour average for cooling towers and electrical bypass	35	35	8.4	PM25_081915(a-e)	21.7	30.2
Carbon Monoxide (CO)						
8-hour average	10,000		205	CO_081915	482	687
1-hour average	40,000		421	CO_081915	842	1,263

Criteria Pollutant	Standards in µg/m³ NAAQS(d) Primary	Secondary	Maximum Ambient Impact Concentration (µg/m³)	AERMOD Filename	Background Concentrations (µg/m³) (a)	Maximum Ambient Impact Concentration Added to Background (µg/m³) (If Available)
Nitrogen Oxides (NO_2)						
Annual average (b),(c)	100	100	19.4	NO2_081915	2.8	22.2
1-hour average	188	--	100	NO2-NAAQS Monte Carlo	16	116
Sulfur Dioxide (SO_2)						
3-hour average	--	1,300	NA	NA	NA	<1,300
1-hour average	195	--	NA	NA	NA	<195

Toxic Air Pollutant	ASIL (µg/m³)	Averaging Period	1st-Highest Ambient Concentration (µg/m³)	AERMOD Filename
DEEP	0.00333	Annual average	0.152	DEEP_081815
NO_2	470	1-hour average	606	NO2_081915
CO	23,000	1-hour average	1,263	CO_081915
Ammonia	70.8	24-hour average	25	CO_081915
Acrolein	0.06	24-hour average	0.001	CO_081915
Benzene	0.0345	Annual Average	0.001	CO_081915

Notes:
N/A = not applicable and/or not provided
µg/m³ = Micrograms per cubic meter.
ppm = Parts per million.
ASIL = Acceptable source impact level.
DEEP = Diesel engine exhaust, particulate
(a) Sum of "regional background" plus "local background" values. Regional background concentrations obtained from WSU NW Airquest website. Local background concentrations derived from AERMOD modeling and include emissions from Con Agra Foods, Microsoft Columbia Data Center, and the Dell Data Center.
(b) For determining the 3-year average, five separate models were run (one for each year of meteorological data) to determine the 98th percentile concentration for each year based on the NAAQS.
(c) Annually averaged concentrations are based on the theoretical maximum annual concentration, which assumes the worst-case scenario that the 3-year rolling average permit limit is released entirely within a single year.
(d) Ecology interprets compliance with the National Ambient Air Quality Standards (NAAQS) as demonstrating compliance with the Washington Ambient Air Quality Standards (WAAQS).

Microsoft has demonstrated compliance with the NAAQS and ASILs except for DEEP. As required by WAC 173-460-090, emissions of DEEP are further evaluated in the following section of this document.

6. SECOND TIER REVIEW FOR DIESEL ENGINE EXHAUST PARTICULATE

Proposed emissions of DEEP and NO_2 from the thirty-seven (37) MWH engines exceed the regulatory trigger level for TAPs (also called an ASIL). A second tier review was required for DEEP and NO_2 in accordance with WAC 173-460-090, and MWH was required to prepare a health impact assessment (HIA). The HIA presents an evaluation of both noncancer hazards and increased cancer risk attributable to MWH's increased emissions of all identified carcinogenic compounds (including DEEP, NO_2, and numerous other constituents), ammonia, carbon monoxide, benzene, and acrolein. MWH also reported the DEEP and NO_2 cumulative risks associated with MWH and prevailing sources in their HIA document based on a cumulative modeling approach. The MWH cumulative risk study is based on proposed generators, nearby existing permitted data center sources, and other background sources including highways and railroads. The MWH HIA document along with a brief summary of Ecology's review will be available on Ecology's website.

7. CONCLUSION

Based on the above analysis, Ecology concludes that operation of the 45 generators and 32 cooling towers will not have an adverse impact on air quality. Ecology finds that Microsoft's MWH Data Center has satisfied all requirements for NOC approval.

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Appendix G:
Second Tier Review Recommendation

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DEPARTMENT OF
ECOLOGY
State of Washington

2nd Revised Health Impact Assessment Review Document for

Microsoft MWH (formerly Oxford) Data Center
Quincy, Washington

Prepared by

Air Quality Program
Washington State Department of Ecology
Olympia, Washington

September 27, 2016

1. Executive Summary

This document presents Ecology's review and summary of the health risks from air pollutants emitted by 45 diesel engines at the Microsoft MWH Data Center in Quincy. This document updates a previous review to reflect changes to the design of previously permitted engines' exhaust stacks and the addition of eight new engines.

In 2014, Ecology issued an air permit which allowed Microsoft to install and operate 37 diesel-powered generators that emit pollutants into the air at the MWH (previously known as Oxford) Data Center. In 2015, Ecology released a revised draft permit for public comment which allowed Microsoft greater flexibility in the way they operate the engines. Before that permit was finalized, Microsoft notified Ecology that they would likely need additional changes prompting Ecology to halt the finalization of the permit.

In January 2016, Microsoft resubmitted application materials to reflect emissions from the 37 engines originally permitted in 2014, and eight new engines. In total, Microsoft MWH's revised 2016 application included emissions from:

- Thirty-two (32) cooling towers
- Thirty-two (32) generators rated at 2,500 kilowatt (kW) electrical output
- Four (4) generators rated at 2,000 kW
- One (1) generator rated at 750 kW
- Eight (8) new generators rated at 2,500 kW

Because the application included changes to the design of existing stacks (shorter than previously permitted), new equipment (eight new engines), and an increase in emissions, Ecology required Microsoft to revise the health impact assessment (HIA) to evaluate the health risks from exposure to diesel engine exhaust particulates (DEEP).

Microsoft hired Landau Associates to revise the HIA (Landau Associates, 2016). In this assessment, Landau Associates estimated lifetime increased cancer risks associated with Microsoft's diesel particles and other toxic air pollutant (TAP) emissions.

The revised diesel particle emissions resulted in an increase lifetime cancer risk from the previous estimate of about 5.7 in one million to a new estimate of about 5.9 in one million. The maximum risk was estimated at a residential location north of MWH Data Center. This risk assumes that a person is exposed to MWH's emissions continuously during their entire lifetime. Ecology allows an increased risk of up to 10 in one million from new sources of air pollutants. The risk can also be expressed as the number of cancers that might occur in addition to those normally expected in a population of one million people. The cancer risk estimates reported here are for increases above a baseline lifetime risk of cancer of about 40 percent in the United States.

The increased cancer risk was quantified assuming that both filterable and condensable particles emitted from MWH's diesel engines constitute DEEP. Typically, only the filterable particles are considered when estimating the risk of exposure to diesel exhaust particles. This is because the studies about the health risk from diesel exposure used measurements of respirable particles from "fresh" diesel exhaust and elemental carbon to represent diesel exhaust emissions. The increased risk estimated by Landau Associates represents a conservatively high estimate. If emissions estimates were based on only filterable emissions (excluding the condensable particles), then the estimated risk would be about one in one million. Landau Associates also assessed chronic and acute noncancer hazards associated with the project's emissions and determined that MWH's emissions by themselves are not likely to result in adverse noncancer health effects.

To evaluate the cumulative effect of numerous sources of diesel particles in the area, Landau Associates assessed the cumulative health risk by adding estimated concentrations associated with MWH's emissions to an estimated background concentration. The maximum cumulative cancer risk to a person who lives near MWH is about 41 in one million. Much of the exposure to diesel particles at this location comes from vehicles travelling on State Route 28. Additionally, exposure to diesel particles in the area is not likely to result in long-term noncancer health effects.

Finally, Landau Associates assessed short-term impacts of nitrogen dioxide (NO_2) emitted at the same time by all 110 permitted and proposed west Quincy data center backup diesel generators during a power outage affecting MWH, Microsoft Columbia, and Dell data centers. This evaluation indicated that elevated NO_2 levels could occur under some unfavorable meteorological conditions. The likelihood, however, of an outage coinciding with unfavorable meteorological conditions is very low.

Because the increase in cancer risk associated with the new data center alone is less than the maximum risk allowed under Ecology's rules (10 in one million), and the noncancer hazard is low, the project is approvable under WAC 173-460-090. Furthermore, the cumulative risks to residents living near MWH Data Center are below the cumulative risk threshold established by Ecology for permitting data centers in Quincy (100 per million or 100×10^{-6}).

This summary document presents Ecology's review of the Microsoft MWH Data Center's revised HIA and other requirements under WAC 173-460.

2. Second Tier Review Processing and Approval Criteria

2.1. Second tier review processing requirements

In order for Ecology to review the second tier petition, each of the following regulatory requirements under Chapter 173-460-090 must be satisfied:

(a) The permitting authority has determined that other conditions for processing the NOC Order of Approval have been met, and has issued a preliminary approval order.

(b) Emission controls contained in the preliminary NOC approval order represent at least best available control technology for toxics (tBACT).

(c) The applicant has developed an HIA protocol that has been approved by Ecology.

(d) The ambient impact of the emissions increase of each TAP that exceed acceptable source impact levels (ASILs) has been quantified using refined air dispersion modeling techniques as approved in the HIA protocol.

(e) The second tier review petition contains an HIA conducted in accordance with the approved HIA protocol.

Acting as the "permitting authority" for this project, Ecology's project permit engineer satisfied items (a) and (b) above on September 22, 2016 (Ecology, 2016). Landau Associates submitted an HIA protocol (item (c)) on December 20, 2013, and the revised final HIA (item (e)) on April 8, 2016. The revised refined air dispersion modeling for short-term NO_2 and annual DEEP emissions (item (d)) was conducted in November and December 2015, respectively. Therefore, all five processing requirements above are satisfied.

2.2. Second tier review approval criteria

As specified in WAC 173-460-090(7), Ecology may recommend approval of a project that is likely to cause an exceedance of ASILs for one or more TAPs only if it:

(a) Determines that the emission controls for the new and modified emission units represent tBACT.

(b) The applicant demonstrates that the increase in emissions of TAPs is not likely to result in an increased cancer risk of more than one in one hundred thousand.

(c) Ecology determines that the noncancer hazard is acceptable.

2.2.1. tBACT determination

Ecology's permit engineer determined that Microsoft's proposed pollution control equipment (i.e., Tier 2 engines equipped with diesel particulate filters, diesel oxidation catalysts, and selective catalytic reduction) more than satisfies the BACT and tBACT requirement for diesel engines powering backup generators at MWH Data Center (Ecology, 2016).[1]

3. HIA Review

As described above, the applicant is responsible for preparing the HIA under WAC 173-460-090. Ecology's project team consisting of an engineer, a toxicologist, and a modeler review the HIA to

[1] BACT was determined to be met through the use of EPA Tier 2 certified engines if the engines are installed and operated as emergency engines, as defined at 40 CFR §60.4219; compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII; and use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

determine if the methods and assumptions are appropriate for assessing and quantifying the surrounding community's risk from a new project.

For the MWH project, the HIA focused on health risks attributable to DEEP and nitrogen dioxide exposure as these were the only TAPs with a modeled concentration in ambient air that exceeded respective ASILs. Landau Associates briefly described emissions and exposure to other TAPs (benzene, carbon monoxide (CO), ammonia,[2] and acrolein) because these pollutants exceeded a small quantity emission rate (SQER), and Ecology requested that health hazards from exposure to these pollutants be quantified.

3.1. DEEP health effects summary

Diesel engines emit very small fine (<2.5 micrometers [µm]) and ultrafine (<0.1 µm) particles. These particles can easily enter deep into the lung when inhaled. Mounting evidence indicates that inhaling fine particles can cause or contribute to numerous adverse health effects.

Studies of humans and animals specifically exposed to DEEP show that diesel particles can cause both acute and chronic health effects including cancer. Ecology has summarized these health effects in "Concerns about Adverse Health Effects of Diesel Engine Emissions" available at <http://www.ecy.wa.gov/pubs/0802032.pdf>.

3.2. NO_2 health effects summary

NO_2 forms when nitrogen, present in diesel fuel and as a major component of air, combines with oxygen to produce oxides of nitrogen. NO_2 and other oxides of nitrogen are of concern for ambient air quality because they are part of a complex chain of reactions responsible for the formation of ground-level ozone. Additionally, exposure to NO_2 can cause both long-term (chronic) and short-term (acute) health effects.

Long-term exposure to NO_2 can lead to chronic respiratory illness such as bronchitis and increase the frequency of respiratory illness due to respiratory infections. Short-term exposure to extremely high concentrations (> 180,000 $\mu g/m^3$) of NO_2 may result in serious effects including death (National Research Council, 2012). Moderate levels (~30,000 $\mu g/m^3$) may severely irritate the eyes, nose, throat, and respiratory tract, and cause shortness of breath and extreme discomfort. Lower level NO_2 exposure (< 1,000 $\mu g/m^3$may cause increased bronchial reactivity in some asthmatics, decreased lung function in patients with chronic obstructive pulmonary disease, and increased risk of respiratory infections, especially in young children (CalEPA, 2008). For the MWH project, the maximum short-term ambient NO_2 concentration has been estimated to be 606 $\mu g/m^3$, 1-hour average.

Power outage emissions present the greatest potential for producing high enough short-term concentrations of NO_2 to be of concern for susceptible individuals, such as people with asthma.

[2] Some ammonia is released from the selective catalytic reduction equipment designed to reduce NO_X emissions.

Landau Associates and Ecology calculated numerical estimates of exposure and hazard reported later in this document.

3.3. Toxicity reference values

Agencies develop toxicity reference values for use in evaluating and characterizing exposures to chemicals in the environment. As part of the HIA, Landau Associates identified appropriate toxicity values for DEEP and NO_2.

3.3.1. DEEP toxicity reference values

To quantify noncancer hazards and cancer risk from exposure to DEEP, quantitative toxicity values must be identified. Landau Associates identified toxicity values for DEEP from two agencies: the U.S. Environmental Protection Agency (EPA) (EPA, 2002; EPA, 2003), and California EPA's Office of Environmental Health Hazard Assessment (OEHHA) (CalEPA, 1998). These toxicity values are derived from studies of animals that were exposed to a known amount (concentration) of DEEP, or from epidemiological studies of exposed humans, and are intended to represent a level at or below which adverse noncancer health effects are not expected, and a metric by which to quantify increased risk from exposure to a carcinogen. Table 1 shows the appropriate DEEP noncancer and cancer toxicity values identified by Landau Associates.

EPA's reference concentration (RfC) and OEHHA's reference exposure level (REL) for diesel engine exhaust (measured as DEEP) was derived from dose-response data on inflammation and changes in the lung from rat inhalation studies. Each agency established a level of 5 $\mu g/m^3$ as the concentration of DEEP in air at which long-term exposure is not expected to cause adverse noncancer health effects.

National Ambient Air Quality Standards (NAAQS) and other regulatory toxicological values for short- and intermediate-term exposure to particulate matter have been established, but values specifically for DEEP exposure at these intervals do not currently exist.

OEHHA derived a unit risk factor (URF) for estimating cancer risk from exposure to DEEP. The URF is based on a meta-analysis of several epidemiological studies of humans occupationally exposed to DEEP. In these studies, DEEP exposure was estimated from measurements of elemental carbon and respirable particulate representing fresh diesel exhaust. The URF is expressed as the estimate of the plausible upper limit (i.e., the 95th percentile upper confidence interval) of cancer risk, assuming continuous lifetime exposure to a substance at a concentration of one microgram per cubic meter (1 $\mu g/m^3$). It is expressed in units of inverse concentration [i.e., $(\mu g/m^3)^{-1}$]. OEHHA's URF for DEEP is 0.0003 $(\mu g/m^3)^{-1}$ meaning that a lifetime of exposure to 1 $\mu g/m^3$ of DEEP results in an increased individual cancer risk of 0.03 percent or a population cancer risk of 300 excess cancer cases per million people exposed.

3.3.2. NO_2 toxicity reference value

OEHHA developed an acute reference exposure level for NO_2 based on inhalation studies of asthmatics exposed to NO_2. These studies found that some asthmatics exposed to about 0.25 ppm (i.e., 470 µg/m^3) experienced increased airway reactivity following inhalation exposure to NO_2 (CalEPA, 2008). Not all asthmatic subjects experienced an effect.

The acute REL derived for NO_2 does not contain any uncertainty factor adjustment, and therefore does not provide any additional buffer between the derived value and the exposure concentration at which effects have been observed in sensitive populations. This implies that exposure to NO_2 at levels equivalent to the acute REL (which is also the same value as Ecology's ASIL) could result in increased airway reactivity in a subset of asthmatics. People without asthma or other respiratory disease are not likely to experience effects at NO_2 levels at or below the REL. OEHHA intended for acute RELs to be "for infrequent 1 hour exposures that occur no more than once every two weeks in a given year" (CalEPA, 2015).

EPA developed an annual and 1-hour NAAQS for NO_2. Compliance with these NAAQS was demonstrated as part of the Notice of Construction (NOC) application process (Ecology, 2016).

Table 1. Toxicity Values Used to Assess and Quantify Non-cancer Hazard and Cancer Risk

Pollutant	Agency	Noncancer	Cancer
DEEP	U.S. Environmental Protection Agency	RfC = 5 µg/m3	N/A[1]
	California EPA–Office of Environmental Health Hazard Assessment	Chronic REL = 5 µg/m^3	URF = 0.0003 per µg/m^3
NO_2	California EPA–Office of Environmental Health Hazard Assessment	Acute REL = 470 µg/m^3	N/A

[1] EPA considers DEEP to be a probable human carcinogen, but has not established a cancer slope factor or URF.

3.4. Affected community/receptors

While MWH Data Center is located in an industrially zoned area and surrounded largely by agricultural land uses, air dispersion modeling indicated that proposed DEEP emissions, assuming DEEP is represented by both condensable and filterable particulate, could result in concentrations in excess of the ASIL at roughly 203 parcels with residential land use codes (Figure 1) [Ecology, 2015; Grant County, 2015]. U.S. Census data show that approximately 710 people live in the area in which Census Blocks intersected by the area in which DEEP concentrations are estimated to exceed the ASIL (U.S. Census Bureau, 2010).

For the purposes of assessing increased cancer risk and noncancer hazards, Landau Associates identified receptor locations where the highest exposure to project-related air pollutants could occur: at the project boundary, a nearby residence, and off-site commercial areas. They also identified and evaluated exposures at other areas with sensitive populations such as schools and a hospital. Landau Associates calculated both noncancer hazards and cancer risks for each of these receptors, and estimated long-term cumulative risks attributable to other known sources of DEEP.[3]

Ecology's review of the HIA found that Landau Associates identified appropriate receptors to capture the highest exposures for residential, commercial, and fence line receptors (Figures 2 and Figure 3). Landau Associates also identified other potential sensitive receptor areas such as students at Monument Elementary and Quincy Valley Schools, and patients at Quincy Valley Hospital.

3.5. Increased cancer risk

3.5.1. Cancer risk attributable to MWH's DEEP and other TAP emissions

Table 2, adapted from the HIA, shows the estimated MWH Data Center-specific and cumulative cancer risk per million at each of the receptors evaluated. The highest increase in risks attributable to MWH Data Center's emissions is 5.9 per million[4] and occurs at residential property north of MWH. Landau Associates also calculated risks posed by other carcinogenic TAPs (i.e., acetaldehyde, benzene, formaldehyde, 1,3-butadiene, and carcinogenic polycyclic aromatic hydrocarbons). They estimated a negligible increased risk attributable to these other TAPs of about 0.02 per million.

When estimating exposure to DEEP, Landau Associates assumed that both filterable and condensable particulate matter make up DEEP resulting in an estimated risk that errs on the side of overestimating risk.[5] Based on emissions estimates presented in the NOC application, filterable particles make up approximately 15 percent of the total filterable and condensable particulate matter.

[3] Landau Associates and Ecology modeled cumulative emissions from existing data centers, railway, and highways. Results were incorporated into the review of proposed emissions from MWH Data Center.
[4] Number per million represents an upper-bound theoretical estimate of the number of excess cancers that might result in an exposed population of one million people compared to an unexposed population of one million people. Alternatively, an individual's increase in risk of one in one million means a person's chance of getting cancer in their lifetime increases by one in one-million or 0.0001 percent.
[5] California Air Resources Board considers the front half (filterable) PM emissions to be consistent with the techniques used to establish diesel PM as a toxic air contaminant.

Table 2. Estimated Increased Cancer Risk for Residential, Occupational, and Student Scenarios Attributable to MWH's DEEP Emissions							
Attributable to:	Risk Per Million from DEEP Exposure at Various Receptor Locations						
	Fence Line Receptor[1]	R-1 North Residence (MIRR)[2]	C-1 Industrial Building (MICR)[3]	Monument Elementary School		Patients at Quincy Valley Medical Center[6]	Maximally Cumulatively Impacted Residence within area > ASIL[2]
				Students[4]	Teachers[5]		
MWH (assumes filterable and condensable particulate are DEEP)	1.0	5.9	1.9	0.1	0.4	<0.1	2.4

[1] Fence line scenario assumes intermittent exposure 250 days per year, two hours per day for 30 years.

[2] Residential scenarios assume continuous lifetime exposure.

[3] Workplace scenarios assume exposure occurs 250 days per year, eight hours per day for 40 years.

[4] Student scenario assumes exposure occurs 180 days per year, eight hours per day for seven years.

[5] Teacher scenario assumes exposure occurs 200 days per year, eight hours per day for 40 years.

[6] Patient scenario assumes a patient is present at the hospital 365 days per year, 24 hours per day for one year.

Note: Landau Associates also calculated risks posed by other carcinogenic TAPs (i.e., acetaldehyde, benzene, formaldehyde, 1,3-butadiene, and carcinogenic polycyclic aromatic hydrocarbons). They estimated a negligible increased risk attributable to these TAPs of about 0.02 per million at the north residence (R-1).

3.5.2. Cancer risk attributable to cumulative DEEP emissions

Landau Associates conducted a separate analysis of cumulative exposure to DEEP in Quincy.

The cumulative risk of all known sources of DEEP emissions in the vicinity of MWH Data Center (Table 3 and Figure 4) is highest for a nearby residence south of State Route 28, and southeast of the proposed project. The cumulative DEEP risk at this home is about 41 per million.[6] The majority (~68 percent) of estimated DEEP exposure at this location is attributable to emissions from vehicles travelling on State Route 28.

[6] Note that residential receptors tend to be the most exposed (e.g., longest exposure duration and exposure frequency). Therefore, their risks tend to be higher than other types of receptors. For regulatory decision-making purposes, Ecology assumes that a resident is continuously exposed at their residence for their entire lifetime.

Table 3. Estimated Cumulative Cancer Risk at Residential Locations near MWH Data Center			
	Risk Per Million from DEEP Exposure at Various Residential Receptor Locations[1]		
Attributable to:	Residence Maximally Impacted by MWH (MIRR)	Maximum Cumulatively Exposed Residence in Modeling Domain (adjacent to HWY 281)	Maximum Cumulatively Exposed Residence within the Area in which MWH–related Emissions Result in Concentrations Greater than the ASIL
MWH[2]	5.9	2.4	0.5
Dell[2]	0.6	0.6	0.7
Microsoft Columbia[2]	0.7	0.9	1.6
SR 28[3]	3.1	27.9	3.9
Rail[3]	2.3	6.6	2.2
SR 281[3]	0.8	2.7	58.8
Cumulative	13.5	41.1	67.7

[1] Residential scenarios assume continuous lifetime exposure.

[2] Based on allowable emissions or requested emission limits. Actual emissions likely to be lower.

[3] Based on 2011 emissions estimates.

3.6. Noncancer hazard

Landau Associates evaluated chronic noncancer hazards associated with long-term exposure to DEEP emitted from MWH Data Center and other local sources (Table 4). Hazard quotients were much lower than unity (one) for all receptors' exposure to MWH Data Center-related and cumulative DEEP.[7] In addition, Landau Associates evaluated combined long-term exposure to DEEP, benzene, acrolein, and ammonia emitted from MWH and determined the hazard indices were much lower than unity for all receptors' exposure to MWH Data Center-related pollutants. This indicates that chronic noncancer hazards are not likely to occur as a result of exposure to DEEP and other project-related TAPs in the vicinity of MWH Data Center.

Landau Associates also evaluated acute hazards associated with short-term exposure to NO_2 (Table 4). Landau Associates evaluated scenarios where MWH Data Center was operating under full power outage mode because this is the time period when short-term emissions would be greatest. Hazard quotients and hazard indices for the MIBR exposures were above one indicating that acute adverse health effects may occur in people occupying areas near the MWH's property boundary during a power outage. All other receptors' noncancer hazards from exposure to MWH's NO_2 emissions were at or below unity.

[7] The highest chronic hazard quotient attributed to cumulative exposure to DEEP (0.07) occurred at the maximum impacted boundary receptor location.

Landau Associates also evaluated short-term exposures to NO_2 emitted from MWH and nearby data center engines and determined that under outage scenarios, hazard indices could exceed unity at several locations. These hazards primarily result from NO_2 exposure (Table 4).[8] The frequency of these potential occurrences is further discussed in Section 4.2.

Table 4. Estimated Short-term NO_2 and Long-term DEEP Noncancer Hazards Attributable to MWH and (Cumulative) Emissions at Locations near MWH Data Center

	Acute (short-term)			Chronic (long-term)		
Receptors	**Max. 1-hr NO_2 (μg/m^3)**	**NO_2 Acute REL (μg/m^3)**	**HQ**	**Annual Avg. DEEP (μg/m^3)**	**DEEP Chronic REL (μg/m^3)**	**HQ**
MIBR	606 (655)	470	1.3 (1.4)	0.42 (0.46)	5	0.083 (0.091)
MICR	454 (455)		1.0 (1.0)	0.16 (0.29)		0.031 (0.058)
MIRR	409 (655)		0.9 (1.4)	0.064 (0.09)		0.013 (0.018)
Hospital	300 (375)		0.6 (0.8)	0.016 (0.1)		0.003 (0.020)
School	258 (527)		0.6 (1.1)	0.038 (0.1)		0.008 (0.020)

4. Other Considerations

4.1. Short-term exposures to DEEP

Exposure to DEEP can cause both acute and chronic health effects. However, as discussed previously, reference toxicity values specifically for DEEP exposure at short-term or intermediate intervals do not currently exist. Therefore, Landau Associates did not quantify short-term risks from DEEP exposure. Generally, Ecology assumes that compliance with the 24-hour $PM_{2.5}$ NAAQS is an indicator of acceptable short-term health effects from DEEP exposure. Ecology's Technical Support Document (TSD) for the draft preliminary NOC approval concludes that MWH's emissions are not expected to cause or contribute to an exceedance of any NAAQS (Ecology, 2016).

4.2. Cumulative short-term NO_2 hazard

While MWH Data Center's NO_2 emissions by themselves are not likely to result in adverse noncancer health effects, Ecology recognizes that it is possible that cumulative impacts of multiple data center's emissions during a system-wide outage could potentially cause NO_2 levels to be a health concern. Landau Associates evaluated the short-term NO_2 impacts that could result from emergency engine operation during a system-wide power outage affecting:

[8] Hazard quotients attributable to other TAPs were extremely low and are not presented in Table 4.

- Dell Data Center
- Microsoft Columbia Data Center
- Microsoft MWH Data Center

While NO_2 levels could indeed rise to levels of concern[9] at various locations across the west side of Quincy, the outage would have to occur at a time when the dispersion conditions were optimal for concentrating NO_2 at a given location.

Ecology estimated the combined probability of a west side Quincy system-wide outage coinciding with unfavorable dispersion conditions. Ecology found the likelihood of this occurrence to be relatively low.

To conduct this analysis, Landau Associates modeled emissions of:

- Simultaneous outage emissions of NO_X for all west side permitted (i.e., Dell Data Center and Microsoft Columbia Data Center)and proposed Microsoft MWH Data Center engines, during all meteorological conditions experienced throughout a five-year period.
- Each engine operates at loads specified in permits (for existing data centers) or permit applications (for MWH Data Center).
- Potential emissions from other NO_X sources on the west side of Quincy like State Route 28, State Route 281, and the BNSF railroad line.

Figure 5 shows the maximum 1-hour NO_2 concentrations that could occur in Quincy if all west side data centers' engines operated simultaneously under emergency conditions. Although the acute reference exposure level for NO_2 is 470 $\mu g/m^3$ (CalEPA, 2008), the figure shows only those concentrations that exceed 454 $\mu g/m^3$ because Ecology assumes that a NO_2 background concentration of 16 $\mu g/m^3$ exists in Quincy at any given time (NW AIRQUEST, 2016). It is important to note that the maximum 1-hour concentrations shown in Figure 5 do not all occur at the same time. The figure displays the worst-case concentration at each location in Quincy. Generally, this figure shows that concentrations of NO_2 could exceed a level of health concern in most areas on the west side of Quincy.

Ecology also analyzed the frequency (# of hours per year) meteorological conditions could result in a NO_2 concentration greater than 454 $\mu g/m^3$ at each receptor point within the west side Quincy modeling domain. If engines were run continuously during the course of a year, some areas near data centers could achieve concentrations of health concern for as often as 300 hours per year. In reality, these data centers were not permitted to continuously operate their engines. The engines are not expected to be used frequently under outage scenarios as the Grant County Public Utilities District (PUD) reported that from 2003 to 2009, the average total outage time for customers that

[9] The level of concern in this case is 454 $\mu g/m^3$. This represents California OEHHA's acute reference exposure level of 470 $\mu g/m^3$ minus an estimated regional background concentration of 16 $\mu g/m^3$.

experience an outage throughout Grant County PUD's service area is about 143 minutes per year (Coe, 2010).

Figure 6 shows the number of years between occurrences in which the NO_2 levels could exceed a level of concern assuming each west side data center operates each engine at outage load during eight hours of simultaneous outage per year. Generally, these occurrences are not likely to happen more than once per lifetime throughout much of Quincy's west side. More frequent occurrences may happen near the boundaries of Dell and Microsoft Columbia data centers. The most frequently impacted parcel may be impacted as often as once every three to six years. It is located west of the Dell property, is zoned industrial, and the 2015 tax parcel land use code is agricultural.

5. Uncertainty

Many factors of the HIA are prone to uncertainty. Uncertainty relates to the lack of exact knowledge regarding many of the assumptions used to estimate the human health impacts of MWH's emissions. The assumptions used in the face of uncertainty may tend to over- or underestimate the health risks estimated in the HIA. Key aspects of uncertainty in the HIA for project MWH are exposure assumptions, emissions estimates, air dispersion modeling, and toxicity of DEEP.

5.1. Exposure

It is difficult to characterize the amount of time that people can be exposed to MWH's DEEP emissions. For simplicity, Landau Associates and Ecology assumed a residential receptor is at one location for 24 hours per day, 365 days per year for 70 years. These assumptions tend to overestimate exposure.

The duration and frequency of power outages is also uncertain. From 2003 to 2009, the average outage for all Grant County PUD power customers was about 2.5 hours per year. While this small amount of power outage provides some evidence that power service is relatively stable, we cannot predict future outages with any degree of certainty.

5.2. Emissions

The exact amount of DEEP emitted from MWH's diesel-powered generators is uncertain. Landau Associates estimated emissions assuming that each engine operates at a load resulting in the highest emissions regardless of actual intended operational load. Landau Associates also attempted to account for higher emissions that would occur during initial start-up and before control equipment was fully warmed up. Finally, the emission estimates for DEEP include adjustment factors to account for condensable particulate in addition to filterable particles. The resulting values are considered to be a conservatively high estimate of DEEP emissions.

5.3. Air modeling

The transport of pollutants through the air is a complex process. Regulatory air dispersion models are developed to estimate the transport and dispersion of pollutants as they travel through the air. The models are frequently updated as techniques that are more accurate become known, but are written to avoid underestimating the modeled impacts. Even if all of the numerous input parameters to an air dispersion model are known, random effects found in the real atmosphere will introduce uncertainty. Typical of the class of modern steady-state Gaussian dispersion models, the AERMOD model used for the MWH analysis may slightly overestimate the short-term (1-hour average) impacts and somewhat underestimate the annual concentrations.

5.4. Toxicity

One of the largest sources of uncertainty in any risk evaluation is associated with the scientific community's limited understanding of the toxicity of most chemicals in humans following exposure to the low concentrations generally encountered in the environment. To account for uncertainty when developing toxicity values (e.g., RfCs), EPA and other agencies apply "uncertainty" factors to doses or concentrations that were observed to cause adverse noncancer effects in animals or humans. Agencies apply these uncertainty factors so that they derive a toxicity value that is considered protective of humans including susceptible populations. In the case of DEEP exposure, the noncancer reference values used in this assessment were generally derived from animal studies. These reference values are probably protective of the majority of the population including sensitive individuals, but in the case of EPA's DEEP RfC, EPA acknowledges (EPA, 2002):

> "…the actual spectrum of the population that may have a greater susceptibility to diesel exhaust (DE) is unknown and cannot be better characterized until more information is available regarding the adverse effects of diesel particulate matter (DPM) in humans."

Quantifying DEEP cancer risk is also uncertain. Although EPA classifies DEEP as probably carcinogenic to humans, they have not established a URF for quantifying cancer risk. In their health assessment document, EPA determined that "human exposure-response data are too uncertain to derive a confident quantitative estimate of cancer unit risk based on existing studies." However, EPA suggested that a URF based on existing DEEP toxicity studies would range from $1x10^{-5}$ to 1×10^{-3} per µg/m^3. OEHHA's DEEP URF (3×10^{-4} per µg/m^3) falls within this range. Regarding the range of URFs, EPA states in their health assessment document for diesel exhaust (EPA, 2002):

> "Lower risks are possible and one cannot rule out zero risk. The risks could be zero because (a) some individuals within the population may have a high tolerance to exposure from [diesel exhaust] and therefore not be susceptible to the cancer risk from environmental exposure, and (b) although evidence of this has not been seen, there could be a threshold of exposure below which there is no cancer risk."

Other sources of uncertainty cited in EPA's health assessment document for diesel exhaust are:

- Lack of knowledge about the underlying mechanisms of DEEP toxicity.
- The question of whether toxicity studies of DEEP based on older engines is relevant to current diesel engines.

Regarding the second bullet above, California EPA's Office of Environmental Health Hazard Assessment recently evaluated experimental data from several new technology diesel engine emissions reflecting emission controls similar to those proposed for MWH's engines (CalEPA, 2012).

> "These studies indicate that the reductions of some air toxics such as polycyclic aromatic hydrocarbons, benzene and 1,3- butadiene in new technology engine exhaust (often 80 – 90%) are not as great as the corresponding reductions in DEP [diesel engine particulate] (often 95 – 99%). The resulting air toxics/DEP ratios for NTE [new technology engine] exhaust may be greater than or equal to similar ratios found in exhaust from older diesel engines. As an example, an analysis of data from one published review indicated that the average 3-ring PAH, 1,3-butadiene and benzene/DEP ratios increased in NTE exhaust compared to older DEE [diesel engine emissions] by 2-, 10- and 4-fold, respectively. These data suggest that while the absolute amount of DEP (and thus estimated cancer risk) and air toxics is much reduced in NTE exhaust, the exhaust composition has not necessarily become less hazardous. Thus, the available data do not indicate that NTE exhaust should be considered to be fundamentally different in kind compared to older DEE for risk assessment purposes and suggests the TAC cancer unit risk value for DEP can continue to be applied to NTE exhaust risk assessments."

Table 5 presents a summary of how the uncertainty affects the quantitative estimate of risks or hazards.

Table 5. Qualitative Summary of How the Uncertainty Affects the Quantitative Estimate of Risks or Hazards

Source of Uncertainty	How Does it Affect Estimated Risk from this Project?
Exposure assumptions	Likely overestimate of exposure
Emissions estimates	Possible overestimate of emissions concentrations
Air modeling methods	Possible underestimate of average long-term ambient concentrations and overestimate of short-term ambient concentration
Toxicity of DEEP at low concentrations	Possible overestimate of cancer risk, possible underestimate of noncancer hazard for sensitive individuals

6. Conclusions and Recommendation

The project review team has reviewed the HIA and determined that:

a) The TAP emissions estimates presented by Landau Associates represent a reasonable estimate of the project's future emissions.

b) Emission controls for the new and modified emission units meet or exceed the tBACT requirement.

c) The ambient impact of the emissions increase of each TAP that exceeds ASILs has been quantified using refined air dispersion modeling techniques as approved in the HIA protocol.

d) The HIA submitted by Landau Associates on behalf of Microsoft adequately assesses project-related increased health risk attributable to TAP emissions.

In the HIA, Landau Associates estimated lifetime increased cancer risks attributable to MWH's DEEP and other TAP emissions. The revised HIA estimated a slight increase previous risk estimate of 5.7 in one million to a new estimate of 5.9 in one million. The maximum risk was estimated at a residential location north of MWH Data Center's property. This risk was quantified assuming that both filterable and condensable particulate emitted from MWH's engines constitutes DEEP. It is important to note that diesel particulate is typically quantified as only the filterable fraction. This is because the health studies that form the basis for quantifying the health risk from diesel exposure used measurements of respirable particulate from "fresh" diesel exhaust and elemental carbon as a surrogate for diesel exhaust emissions. Therefore, the increased risk estimated by Landau Associates represents a conservatively high estimate. Based on that filterable emissions are about 15 percent of MWH's filterable and condensable emissions, an estimated risk of about one in one million at that location is a more realistic estimate.

Landau Associates also assessed chronic and acute noncancer hazards attributable to the project's emissions and determined that MWH's emissions by themselves are not likely to result in adverse noncancer health effects.

Finally, Landau Associates and Ecology assessed the cumulative health risk by adding estimated concentrations attributable to Microsoft's emissions to an estimated background DEEP concentration. The maximum cumulative cancer risk from resident's exposure to DEEP in the vicinity of MWH is approximately 41 in one million. Most of the exposure to diesel particulate at this location comes from vehicles travelling on State Route 28. Additionally, exposure to DEEP in the area is not likely to result in noncancer health effects.

The project review team concludes that the HIA represents an appropriate estimate of potential increased health risks posed by MWH Data Center's TAP emissions. The risk manager may recommend approval of the revised permit because total project-related health risks are permissible under WAC 173-460-090 and the cumulative risk from DEEP emissions in Quincy is less than the cumulative additional cancer risk threshold established by Ecology for permitting data centers in Quincy (100 per million or 100 x 10^{-6}) [Ecology, 2010].

Additionally, Ecology's analysis of short-term impacts from simultaneous outage emissions determined a very low likelihood of a west side Quincy system-wide power outage coinciding with unfavorable pollutant dispersion. While existing power outage reports from each of the data centers do not indicate power outages have simultaneously affected all Quincy data centers, Ecology should track outage reports from the data centers to ensure that assumptions used in the analysis remain plausible.

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Figure 1. Residential parcels in the area where DEEP concentrations could exceed the ASIL

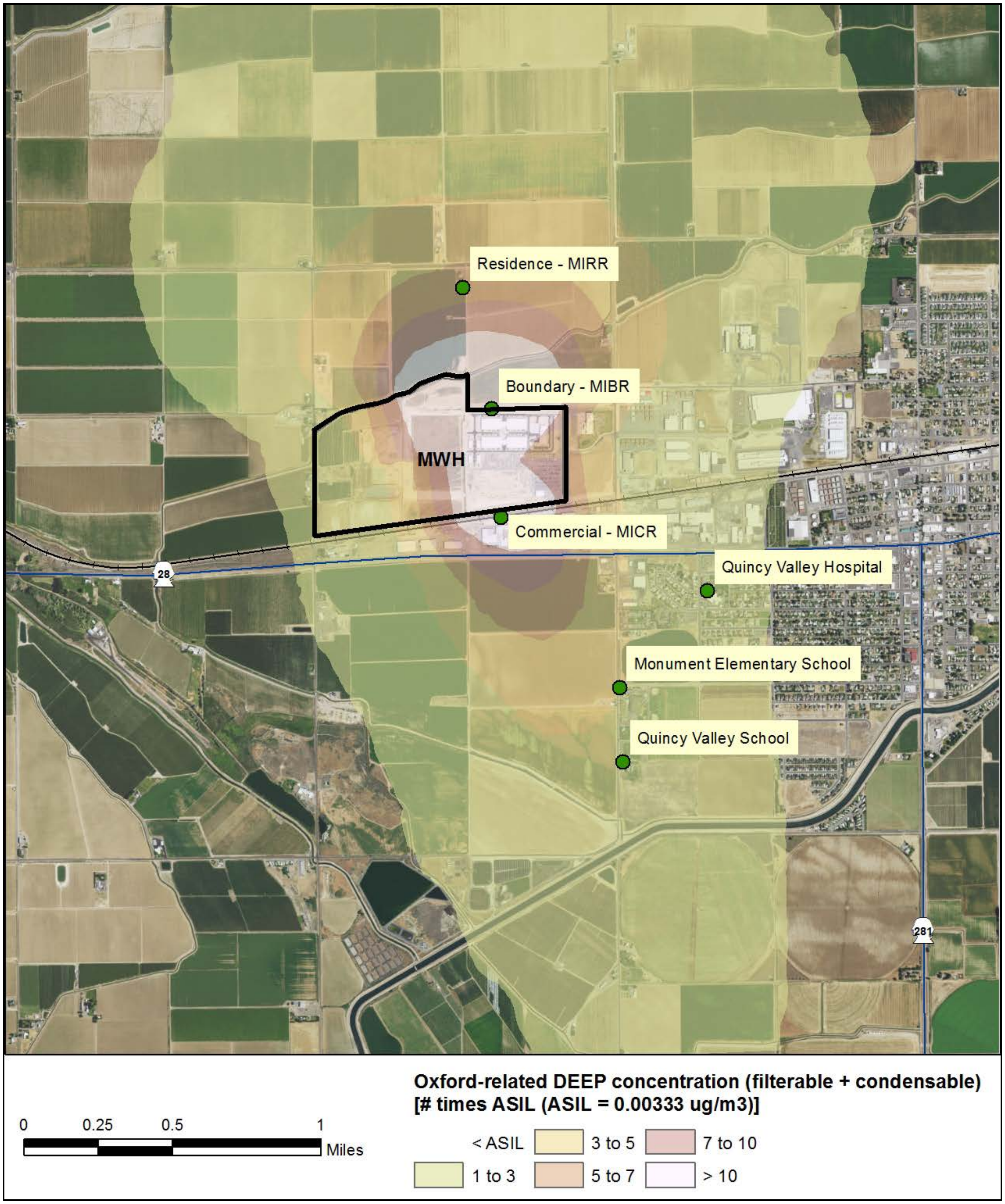

Figure 2. Receptor locations in relation to estimated DEEP concentrations (assuming both filterable and condensable fractions represent DEEP). Concentrations are reported as the number of times higher than the ASIL.

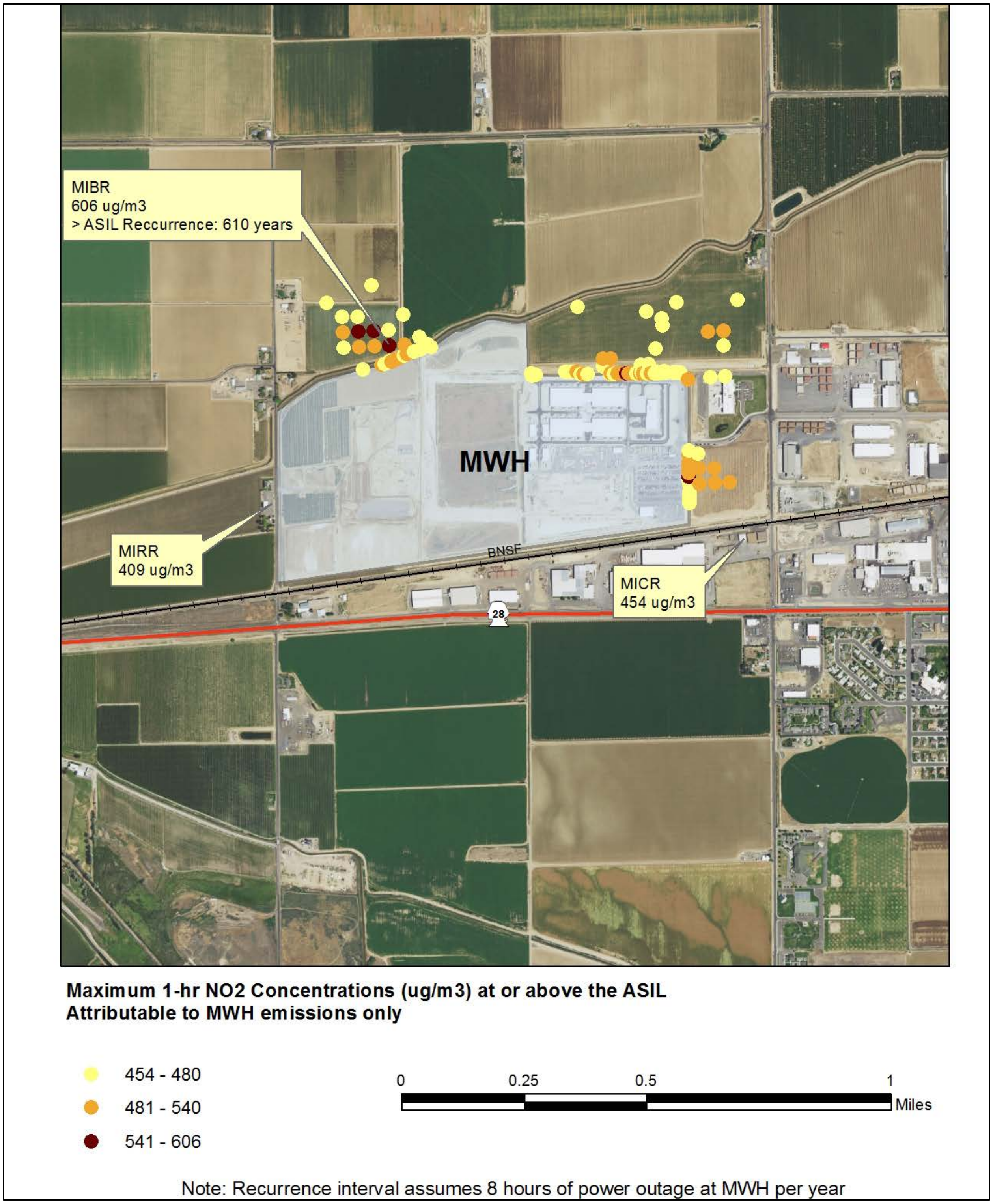

Figure 3. Receptor locations in relation to estimated 1-hour NO2 concentrations

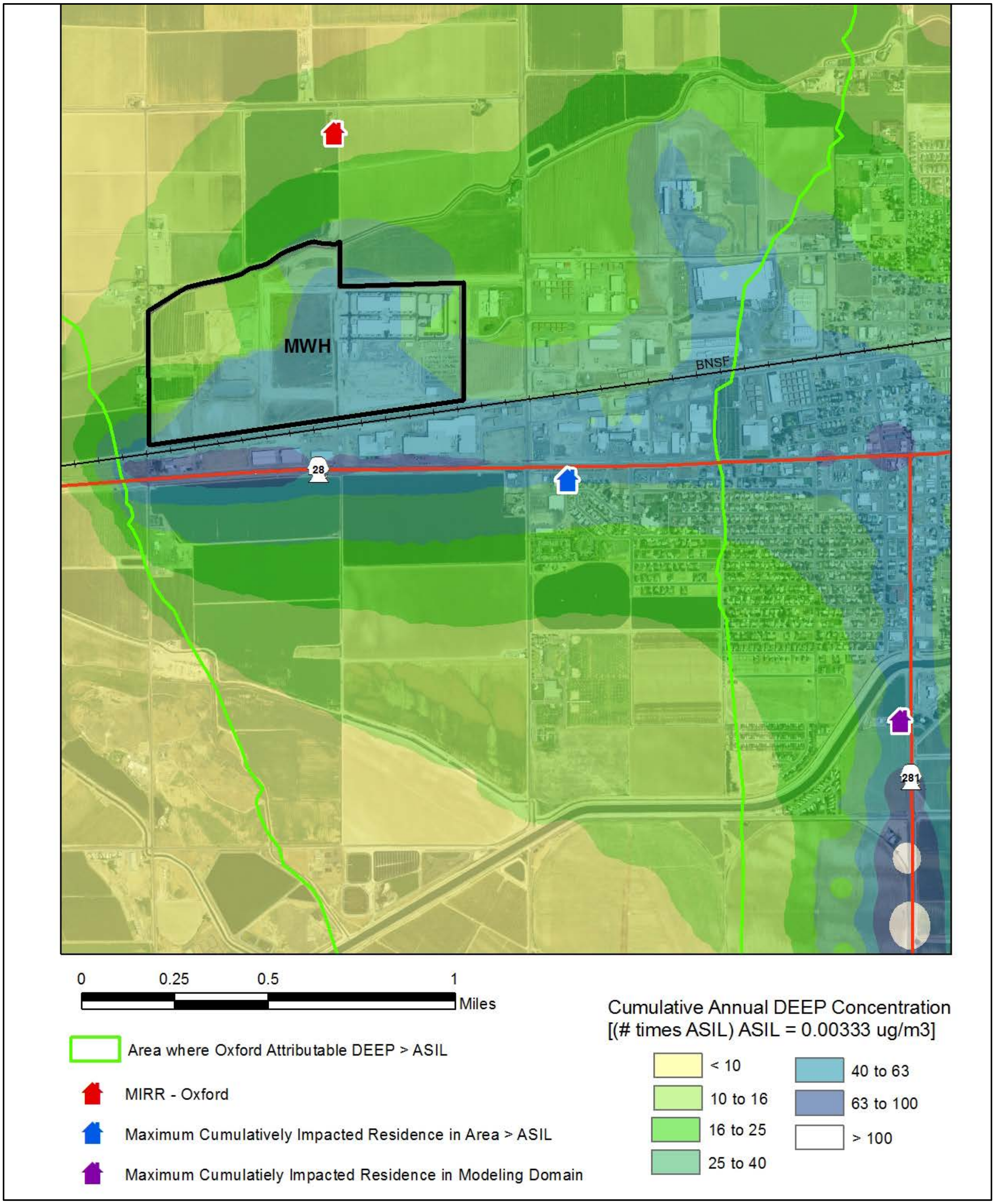

Figure 4. Cumulative DEEP concentrations (estimated by Landau Associates) in the MWH vicinity. Concentrations are reported as the number of times higher than the ASIL.

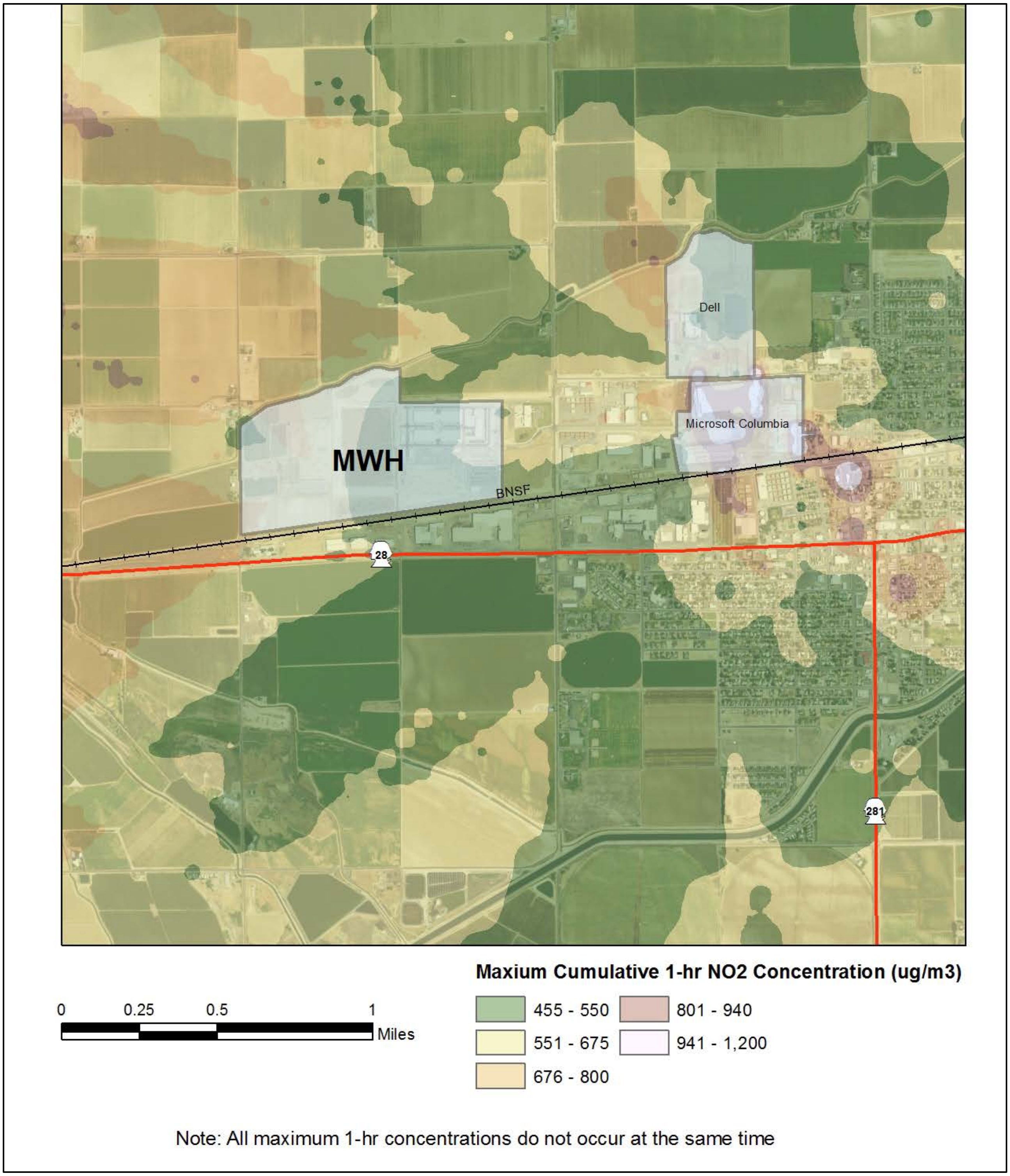

Figure 5. Estimated maximum 1-hr NO_2 concentrations resulting from cumulative NO_X emissions of all permitted and proposed data center engines during a simultaneous outage in Quincy. These maximum concentrations do not all occur at the same time.

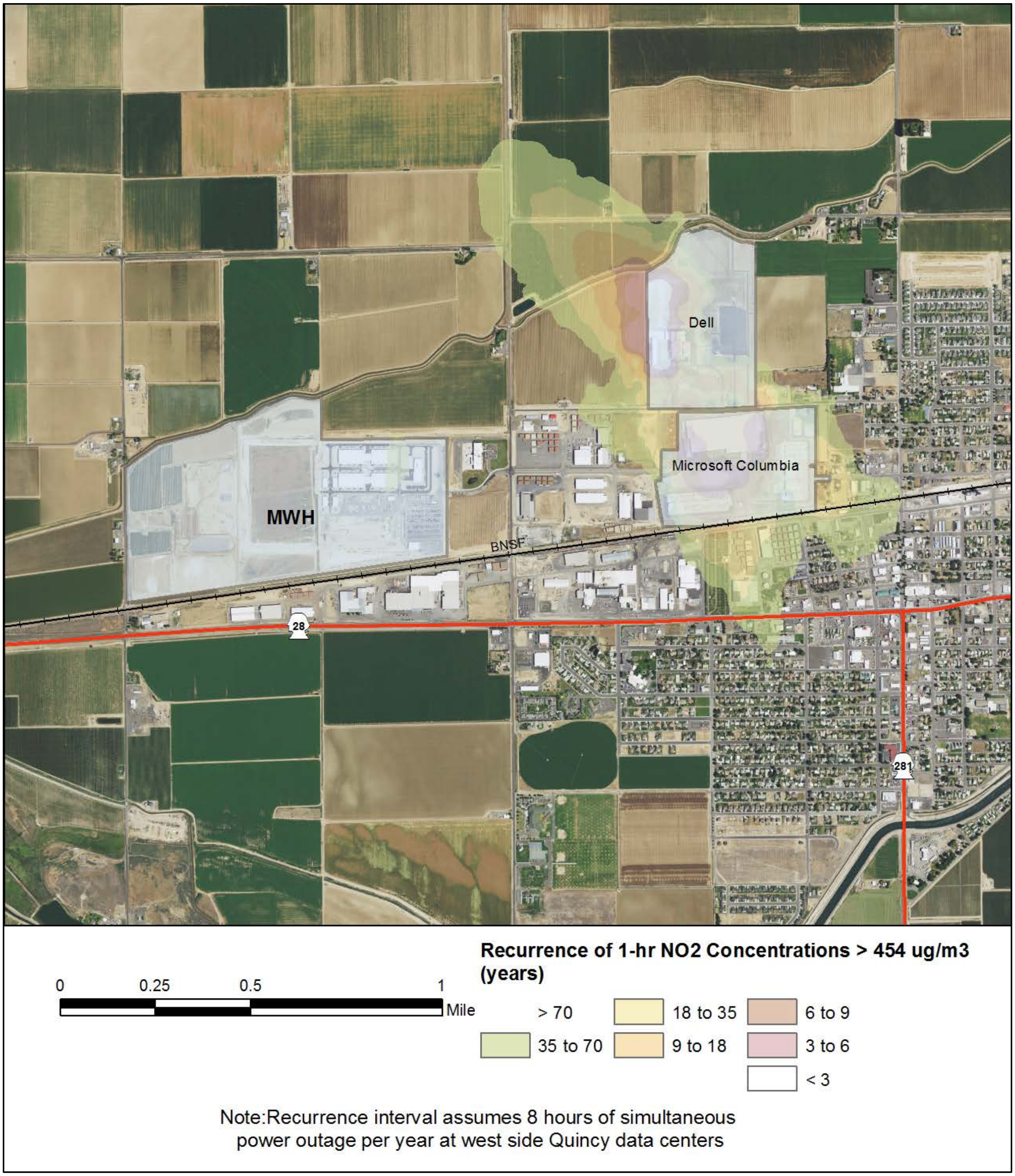

Figure 6. Estimated interval between occurrences of 1-hr NO_2 concentrations greater than 454 ug/m^3 assuming eight hours of simultaneous west Quincy data center emergency engine outage emissions per year.

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