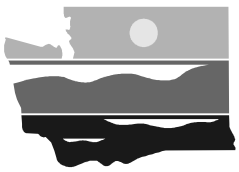

As required by

the Washington State Administrative Procedures Act

Chapter 34.05 RCW

CONCISE EXPLANATORY STATEMENT

AND

RESPONSIVENESS SUMMARY

REGARDING THE

DRAFT AIR QUALITY PERMIT FOR

MICROSOFT COLUMBIA DATA CENTER EXPANSION PROJECT

10/21/2010

Publication: 10-02-032

As required by the Washington State Administrative Procedures Act

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CONCISE EXPLANATORY STATEMENT

AND

RESPONSIVENESS SUMMARY

FOR THE

MICROSOFT COLUMBIA DATA CENTER EXPANSION PROJECT

Prepared by:

Washington State Department of Ecology

Air Quality Program

10/21/2010

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If you need this publication in an alternate format, please 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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CONCISE EXPLANATORY STATEMENT

I. Introduction

Microsoft's Columbia Data Center operates on a 70-acre site on the outskirts of Quincy, Washington. Data centers house the servers that provide e-mail, manage instant messages, and run applications for our computers.

Microsoft has applied to the Washington Department of Ecology (Ecology) for a permit called a "notice of construction order" (NOC). An NOC is required when industries upgrade or modify their equipment. Its purpose is to protect air quality. Microsoft's NOC application would allow Microsoft to install and operate 13 additional diesel-powered backup generators to support expanded operations.

II. Response to Comments

A. Comments Received Orally at the Public Hearing

Comment 1, Todd Heikes, 1309 3rd Avenue SW, Quincy, Washington 98848:
My first question out of four is: Will diesel exhaust particulates only act as a gas, which was stated, or will there be a chance of them settling out, and if they do settle out because of getting larger, could there still be biological issues caused by those settling particles even if their size is at PM10 especially if they're assimilated in a young child?

Ecology Response:

Because of their small size, the diesel engine exhaust particulates, which are included in the category of particulate matter of 2.5 microns in diameter (designated as $PM_{2.5}$) will behave as a gas. Particles in this category may grow to larger sizes through agglomeration, chemical reactions, and nucleation. For significant settling of the particles to occur near the source of the exhaust, the particles should be large enough to experience a significant pull from gravity (generally greater than 2 microns in diameter). When diesel engine exhaust particles are fresh, most are typically less than one-tenth of a micron in diameter. Therefore, even after agglomeration and other atmospheric processes, these particles will generally only grow to "accumulation mode" sizes of two-tenths to 1 micron in diameter. Because this accumulation mode size is too small for removal by gravitational settling to be a factor and too big for removal by diffusion, these particles will be carried by prevailing wind patterns well away from the source of the exhaust before they settle on the surface. Thus, significant settling of

Microsoft's diesel engine exhaust particulate is not expected to occur within the Quincy community.

Comment 2, Todd Heikes:
The next question is: Is the technology used the best available? If not, why, and are the youth at Mountain View worth that price?

Ecology Response:
Ecology takes very seriously the potential health threat to the public that proposed industrial projects might cause. But state law requires that we also consider the "energy, environmental, and economic impacts and other costs" of a technology before we determine what types of emission-limiting technology should be used.

The term we use to describe emission-limiting technology is "Best Available Control Technology" or BACT. This is a little bit confusing because BACT is all about whether emissions are kept low enough to protect human health. While we can require the use of certain technology to meet the emission limit, we cannot require that an industry use technology that goes beyond the protective limit.

In the case of Microsoft's project, only the new engines proposed for the expansion are subject to BACT requirements at this time. The existing, older engines underwent a BACT evaluation before they were installed.

Under Ecology's permit restrictions, new diesel engines, to be installed for expansion, will emit less than one-half ton of diesel particles per year. This emission rate is well within the range of safety set by the U.S. Environmental Protection Agency. It is also too low to make any add-on control technology feasible. We estimated that it would cost Microsoft approximately $800,000 to reduce each ton of diesel particulate. No other regulatory agency, to our knowledge, has required a control technology for diesel particulate that would cost anywhere close to that value.

The process of determining the BACT for a proposed project involves comparing emission limits required of similar facilities around the world. Ecology did not find any emergency generators with the same level of low emissions like Microsoft's that were required to install diesel particulate filters. Our review of Microsoft's permit application showed us that Microsoft has made every effort to consider and protect the public's health. By law, Ecology has no basis to require that Microsoft install additional protective controls.

Comment 3, Todd Heikes:
The next question is: Noncancerous is a concern. Will there be an increase with noncancerous issues because the generators are increasing output in the young children at Mountain View?

Ecology Response:
The risk to human health is considered low because the level of toxic air pollutants are estimated to be less than reference concentrations (RfC)s established by the U.S. Environmental Protection Agency (USEPA). An RfC is defined by the USEPA as:

> *"An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime…"*

Ecology considered all sources of diesel engine exhaust particulate (DEEP) in Quincy, not just the Microsoft expansion project. The maximum estimated DEEP concentration at Mountain View Elementary School is approximately 80 times lower than the USEPA's reference concentration. Therefore, non-cancer health effects from long-term exposure to DEEP are not likely to occur at this location.

Comment 4, Todd Heikes:
And the last question: Will generators be running during school hours, and if so, why?

Ecology Response:
The generators will be operating during school hours for maintenance testing and also, potentially, during emergency operation. In general, the warmer the air in the upper atmosphere, the more air will move and carry gas and exhaust away from a particular place. During daytime hours, especially from 10am to 2pm, air dispersion is the greatest. If we required Microsoft to perform engine maintenance testing during evening hours, the air would be stagnant, or unmoving, due to the colder upper atmosphere at that time of day. The stagnant air would keep the diesel engine exhaust down lower to the ground, where it would be more harmful to public health. Therefore, it is better for everyone's health to allow Microsoft to operate the generators during the day.

The draft permit included a condition that engine maintenance testing be conducted in a manner protective of human real. Condition 3.7 reads as follows:

Approval Condition 3.7
Each of the 37 generator engines require maintenance and testing for approximately one hour per month. To mitigate engine emission impacts, Microsoft Corporation will perform at least 80% of all maintenance testing from 7:00 AM until 5:00 PM on Monday through Wednesday with no more than 3 engines tested concurrently. Engine maintenance and testing may take place outside of these restrictions upon coordination by Microsoft with the other data centers in Quincy to

minimize engine emission impacts to the community. Microsoft shall maintain records of the coordination communications with the other data centers, and those communications shall be available for review by Ecology. This schedule can be re-negotiated at any time as approved in writing by Ecology, and will not trigger revision or amendment of this Order.

In addition, as a result of comments and questions received, we have added a condition into the permit, requiring Microsoft to establish a communication link with the Mountain View Elementary School and the Quincy School District to keep them apprised of engine testing and maintenance schedules. The condition reads as follows:

Approval Condition 1.2
Microsoft shall schedule a meeting with Mountain View Elementary School administrators by no later than February 15, 2011. The meeting will include officials from the Quincy School District at the discretion of the Mountain View Elementary School administrators. The purpose of the meeting will be to both communicate, and better understand, any potential concerns or complaints that the school may have regarding emergency generator maintenance testing and operation. In addition, Microsoft will provide the school administrators with a direct line to one of the Columbia Data Center managers. The school administrators shall be provided a maintenance testing schedule, as required in the permit and will update the school whenever Ecology-approved changes occur in maintenance testing. As decided by the school administrators and Microsoft, an ongoing relationship between the school and Microsoft should be established.

In addition, the permit now includes a provision ensuring that air quality concerns will be quickly addressed. The new condition reads as follows:

Approval Condition 9.3
Any air quality complaints resulting from operation of the proposed 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.

B. Comments Received in Writing

Comment 1, received from Jim Hemberry, Mayor of Quincy and Tim Snead, City Administrator, City of Quincy:
The values for some pollutants appear to increase exponentially for the expansion phase. Specifically, the pollutants CO, $PM_{2.5}$, diesel engine exhaust particulate, and carbon monoxide are given a relatively higher value for potential to emit under

expansion, which as 13 diesel engines, than for the existing units, which have 24 diesel engines.

Ecology Response:
The City has correctly noted that the calculated per-engine emission rates for certain pollutants (the products of incomplete combustion: carbon monoxide (CO), volatile organic compounds (VOC) and diesel engine exhaust particulate (DEEP)) for the proposed Microsoft expansion are considerably higher than the per-engine emission rates for the original construction of the Columbia Data Center, in 2007. That is because Ecology directed Microsoft to use a more conservative emission calculation method for the current expansion project.

For the original permitting, in 2006-2007, Ecology used the emission data provided by the manufacturer of the generators—Caterpillar, Inc.—to determine the rate of emissions under specific engine loads. At high engine loads the engines run at their peak efficiency, which means the exhaust contains very low levels of certain pollutants that are given off when incomplete combustion of diesel occurs. These pollutants are carbon monoxide, diesel exhaust particles, and volatile organic compounds. However, the more efficient combustion does give off relatively high levels of NOx.

Ecology's approach to evaluating emissions changed for the current expansion proposal. This time, we used the "Tier-2" emission factors, established by the U.S. Environmental Protection Agency. These factors are based on the weighted average of five engine loads. The Tier-2 emission factors are governed by low load conditions where generators run poorly, so the Tier-2 emission factors for the products of incomplete combustion (carbon monoxide, volatile organic compounds, and diesel engine exhaust particles) are artificially high. As a result, the per-engine emission rates calculated for the Columbia Data Center expansion were considerably higher than the rates calculated for the original construction of the data center. Because the key issue at Quincy is the impact of diesel exhaust particles, use of the USEPA Tier-2 emission factors provides a conservatively high estimate of the level of these particles and their health impacts on the community. Therefore, use of the Tier-2 emission factors was protective of the public.

Table 1, below, compares the engine loads and emission factors that were used for the two permitting projects.

Table 1. Emission Factors Used For Air Quality Modeling

Expansion Phase	Engine Load During Outage	Engine Load During Routine Testing	Source of Emission Factors	Diesel Engine Exhaust Emission Factors (g/kWm-hr)			
				NOx	Particles	Carbon Monoxide	Volatile Organic Compounds
Original construction of the Columbia Data Center	66%	75%	Caterpillar, Inc Load-specific data	6.7	0.13	0.47	0.31
Columbia Data Center expansion	85%	10% - 40%	USEPA Tier-2 limits	6.12	0.2	3.5	0.28

Comment 2, City of Quincy:
The double asterisk at the bottom of Table 2 is missing. It is a reference for diesel engine exhaust particulate listed in the table.

Ecology Response:
Thank you, this error has been noted and corrected.

Comment 3, Tom Harris, Quincy School District Maintenance Supervisor:
With the potential health effects from the diesel engines would it be possible to provide the Quincy School District with a schedule of the testing cycles the generators will be on?

Ecology Response:
The draft permit included a condition that engine maintenance testing be conducted in a manner protective of human real. Condition 3.7 reads as follows:

Approval Condition 3.7
Each of the 37 generator engines require maintenance and testing for approximately one hour per month. To mitigate engine emission impacts, Microsoft Corporation will perform at least 80% of all maintenance testing from 7:00 AM until 5:00 PM on Monday through Wednesday with no more than 3 engines tested concurrently. Engine maintenance and testing may take place outside of these restrictions upon coordination by Microsoft with the other data centers in Quincy to minimize engine emission impacts to the community. Microsoft shall maintain records of the coordination communications with the other data centers, and those communications shall be available for review by Ecology. This schedule can be re-

negotiated at any time as approved in writing by Ecology, and will not trigger revision or amendment of this Order.

In addition, as a result of comments and questions received, we have added a condition into the permit, requiring Microsoft to establish a communication link with the Mountain View Elementary School and the Quincy School District to keep them apprised of engine testing and maintenance schedules. The condition reads as follows:

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Microsoft shall schedule a meeting with Mountain View Elementary School administrators by no later than February 15, 2011. The meeting will include officials from the Quincy School District at the discretion of the Mountain View Elementary School administrators. The purpose of the meeting will be to both communicate, and better understand, any potential concerns or complaints that the school may have regarding emergency generator maintenance testing and operation. In addition, Microsoft will provide the school administrators with a direct line to one of the Columbia Data Center managers. The school administrators shall be provided a maintenance testing schedule, as required in the permit and will update the school whenever Ecology-approved changes occur in maintenance testing. As decided by the school administrators and Microsoft, an ongoing relationship between the school and Microsoft should be established.

In addition, the permit now includes a provision ensuring that air quality concerns will be quickly addressed. The new condition reads as follows:

Approval Condition 9.3
Any air quality complaints resulting from operation of the proposed 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.

Comment 4, Tom Harris:
Is it possible for the generators to be programmed to run their test cycle during non-school hours or possibly on Sundays so that it would be less of an impact on our students and staff?

Ecology Response:
The generators will be operating during school hours for maintenance testing and also, potentially, during emergency operation. In general, the warmer the air in the upper atmosphere, the more air will move and carry gas and exhaust away from a particular place. During daytime hours, especially from 10am to 2pm, air dispersion

is the greatest. If we required Microsoft to perform engine maintenance testing during evening hours, the air would be stagnant, or unmoving, due to the colder upper atmosphere at that time of day. The stagnant air would keep the diesel engine exhaust down lower to the ground, where it would be more harmful to public health. Therefore, it is better for everyone's health to allow Microsoft to operate the generators during the day.

The draft permit included a condition that engine maintenance testing be conducted in a manner protective of human real. In addition, as a result of comments and questions received, we have added a condition into the permit, requiring Microsoft to establish a communication link with the Mountain View Elementary School and the Quincy School District to keep them apprised of engine testing and maintenance schedules. Please see the response to Comment 3, above.

Comment 5, Danna Dal Porto, 16651 Road 3 NW, Quincy, WA 98848:
I am requesting an extension to the comment period due to a lack of notice on your part.

Ecology Response:
Ecology's Air Quality Program Management considered three requests to extend the public comment period for the Microsoft Columbia Center Air Quality Draft Permit. Information considered included whether the public notification of both the hearing and the draft permit had been done in an appropriately and timely manner, and the likelihood that new information about the project would be received during the comment period.

The rules regarding both public hearings and draft permit review require a 30-day notice. In reviewing our public outreach for this hearing, we found the following significant actions of public notice:

1. Legal ad placed on August 26 in the Columbia Basin Herald (the largest daily newspaper in Grant County, where the project is located). In selecting the newspaper, we took into account the extent of readership throughout the city, county and region to maximize contact with the people who might have an interest in this project. The ad stated where the project documents were available to review and when/ where the public hearing would be held. The ad further stated how to submit public comment and that all comments were required to be postmarked no later than October 4, 2010.

2. On Sept. 20, 2010, Ecology issued a press release to all news media--radio, TV, and newspapers—in Adams, Douglas, Franklin, Grant, Lincoln and Spokane counties. From this press release, we know that the articles were run in the following local newspapers and included information about the public hearing and listed the close of comments date as October 4th:

- Quincy Valley Post Register: September 16, 2010
- Columbia Basin Herald: September 8, 2010
- Articles also appeared in several on-line industry websites

3. Display ads inviting people to the hearing were published in both the Quincy Valley Post Register and the Columbia Basin Herald on September 24th and 27th.

4. Information was available on Ecology's on-line public calendar.

5. Flyers advertising the hearing in both Spanish and English were posted at several locations in the community the week prior to the hearing.

Ecology provided significant public notice of the opportunity to provide public comment and notice of hearing (40 days). Ecology received public comment from nine individuals (including two of the three who requested extensions) prior to the closing date of the comment period. The review of whether the project information complied with Washington State laws and regulations determined that Ecology's public outreach for the comment period was complete and thorough. Therefore, the comment period will not be extended.

Comment 6, Danna Dal Porto:
I would like to know how long a time period was used to arrive at that number of outage days.

Ecology Response:
We assumed 48 hours of continuous outage as our worst-case scenario. This was established based on information from the Grant County PUD. According to a Grand County PUD representative, outages are tracked in a database, and data shows that over the past seven years, Grant County has averaged significantly fewer hours of total outages (an average of 152 minutes, or about 2.5 hours, per year county-wide) than our worst-case scenario estimate.

Comment 7, Danna Dal Porto:
I would like every consideration being given to limiting future sources of particulates in Quincy, WA.

Ecology Response:
Ecology's primary goal in the Air Quality Program is to protect the public's health and well-being. We do this by minimizing the impact of toxic air pollutants on the communities near the potential source of toxic emissions, which is done through education and regulation.

Particulates come from two major sources in Quincy: personal and industrial. Residential sources of particulates can be minimized by limiting or ceasing outdoor

burning, by using electric or propane rather than wood stoves, and never burning garbage.

As for industrial sources of emissions, we are not able to restrict a company from building. And we must provide an Air Quality permit if they meet our criteria, as dictated by law. However, one way to limit future sources of particulates in Quincy is to address the issue with local government. Local government is responsible for zoning, including designating the boundaries for Urban Growth Areas. Zoning has a major impact on future industrial sources and locations in the city of Quincy.

Comment 8, Danna Dal Porto:
I believe the notification process was flawed.

Ecology Response:
Please see the response to Comment 5, above.

Comment 9, Danna Dal Porto:
My next concern is I did not have time to review the documents related to this project. Please provide me with the reason you are using to deny me access to these documents.

Ecology Response:
Ecology provided significant public notice of the opportunity to provide public comment and notice of hearing from August 26 until October 4, 2010 (40 days). Ecology also advertised that the permit documents were available for review at both our office in Spokane and at the Quincy City Hall beginning on August 26, 2010. Ecology did not deny access to any public documents related to this project, and has afforded any person interested in the Microsoft expansion sufficient notice of the project and ample opportunity to review the permit documents.

Comment 10, Danna Dal Porto:
My second concern about this project is the number of days or hours that the generators will run. I believe that the generators fire up when the power surges. How long do they run?

Ecology Response:
The engines will run during power outages and during maintenance testing operations. Ecology requested information from Microsoft regarding the amount of time that power had been disrupted in the Quincy Urban Growth Area (UGA). This information was reviewed first in 2007, for the original construction of the data center, and again in 2010 for its expansion. It was found that the power in the Quincy UGA is very reliable, and is well

below the 104 hours per engine per year that Microsoft requested for operation of the new engines. It is important to understand that Microsoft can only operate each of the new engines for 104 hours per year, and that our evaluation of their proposal was based on those 104 hours per year. Actual hours of operation at the Columbia Data Center are anticipated to be much lower. In 2009, Microsoft only operated each engine for a maximum of only about 58 hours.

The draft permit included a condition that engine maintenance testing be conducted in a manner protective of human real. Condition 3.7 reads as follows:

Approval Condition 3.7

Each of the 37 generator engines require maintenance and testing for approximately one hour per month. To mitigate engine emission impacts, Microsoft Corporation will perform at least 80% of all maintenance testing from 7:00 AM until 5:00 PM on Monday through Wednesday with no more than 3 engines tested concurrently. Engine maintenance and testing may take place outside of these restrictions upon coordination by Microsoft with the other data centers in Quincy to minimize engine emission impacts to the community. Microsoft shall maintain records of the coordination communications with the other data centers, and those communications shall be available for review by Ecology. This schedule can be re-negotiated at any time as approved in writing by Ecology, and will not trigger revision or amendment of this Order.

In addition, as a result of comments and questions received, we have added a condition into the permit, requiring Microsoft to establish a communication link with the Mountain View Elementary School and the Quincy School District to keep them apprised of engine testing and maintenance schedules. The condition reads as follows:

Approval Condition 1.2

Microsoft shall schedule a meeting with Mountain View Elementary School administrators by no later than February 15, 2011. The meeting will include officials from the Quincy School District at the discretion of the Mountain View Elementary School administrators. The purpose of the meeting will be to both communicate, and better understand, any potential concerns or complaints that the school may have regarding emergency generator maintenance testing and operation. In addition, Microsoft will provide the school administrators with a direct line to one of the Columbia Data Center managers. The school administrators shall be provided a maintenance testing schedule, as required in the permit and will update the school whenever Ecology-approved changes occur in maintenance testing. As decided by the school administrators and Microsoft, an ongoing relationship between the school and Microsoft should be established.

In addition, the permit now includes a provision ensuring that air quality concerns will be quickly addressed. The new condition reads as follows:

Approval Condition 9.3

Any air quality complaints resulting from operation of the proposed 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.

Comment 11, Danna Dal Porto:
My last comment is to speak to the safety of these generators in such large numbers. I am requesting that Ecology require filters being placed on these machines.

Ecology Response:
Ecology takes very seriously the potential health threat to the public that proposed industrial projects might cause. But by law, Ecology has no basis to require that Microsoft install additional protective controls. Please see Comment 2, above, regarding this issue.

Comment 12, Pat Husband, 421 K Street SW, Quincy, WA 98848:
I am asking that the public comment deadline of Oct. 4 be extended on the Microsoft data center expansion center.

Ecology Response:
Please see the response to Comment 5.

Comment 13, Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848:
Is an operating permit the same as an air quality permit?

Ecology Response:
No, an (Air) Operating Permit is not the same as an Air Quality Permit. An Air Operating Permit is issued to the owner of any major source of air pollution. The permit is issued after Ecology has determined that the source meets all applicable requirements listed in the Washington Administrative Code (WAC), Chapter 173-401 and the Revised Code of Washington (RCW), Chapter 70.94.161 . An air quality permit is any approval issued under the state or federal Clean Air Act, although in the context of the question it likely refers to a Notice of Construction approval order issued under Chapter 173-400 WAC and RCW 70.94.152.

Comment 14, Patricia Anne Martin:
Isn't Celite's emission a similar source, i.e., emission, in that it constitutes particulate matter which is also the concern from DEEP? Were Celite's emissions considered, and if not, why not?

Ecology Response:
Particulate matter emissions from Celite were not considered a source of diesel engine exhaust particles (DEEP) because Celite emissions are not generated by diesel engine exhaust. Therefore Celite emissions were not added to the estimates for DEEP used in the evaluation of Microsoft's proposed expansion.

Comment 15, Patricia Anne Martin:
Why weren't all the exposures in our area considered?

Ecology Response:
Under Chapter 173-460 of the Washington Administrative Code (WAC), only those toxic air pollutant emissions that are predicted to exceed an acceptable source impact level (ASIL) are evaluated in the Health Impact Analysis (HIA) for a proposed project. Therefore, only the emissions from Microsoft's proposed 13 new engines were compared to the ASIL. In this case, diesel engine exhaust particles were the only toxic air pollutant evaluated in the HIA.

Comment 16, Patricia Anne Martin:
I am writing to request an extension to the comment period on the expansion of the Microsoft Columbia Data Center.

Ecology Response:
Please see the response to Comment 5.

Comment 17, Patricia Anne Martin:
Ecology refers to "existing data **center** emissions" (emphasis added) in calculating the cancer rate of 30 in 1 million (Executive summary); "Ecology calculated background DEEP near Microsoft", and then discusses DEEP concentrations "to be about 100 times the DEEP ASIL near two existing data centers." There is no discussion that WDOE included releases from Yahoo and Intuit for modeling "background" or "cumulative" ambient air quality and/or health impacts for DEEP.

Ecology Response:
Section 4.2.5 of the technical support document for the third tier petition briefly describes how Ecology estimated background levels of DEEP in Quincy. With this information, Ecology's toxicologists looked at the potential health effects of diesel engine exhaust particles from the following sources:

- Microsoft's 13 new generators
- Microsoft's existing 24 generators
- Other sources of diesel engine exhaust particles in the area, such as trucks on highways and trains
- Large diesel generators at the Yahoo and Intuit data centers in Quincy

Comment 18, Patricia Anne Martin:
Did Ecology include releases from Intuit and Yahoo in their air quality modeling? And more specifically, did they model releases from Microsoft, Yahoo and Intuit together in assessing health impacts community-wide? Please identify **all** sources of emissions considered for "background" and "cumulative" releases to arrive at 30 and 41 cancers in 1 million. If Yahoo and Intuit were not considered please explain why.

Ecology Response:
Yes, Ecology included releases from Yahoo and Intuit in our air quality modeling. Please see the response to Comment 17.

Comment 19, Patricia Anne Martin:
Ecology relies on a variety of sources for its conclusion of safety (see references page 33 of Tier III review) that are written prior to 2004. In light of the new National Ambient Air Quality Standards (NAAQS) for diesel emission particulates ($PM_{2.5}$) and NO_2 finalized in January 2010, it seems remiss for the Ecology not to have looked to more recent publications for guidance. The attached Memorandum titled "*Guidance Concerning the Implementation of the 1-hr NO_2 NAAQS*" dated June 29, 2010 is attached for your review. The EPA suggests a SIL (Significant Impact Level) of 4 ppb or 7.5 ug/m3, much lower than the 470 ug/m3 ASIL inserted into the state air quality standards under 2009 rulemaking (WAC 173-460-150). Please provide not only justification for using outdated material, but provide defensible justification for establishment of an ASIL that exceeds the NAAQS for NO_2.

Ecology Response:
Ecology is familiar with the National Ambient Air Quality Standards (NAAQS) and related guidance documents. Ecology is responsible for ensuring that the predicted emissions from Microsoft's expansion of the Columbia Data Center will not result in a violation of the NAAQS, and relies on guidance from the U.S. Environmental Protection Agency (USEPA) to consistently apply these rules in their jurisdiction.

Your next comment appears to question why the Acceptable Source Impact Level (ASIL) for nitrogen dioxide (NO_2) is lower than the 1-hour NAAQS limits for NO_2. The key distinction is that the ASIL is not a standard, but a trigger value above which further site-specific review is required. This contrasts with NAAQS limits, which are standards that must not be violated.

Another distinction relates to the estimated ambient concentration which forms the basis for satisfying a first-tier ASIL comparison versus demonstrating compliance with the NAAQS. For example, in a first-tier review under Chapter 173-460 WAC, a source must estimate the maximum 1-hour off-site NO_2 concentration then compare it to the ASIL. If the maximum concentration is less than 470 ug/m3, no further review is required, but a health impact assessment (second tier review) must be prepared if the maximum concentration is higher than the ASIL.

Demonstrating compliance with the NAAQS is much different. To comply with the NO_2 NAAQS, a source must demonstrate that the 3-year average of the 98th percentile of the daily maximum 1-hour average off-site concentration is less than 188 ug/m3 or 100 ppb. So a source could show a maximum concentration greater than 188 ug/m3, but still be in compliance with the NAAQS.

Your comment also raises the issue of Significant Impact Levels. Significant Impact Levels, or SILs, are only used when permitting major (large) sources of air pollution which are subject to federal preconstruction permitting requirements. SILs are numeric values derived by the USEPA that may be used to evaluate the impact a proposed major source or modification may have on the NAAQS or PSD increment. SILs are the level of ambient impact that is considered to represent a "significant contribution" to nonattainment. SILs currently appear in the USEPA's regulations in 40 CFR 51.165(b). The Microsoft Columbia Data Center is not a major stationary source or modification under the federal or state clean air acts.

Comment 20, Patricia Anne Martin:

Because NO_2 modeling was represented to not exceed NO_2 ASIL for the 13 generators, i.e., expansion project, no further modeling was conducted on NO_2 emissions from Microsoft's 24 existing generators, rail, trucks, Yahoo, Intuit or Celite.

Ecology Response:

This is a true statement.

Comment 21, Patricia Anne Martin:

Ecology assumed "all DEEP emissions to be PM2.5", when the literature is very clear that 80-90% of DEEP is <0.5 microns. A) What effect does Ecology's assumption to particle size have on the outcome of the HIA? In other words, what are the numerical differences in health impacts from ultrafine diesel particulates and PM2.5? B) What is the difference in distances traveled, air modeling plume shape, air distribution between ultrafine particulates and PM 2.5? C) What are the differences in health impacts, e.g., asthma, heart attacks, etc., expected from ultrafine particulate inhalation and PM2.5? B) Do atmospheric conditions affect them differently?

Ecology Response:

A) By definition, $PM_{2.5}$ pertains to particles less than or equal to 2.5 micrometers in diameter; therefore, diesel engine exhaust particles are a component of $PM_{2.5}$. As part of the permit process, Ecology required Microsoft to demonstrate compliance with the NAAQS limits for $PM_{2.5}$ **and** assess risks by using toxicity factors specific to diesel engine exhaust particulate. In our review of Microsoft's health impacts assessment, Ecology evaluated the non-cancer and cancer health impacts of diesel exhaust particles by using toxicity values **specific to** diesel engine exhaust particulate. The USEPA and California EPA OEHHA established these toxicity values.

The USEPA's non-cancer reference concentration (RfC) for diesel engine exhaust particulate is 5 micrograms per cubic meter (ug/m3). Considering cumulative diesel emissions from all sources in Quincy, the maximum estimated offsite concentration near Microsoft is about 0.2 ug /m3. This occurs along the southern boundary of Microsoft's property, near the BNSF railroad tracks. The RfC is defined by the USEPA as:

"An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive

subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime….."

The estimated annual average concentration at this location is approximately 25 times lower than the USEPA's RfC. Therefore, non-cancer health effects from long-term exposure to DEEP are not likely to occur at this location or other locations near Microsoft.

With regard to cancer risk, Ecology used a Unit Risk Factor derived by California EPA Office of Environmental Health Hazard Assessment to quantify increased cancer risk from exposure to diesel particulate. Please refer to sections 4.3 and 4.4 of the technical support document (see Appendices) for the third tier petition for more information on our methodology for assessing risk to diesel engine exhaust particulate.

B) AERMOD, the regulatory model used for estimating how air pollutants disperse, does not distinguish between particulate or ultrafine particulate emissions. There is no treatment of atmospheric chemistry, phase equilibria, deposition (dry or wet), particle growth, gas-to-particle conversion, condensation, nucleation, agglomeration or volatilization off particles. As such the model mimics the DEEP dispersion in the atmosphere in the same manner that it handles $PM_{2.5}$ and most other gaseous pollutants being modeled (except NO_2, because of the often-employed PVMRM scheme). The difference in their concentrations at a particular receptor at a given time is driven entirely by differences in their emission patterns.

For the travel distances involved, particulates with aerodynamic diameters of 2.5 um or less behave very similarly to gases--their settling velocities are generally much less than the turbulent velocities of the atmosphere that disperse them. Any combination of the above mentioned phenomena might, in reality; result in DEEP concentrations not being linearly correlated with $PM_{2.5}$. But models have not yet evolved to satisfactorily approximate them.

C) Currently, the USEPA established NAAQS for fine particles ($PM_{2.5}$) based in part on numerous studies that have demonstrated an association between fine particles and acute mortality and health effects. The USEPA is also concerned that ultrafine particles could be a very important component of fine particles associated with these adverse health effects. Unfortunately, we don't have a firm understanding of whether particles with different size ranges have different abilities to cause health

effects. As a result, the USEPA is investing research money into better understanding health effects associated with exposure to different size particles. This research will help the USEPA determine if additional standards should be made to regulate ultrafine particles (separate from $PM_{2.5}$), and whether these particles should be regulated based on the number of particles in air instead of the mass of the particles.

Comment 22, Patricia Anne Martin:

ICF used information from the existing Yahoo and Intuit permits for consideration in the HIA. Yahoo and Intuit permits were only reviewed against NO. Does this mean that ICF did not consider diesel and NO_2 emissions from Yahoo and Intuit for "background", "cumulative" and "ambient air" concentrations that were used in assessing the impact on the community's health?

Ecology Response:

Ecology conducted "background" modeling for the purpose of estimating cumulative risks from exposure to diesel engine exhaust particles. Emissions from Yahoo! and Intuit data centers were included in our background estimate of DEEP.

Comment 23, Patricia Anne Martin:

How many people live in the 130 residentially zoned parcels that exceed the ASIL for DEEP?

Ecology Response:

Please contact the City of Quincy for a response to this question. Knowledge of the actual number of people currently residing in those parcels is not required for calculating risks to the community.

Comment 24, Patricia Anne Martin:

Please identify the composition and volume of "Data center emissions … derived from existing permits Microsoft (2006), Yahoo! (2007 and Intuit (2007)"? Ecology used "data center emissions and descriptions … obtained from input files provided by ICF International as part of their analysis of the current Microsoft application". Why didn't WDOE use information directly from Yahoo and Intuit files? How does the information in Yahoo and Intuit files differ from what ICF used?

Ecology Response:
A permit applicant is not required to supply Ecology with any additional files if they engage the services of a consultant. Ecology's permit review engineers first verify that the emissions provided in the application are a true reflection of the emissions likely to occur under the expected operating scenarios. As part of our evaluation of the modeling conducted by the applicant (or their consultant), Ecology confirms that (1) the emissions rates supplied to the model are consistent with those stated in the permit application; (2) the model was setup and run correctly, reflecting the operating schedule described in the application; and (3) concentrations output by the model are correctly reflected in the report.

Once the emission rates in the Microsoft application were verified, we realized that we could improve the accuracy of our results by using those input files rather than re-entering the identical information from the Yahoo! and Intuit files.

Comment 25, Patricia Anne Martin:
The Port District's intermodal center will bring an increase in railway volume. Did the state factor in their increased emissions?

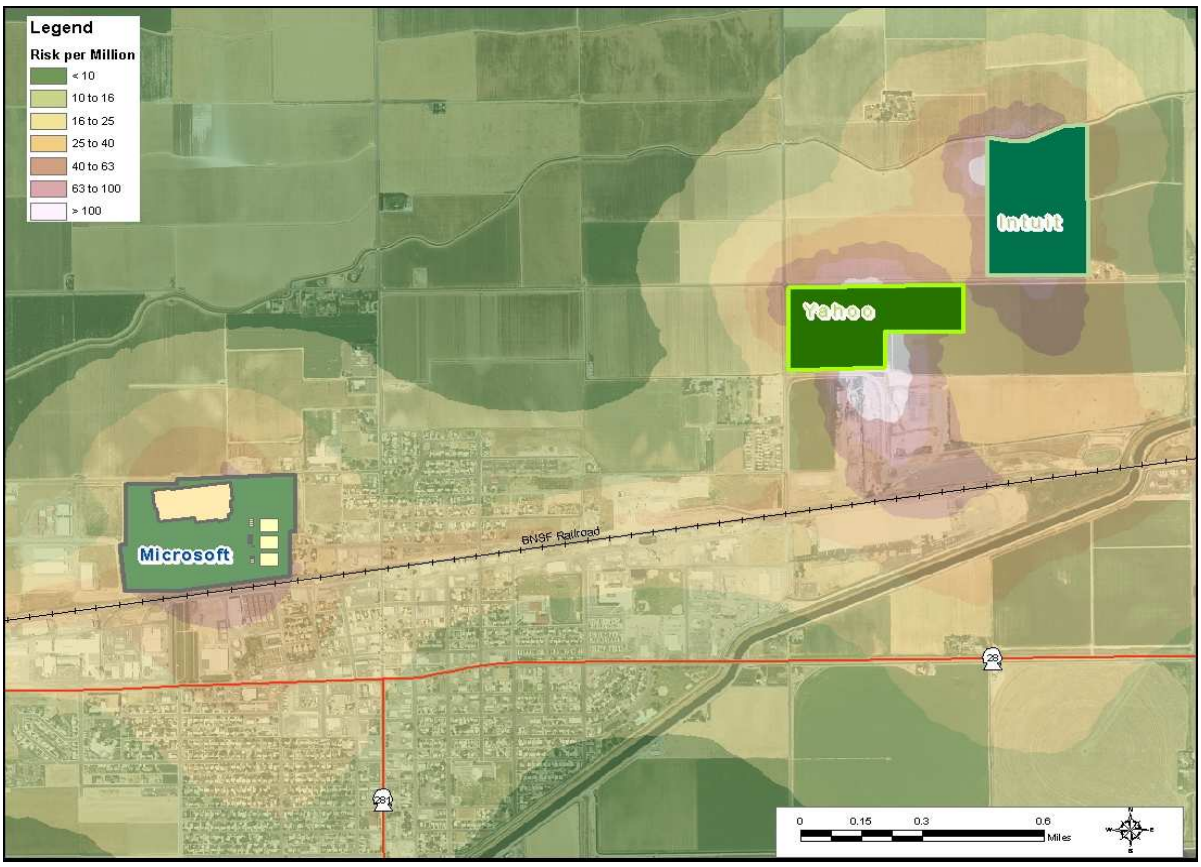
Ecology Response:
No. Ecology looked at current estimates of diesel engine exhaust particles for modeling purposes. We did not assume an increase in diesel exhaust, and we did not account for future decreases in rail emissions from improved diesel technology. This improved technology will be phased in starting in a few years. It is difficult to guess what actual railway emissions will be in the future, so current emissions proved to be the most accurate for modeling purposes.

Comment 26, Patricia Anne Martin:
Where do the plumes from Yahoo/Intuit intersect with Microsoft? What is the level of NO_2 and $PM_{2.5}$ in that area?

Ecology Response:

As the map of cumulative impacts in Figure 1 demonstrates, the main portion of the diesel engine exhaust from Microsoft's Columbia Data Center does not intersect with the diesel engine exhaust from other data centers. Because the diesel engine exhaust particulate is evaluated as an annual average, its plume is composed of many individual plumes (more than 8000--one for each hour of the year) produced by the annual distribution of wind directions and wind speeds. This temporal averaging spreads the pattern out as shown.

Figure 1.



The concentration pattern for one-hour average NO_2 will consist of relatively narrow plumes that move around from hour to hour according to the wind direction. Although the plumes will be widened by the affects of air flowing over and around the buildings, the range of directions that are required for Microsoft emissions to interact with plumes from the other data centers is limited. The relevant metrics are the 98th percentile of the daily maximum (for the NAAQS) and the maximum 1-hour concentration in each year (toxics). As such, each hour's concentration field is evaluated independently and the concentrations of the preceding and following hours have little influence on the evaluation at a specific location.

NO_2 is thought to be less than 25 percent of the NOx in diesel engine exhaust. The process to produce NO_2 from relatively concentrated plumes, such as produced by diesel engines, is not instantaneous and typically reaches equilibrium when 75 to 90 percent of the total NOx emissions have converted to NO_2. This process depends on atmospheric conditions and may take as long as an hour. In that time the plume has typically traveled 5 to 10 kilometers and has dispersed.

Comment 27, Patricia Anne Martin:
How many hours of "storm avoidance" and "electrical bypass" was experienced last year by Microsoft? By Yahoo? By Intuit?

Ecology Response:
The Ecology permits for all the data centers in Quincy are required to report annual engine operation. As of 2009, the maximum amount of actual operation of each engine at the Microsoft, Intuit, and Yahoo! data centers is 58 hours, 8 hours, and 10 hours, respectively. Ecology does not consider "storm avoidance" to be a reason for emergency operation, and does not provide for "storm avoidance" in any permit issued to a Quincy data center. The amount of operating time that was due to "electrical by-pass" is not specifically known, but would be unlikely unless the PUD needed to disrupt power in order to splice into existing feeder lines to the facility. The majority of the operation during 2009 at each data center was for maintenance and reliability testing.

Comment 28, Patricia Anne Martin:
After how many hours of down time caused by storm avoidance or PUD outage -- in which all three data centers run their backup generators-- is it advised that people either stay indoors or evacuate Quincy?

Ecology Response:
Ecology considers a power outage of sufficient duration that would require evacuation of Quincy to be highly unlikely. This assumption is based on the overall reliability of the electrical grid in Quincy, the fact that two separate sources of power exist, and the duration of historical power outages in the Quincy UGA after the recent upgrades to the area power system. However, we understand that unforeseen events may result in an extended power outage. If an extended power outage does occur, Ecology will work with local health officials to develop appropriate messages related to air quality concerns in Quincy. These messages would likely be similar to those used during winter air stagnation events.

Comment 29, Patricia Anne Martin:
According to the Regulatory Impact Analysis (RIA) for Existing Stationary Spark Ignition (SI) Reciprocating Internal Combustion Engines (RICE) NESHAP - Final Report [EPA 452/R-10-010], NO_x is a precursor to PM2.5. Was this considered during the HIA modeling or factored into the HIA in any way? Why or why not?

Ecology Response:
The USEPA has determined that NO_x is a precursor to $PM_{2.5}$. There is a percentage of NO_x that can convert to $PM_{2.5}$ under certain conditions. That conversion may take as long as 4 hours and the plume will typically travel 10 to 20 kilometers and be widely dispersed. Current dispersion models approved by the EPA do not have the capability to make the calculations necessary to estimate NO_x conversion to $PM_{2.5}$. The USEPA is working on adding an algorithm to the AERMOD model to run the calculation. The answer to the question is no, the HIA modeling did not factor in NO_x conversion to $PM_{2.5}$.

Comment 30, Patricia Anne Martin:
With respect to the NAAQS modeling for NO_2, it is not clear from the Technical Support Document whether the existing engines were evaluated in order to determine if there was a need to conduct a cumulative impacts analysis. To be clear, I am asking whether the plumes from the existing engines interact with the plumes from the proposed engines. Likewise, do the plumes from any other nearby source interact with the plume of the proposed engines? Also, what was the source of background data for the NO_2 modeling?

Ecology Response:
Please see the response to Comment 26.

Comment 31, Patricia Anne Martin:
The DIS data center is installing only 5 diesel backup generators, yet there is mitigation including installing diesel oxidation catalysts (DOC) on diesel engines and limiting maintenance testing to less than 50 hours per year. The limitation on hours required for 5 generators (250 hrs total) raises my concerns about 37 diesel engines operating for up to 104 hours each (3848 hrs total) for testing, storm avoidance, electrical bypass and power outages. Looking at the modeled air quality impacts from 5 diesel generators operating for a total of 250 hrs (Table 6, page 4 of the Preliminary Assessment for construction, attached) at the DIS data center, the results found within the Tier III review are difficult to accept as accurate. Please

explain how the results were derived. Why is a diesel oxidation catalyst best available control technology (BACT) in Olympia, but not in Quincy?

Ecology Response:
Ecology management decided to use a community-wide approach to better understand the risk from data centers in Quincy.

By itself, the Microsoft expansion would not require a third-tier review. But other data companies are also interested in building or expanding in Quincy. Because the existing and proposed data centers are relatively close together, Ecology decided to use a community-wide approach in reviewing Microsoft's application for the 13 new generators. The community-wide approach adds together the various sources of DEEP, such as trucks and cars on highways, trains on railroads, and backup generators from data centers, to evaluate the overall impact of DEEP. This approach triggered a third-tier review.

When Microsoft built the Columbia Data Center, DEEP was not yet regulated. The permit Ecology issued at that time allowed more hours of generator use and more fuel use than would likely be allowed today. As part of the third tier review, Ecology and Microsoft staffs worked together to find ways to minimize potential health effects from DEEP. Microsoft offered to reduce by half the maximum amount of diesel fuel authorized in its existing permits. Microsoft is also limiting the amount of engine testing, maintenance, and other engine use. Each engine will be limited to less than 44 hours of operation per year for storm avoidance and "electrical bypass." Each of the 13 new engines will be tested for an average of 12 hours per year. Total operation of the 13 new engines will be, at most, 104 hours per engine per year.

Ecology evaluated the use of diesel oxidation catalysts for controlling DEEP, CO and hydrocarbon emissions from the 13 additional engines. As noted above, our priority for Quincy was to reduce cumulative health risks associated with emissions of DEEP while also meeting our BACT obligation for the other pollutants. Our evaluation indicated that diesel oxidation catalysts could only reduce up to 25 to 30 percent of DEEP at a cost of approximately $380,000 per ton of DEEP removed. The estimated cost to control CO and hydrocarbons by using diesel oxidation catalysts were $5,000 and $116,000, respectively, per ton of pollutant removed.

In order to achieve a better reduction in DEEP emissions than achieved by using diesel oxidation catalysts, Microsoft offered to reduce allowable emissions from

their existing engines by about 50 percent. Since Ecology's priority was to reduce emissions of DEEP, and because DEEP emissions from the expansion were already very low (less than one-half ton per year), Ecology accepted Microsoft's emission reduction proposal in lieu of diesel oxidation catalysts.

Comment 32, Patricia Anne Martin:
How many additional heart attacks can Quincy expect as a result of the cumulative impact of DPM and NO2 on our air quality?

Ecology Response:
In the technical support document for the third tier petition, Ecology evaluated the non-cancer hazards associated with long-term exposure to diesel engine exhaust particulate from all known sources in Quincy. We found that the cumulative maximum off-site concentration of DEEP near Microsoft's property was about 25 times lower than the USEPA's RfC implying that adverse non-cancer health effects from exposure to DEEP are not likely to occur (see responses to questions 3 and 21).

Additionally, Microsoft demonstrated compliance with the daily and annual $PM_{2.5}$ national ambient air quality standards (NAAQS). The NAAQS are designed to protect human health.

Ecology acknowledges that there is a growing body of epidemiological evidence showing an association between $PM_{2.5}$ and cardiovascular and cardiopulmonary effects even at lower $PM_{2.5}$ concentrations. The USEPA is currently reviewing these epidemiological studies (and other information) in their review of the $PM_{2.5}$ NAAQS to determine if a revision to the NAAQS is appropriate.

The health effects of diesel engine exhaust are due to the toxic air pollutants carried by the fine particulate matter that is generated. When inhaled, these tiny particles can easily make their way deep into a person's lungs and can translocate into other parts of the body. Studies show this can cause many health problems, including inflamed and irritated lungs and breathing passages.

The amount of diesel exhaust particles that come from Microsoft's diesel generators are not predicted to be enough to cause the health effects listed above. The risk is considered low because the level of toxic air pollutants are estimated to be less than the "level of concern" established by the USEPA.

Comment 33, Patricia Anne Martin:
Ecology's burden of proof under Tier III is "based on a determination that emissions will be maximally reduced through available preventive measures, assessment of environmental benefit, disclosure of risk at a public hearing, etc." What maximal preventive measures has the WDOE put in place to protect Quincy? What benefit does Quincy gain from a less protective standard, i.e., 100 cancers in 1 million? I was in attendance at the public hearing and I would have to say that disclosure of the risk, i.e., honest and full disclosure, was not given. In my opinion the state has not met its burden of proof.

Ecology Response:
Risk assessment is best used as a ruler to help us decide which concerns and issues are the most important in protecting peoples' health. Risk assessment can't predict rates of a certain disease in an exposed community. However, it is a good tool for estimating potential risk based on current knowledge and many assumptions. Many of the assumptions used to assess risk overestimate risk to be sure our regulatory decisions help protect human health.

Ecology's scientists estimated that if Microsoft does not expand, the risk from diesel exhaust particles for a person who lives near the Columbia Data Center is about 41 per million, or four per 100,000. This means that if one million people lived close to the Columbia Data Center, 41 people might be expected to get cancer because of breathing diesel exhaust particles.

When Ecology's scientists looked at the risk that might be caused by the expansion project itself, they estimated that another two people in one million might get cancer. If one million people lived close to the Columbia Data Center, this would mean a total of 43 people might be expected to get cancer because of breathing diesel exhaust particles.

Microsoft offered to voluntarily reduce the amount of diesel fuel used by the generators. They did this by cutting permitted hours of operation by more than half. If Microsoft did not do this, the cancer risk would obviously be higher after the expansion. When Ecology calculated what this meant for risk of cancer, we found that the estimated risk decreased to 30 in one million, or three in 100,000. If one million people lived close to the Columbia Data Center, 30 people might be expected to get cancer because of breathing diesel exhaust particles. **This is actually lower than the risk before the expansion.**

Toxicologists generally consider a rate of 10 additional cancers in one million people to be the point that would cause higher concern. The U.S. Environmental Protection Agency has determined that acceptable health risk can range up to 100 additional cancers in one million people exposed to a cancer-causing chemical. The Microsoft expansion could potentially cause two additional cancers in one million people. With Microsoft's voluntary limits in operation, the risk decreases to be even lower than the risk before the expansion. As a result, the study showed that Microsoft's backup diesel generators will typically not emit enough diesel exhaust particles to cause health problems.

Comment 34, Patricia Anne Martin:
I think it also important to note that health analysis fact sheets were not available online until Saturday October 2, 2010. Key to public comment in a Tier III assessment is the public's understanding of the risks involved. Not having those documents available until the end of the comment period is unconscionable. Additionally, for comparison purposes and fuller understanding of releases from Microsoft's existing operations documents that preceded the Tier II/III review should have been available online.

Ecology Response:
Ecology required Microsoft to publish a public notice in the Columbia Basin Herald on August 26, 2010 that stated the permit documents were available for review at both the Ecology office in Spokane and at the Quincy City Hall beginning on August 26, 2010. Ecology provided local access to the public documents related to this project, and has afforded any person interested in the Microsoft expansion sufficient notice of the project and ample opportunity to review permit documents. Ecology does not have sufficient resources to make every document available online. However, we do provide access to all public documents, and those documents can be reviewed at our office, or can be requested under the state public disclosure laws.

III. Summary of public involvement opportunities

A. Summary of public involvement opportunities for this permit:

1. Legal ad placed on August 26 in the Columbia Basin Herald (the largest daily newspaper in Grant County, where the project is located). In selecting the newspaper, we took into account the extent of readership throughout the city, county and region to maximize contact with the people who might have an interest in this project. The ad stated where the project documents were available to review and when/ where the public hearing would be held. The ad further stated how to submit public comment and that all comments were required to be postmarked no later than October 4, 2010.

2. On Sept. 20, 2010, Ecology issued a press release to all news media--radio, TV, and newspapers—in Adams, Douglas, Franklin, Grant, Lincoln and Spokane counties. From this press release, we know that the articles were run in the following local newspapers and included information about the public hearing and listed the close of comments date as October 4th:

- Quincy Valley Post Register: September 16, 2010
- Columbia Basin Herald: September 8, 2010
- Articles also appeared in several on-line industry websites

3. Display ads inviting people to the hearing were published in both the Quincy Valley Post Register and the Columbia Basin Herald on September 24th and 27th.

4. Information was available on Ecology's on-line public calendar.

5. Flyers advertising the hearing in both Spanish and English were posted at several locations in the community the week prior to the hearing.

IV. Appendices

A. Individuals and Organizations Providing Written Comments

B. Individuals and Organizations Providing Oral Comments

C. List of Public Comment Submittals

D. Copies of All Written Comments

E. Hearing Transcript and Oral Comments

F. Public Notices

G. Technical Support Document

H. Final Permit

Appendix A
Individuals and Organizations Providing Written Comments

Document Number	Name and Affiliation	Comment Number(s)
1	Jim Hemberry, Mayor of Quincy, Tim Snead, City Administrator, City of Quincy	B 1,2
2	Tom Harris, Quincy School District	B 3,4
3	Danna Dal Porto	B 5-11
4	Pat Husband	B 12
5	Patricia Anne Martin	B 13-34

Appendix B
Individuals and Organizations Providing Oral Comments

Document Number	Name and Affiliation	Comment Number(s)
6	Todd Heikes	A 1-4

Appendix C
List of Public Comment Submittals

1. Eldon Roush, 2213 Hwy 25 N, Evans, WA 99126. Comments received in e-mail dated September 3, 2010 at 7:22 AM. Message contained information on diesel engine exhaust from the California Air Resources Board, with statement at the end of the message "NO diesel fuel burning backup generators". No response necessary.
2. Philip Anderson, 15679 Road 9 NW, Quincy, WA 98848. Comment received in e-mail dated September 3, 2010 at 8:21 PM in support of the project. No response necessary
3. Jim Hemberry, Mayor of Quincy, Tim Snead, City Administrator, City of Quincy. Written comments received during the public hearing on September 28, 2010 in support of project. Comments contained two questions which were answered in responsiveness summary.
4. Patrick Boss, Public Affairs Director, Port of Quincy. Written comment received during the public hearing on September 28, 2010 in support of the project. No response necessary.
5. Todd Heikes, 1309 3rd Avenue SW, Quincy, Washington 98848. Comments given during the September 28, 2010 hearing in Quincy. Comments contained four questions which were answered in responsiveness summary.
6. Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848, comment received in e-mail to Karen Wood dated September 29, 2010, 10:08 AM. Comments contained two questions which were answered in responsiveness summary.
7. Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848, comment received in e-mail to Karen Wood dated September 29, 2010, 10:42 AM and forwarded to Greg Flibbert for response. Comments contained one question which was answered in responsiveness summary.
8. Tom Harris, Quincy School District Maintenance Supervisor, comment received in e-mail dated September 30, 2010, 3:49 PM. Comments contained two questions which were answered in responsiveness summary. In addition, Mr. Harris requested a copy of the presentations, and the question and answer session given prior to the public hearing. Mr. Harris was sent a copy of the power point presentation and notes from the question and answers session (Kari Johnson 10/7/10) in response to his request.
9. Danna Dal Porto, 16651 Road 3 NW, Quincy, WA 98848, comment received in e-mail dated October 1, 2010, 10:27 AM. Comments contained a request to extend the public comment period and two questions which were answered in responsiveness summary. The request for an extension of the public comment period was also answered in the responsiveness summary.
10. Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848, comment received by e-mail dated 10/1/10 4:56 PM. The comment requested an extension to the public comment period for this project. The request for extension of the public comment period was answered in the responsiveness summary.

11. Pat Husband, 421 K Street SW, Quincy, WA 98848, comment received by e-mail dated October 3, 2010 9:15 PM. The comment requested an extension to the public comment period for this project. The request for extension of the public comment period was answered in the responsiveness summary.
12. Curt Morris, President/Chair, Port of Quincy. Written comment received in e-mail dated October 4, 2010 12:38 PM. This message contained the same content as submitted by Patrick Boss during the public hearing on September 28, 2010 in support of the project. No response necessary.
13. Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848, comment received by e-mail dated 10/4/10 4:58 PM with minor corrections submitted 10/4/10 5:32 PM. Comments contained seventeen questions which were answered in responsiveness summary.
14. Danna Dal Porto, 16651 Road 3 NW, Quincy, WA 98848, comment received in e-mail dated October 4, 2010, 5:09 PM. Comments contained four questions which were answered in responsiveness summary.

Appendix D
Copies of All Written Comments

1. Greetings:
Diesel fuel is so toxic to our health and environment that the fuel should be banned! There are less toxic fuels that can be used!

Diesel fuel is widely used throughout our society. It powers the trucks that deliver products to our communities, the buses that carry us to school and work, the agricultural equipment that plants and harvests our food, and the backup generators that can provide electricity during emergencies. It is also used for many other applications. Diesel engines have historically been more versatile and cheaper to run than gasoline engines or other sources of power. Unfortunately, the exhaust from these engines contains substances that can pose a risk to human health.

In 1998, the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) completed a comprehensive health assessment of diesel exhaust. This assessment formed the basis for a decision by the California Air Resources Board (ARB) to formally identify particles in diesel exhaust as a toxic air contaminant that may pose a threat to human health. The American Lung Association of California (ALAC) and its 15 local associations work to prevent lung disease and promote lung health. Since 1904, the American Lung Association has been fighting lung disease through education, community service, advocacy and research.

This fact sheet by OEHHA and ALAC provides information on health hazards associated with diesel exhaust.

What is diesel exhaust?

Diesel exhaust is produced when an engine burns diesel fuel. It is a complex mixture of thousands of gases and fine particles (commonly known as soot) that contains more than 40 toxic air contaminants. These include many known or suspected cancer-causing substances, such as benzene, arsenic and formaldehyde. It also contains other harmful pollutants, including nitrogen oxides
(a component of urban smog).

How are people exposed to diesel exhaust?

Diesel exhaust particles and gases are suspended in the air, so exposure to this pollutant occurs whenever a person breathes air that contains these substances. The prevalence of diesel-powered engines makes it almost impossible to avoid exposure to diesel exhaust or its byproducts, regardless of whether you live in a rural or urban setting. However, people living and working in urban and industrial areas are more likely to be exposed to this pollutant. Those spending time on or near roads and freeways, truck

loading and unloading operations, operating diesel-powered machinery or working near diesel equipment face exposure to higher levels of diesel exhaust and face higher health risks.

What are the health effects of diesel exhaust?

As we breathe, the toxic gases and small particles of diesel exhaust are drawn into the lungs. The microscopic particles in diesel exhaust are less than one-fifth the thickness of a human hair and are small enough to penetrate deep into the lungs, where they contribute to a range of health problems.

Diesel exhaust and many individual substances contained in it (including arsenic, benzene, formaldehyde and nickel) have the potential to contribute to mutations in cells that can lead to cancer. In fact, long-term exposure to diesel exhaust particles poses the highest cancer risk of any toxic air contaminant evaluated by OEHHA. ARB estimates that about 70 percent of the cancer risk that the average Californian faces from breathing toxic air pollutants stems from diesel exhaust particles.

In its comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers and equipment operators. The studies showed these workers were more likely to develop lung cancer than workers who were not exposed to diesel emissions. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Using information from OEHHA's assessment, ARB estimates that diesel-particle levels measured in California's air in 2000 could cause 540 "excess" cancers (beyond what would occur if there were no diesel particles in the air) in a population of 1 million people over a 70-year lifetime. Other researchers and scientific organizations, including the National Institute for Occupational Safety and Health, have calculated cancer risks from diesel exhaust that are similar to those developed by OEHHA and ARB.

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, lightheadedness and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

Diesel engines are a major source of fine-particle pollution. The elderly and people with emphysema, asthma, and chronic heart and lung disease are especially sensitive to fine-particle pollution. Numerous studies have linked elevated particle levels in the air to increased hospital admissions, emergency room visits, asthma attacks and premature deaths among those suffering from respiratory problems. Because children's lungs and

respiratory systems are still developing, they are also more susceptible than healthy adults to fine particles. Exposure to fine particles is associated with increased frequency of childhood illnesses and can also reduce lung function in children.

Like all fuel-burning equipment, diesel engines produce nitrogen oxides, a common air pollutant in California. Nitrogen oxides can damage lung tissue, lower the body's resistance to respiratory infection and worsen chronic lung diseases, such as asthma. They also react with other pollutants in the atmosphere to form ozone, a major component of smog.

What is being done to reduce the health risks from diesel exhaust?

Improvements to diesel fuel and diesel engines have already reduced emissions of some of the pollutants associated with diesel exhaust. However, diesel exhaust is still one of the most widespread and toxic substances in California's air.

ARB's Diesel Risk Reduction Plan, when fully implemented, will result in a 75 percent reduction in particle emissions from diesel equipment by 2010 (compared to 2000 levels), and an 85 percent reduction by 2020. The plan calls for the use of cleaner-burning diesel fuel, retrofitting of existing engines with particle-trapping filters, and the use in new diesel engines of advanced technologies that produce nearly 90 percent fewer particle emissions, as well as the use of alternative fuels.

The use of other fuels, such as natural gas, propane and electricity offer alternatives to diesel fuel. All of them produce fewer polluting emissions than current formulations of diesel fuel. As a result of ARB and local air-quality regulations, public transit agencies throughout California are using increasing numbers of passenger buses that operate with alternative fuels or retrofitted equipment.

Although the above information pertained to the State of California, the toxic effects outlined also applies to the citizens of Washington State as well.

NO diesel fuel burning backup generators!

Eldon Roush
2213 Hwy 25 N
Evans, WA 99126

2. This comment is in support of the Backup Generators.

If you stop and think about it this is really about the same as having 13 new Farm Combines or tractors for the field.

The local Farm machinery businesses are doing everything they can to get these or similar equipment sold and running so as someone who has lived in the Columbia Basin since 1959 and the Quincy area since 1984 I don't see any harm in having the backup generators, in fact recommend them.

Phil Anderson
15679 Rd 9 NW
Quincy, WA. 98848
509-787-4276

3. From: Jim Hemberry, Mayor of Quincy
Tim Snead, City Administrator

The City of Quincy respectfully submits the following written comments to the Washington State Department of Ecology, Air Quality Program staff on September 28, 2010 regarding Microsoft's permit for expansion of the Columbia Data Center.

City Supports Microsoft Expansion

After careful review of Ecology's Notice of Construction order for the proposed expansion, the agency's data center air emission analysis of the Quincy area, as well as other related support documents, including the Washington State Toxic Air Pollutants Priorities Study, the City supports Director Sturdevant's approval of Microsoft's Columbia Data Center expansion.

Introduction

The future of the internet and computer/technology industry is reliant on a backbone of data centers built around the globe, according to leading economists and industry analysts. They project a decade of growth in data center development to build the capacity for a world that is becoming ever more connected via the internet and computer technologies.

As the State and Ecology are aware, Quincy has become a data center hub for many reasons, including abundant green hydropower, affordable and available land, and at least we like to believe, sensible local planning and coordination.

Energy Play's a Critical Role in Quincy

The data center boom starts with energy, and as noted, this hearing is on the potential health impacts in Quincy from the occasional, but infrequent use of diesel generators located at Microsoft's Columbia Data Center.

Diesel particulate matter is a regulated toxic air pollutant that in significant concentrations, is known to cause impacts to human health. In November 2008, Ecology released the *Washington State Toxic Air Pollutants Priorities Study,* which ranks known toxic air pollutants by cancer and non-cancer risk estimates. Diesel Particulate Matter is

the air toxic of highest concern, according to the Ecology study, and concludes in its recommendations that "Our greatest opportunity for reducing public health risks from toxic air pollutants appears to be limitation of diesel engine emissions".

With that recommendation, the study set an agency goal of reducing toxic air pollutants in Washington by 50% by 2010, relative to 2000 levels.

It was in this environment that the agency generated a modeling analysis of the Quincy data centers emission impacts from diesel powered backup generators (titled: *Potential Acute Health Impacts of Multiple Diesel-powered Emergency Generators' Emissions).*

In a meeting with Ecology air program staff on September 8, 2009 in Quincy to discuss the data center air emission modeling analysis and related matters, the City, consultants, and Port of Quincy representatives were provided a presentation on energy supply and reliability by William Coe of the Grant County Public Utility District (GCPUD).

Using a graphic of the local area, Mr. Coe explained that the City of Quincy has a high level of electrical power redundancy because it is served by two different transmission lines; Grant County Public Utility District on the west, and the Bonneville Power Administration (BPA) on the east. Both of these utilities are already implementing facility and capacity upgrades, with the GCPUD scheduled to complete installation of a new transmission line in 2013, which will provide additional system capacity and improve the area's overall energy reliability.

Importantly, data centers on the east side of town (Yahoo!, Intuit, Sabey) are on BPA's line, while data centers on the west side of town are connected to the GCPUD, making a complete system wide power failure nearly impossible. In fact, at the City we cannot recall a community wide power outage in modern times (2000 or so).

In our meeting with Ecology, we understood that in calibrating the air emission model for the data centers (Intuit, Yahoo!, Microsoft) in Quincy, the agency assumed a 'worst case scenario' in which the City experienced a complete power outage, requiring all data centers to simultaneously use their respective diesel backup generators.

The model further assumes that at this time of a complete power loss and intense diesel generator use by all the data centers, an air inversion condition could occur, which would essentially trap this mass of diesel particulates, and move it into areas of the town where it could potentially impact local sensitive populations.

However, this projected 'worst case scenario' is now halved by the fact that the City is served by two distinct and separately operated power systems that are highly unlikely to ever simultaneously lose power in Quincy.

As you are aware, Ecology has worked with the data centers cooperatively on an agreement for when the diesel generators can be periodically tested, so that they are not operated simultaneously, thereby reducing overall impacts during testing.

In a relevant follow-up question about Quincy data center energy impacts this year, Coe provided this answer via e-mail to the City:

> *"Grant County PUD is committed to serving the electrical demand of its current and future customers. The Quincy area within Grant County PUD's service area has recently generated significant interest by numerous data centers. This interest is primarily based on the utility's low cost power and the availability of broadband communications. Grant County PUD is committed to improving and preserving the availability of these* low *cost services.*
>
> *The initial data center interests presented the utility and local area with new opportunities to provide services in large-scale quantity demands, demands new to these small scale rural systems. Initial data center interest included nearly 200 megawatts of electricity demand for the utility. This electrical demand required the utility to plan for significant infrastructure improvements. The development of data center electricity demands decreased significantly as construction plans were curtailed for numerous business and economic reasons. The curtailment of construction build-out allowed the utility to improve its infrastructure including transmission line upgrades and substation construction to meet the needs of these new facilities. In 2009, the average monthly total data center electrical demand in the Quincy area was approximately 34 megawatts. The utility currently has electrical capacity to serve additional load in the Quincy area. Grant County PUD is also proceeding with plans to construct a new 230kV transmission line through the Quincy area that is scheduled to be completed in late 2013. This new transmission line will provide even more electrical capacity for not only Quincy, but the entire Grant County PUD system.*
>
> *Grant County PUD is currently investing hundreds of millions of dollars for system wide infrastructure improvements. These improvements include generator upgrades, transmission line construction, and build out of a fiber optic communication system. The costs of these improvements will be shared by all customers of the utility".*
>
> February 26, 2010
>
> *William L. Coe*
>
> Public Utility District #2 of Grant County

Consequently, the power supply in the Quincy area is highly reliable, supported by two different sources, and being upgraded in anticipation of data center development. Given these conditions, we encourage Ecology to reconsider the data center modeling calibrations and/or assumptions, so that the model will present a more accurate depiction of potential health impacts from the future likely infrequent and planned

operation of data center backup diesel generators.

Technical comments

In review of Ecology's Draft Order approving Microsoft's additional diesel generators, we had the following comments regarding Table 2: Potential to Emit for Microsoft Columbia Data Center:

1) The values for some pollutants appear to increase exponentially for the Expansion phase. Specifically, the Pollutants CO, PM2.5, Diesel Engine Exhaust Particulate, and Carbon Monoxide are given a relatively higher value for potential to emit under Expansion, which has 13 diesel engines, than for the Existing units, which have 24 diesel engines.

2) The double asterisk at the bottom of Table 2 is missing. It is a reference for Diesel Engine Exhaust Particulate listed in the table.

Economic and tax considerations

Regarding economic impacts, a little history is helpful: The City of Quincy has three existing data centers – Microsoft, Yahoo! and Intuit - which were sited and built between 2005 and 2008. During that span, these three companies invested an estimated one billion ($1,000,000,000) in private sector funds for construction, and another one billion ($1,000,000,000) in equipment.

That $2.0 billion private investment resulted in significant new sales tax and property tax revenues for the City and State, and boosted both short and long term employment in North Central Washington, an area of chronic high unemployment.

The $8.5 million the City received in data center generated tax dollars was reinvested back into the community to improve the quality of life of Quincy residents by funding vital community services and projects including: the Hospital District's ambulance service, equipment for the Police Department, street construction projects, a ladder truck for the Fire Department, improvements to the Senior Center, City Park, and town Museum, as well as providing critical matching funds for the Library project.

Importantly, the data center's property tax investment has allowed the City to reduce its levy rate from $3.17 per thousand in 2008, to a rate of $2.94 in 2010, a 6.6% reduction in property taxes, as more of the funding for public schools and other local taxing districts was borne by the data centers.

However, the data center mini-boom ended, in large part because of the State Attorney General's opinion on the rural county sales tax and use deferral, which all three data

centers had assumed they would qualify for when they built their facilities. Once that opinion was publicized, private investment in Quincy dried up.

As you know, the State Department of Revenue sponsored and the City of Quincy supported SB 6789, which the legislature passed by wide margins in both chambers, provided data centers that locate in rural areas with a sales tax exemption for equipment during a fifteen month construction window, which ends July 1, 2011. With the Microsoft expansion and the planned future expansion of Yahoo!, and potential new development from Sabey and two known as well as other unknown data center projects, the City is bracing for a variety of scenarios including a similar mini-boom that was experienced from 2005-2008.

In this environment, stakeholder relationships and private-public partnerships are vital to solve challenging issues and develop the necessary infrastructure in a timely manner to enhance critical private investment and insure economic development, no small task in rural communities that often have limited public resources.

Microsoft's permit for expansion will generate a significant private investment in the Columbia Data Center and represents a long-term partnership with our community.

City Water Reclamation and Reuse Utility

As Ecology is aware, the City of Quincy has been working diligently with all stakeholders in developing an affordable, green solution to industrial and municipal water needs by constructing a water reclamation and reuse utility that conserves water and reduces industrial discharge. With full stakeholder participation, this utility offers the most environmentally safe and cost effective solution for all industrial users.

A recent example of the City's pro-active effort to develop green, local alternative technologies is our current biogas retrofit/methane energy project. The City and a private contractor, Environmental Management Corporation (EMC) are in the process of installing a biogas retrofit to one of our four industrial wastewater lagoons in order to generate methane gas from the decomposition process. That gas will be captured to generate power, resulting into a cost savings that will allow the City to keep industrial rates competitive well into the future.

While EMC and Grant PUD are still determining a price for the power, it is projected this system will recover enough volume to offset a percentage of the facility's future energy related operating costs.

In these times of economic uncertainty and tight budgets, the biogas project will hopefully continue to provide the City with an important cost tool for maintaining a competitive industrial rate structure in the future.

Summary

The City of Quincy supports Director Sturdevant's approval of Microsoft's Columbia Data Center planned expansion, and the infrequent but periodic operation of 13 new diesel generators for electrical energy backup. As noted above, the City is served by two separate power sources providing a high level of electrical power redundancy, and a historical record of providing timely and efficient service response during power outages. The infrequent use of the backup diesel generators, by testing or from outages, the location of the stacks, and the nature of the Quincy Valley airshed, suggests the potential health risks are relatively minor from this source.

Data centers strengthen the local economy by investing private capital and creating a second economic cluster based on technology. This significant economic investment and development is altering our community and adding economic stability. As noted above, future data center development in Quincy is anticipated during the next 10 months. Quincy's current unemployment rate is just under 12%, with approximately 57.7 percent of its population low- to moderate-income, representing an available workforce ready to meet some of the projected data center development and construction demand.

In closing, the City acknowledges that Ecology has a critical role to play in how data center development can occur in Quincy. Communication is essential as potential concerns or obstacles can be identified and discussed in order to reduce impacts and allow for a timely review of projects. The City looks forward to nurturing an open and cooperative working relationship with Ecology air program staff regarding this and other related air quality issues.

4. Dear Greg Flibbert,
I am writing on behalf of the Port of Quincy in support of the Department of Ecology's proposed "notice of construction" order or permit for the expansion of the Microsoft Columbia Data Center in Quincy. Additionally, the Port of Quincy supports the formal approval document by the Department of Ecology that will allow Microsoft to install 13 new backup diesel generators for use during power failures to support the expanded facility's data servers.

According to Grant County PUD, Quincy has a high level of electrical power redundancy because it is drawing electrical power from two different sets of the transmission lines. In fact, Quincy is the only community in the area/region with this sort of redundancy. As a result, the probability of Quincy having a complete blackout is extremely low, because half of Quincy gets power from one set of transmission lines (known as the west transmission lines) and other half of Quincy receives power from a different set of transmissions lines (known as the east transmissions lines). More specifically, the Microsoft Data Center draws its power from the west transmission lines, while Intuit and Yahoo! draw their power from the east transmission lines.

In addition to the power redundancy in Quincy, Grant County PUD has some of the lowest rates of power outages and shortest down times in the Pacific Northwest. Moreover, given that the Quincy Valley air shed covers a very large geographic area with a very small population, and Microsoft and the other data centers are situated in locations not close to populated areas and in locations where the wind generally blows away from Quincy, the impact of backup diesel generators is even further minimized.

Furthermore, even though Microsoft and other data centers in Quincy have to periodically test their backup diesel generators, the data centers and other parties (such as the Department of Ecology, the Port of Quincy and the City of Quincy) worked together earlier this year to come up with cooperative arrangement so that each data center does not test its backup diesel generators on the same day as another data center in Quincy. In other words, the data centers in Quincy are proactively working together to make sure that they greatly minimize any air emissions impacts when they test their generators.

In conclusion, the Port of Quincy thanks the Department of Ecology for the opportunity to provide these comments and we support the Department of Ecology Director Ted Sturdevant's recent approval of the permit to expand the Microsoft Columbia Data Center in Quincy, allowing Microsoft to install 13 new backup diesel generators.

Sincerely,
Curt Morris
President/Chair
Port of Quincy

5. (Todd Heikes, Oral Comment)
My first question out of four is: will diesel exhaust particulates only act as a gas, which was stated, or will there be a chance of them settling out, and if they do settle out because of getting larger, could there still be biological issues caused by those settling particles even if their size is at PM^{10} especially if they're assimilated in a young child.

The next question is: is the technology used the best available? If not, why, and are the youth at Mountain View worth that price?

The next question is: noncancerous is a concern. Will there be an increase with noncancerous issues because the generators are increasing output in the young children at Mountain View?

And the last question: will generators be running during school hours, and if so, why?

6. Dear Karen:

Regarding Celite's air emissions I could only find the following online from 2001 indicating that they released 41.57 tpy of PM10 and were not required to get an operating permit. Is an operating permit the same as an air quality permit? In 2008 Celite was fined for not having an air quality permit for 2006-2007 (makes me wonder if they had not had one since 2001).

SEPA requires that DOE consider other like sources and consider the cumulative effects on the community. Isn't Celite's emission a similar source, i.e., emission, in that it constitutes particulate matter which is also the concern from DEEP? Were Celite's emissions considered, and if not, why not?

Patty

7. Karen:

My understanding of the review process is that a background of current exposures -- all of them, not just DEEP -- is to be conducted plus the new exposures. Then a cumulative effect from all exposures -- new plus old -- is to be presented to the citizens so that they can make an informed decision as to whether the increased risk (over the current existing environmental exposures) is worth it.

Why weren't all the exposures in our area considered?

Patty

8. Dear Greg,

My name is Tom Harris and I am the Maintenance Supervisor for the Quincy School District. I recently attended a portion of the Public hearing that was held at the Quincy City Hall on Sept 28th 2010. Unfortunately I was only able to attend the last part of that meeting so I would like to request a copy of the Presentations and the question and answer session that took place that night. I came to the meeting as the Quincy School Districts representative.

The Quincy School district would like a response to the following question:

1. With the potential health effects from the diesel engines would it be possible to provide the Quincy School District with a schedule of the testing cycles the generators will be on?
2. Is it possible for the Generators to be programmed to run their test cycle during non school hours or possibly on Sundays so that it would be less of an impact on our students and staff?

The district would like for our concerns to be addressed in the written responsive summary that will be on your website in 30 days.

Respectfully,

Tom Harris
Quincy School District
509-398-0835
tharris@qsd.wednet.edu

9. Dear Mr. Flibbert,

This is my comment for the public hearing on Quincy Air Quality. I am curious about the guidelines for this meeting. I saw the notice for this meeting in the Moses Lake newspaper. I do not remember seeing a notice for the meeting in the Quincy, WA paper. I also remember the meeting notice did not appear more than once and it was posted in the paper just before the meeting date. There was no mention of the closing of the comment period. I thought there were specific guidelines for notifying the public in order for the public to make official comments. I am requesting an extension to the comment period due to the lack of notice on your part.

My concerns about the air quality in Quincy stem from the generators used at the data centers being built in our community. The generators are used in place of a power outage. I understand that at the public meeting (I was unable to attend) a number of days was mentioned for the outages of power to Quincy that is served by Grant County Public Utility District. As I was unable to attend I could not question the number of outage days mentioned.

I would like to know how long a time period was used to arrive at that number of outage days. We have had several severe storms that have resulted in downed lines and outages of days, not hours. We had a fire at Priest Rapids dams recently and that resulted in that power generation being curtailed for an extended time. The Wentachee World editor ran an article recently which mentioned the disrupting effect of the addition of wind power to the grid. On one occasion the grid was stretched and the GCPUD had to quickly adjust to avoid damage to the grid and, I assume, serious disruption of power. I cannot provide specific dates to these facts as I am not home and cannot access my documents. I have to send this comment in to you without supporting dates because I think the comment period is closing in just a few days.

Quincy has air quality issues already with particulate material from the diatomaceous earth processor. We have the constantly blowing dust and now we have particulates from generators blowing over our elementary school. I would like every consideration being given to limiting future sources of particulates in Quincy, WA.

Again, I regret that this letter is so limited with details.

Sincerely,

Danna Dal Porto
16651 Road 3 NW
QUINCY, WA 98848
(509)989-7444

10. Dear Mr. Flibbert,

I am writing to request an extension to the comment period on the expansion of the Microsoft Columbia Data Center located in Quincy WA. Permitting the installation and operation of an additional thirteen (13) backup diesel generators may have long-term health consequences for our community and additional time is needed to more fully understand them.

Thank you for your consideration of my request.

Sincerely,

Patricia Anne Martin
Quincy, WA

11. I am asking that the public comment deadline of Oct. 4 be extended on the Microsoft data center expansion center. I feel that the community has not been informed through our local paper (Quincy Valley Post-Register) by the Dept. of Ecology on the potential additional pollutants of 13 more diesel-powered in our community. We need more information and more time.
Thank you,
Pat Husband
421 K. Street SW
Quincy, WA. 98848
509-787-1743

12. Curt Morris, President/Chair, Port of Quincy. This message contained the same content as submitted by Patrick Boss during the public hearing on September 28, 2010 in support of the project.

13. Dear Mr. Flibbert,

Please accept my comments regarding the proposed installation and operation of 13 backup diesel generators at Microsoft Columbia Data Center in Quincy WA. It is my understanding that the Department of Ecology cannot allow construction of the facility

to proceed until all public comments have been considered. WAC 173-400-171 (4)(c). Please contact me immediately if you disagree.

As for the Tier III review conducted by the WDOE it is my opinion that it is operating outside the intent of the law, and its conclusion of safety is indefensible. In order to reach a decision that Microsoft can proceed with construction because "the cumulative risks are within a range considered by Ecology to reflect "an ample margin of safety", the WDOE arbitrarily assigned a less protective standard to Quincy. Specifically, Ecology "established a risk management goal of 100 excess cancer cases in one million people exposed. Ecology has defined this goal to represent the cumulative level of concern for Quincy residents (also called an "ample margin of safety")." In other words, Ecology created a standard that Microsoft could meet when it was apparent that they could not meet the standard of 10 cancers in 1 million. It should be noted that this "ample margin of safety" is less protective than the level set by the Washington legislature, and less protective than the standard used during review of the new Washington Department of Information Services (DIS) data center in Olympia. Washington Administrative Code 173-460 "Controls for new sources of toxic air pollutants" applies statewide WAC 173-460-030. Creating exceptions for Quincy is indefensible.

With that said, I have many questions regarding "*Technical Support Document for the Third Tier Petition for Microsoft Columbia Data Center Expansion Project*" (Tier III Review). For the sake of brevity I will list them.

1. WDOE refers to "existing data **center** emissions" (emphasis added) in calculating the cancer rate of 30 in 1 million (Executive summary); "Ecology calculated background DEEP near Microsoft", and then discusses DEEP concentrations "to be about 100 times the DEEP ASIL near two existing data centers." There is no discussion that WDOE included releases from Yahoo and Intuit for modeling "background" or "cumulative" ambient air quality and/or health impacts for DEEP.
    a. Did WDOE include releases from Intuit and Yahoo in their air quality modeling? And more specifically, did they model releases from Microsoft, Yahoo and Intuit together in assessing health impacts community-wide? Please identify **all** sources of emissions considered for "background" and "cumulative" releases to arrive at 30 and 41 cancers in 1 million. If Yahoo and Intuit were not considered please explain why.
2. WDOE relies on a variety of sources for its conclusion of safety (see references page 33 of Tier III review) that are written prior to 2004. In light of the new National Ambient Air Quality Standards (NAAQS) for diesel emission particulates (PM2.5) and NO2 finalized in January 2010, it seems remiss for the WDOE not to have looked to more recent publications for guidance. The attached Memorandum titled "*Guidance Concerning the Implementation of the 1-hr NO2 NAAQS*" dated June 29, 2010 is attached for your review. The EPA suggests a SIL (Significant Impact Level) of 4 ppb or 7.5 ug/m3, much lower than the 470 ug/m3 ASIL inserted into the state air quality standards under 2009 rulemaking (WAC 173-460-150). Please provide not only justification for using outdated material, but provide defensible justification for establishment of an ASIL that exceeds the NAAQS for NO2.

3. Because NO2 modeling was represented to not exceed NO2 ASIL for the 13 generators, i.e., expansion project, no further modeling was conducted on NO2 emissions from Microsoft's 24 existing generators, rail, trucks, Yahoo, Intuit or Celite.
4. WDOE assumed "all DEEP emissions to be PM2.5", when the literature is very clear that 80-90% of DEEP is <0.5 ug. What effect does WDOE's assumption to particle size have on the outcome of the HIA? In other words, what are the numerical differences in health impacts from ultrafine diesel particulates and PM2.5? What is the difference in distances traveled, air modeling plume shape, air distribution between ultrafine particulates and PM 2.5? What are the differences in health impacts, e.g., asthma, heart attacks, etc., expected from ultrafine particulate inhalation and PM2.5? Do atmospheric conditions affect them differently?
5. ICF used information from the existing Yahoo and Intuit permits for consideration in the HIA. Yahoo and Intuit permits were only reviewed against NO. Does this mean that ICF did not consider diesel and NO2 emissions from Yahoo and Intuit for "background", "cumulative" and "ambient air" concentrations that were used in assessing the
6. How many people live in the 130 residentially zoned parcels that exceed the ASIL for DEEP? Page 15
7. Please identify the composition and volume of "Data center emissions … derived from existing permits Microsoft (2006), Yahoo! (2007 and Intuit (2007)"? WDOE used "data center emissions and descriptions … obtained from input files provided by ICF International as part of their analysis of the current Microsoft application". Why didn't WDOE use information directly from Yahoo and Intuit files? How does the information in Yahoo and Intuit files differ from what ICF used?
8. The Port District's intermodal center will bring an increase in railway volume. Did the state factor in their increased emissions?
9. Where do the plumes from Yahoo/Intuit intersect with Microsoft? What is the level of NO2 and PM2.5 in that area?
10. How many hours of "storm avoidance" and "electrical bypass" was experienced last year by Microsoft? By Yahoo? By Intuit?
11. After how many hours of down time caused by storm avoidance or PUD outage -- in which all three data centers run their backup generators-- is it advised that people either stay indoors or evacuate Quincy?
12. According to the Regulatory Impact Analysis (RIA) for Existing Stationary Spark Ignition (SI) Reciprocating Internal Combustion Engines (RICE) NESHAP - Final Report [EPA 452/R-10-010], NOx is a precursor to PM2.5. Was this considered during the HIA modeling or factored into the HIA in any way? Why or why not?
13. With respect to the NAAQS modeling for NO2, it is not clear from the Technical Support Document whether the existing engines were evaluated in order to determine if there was a need to conduct a cumulative impacts analysis. To be clear, I am asking whether the plumes from the existing engines interact with the plumes from the proposed engines. Likewise, do the plumes from any other nearby source interact with the plume of the proposed engines? Also, what was the source of background data for the NO2 modeling?
14. The DIS data center is installing only 5 diesel backup generators yet there is mitigation including:
    a. Installing diesel oxidation catalysts (DOC) on diesel engines

b. Limiting maintenance testing to less than 50 hours per year

The limitation on hours required for 5 generators (250 hrs total) raises my concerns about 37 diesel engines operating for up to 104 hours each (3848 hrs total) for testing, storm avoidance, electrical bypass and power outages. Looking at the modeled air quality impacts from 5 diesel generators operating for a total of 250 hrs (Table 6, page 4 of the Preliminary Assessment for construction, attached) at the DIS data center, the results found within the Tier III review are difficult to accept as accurate. Please explain how the results were derived? Why is a diesel oxidation catalyst best available control technology (BACT) in Olympia, but not in Quincy?

15. How many additional heart attacks can Quincy expect as a result of the cumulative impact of DPM and NO2 on our air quality?
16. Ecology's burden of proof under Tier III is "based on a determination that emissions will be maximally reduced through available preventive measures, assessment of environmental benefit, disclosure of risk at a public hearing, etc." What maximal preventive measures has the WDOE put in place to protect Quincy? What benefit does Quincy gain from a less protective standard, i.e., 100 cancers in 1 million? I was in attendance at the public hearing and I would have to say that disclosure of the risk, i.e., honest and full disclosure, was not given. In my opinion the state has not met its burden of proof.
17. I think it also important to note that health analysis fact sheets were not available online until Saturday October 2, 2010. Key to public comment in a Tier III assessment is the public's understanding of the risks involved. Not having those documents available until the end of the comment period is unconscionable. Additionally, for comparison purposes and fuller understanding of releases from Microsoft's existing operations documents that preceded the Tier II/III review should have been available online.

Finally, according to the NO2 Guidance document attached Microsoft exceeds the tonnage threshold of 40 tpy and exceeds the suggested SIL of 4 ppb, and yet no background or accumulative assessment was conducted on NO2. Where dispersion modeling predicts a violation of NAAQS the agency must require compliance not only at the proposed source, but all sources which contribute to the violation1[1]. Ecology has the violation persists after the source owner or

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1[1] In implementing the changes to the *Guideline*, we recognize that there may arise occasions in which the application of a new model can result in the discovery by a permit applicant of previously unknown violations of NAAQS or PSD increments due to emissions from existing nearby sources. This potential has been acknowledged previously and is addressed in existing EPA guidance ("Air Quality Analysis for Prevention of Significant Deterioration (PSD)," Gerald A. Emison, July 5, 1988). To summarize briefly, the guidance identifies three possible outcomes of modeling by a permit applicant and details actions that should be taken in response to each:

1. Where dispersion modeling shows no violation of a NAAQS or PSD increment in the impact area of the proposed source, a permit may be issued and no further action is required.
2. Where dispersion modeling predicts a violation of a NAAQS or PSD increment within the impact area but it is determined that the proposed source will not have a significant impact (i.e., will not be above de minimis levels) at the point and time of the

operator eliminates its contribution, but the State must take further appropriate actions at nearby sources to eliminate the violations within a timely manner.

modeled Microsoft's off-site concentration in excess of the 1-hr NO2 NAAQS (Table 4. Modeled Off-site TAP Concentrations to ASILs, page 9 Third Tier Review Recommendation, August 20, 2010) as proof that this assessment is required, and not only for Microsoft and its existing generators, but for all contributors. The state's responsibility to protecting Quincy has only just begun.

Thank you for consideration of my comments.

Sincerely,

Patricia Anne Martin
Former mayor, Quincy WA

14. Dear Members of the Department of Ecology,

This is a second set of comments regarding the Microsoft complex in Quincy and the particulates from the diesel generators. I have requested an extension of the comment period. This afternoon around 3pm, the day that public comments are due, I received a phone call from Karen Wood of the Spokane office of DOE and she told me the public comment period would not be extended. I am curious how she can make that decision without hearing my concerns.

My first concern centers on the process used by the Spokane office to notify residents of Quincy about the public hearing: I believe the notification process was flawed. I have followed many issues in Grant County and this is one of the important issues receiving the worst possible notification. First, I attribute these flaws to the Spokane office. That office has chosen the Columbia Basin Herald (CBH) of Moses Lake, WA as their paper of record. I checked the distribution of the three "local" papers and I disagree with their choice. Ms. Woods told me that DOE chooses a daily paper as opposed to the weekly local paper. The official notification for this meeting was put in the CBH on August 26, 2010, according to an email I was sent. That was followed by notifications in the same paper for several weeks. The local paper, the Quincy Valley Post Register (QVPR), received at least one notice I saw that ran on September 23, 2010. The Wenatchee World (WW) was given no notices to post.

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modeled violation, then the permit may be issued immediately, but the State must take appropriate actions to remedy the violations within a timely manner.

3. Where dispersion modeling predicts a violation of a NAAQS or PSD increment within the impact area and it is determined that the proposed source will have a significant impact at the point and time of the modeled violation, then the permit may not be issued until the source owner or operator eliminates or reduces that impact below significance levels through additional controls or emissions offsets. Once it does so, then the permit may be issued even if

CBH…….home delivery…….778
QVPR…..home delivery…….1,700
WW…….home delivery…….700

Seems to me that the notices could have been spread about in a manner to reach the greatest number of people and that was not done. People in Quincy shop in Wenatchee and read that paper. Quincy residents travel to the closest town to shop Costco, Macy's and Target, they do not travel farther away to Moses Lake to shop Les Schwab and the Big R ag store. The WAC #173-400-171 indicates that "the paper chosen should be in general circulation in the area of the proposed project". It says nothing about the paper being a daily paper or a weekly paper. Ms. Woods told me today that they chose the CBH as the paper of record for Grant County. Sorry, but that is not correct either. The paper of record is the Grant County Journal located in Ephrata and hardly anyone in Quincy reads that paper. Ms. Woods told me today that the CBH has been used before by DOE and no one had complained. I am complaining today and I believe my complaints are valid.

An email I received in my inquiry into the notification process indicated that Kendra Robinson—Harding sent out radio and TV press releases. I would like point out that no TV stations serve this area and having notices on radio is pretty hit and miss with so many types of radio choices for this area. Also, did the notices go out in Spanish? Apparently notices were available to residents in town in English and Spanish. What bothers me is the fact that I live in the country, 8 miles from town, but I should have known about this meeting and I did not. I did not see any notices at the library (a common place for notices), the hardware store, the lumber yard or the coffee shop. I wonder where these notices were placed in town.

My next concern is I did not have time to review the documents related to this project. The purpose of the public comment period is to inform citizens. I was not informed and I demand additional time to review these documents and discuss them with my fellow Quincy residents. I believe this is a reasonable request and I see no reason to deny this request. Please provide me with the reason you are using to deny me access to these documents.

My second concern about this project is the number of days or hours that the generators will run. At the meeting an employee of the Grant Public Utility District gave a number of days for down time in electric service. I would like to ask more questions. Did his number of down days include the number of power surges that are experienced locally? Those happen all the time. I believe the generators fire up when the power surges. How long do they run? The Wenatchee World newspaper ran an article in Sunday, May 30, 2010, an extended article about the effect of the newly constructed wind farms and the disruption of the power on the grid. The complexity of the hydroelectric combining with the wind farms is going to be an ever expanding issue as

more of these wind farms come on line. As mentioned in the article, the possibility of the grid being compromised is a fact. What happens then?

My last comment is to speak to the safety of these generators in such large numbers. I am requesting that DOE require filters being placed on these machines. With filters, the public is protected no matter what happens….and the future disruption of power cannot be determined. Be safe, put on filters. The data centers have a generous profit margin considering that the GCPUD rate payers provided the fiber lines and the government provided the NOANET redundant fiber lines. The GCPUD rate for industry is below residential rates so we help them with their profit by giving them great electric rates. We know the land prices were agreeable because the Port of Quincy got great land prices for them to locate in Quincy. I believe that filters should be required just like the DOE has recently required for the data center being built near Olympia….and I believe that site has a low number of generators (5) as opposed to 70 plus here in Quincy.

Thank you for accepting these comments. I would have more to say if I had more time and could research my numbers more carefully.

My complements to Jani Gilbert of the Spokane Office of DOE….she is to be complemented in trying to help me.

Sincerely,

Danna Dal Porto
16651 Road 3 NW
Quincy, WA 98848
Home: (509)785-2380
Cell: (509)989-7444
ddalporto@smwireless.net

Appendix E
Hearing Transcript and Oral Comments

Public Hearing
Microsoft Proposed Expansion to
Columbia Data Center in Quincy, WA

Formal Comment

Date:	September 28, 2010
Location:	Quincy, Washington
Transcribed by:	Brenda Cavan, Dept. of Ecology Air Quality/ ERO, September 30, 201021, 1996

Kendra-Robinson Harding:

So we have one person that's indicated they'd like to give comments. When I call your name, you need to come up and you need to state your name, company, organization, and your address.

So, please let the record show that it is 7:03 p.m. on September 28, 2010, and this hearing is being held at the Quincy City Council Chambers in Quincy, Washington. This hearing is on proposed expansion of Microsoft's Columbia Data Center in Quincy, Washington.

Legal notice of this hearing was published in the Columbia Basin Herald newspaper on August 26, 2010. In addition, display ads were published in the Quincy Valley Post Register on September 23, 2010, and in the Columbia Basin Herald on September 25th and 27th, 2010. A press release including information for public broadcast was distributed to radio, TV, and newspapers on September 2, 2010.

Information about the hearing was placed on the Department of Ecology's on-line public calendar. Flyers advertising the hearing in both English and Spanish were posted at public locations around Quincy on September 20, 2010. Any testimony received at this hearing along with any written comments received by the end of the comment period will be part of the official hearing record for this issue. Those offering testimony will receive a copy of the response to public comments that Ecology prepared. If you would

like to send Ecology written comments, please mail them to Greg Flibbert at the Department of Ecology by 5:00 p.m. on October 4, 2010. It can also be faxed to (509) 329-3529 or e-mailed to Greg at gfli461@ecy.wa.gov.

Formal Comment Period

Kendra: It is now the formal comment period. One person has indicated that they would like to provide testimony. Would anybody like to comment that has not given me a card? Alright. So Todd Heikes, could you please come up.

My name is Todd Heikes. I have no company or organization. My address is 1309 3rd Avenue SW, Quincy, Washington 98848.

1. My first question out of four is: will diesel exhaust particulates only act as a gas, which was stated, or will there be a chance of them settling out, and if they do settle out because of getting larger, could there still be biological issues caused by those settling particles even if their size is at PM^{10} especially if they're assimilated in a young child.

2. The next question is: is the technology used the best available? If not, why, and are the youth at Mountain View worth that price?

3. The next question is: noncancerous is a concern. Will there be an increase with noncancerous issues because the generators are increasing output in the young children at Mountain View?

4. And the last question: will generators be running during school hours, and if so, why?

Thank you.

End of Formal Comment

Kendra: Ok. Thank you very much.

Ok, are there any further comments or questions?

Alright, let the record show the hearing was adjourned at 7:07 p.m.

Appendix F
Public Notices

DEPARTMENT OF ECOLOGY
State of Washington

News Release

FOR IMMEDIATE RELEASE – September 2, 2010
10-224

Public invited to comment on draft permit for Microsoft Columbia Data Center expansion

SPOKANE — The Washington State Department of Ecology (Ecology) invites the public to comment on a proposed "notice of construction" order (permit) for the expansion of the Microsoft Columbia Data Center, in Quincy. The notice is a formal approval document that allows the company to install 13 new backup generators for use during power failures to support the facility's data servers. The generators are powered by diesel engines.

Diesel engine exhaust particulate is a toxic air pollutant. Because of this, Ecology required a thorough evaluation of the health risks posed by the expansion project. This evaluation is called a "third-tier review of the health impact assessment" and the director of Ecology must approve it before the generators are installed.

The Microsoft Columbia Data Center was built in 2008 after Ecology approved a permit for installing and operating 24 electrical generators, capable of producing 60 megawatts of emergency backup electrical power. The expansion would add 32.5 megawatts of backup electricity.

The original construction did not involve the in-depth health assessment that is required now. This is partly because state rules governing such reviews have changed since 2008, but also because of the way Ecology views the evolution of data center construction in Quincy.

Considered by itself, the Microsoft expansion would not necessitate the third-tier review. But due to the interest expressed by other data companies to expand or build in the Quincy area, Ecology was concerned that the cumulative effect of diesel

engine emissions should be assessed. This approach elevated Ecology's review of Microsoft's permit request to the director's level.

On Aug. 20, 2010, Ecology Director Ted Sturdevant approved the permit to expand. The public is invited to comment on this decision. A public hearing is scheduled to be held Tuesday, Sept. 28, in the council chambers at the Quincy City Hall, 104B St. SW, Quincy. Pre-hearing presentations and discussion will begin at 5:30 p.m., followed by the hearing at 7 p.m. The hearing will continue until everyone who wants to testify has had the opportunity to do so.

The public also may comment in writing to Ecology until Oct. 4, 2010. Documents about the permit and the health assessment are available for review at the Department of Ecology, Eastern Regional Office, Air Quality Program, 4601 N. Monroe St., Spokane, WA. Or contact Greg Flibbert at 509-329-3452 or gfli461@ecy.wa.gov. They also are available at the City of Quincy, 104 B St. SW, Quincy, WA and on Ecology's website: http://www.ecy.wa.gov/programs/air/Tier2/Tier2_final.html

Comments may be submitted to Gregory Flibbert, Air Quality Program, Department of Ecology, Eastern Regional Office, 4601 N. Monroe St., Spokane, WA 99205-1295, or by email to gfli461@ecy.wa.gov.

Ecology will review and respond to all comments. The documents could be amended based on the comments Ecology receives.

###

Media Contacts: Cathy Cochrane, Communications, 509-329-3433; ccoc461@ecy.wa.gov or Jani Gilbert, Communications, 509-329-3645; jagi461@ecy.wa.gov

For more information: http://www.ecy.wa.gov/programs/air/Tier2/Tier2_final.html

Ecology's Web site: http://www.ecy.wa.gov

###

Broadcast version

Microsoft is planning to expand its Columbia Data Center, in Quincy, and the Washington Department of Ecology is asking the public to comment. Microsoft wants to add another thirteen diesel-powered backup generators to support new data servers.

Diesel engine exhaust contains particles that are considered toxic air pollutants. Ecology's director has approved the permit that allows expansion, but the permit is not final until the public has had time to weigh in.

A public hearing will be held at the Quincy City Council Chambers, in Quincy, on September 28th, beginning at 5:30 p.m. People may also send in their written comments. Contact the Department of Ecology for more information.

###

Public Hearing Announcement

Do you have questions about the Microsoft Columbia Data Center expansion? Would you like to learn more about emissions from the backup diesel generators? Then you need to come to this!

- Tuesday, September 28, 2010
- Council Chambers, Quincy City Hall
- Join us for a presentation and discussion at 5:30pm
- Formal hearing begins at 7:00pm

DEPARTMENT OF ECOLOGY
State of Washington

For more information, look on our website at
http://www.ecy.wa.gov/programs/air/Tier2/Tier2_final.html

Or contact Greg Flibbert at 509-329-3452 or gfli461@ecy.wa.gov

If you need this information in another format, contact the Air Quality Program at 360-407-6800. If you have a hearing loss, call 711 for Washington Relay Service. If you have a speech disability, call 877-833-6341.

Public Hearing Announcement

Do you have questions about the Microsoft Columbia Data Center expansion? Would you like to learn more about emissions from the backup diesel generators? Then you need to come to this!

- Tuesday, September 28, 2010
- Council Chambers, Quincy City Hall
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DEPARTMENT OF ECOLOGY
State of Washington

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If you need this information in another format, contact the Air Quality Program at 360-407-6800. If you have a hearing loss, call 711 for Washington Relay Service. If you have a speech disability, call 877-833-6341.

¿Tiene usted preguntas sobre la expansión del Centro Columbia de Datos de Microsoft? ¿Le gustaría informarse más acerca de las emisiones producidas por los generadores diesel auxiliares? ¡Entonces, usted debe asistir a ésta audiencia pública!

- Martes, el 28 de Septiembre de 2010
- Sala del Consejo Municipal, Municipalidad de la Ciudad de Quincy
- Ven para ver una presentación y participar en una discusión a las 5:30pm
- La audiencia formal comenzará a las

DEPARTMENT OF ECOLOGY
State of Washington

Para obtener más información, visíte nuestro sitio Web al http://www.ecy.wa.gov/programs/air/Tier2/Tier2_final.html

O comuníquese con Greg Flibbert al 509-329-3452 o gfli461@ecy.wa.gov

Si usted necesita esta información en otro formato, comuníquese con el Programa de Calidad de Aire al 360-407-6800. Si usted tiene discapacidad auditiva, marque 711 para el Servicio de Retransmisión de Washington. Si tiene discapacidad del habla, comuníquese con 877-833-6341.

Appendix G
Technical Support Document

TECHNICAL SUPPORT DOCUMENT
FOR APPROVAL ORDER NO. 10AQ-E3XX
2010 MICROSOFT COLUMBIA DATA CENTER
MSN CO 3.1, CO 3.2, AND CO 3.3 EXPANSION (GSF, DO)
~~AUGUST 4~~OCTOBER 19, 2010

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BACKGROUND

Microsoft Corporation (Microsoft) submitted a Notice of Construction (NOC) application for the Columbia Data Center on October 23, 2006. The Columbia Data Center project consisted of twenty-four 2.5 MW generators powered by Caterpillar 3516C engines and 2 banks of evaporative coolers. The generators have a capacity of 60 Megawatts.

The Department of Ecology (Ecology) issued Order No. 07AQ-E230 on August 8, 2007 to Microsoft. Subsequently, Microsoft notified Ecology's Air Quality Program (AQP) that several small engines were missed in the original NOC application, and Microsoft submitted a NOC application for a minor modification on June 12, 2009. Ecology's Eastern Regional Office (ERO) approved the minor modification by issuing Order No. 09AQ-E308 on August 28, 2009. NOC Approval Order No. 09AQ-E308 included all the approval conditions of 07AQ-E230, and rescinded Order No. 07AQ-E230. The Microsoft Columbia Data Center has a single Air Quality permit.

NOC Approval Order No. 09AQ-E308 allows each engine to operate for an average of 285 hours per year, limits total fuel to 890,021 gallons of road specification diesel fuel, and restricts NO_x emissions to 89.4 tons per year.

1. EXECUTIVE SUMMARY

Microsoft submitted a NOC application on May 14, 2010 for the Phased CO3.2 (Phase 1), CO3.1 (Phase II), and CO3.3 (Phase II) Expansion of the Columbia Data Center, hereafter referred to as the Microsoft Expansion. The Microsoft Expansion consists of the addition of three new buildings with thirteen 2.5 electrical-megawatts (MW) generators powered by Caterpillar 3516C engines, one smaller 111 kWm diesel firewater pump, and no evaporative coolers.

Microsoft has asked for a NO_x emission limitation for the Columbia Data Center plus the Microsoft Expansion of 89.4 tons per year. Further, Microsoft would like to limit fuel usage at the original Columbia Data Center plus the Microsoft Expansion to 439,493 gallons of on-road specification ultra-low sulfur diesel fuel. The NO_x limit of 89.4 tons per year is currently allowed in NOC Approval Order No. 09AQ-E308. These limits will be achieved by reducing the hours of operation and fuel usage of the original 24 engines permitted at the Columbia Data Center.

Review of the May 14, 2010 NOC application began on May 17, 2010, and a completeness determination was issued on May 21, 2010 by the permit team (Flibbert, Ogulei) in coordination with the Science and Engineering Section Manager (Johnston) and the Eastern Regional Office

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Section Manager (Wood). Additional information was submitted by Microsoft on May 24, June 1, June 4, 2010, June 25, 2010, and July 22, 2010. The NOC application was considered complete as of July 22, 2010. The final draft Preliminary Determination (i.e., Proposed Decision) was submitted to HQ on July 27, 2010, for review and to initiate the Tier II review.

2. PROJECT DESCRIPTION

2.1 The Microsoft Expansion consists of the addition of three new buildings with thirteen 2.5 MW generators powered by Caterpillar 3516C engines. Microsoft has proposed to reduce the fuel usage at the Columbia Data Center below what is currently allowed in NOC Approval Order No. 09AQ-E308, i.e., 890,021 gallons per year to 439,493 gallons per year. The 13 Microsoft Expansion engines will be limited to 139,493 gallons of on-road specification diesel fuel per year. The fuel limitation for the original 24 engines at the Columbia Data Center will be reduced to 300,000 gallons per year. The new facility-wide fuel limit will be 439,493 gallons of on-road specification diesel fuel per year. The new fuel limit will be achieved by reducing the hours of operation of the original 24 engines permitted.

Ecology submitted a draft approval order to Microsoft on June 14, 2010. The draft approval order proposed the use of diesel oxidation catalysts (DOCs) in each engine for the control of diesel engine exhaust particulate, carbon monoxide, and multiple organic compounds. On June 25, 2010 Microsoft requested an alternative means of achieving the emission reductions stipulated in the June 14, 2010 draft approval order. Microsoft proposed to take a reduction in the operating hours permitted for the existing CO1 and CO2 engines, and cap the annual number of gallons of fuel used. The original permits issued for CO1 and CO2 allowed for up to 890,021 gallons of total diesel fuel usage each year. Microsoft agreed to limit the fuel usage as follows:

Project	Historical allowed fuel usage (gallons per year)	Proposed allowed fuel usage (gallons per year)	Percent reduction (Total)
CO 1 & 2	890,021	300,000	66.3%
CO3.2 (Phase I), CO3.1 (Phase II), & CO3.3 (Phase II)	-	139,493	
Total	890,021	439,493	50.6%

The pollutant of greatest concern for this project is diesel engine exhaust particulate. By installing a DOC this project would have a reduction of approximately 0.1 ton of diesel engine exhaust particulate each year. By limiting the fuel to 439,493 gallons per year the facility, even with the new 13 engines would have a reduction of up to 0.8 tons per year of diesel engine exhaust particulate.

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2.1.1 Potential to Emit for Criteria and Toxic Air Pollutant Emissions

Table 2: Potential to Emit for Microsoft Columbia Data Center

Pollutant	**Emission Factor**	**Emission Factor Reference**	**Existing Units 1 thru 24 Potential To Emit[1]**	**Expansion Units 25 thru 37 Potential To Emit**	**Facility Potential to Emit**
Criteria Pollutant	g/kW-hr		tons/yr	tons/yr	tons/yr
NO_x	6.12	§89.112a	30.1	13.9	44.0
CO	3.50	§89.112a	2.1	8.0	10.1
SO_2	15 ppm/gal	MassBal	0.032	0.015	0.047
$PM_{2.5}$	0.200	§89.112a	0.58	0.45	1.03
VOC	0.282	CEC-05-049	1.4	0.60	2.0
Toxic Air Pollutants					
Primary NO_2	0.62	10% NO_x	3.01	1.39	4.40
Diesel Engine Exhaust Particulate	0.200	$PM_{2.5}$	0.58	0.45	1.03
Carbon monoxide	3.50	CO	2.1	8.0	10.1
Sulfur dioxide	15 ppm/gal	SO_2	0.032	0.015	0.047
Carbon based TAPs	lbs/MMBtu				
Acrolein	8.04E-06	AP-42 §3.4	2.29E-03	7.90E-05	2.37E-03
Benzene	7.92E-04	"	2.16E-02	7.80E-03	2.94E-02
Toluene	2.87E-04	"	7.75E-03	2.80E-03	1.06E-02
Xylenes	1.97E-04	"	5.39E-03	1.90E-03	7.29E-02
1,3 Butadiene	1.99E-05	"	2.02E-03	2.00E-04	2.22E-03
Formaldehyde	8/05E-05	"	5.39E-02	7.90E-04	5.47E-02
Acetaldehyde	2.57E-05	"	2.29E-02	2.50E-04	2.32E-02
Benzo(a)Pyrene	1.31E-07	"	3.71E-06	1.30E-06	5.01E-06
PAH (sum)	3.96E-06	"	na	3.90E-05	na
PAH (w/ TEF)	5.08E-07	"	na	5.00E-06	na

[1] **Potential to Emit** accounts for reduction in fuel use from the existing engines.

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2.1.2 Maximum Operation

Table 2.1.2: Microsoft Expansion 13 Generator Engines Annual Operations				
No.	**Operation**	**Average Load**	**Annual Hours**	**kW-hr/yr**
1	Scheduled Testing	10%	12*	57,720
2	Power Outage	85%	48	1,342,560
3	UPS Maintenance	40%	44	659,516
4	Total Operations	53%	104	2,059,796

* Maximum of one hour per month operation.

2.2 Tier 4 transitional emissions referenced in NOC Approval Order No. 10AQ-E374~~xx~~ can be found in the following EPA document:

Report No. NR-009c
EPA 420-P-04-009
Revised April 2004
Appendix A, Table A2, page A8

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Table 2.2: Tier 4 Transitional emission factors				
Pollutant	**NMHC**	**CO**	**NO_x**	**PM**
g/hp-hr	0.282	0.076	0.460	0.069
g/kWm-hr[1]	0.378	0.102	0.617	0.093

[1] conversion factor of 0.74558

2.3 Total emissions from the two banks of cooling towers shall be less than or equal to the amounts contained in the following Table:

Table 2.3: Cooling Towers Emission Limits			
Pollutant	**Water supply conc. Mg/l**	**Recirc. water conc. Mg/l**	**Emission rate Lbs/yr**
2.2.1 Hexavalent Chromium*	0.00083	0.0023	0.0054
2.2.2 Arsenic	0.025	0.070	0.16
2.2.3 Barium	0.2	0.56	1.29
2.2.4 Nickel	0.05	0.14	0.32
2.2.5 Bromine	Na	75	173
2.2.6 TDS as PM_{10}	Na	1072	2,466.17

* There shall be no hexavalent chromium added to treat the cooling tower water. This value is a result of hexavalent chromium in the City of Quincy water supply.

2.4 The Columbia Data Center has four small emergency engines consist of three 149 bhp engines to power fire water pumps and one 398 bhp emergency engine to power the cooling water pre-treatment facility. The three fire water pump engines and the cooling water pre-treatment engine are considered permit exempt under Washington

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Administrative Code (WAC) 173-400-110(4)(h)(xxxix), and will not be further addressed in the Approval Order.

3. 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 Columbia Data Center is regulated by the requirements specified in:

3.1 Chapter 70.94 Revised Code of Washington (RCW), Washington Clean Air Act,
3.2 Chapter 173-400 Washington Administrative Code (WAC), General Regulations for Air Pollution Sources,
3.3 Chapter 173-460 WAC, Controls for New Sources of Toxic Air Pollutants, and
3.4 40 CFR Part 60 Subpart IIII

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.

4. BEST AVAILABLE CONTROL TECHNOLOGY

Best Available Control Technology (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….*"

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, 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] 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.

[1] RCW 70.94.030(7) and WAC 173-400-030(12)
[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.

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The proposed diesel engines 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, PM_{10} and $PM_{2.5}$) and sulfur dioxide.

4.1 BACT ANALYSIS FOR NOx

Microsoft reviewed EPA's RACT/BACT/LAER Clearinghouse (RBLC) database to look for NOx add-on 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. 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 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 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 control options identified through a literature review include water injection and NOx adsorbers.

4.1.1 ***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. The use of a lean ultralow sulfur fuel is required to achieve good NOx destruction efficiencies. SCR can reduce NOx emissions by up to 90-95 percent while simultaneously reducing hydrocarbon (HC), CO and PM emissions.

For SCR systems to function effectively, exhaust temperatures must be high enough (about 200 to 500^{o}C) to enable catalyst activation. For this reason, SCR control efficiencies are expected to be relatively low during the first 20 to 30 minutes after engine start up, especially during maintenance, testing and storm avoidance loads. There are also complications of managing and controlling the excess ammonia (ammonia slip) from SCR use.

Microsoft has evaluated the cost effectiveness of installing and operating SCR systems on each of the proposed diesel engines. The analysis indicates that the use of SCR systems would cost approximately $23,500 per ton of NOx removed from the exhaust stream. A previous survey by Ecology found that the permitting agencies surveyed have required installation of NOx controls as BACT with expected operational costs ranging from $143 to $9,473 per ton of NOx removed. Ecology concludes that while SCR is a demonstrated emission control technology for diesel engines, it is not economically feasible for this project. Therefore, Ecology rejects this NOx control option as BACT.

4.1.2 ***NOx adsorbers.*** The use of NOx adsorbers (sometimes called lean NOx traps) is a catalytic method being developed and tested by diesel engine manufacturers to reduce

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NOx emissions, primarily from mobile sources. The NOx adsorber contains a catalyst (e.g., zeolite or platinum) that is used to "trap" NOx (NO and NO_2) molecules found in the exhaust. NOx adsorbers can achieve NOx reductions greater than 90% at typical steady-state exhaust gas temperatures.

However, as of this writing, NOx adsorbers are experimental technology and are, therefore, very expensive. Additionally, a literature search did not reveal any indication that this technology is commercially available for stationary backup generators. Thus, Ecology rejects NOx adsorbers as BACT for the proposed diesel engines.

4.1.3 ***Combustion Controls and Tier 2 compliance.*** Diesel engine manufacturers typically use proprietary combustion control methods to achieve the emission reductions needed to meet applicable EPA tier standards. Common controls include fuel injection timing retard and exhaust gas recirculation. Injection timing retard reduces the peak flame temperature and NOx emissions, but may lead to higher fuel consumption. Microsoft will install Caterpillar engines that will use a combination of combustion control methods, including fuel injection timing retard, to comply with EPA Tier-2 emission limits.

4.1.4 ***Other control options***. Other NOx control options, such as water injection, were rejected because there was no indication that they are commercially available and/or effective in new large diesel engines.

4.1.5 **BACT determination for NOx**

Ecology determines that BACT for NOx is the use of good combustion practices, an engine design that incorporates fuel injection timing retard, turbocharger and a low-temperature aftercooler, EPA Tier-2 certified engines, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.

4.2 BACT ANALYSIS FOR PARTICULATE MATTER, CARBON MONOXIDE AND VOLATILE ORGANIC COMPOUNDS

Microsoft reviewed the available published literature and the RBLC and identified the following demonstrated technologies for the control of diesel engine exhaust particulate, carbon monoxide and volatile organic compounds from the proposed diesel engines:

4.2.1 ***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% 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.

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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 $270,000 per ton of engine exhaust particulate removed from the exhaust stream, assuming 48 hours per year of emergency operation. A previous survey by Ecology found that none of the permitting agencies surveyed had required installation of a particulate matter control device (as BACT) that was expected to cost more than $23,200 per ton of particulate removed.

Since the estimated DPF cost effectiveness value for the proposed Microsoft project far exceeds the $23,200 per ton upper limit, Ecology concludes that the use of DPFs is not economically feasible for this project. Therefore, Ecology rejects this control option as BACT for particulate matter.

4.2.2 ***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 (approximately 90% reduction), DOCs have also been demonstrated to reduce up to 30% of diesel engine exhaust particulate emissions, and more than 50% of hydrocarbon emissions.

Microsoft has evaluated the cost effectiveness of installing and operating DOCs on each of the proposed diesel engines. If the cost effectiveness of DOC use is evaluated using the total amount of carbon monoxide, particulate matter and hydrocarbons reduced, the normalized operational cost estimate becomes $4,500 per ton of pollutants removed, assuming 48 hours per year of emergency operation. The corresponding DOC cost effectiveness value assuming only carbon monoxide destruction is approximately $5,000 per ton of carbon monoxide removed. If particulate matter and hydrocarbons are individually considered, the cost effectiveness values become $387,610 and $116,500 per ton of pollutant removed, respectively.

Microsoft acknowledges that DOC technology is commercially available and "would be reliable". A previous survey by Ecology found that the permitting agencies surveyed have required installation of carbon monoxide controls as BACT on other types of emission units, with expected operational costs ranging from $300 to $9,795 per ton of carbon monoxide removed. The upper level of that range is suspect and it is possible that that number actually reflects California BACT which is typically equivalent to a Lowest Achievable Emissions Rate (LAER) limit. In Washington, costs for controlling CO from combined cycle natural gas electric generating facilities are usually in the $3,500 to $5,000 range. The cost effectiveness estimates calculated for Microsoft's project fall within this range when all pollutants to be controlled are considered, or if only carbon monoxide is considered.

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4.2.3 **BACT Determination for Particulate Matter, Carbon Monoxide and Volatile Organic Compounds**

Because ~~D~~diesel oxidation catalysts can reduce particulate matter by up to 30%, hydrocarbons by up to 50%, and carbon monoxide by approximately 90%, Ecology considered applying diesel oxidation catalysts as BACT for these compression ignition engines. The fact that the oxidation catalyst also reduced approximately 25-30% of the diesel engine exhaust particulate emissions from the proposed new engines made this option attractive to Ecology. In order to achieve a better reduction in DEEP emissions than achieved using diesel oxidation catalysts, Microsoft offered to reduce allowable emissions from their existing engines by about 50%. Microsoft's offer to reduce fuel usage by 50% even with the insta~~i~~llation of the 13 new engines, would result in a reduction of more than 7 times the amount of diesel engine exhaust particulate being reduced over the use of an oxidation catalyst. Therefore, Ecology determines BACT for particulate matter, carbon monoxide and volatile organic compounds is restricted operation of the EPA Tier-2 certified engines, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.

4.3 BACT ANALYSIS FOR SULFUR DIOXIDE

4.3.1 Ecology and 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). Using this control measure, sulfur dioxide emissions would be limited to 0.015 tons per year.

4.3.2 **BACT Determination for Sulfur Dioxide**

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 BEST AVAILABLE CONTROL TECHNOLOGY FOR TOXICS

Best Available Control Technology for Toxics (tBACT) means BACT, as applied to toxic air pollutants.[3] The procedure for determining tBACT follows the same procedure used above for determining BACT. 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.

For the proposed project, tBACT must be determined for each of the toxic air pollutants listed in Table 1 below. As illustrated by Table 1, Ecology has determined that compliance with BACT, as determined above, satisfies the tBACT requirement.

[3] WAC 173-460-020

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Table 1. tBACT Determination

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Toxic Air Pollutant	tBACT
Acetaldehyde	Compliance with the VOC BACT requirement
Acrolein	Compliance with the VOC BACT requirement
Benzene	Compliance with the VOC BACT requirement
Benzo(a)pyrene	Compliance with the VOC BACT requirement
1,3-Butadiene	Compliance with the VOC BACT requirement
Carbon monoxide	Compliance with the CO BACT requirement
Diesel engine exhaust particulate	Compliance with the PM BACT requirement
Formaldehyde	Compliance with the VOC BACT requirement
Nitrogen dioxide	Compliance with the NOx BACT requirement
Sulfur dioxide	Compliance with the SO_2 BACT requirement
Toluene	Compliance with the VOC BACT requirement
Total PAHs	Compliance with the VOC BACT requirement
Xylenes	Compliance with the VOC 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. For purposes of demonstrating compliance with the national ambient air quality standards (NAAQS) and acceptable source impact levels (ASILs), Microsoft assumed the entire Columbia Data Center would experience 2 full days of power outage, in which case 12 backup engines were assumed to operate at their rated load at the same time, and the 13th engine running at idle (approximately 10% load). For engine testing, Microsoft assumed that all 13 engines were tested on a single day (with five engines operating at the same time) while operating at low (i.e., approximately 10%) load. Only two engines will operate at the same time in an electrical bypass.

The AERMOD model used the following data and assumptions:

5.1 Five years of sequential hourly meteorological data (2004–2008) from Moses Lake Airport were used. Twice-daily upper air data from Spokane were used to define mixing heights.

5.2 Digital topographical data (in the form of Digital Elevation Model files) for the vicinity were obtained from BeeLine software.

5.3 Each generator was modeled with a stack height of 31 feet above local ground.

5.4 The existing CO1/CO2 data center building, the proposed new CO3.2 (Phase I), CO3.1 (Phase II) and CO3.3 (Phase II) server buildings, and each expansion generator's acoustical enclosure 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 300 meters from each

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facility boundary. A grid spacing of 25 to 50 meters was used for distances more than 300 meters from the boundary.

5.6 1-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 40 parts per billion (ppb) of background ozone, and an equilibrium NO_2 to NOx ambient ratio of 90%. For purposes of modeling NO_2 impacts, the primary NOx emissions at the stack exit were assumed to consist of 10% NO_2 and 90% nitric oxide by mass.

5.7 Dispersion modeling is sensitive to the assumed stack parameters (i.e., flow rate 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. ~~Stack parameters are provided in Appendix E.~~

To demonstrate compliance with the 1-hr NO2 and 24-hr PM2.5 NAAQS, Microsoft assumed that, due to power reliability, any outages would not last for more than 6 days in a year. Thus, they assumed that the 7th highest concentration in a given year would fall on a day when they are conducting maintenance and readiness testing. If Microsoft ends up having more than 6 different days of power outages each lasting an hour or longer, they could threaten the 1-hr NO2 NAAQS especially if it happens on back-to-back years. Grant PUD has stated that a 6-day outage scenario on back-to-back years is extremely unlikely and therefore no exceedance of the 1-hr NO2 or 24-PM2.5 NAAQS is expected.

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. As required by WAC 173-40-090, emissions of diesel engine exhaust particulate are further evaluated in the following section of this document.

6. THIRD TIER REVIEW FOR DIESEL ENGINE EXHAUST PARTICULATE

As discussed above, proposed emissions of diesel engine exhaust particulate (DEEP) from the 13 additional engines exceed the regulatory trigger level for toxic air pollutants (also called an Acceptable Source Impact Level, (ASIL). A second or third tier review is required for DEEP in accordance with WAC 173-460-090 or WAC 173-460-100, respectively.

Microsoft's existing computer data center is currently one of three data centers operating in the rural town of Quincy, WA. The three data centers utilize dozens of large (>2 MW) diesel engines to supply backup power in support of data center operations. Additionally, due to the April, 2010 enactment of the *Computer Data Centers – Sales and Tax Exemption* law in Washington State, several companies have expressed interest in expanding existing or developing new data centers in Quincy. Thus, more large diesel-powered generators will be needed to supply backup power for the additional data centers.

Large diesel-powered backup engines emit DEEP, which is a high priority toxic air pollutant in the state of Washington. In light of the potential rapid development of other data centers in the Quincy area, and recognizing the potency of DEEP emissions, Ecology decided to evaluate Microsoft's

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proposal on a community-wide basis. The community-wide evaluation approach considers the cumulative impacts of DEEP emissions resulting from Microsoft's project, and includes consideration of prevailing background emissions from existing permitted data centers and other DEEP sources in Quincy. This evaluation was conducted under the third tier review requirements of WAC 173-460-100.

Ecology's director approved Microsoft's third tier petition on August 20, 2010. The results of Ecology's evaluation of cumulative risks associated with Microsoft's project are included in a separate technical support document. Please refer to that technical support document for a discussion and evaluation of the risks associated with diesel engine exhaust particulate emitted by Microsoft.

7. PUBLIC INVOLVEMENT

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As required by state rules, Ecology held a formal public comment period to provide the public with the opportunity to comment on Microsoft's proposal and Ecology's proposed decision. A public hearing was held on Tuesday, September 28, 2010, in the council chambers at the Quincy City Hall, 104B St. SW, Quincy. Pre-hearing presentations and discussion began at 5:30 p.m., followed by the hearing at 7 p.m.

The proposed permit and third tier review risk management decision were posted at the Department of Ecology website at http://www.ecy.wa.gov/ programs/air/Tier2/Tier2_final.html. Project documents were also made available for review at Ecology's Eastern Regional Office in Spokane, WA, and at the City of Quincy offices in Quincy, WA.

The formal public comment period closed October 4, 2010. Ecology received a number of comments at the public hearing and during the public comment period. All of the comments have been addressed in the Responsiveness Summary, which is herein incorporated as a part of this technical support document.

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No substantive changes, other than minor miscellaneous clarifications, were made to the NOC approval order as a result of the public involvement process.

~~7~~8. CONCLUSION

Based on the above analysis, Ecology concludes that operation of the 13 generators will not have an adverse impact on air quality. Ecology finds that Microsoft has satisfied all requirements for NOC approval.

******END OF MICROSOFT 2010 EXPANSION TSD ******
NOC APPROVAL ORDER NO. 09AQ-E308 NON-NSR MODIFICATIONS (RWK)

On June 12, 2009, Microsoft Corporation (MSN) submitted a request to modify its order of approval (No. 07AQ-E230) to add 3 emergency diesel engines MSN omitted from its original application (installed and operating at this time) and to extend the period of time allowed for

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construction of the 23rd and 24th large engines approved in Order 07AQ-E230. WAC 173-460 and WAC 173-400 were revised in the period of time since the MSN data center was approved, adding an exemption from NSR for emergency engines equal to or smaller than 500 HP. Each of the three existing engines included in the June 12, 2009 request qualifies for this exemption if it is new equipment. Because the engines are in place already, they were installed subject to the rules in place at the time of installation and so, are subject to BACT and t-BACT and the other requirements of NSR if their addition to this project involves increases in emissions. The application indicates that these engines will be operated solely for diagnostic and readiness testing, that the facility diesel fuel limit is not to be changed, and that the engines will satisfy the BACT requirements imposed on the large engine generators approved in 07AQ-E230, so this proposal is a project not subject to NSR under old 400 and 460 or new 400 and 460.

The emission inventory for this project does not change with the addition of these engines because MSN has agreed to retain the facility-wide fuel limit of Approval Order 07AQ-E230. The smaller engines emit not emit significantly different levels of pollutants for a given energy output, and will not change the inventory if the overall fuel consumption limit is not changed.

This modification to the MSN Approval Order, then, is to identify the 3 engines omitted from the earlier order, include NSPS paperwork requirements as approval conditions if they are not already requirements for the large engines, and to agree to extend the period of time allowed for MSN to start construction of engines 23 and 24.

FINDINGS & EVALUATIONS FOR NOC APPROVAL ORDER NO. 07AQ-E230 (RWK)

Microsoft Corporation (MSN) submitted a Notice of Construction (NOC) application on October 23, 2006, for the installation of the Columbia Data Center located at 501 Port Industrial Parkway, Quincy, in Grant County. The Columbia Data Center will be used by MSN as an electronic data storage facility. Air contaminant sources at the facility consist of twenty-four (24) Caterpillar Model 3516C-TA diesel powered generator units with a combined 100 percent standby rating capacity of 60 megawatts (MW) used for emergency backup power, six banks of evaporative cooling towers on three buildings, and associated support equipment such as fuel tanks, cooling water storage and treatment, and electrical systems. The generators will be used to provide emergency backup electrical power to the Grant County PUD hydroelectric power grid. Operation of each generator has been estimated at 70 hours per year for maintenance purposes and a maximum of 215 hours per year of operation for emergency backup electrical generation. The diesel generators will exclusively burn ultra-low sulfur (less than 0.0015 wt %), EPA on-road specification No. 2 distillate diesel oil.

The Ecology Air Quality Program (AQP or Ecology) reviewed the October 23, 2006, NOC application and responded to MSN with a completeness determination dated October 26, 2006. MSN responded to the completeness determination on January 10, 2007, and Ecology informed MSN that a Tier II analysis would be necessary in correspondence dated January 11, 2007. The Tier II analysis was considered complete based on submittals from MSN dated March 14, May 10, June 5 and 6, 2007. The MSN NOC application was considered complete on June 25, 2007, and the Preliminary Determination was issued for the project on June 25, 2007. After a thirty

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day public comment period, NOC approval ORDER No. 07AQ-E230 was issued on August 8, 2007.

FINDINGS:

1. LAWS AND REGULATIONS

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 Columbia Data Center is regulated by the requirements specified in:

1.1 Chapter 70.94 Revised Code of Washington (RCW), Washington Clean Air Act,
3.5 Chapter 173-400 Washington Administrative Code (WAC), General Regulations for Air Pollution Sources,
3.6 Chapter 173-460 WAC, Controls for New Sources of Toxic Air Pollutants, and
3.7 40 CFR Part 60 Subpart IIII

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. EMISSIONS

2.1 Operation of the twenty-four 2006 model year Caterpillar Model 3516C-TA diesel engines coupled to Caterpillar Model SR5 generators will result in the following potential emissions based on 70 hours of planned diagnostic testing and 215 hours of full standby operation per year. Emission factors for Criteria Pollutants are based upon emission rate guarantees by the manufacturer. The Toxic Air Pollutants (TAPs) are based on AP-42 emission rate factors.

Table 2.1: Generator and Fire Pump Engines Potential to Emit

Pollutant	**Hourly Emissions**	**Annual Emissions**
Criteria Pollutant (Caterpillar)	(lbs/hr)	(tons/yr)
2.1.1 Nitrogen Oxides (NO_x)	648	89.4
2.1.2 Carbon Monoxide (CO)	45	6.27
2.1.3 Sulfur Dioxide (SO_2)	0.61	0.094
2.1.4 Particulate Matter (PM_{10})	12	1.71
2.1.5 Hydrocarbons (HC)	30	4.18
Toxic Air Pollutants (AP-42)		
2.1.6 Nitric Oxide (NO)	402	55.41
2.1.7 Acrolein	0.49	0.0068
2.1.8 Benzene	0.46	0.064
2.1.9 Toluene	0.17	0.023
2.1.10 Xylenes	0.12	0.016

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2.1.11 1,3 Butadiene	0.01	0.006
2.1.12 Formaldehyde	1.18	0.16
2.1.13 Acetaldehyde	0.49	0.068
2.1.14 Benzo(a)Pyrene	0.000077	0.000011

2.2 Cooling tower emissions are mass balance calculations based on the concentrations of toxic air pollutants in the City of Quincy municipal water supply and the worst case amount of bromine in the NALCO biocide.

BACT

As required by WAC 173-400-113, this project shall use Best Available Control Technology (BACT) to control criteria air contaminant emissions. BACT for the diesel electric generators and the cooling towers is as follows:

3.1 The use of EPA on-road Specification No. 2 distillate fuel oil with a sulfur content of 0.0015 weight percent or less.

3.2 The use of generator engines certified to EPA Tier II (40 CFR 89) emission standards for NOx, CO, and HC.

3.3 The use of mist eliminators on all the cooling tower units that will maintain the maximum drift rate to less than 0.001 percent of the circulating water rate, reducing criteria and toxic air pollutant emissions.

4. T-BACT

As required in WAC 173-460-040(4)(b), this project shall use Best Available Control Technology for Toxics (T-BACT) to control toxic emissions. T-BACT for this project is the same as BACT.

MODELING

Dispersion modeling was conducted by the applicant to evaluate near-source and distant impacts. The modeling evaluation did not result in any exceedances of either criteria or toxic ambient air quality standards.

6.1 The dispersion modeling was conducted using ISCST3 for criteria and toxic air pollutants from the twenty-four (24) diesel electric generators. Acrolein and nitric oxide were the only air pollutants that exceeded the acceptable source impact level (ASIL). A Tier II risk analysis was required by Ecology in correspondence dated January 11, 2007. MSN submitted information dated March 14, May 10, June 5 and 6, 2007, to complete the Tier II risk analysis. Ecology determined that alternative risk based exposure limits to nitric oxide and acrolein that were above the ASIL would be adequately protective of public health with a five foot exhaust stack extension on all the diesel electric generators to reduce acrolein to below the alternative risk based exposure limit. Exhaust stack extensions raising the engine genset stacks five feet higher than proposed in the application were also determined to reduce impacts of NO emissions. NO is expected to be removed from the list of compounds requiring review under WAC 173-460 in the on-going

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WAC 173-460 rule revision process (anticipated to be completed prior to significant operations at this facility).

The facility will have six banks of cooling tower units installed, two banks in each of the three buildings. Each bank of cooling towers will have eighteen (18) cooling units (total 108 cooling towers). Dispersion modeling was also conducted for the worst-case toxic air pollutant and PM_{10} emission rates from the six sets of cooling towers. EPA model SCREEN3 ambient impacts were below the ASIL for toxic air pollutant and the National Ambient Air Quality Standards (NAAQS) for PM_{10} emissions. No further dispersion modeling was conducted.

Appendix H
Final DRAFT Permit

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A NEW) APPROVAL ORDER No. 10AQ-E374
AIR CONTAMINANT SOURCE FOR)
MICROSOFT CORPORATION)
COLUMBIA DATA CENTER)

TO: Jack Eaton, Facilities Program Manager
Microsoft Corporation
Columbia Data Center
501 Port Industrial Parkway
Quincy, WA 98848

EQUIPMENT

1. List of equipment that was evaluated for this order of approval. Existing unit ID nos. CO1/1 nos. 1-12 and CO1/2 nos. 1-12 were permitted in 09AQ-E308. New unit ID nos. 25-37 were proposed in the document titled "Microsoft Columbia Data Center CO3, CO4, and CO5 Expansion, Microsoft Corporation, Quincy, WA"" submitted on May 14, 2010. Microsoft has subsequently changed the designations of the Columbia Data Center Expansion phases to CO3.1 (Phase II), CO3.2 (Phase I), and CO3.3 (Phase II), respectively. The phases will be referred to in this Order as CO3.1, CO3.2, and CO3.3.

Table 1.1: 2.5 MW Engine & Generator Serial Numbers

Phase	Unit ID	Engine SN	Generator SN	Build date
CO1/1	1	SBK000170	G4B00130	8/14/06
"	2	SBK000179	G4B00132	8/25/06
"	3	SBK000169	G4B00128	8/10/06
"	4	SBK000181	G4B00133	8/28/06
"	5	SBK000176	G4B00131	8/25/06
"	6	SBK000168	G4B00129	8/10/06
"	7	SBK000160	G4B00125	7/21/06
"	8	SBK000159	G4B00127	7/19/06
"	9	SBK000162	G4B00126	7/24/06
"	10	SBK000158	G4B00124	7/19/06
"	11	SBK000172	G4B00113	8/18/06
"	12			
CO1/2	1	SBK000208	G4B00173	11/1/06
"	2	SBK000214	G4B00171	11/6/06
"	3	SBK000211	G4B00176	11/3/06
"	4	SBK000213	G4B00177	11/6/06
"	5	SBK000201	G4B00178	10/20/06
"	6	SBK000171	G4B00112	8/17/06
"	7	SBK000212	G4B00175	11/6/06
"	8	SBK000205	G4B00170	10/30/06
"	9	SBK000210	G4B00172	11/3/06

"	10	SBK000200	G4B00179	10/20/06
"	11	SBK000209	G4B00174	11/2/06
"	12			
CO3.2	25	SBK00949		July 2010
	26	SBK00947		July 2010
	27	SBK00945		July 2010
	28	SBK00953		July 2010
	29	SBK00951		July 2010
CO3.1	30	Not received		
	31	Not received		
	32	Not received		
	33	Not received		
CO3.3	34	Not received		
	35	Not received		
	36	Not received		
	37	Not received		

Table 1.2: Fire Pump Engine SN

Unit ID	Engine SN	Engine Size	Build Year
CO1	Pe6068t602182	149 bhp	2006
CO2	Pe6068t679482	149 bhp	2007
CO3.1, 3.2, 3.3	Not received	149 bhp	

Table 1.3: Cooling Water Pre-treatment Generator Engine SN

Unit ID	Engine SN	Engine Size	Build Year
CWPT.1	G5AO1427	398 bhp	2007

Table 1.4: Cooling Towers

Unit ID	# Cooling Tower Banks	# Cooling Tower Units per Bank	Total # Cooling Tower Units
CO1	1	18	18
CO2	1	18	18
Total	2	na	36

PROJECT SUMMARY

1. The Microsoft Columbia Data Center will contain six buildings designated CO1, CO2, WTF, CO3.1, CO3.2, and CO3.3. Buildings CO1 and CO2 were permitted in 2007, and constructed in 2007 and 2008. Buildings CO3.1, CO3.2, and CO3.3 were permitted in 2010, and will be constructed in 2010 through 2012. The Columbia Data Center will have thirty-seven Caterpillar Model 3516C-TA diesel powered electric generators and four small diesel-fired emergency engines. The Department of Ecology (Ecology) approved the installation and operation of twenty-four of the engines (Unit IDs 1 to 24) in

Order No. 09AQ-E308 issued on August 28, 2009. The current action approves the installation and operation of thirteen additional 2.5 eMW~~e~~ engines. At the request of the applicant, Ecology is also reducing the allowable operating hours and diesel fuel allocation for the existing CO1 and CO2 engines.

Table 2: Potential to Emit for Microsoft Columbia Data Center			
Pollutant	**Existing Units 1 thru 24 Potential To Emit**	**Expansion Units 25 thru 37 Potential To Emit**	**Facility Potential to Emit**
Criteria Pollutant	tons/yr	tons/yr	tons/yr
2.1.1 NO_x	30.1	13.9	44.0
2.1.2 CO	2.1	8.0	10.1
2.1.3 SO_2	0.032	0.015	0.047
2.1.4 $PM_{2.5}$	0.58	0.45	1.03
2.1.5 VOC	1.4	0.60	2.0
Toxic Air Pollutants			
2.1.6 Primary NO_2*	3.01	1.39	4.40
2.1.7 Acrolein	2.29E-03	7.90E-05	2.37E-03
2.1.8 Benzene	2.16E-02	7.80E-03	2.94E-02
2.1.9 Toluene	7.75E-03	2.80E-03	1.06E-02
2.1.10 Xylenes	5.39E-03	1.90E-03	7.29E-02
2.1.11 1,3 Butadiene	2.02E-03	2.00E-04	2.22E-03
2.1.12 Formaldehyde	5.39E-02	7.90E-04	5.47E-02
2.1.13 Acetaldehyde	2.29E-02	2.50E-04	2.32E-02
2.1.14 Benzo(a)Pyrene	3.71E-06	1.30E-06	5.01E-06
2.1.15 PAH (sum)	na	3.90E-05	na
2.1.16 PAH (w/ TEF)	na	5.00E-06	na
2.1.17 Diesel Engine Exhaust Particulate**	0.58	0.45	1.03
2.1.18 Carbon monoxide	2.1	8.0	10.1
2.1.19 Sulfur dioxide	0.032	0.015	0.047

*Assumed to be equal to 10% of the total NOx emitted.
** diesel engine exhaust particulate is DEEP, which is ~~=~~ equal to $PM_{2.5}$ emissions.

2. The small emergency engines consist of three 149 bhp engines to power fire water pumps and one 398 bhp emergency engine to power the cooling water pre-treatment facility. The three fire water pump engines and the cooling water pre-treatment engine are considered permit exempt under Washington Administrative Code (WAC) 173-400-110(4)(h)(xxxix), and will not be further addressed in the Approval Order.

3. The original (2007) MSN Columbia Data Center (CO1 and CO2) was constructed with 12 Evapco Model USS 312-454 cooling units to dissipate heat from the electronic servers. Each Model USS 312-454 unit has three cooling towers and three fans. Each end

of the building will have one bank of six Model USS 312-454 units for a total of eighteen cooling towers with a total of 36 cooling towers. Each individual cooling tower has a design recirculation rate of 3150 gallons per minute.

DETERMINATIONS

In relation to this project, the State of Washington 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 utilize best available control technology (BACT) as defined below:

Pollutant(s)	**BACT Determination**
Particulate matter (PM), carbon monoxide and volatile organic compounds	Restricted operation of EPA Tier-2 certified engines, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Nitrogen oxides (NOx)	Good combustion practices; an engine design that incorporates fuel injection timing retard, turbocharger and a low-temperature after-cooler; EPA Tier-2 certified engines; and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Sulfur dioxide	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 (tBACT) as defined below:

Toxic Air Pollutant(s)	**tBACT Determination**
Acetaldehyde, carbon monoxide, acrolein, benzene, benzo(a)pyrene, 1,3-butadiene, diesel engine exhaust particulate, formaldehyde, toluene, total PAHs, xylenes	Restricted operation of EPA Tier-2 certified engines, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Nitrogen dioxide	Good combustion practices; an engine design that incorporates fuel injection timing retard, turbocharger and a low-temperature after-cooler; EPA Tier-2 certified engines; and compliance with the operation and maintenance restrictions of 40 CFR Part 60,

	Subpart IIII.
Sulfur dioxide	Use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

4. Ecology has evaluated the cumulative health risks associated with diesel engine exhaust particulate emissions from the proposed project, in accordance with WAC 173-460-100. Ecology has concluded that the cumulative health risks from the project are acceptable, and that approval of the project will result in a greater environmental benefit to the state of Washington. The technical analysis supporting this determination is hereby incorporated into this Notice of Construction Approval Order.

THEREFORE, IT IS ORDERED that the project as described in the Notice of Construction 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. 09AQ-E308 is rescinded and replaced entirely on March 1, 2011. During the time period in which both this Order and Order No. 09AQ-E308 are both in effect, this Order takes precedence over 09AQ-E308 at the discretion of Ecology. At a minimum, Order No. 09AQ-E308 Approval Condition 3.1 shall remain in effect until March 1, 2011.

1.2 Microsoft shall schedule a meeting with Mountain View Elementary School administrators by no later than February 15, 2011. The meeting will include officials from the Quincy School District at the discretion of the Mountain View Elementary School administrators. The purpose of the meeting will be to both communicate, and better understand, any potential concerns or complaints that the school may have regarding emergency generator maintenance testing and operation. In addition, Microsoft will provide the school administrators with a direct line to one of the Columbia Data Center managers. The school administrators shall be provided a maintenance testing schedule, and will update the school whenever changes occur in maintenance testing. As decided by the school administrators and Microsoft, an ongoing relationship between the school and Microsoft should be established.

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2. EQUIPMENT RESTRICTIONS

2.1. The 37 Caterpillar Model 3516C 2.5 eMW engines used to power the electrical generators shall be certified by the manufacturer to meet 40 CFR 89 Tier II emission levels if manufactured before January 1, 2011. Any generator engine manufactured after January 1, 2011 shall meet 40 CFR 89 Tier IV Transitional emission levels or other specifications as required by the EPA at the time the engines are installed~~.~~.

2.2. The only Caterpillar Model 3516C 2.5 eMW engines and electrical generating units approved for operation at the Columbia Data Center are those listed in Table 1.1 above.

2.3. Manufacture and installation of the engine/generator sets identified as unit numbers 23 and 24 in Table 1.1 shall take place by August 28, 2012. Manufacture and installation of the CO3.2 engine/generator sets identified in Table 1.1 shall take place within 12 months of the issue date of this Order. Manufacture and installation of the CO3.1 and CO3.3 engine/generator sets identified in Table 1.1 shall take place within 24 months of the issue date of this Order. If the manufacture and installation of these engines has not completed within the above schedule, a NOC application may be required prior to installation.

2.4. Replacement of failed engines with identical engines (same manufacturer and model) requires notification prior to installation, but will not require Notice of Construction unless there is an emission rate increase from the replacement engines.

2.5. The twenty 2.5 eMW CO1 and CO2 engine-generator exhaust stack heights shall be greater than or equal to 38 feet above ground level and 8 feet above roof height. The four 2.5 eMW ground level CO1 and CO2 engine-generators exhaust stack heights shall be greater than or equal to 20 feet above ground level. The thirteen 2.5 eMW ground level CO3.1, CO3.2, and CO3.3 engine-generators exhaust stack heights shall be greater than or equal to 31 feet above ground level.

3. OPERATING LIMITATIONS

3.1. The fuel consumption at the Columbia Data Center facility shall be limited to a total of 439,493 gallons per year and 88,800 gallons per day of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil (less than 0.00150 weight percent sulfur). Total annual fuel consumption by the facility may be averaged over a three (3) year period using monthly rolling totals.

3.2. The 24 CO1 and CO2 generators shall be limited to 300,000 gallons per year and not operate more than 121 hours per year per engine at an average capacity of 53% of full standby capacity. Individual units may be operated ~~longer than 121 hours a year and~~ at a higher load than 53% of full standby capacity as long as total generator fuel consumption remains below 300,000 gallons per year of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil and no emission limit is exceeded. Total annual fuel consumption by the 24 CO1 and CO2 generators may be averaged over a three (3) year period using monthly rolling totals.

Comment [DO1]: Having this portion here contradicts the first sentence. I think it would be clearer for compliance purposes to just limit the engines to 121 hours per year.

3.3. The 13 CO3.1, CO3.2, and CO3.3 generators shall not operate more than 104 hours per year per engine at an average load of 53% of full standby capacity. Individual units may be operated ~~longer than 104 hours per year and~~ at a higher load than 53% of full standby capacity as long as total generator fuel consumption from the 13 engines remains below 139,493 gallons per year of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil and no emission limit is exceeded. Total annual fuel consumption by the 13 CO3.1, CO3.2, and CO3.3 generators may be averaged over a three (3) year period using monthly rolling totals.

3.4. The limitation on the annual diesel fuel allocation for the 13 CO3.1, CO3.2, and CO3.3 generator engines does not become effective until Microsoft has completed acceptance testing of the engines and generators. However, all emission limits remain effective during the acceptance testing period.

3.5. Operation of the 13 CO3.1, CO3.2, and CO3.3 generators for required monthly maintenance and testing shall be limited to approximately one hour per month each at an average electric load of 10% of the standby rating. No more than five engines shall operate at the same time during engine testing.

Comment [DO2]: Consistent with Page 6-2 of MSN's June 2010 NOC support document.

3.6. Operation of the 13 CO3.1, CO3.2, and CO3.3 generators for electrical bypass shall be limited to approximately 44 hours per year each at an average electrical load of 40% of the standby rating. No more than two engines shall operate at the same time during any electrical bypass operation

Comment [DO3]: Consistent with the 7/22/10 electrical bypass modeling memo from MSN.

3.7. Each of the 37 generator engines require maintenance and testing for approximately one hour per month. To mitigate engine emission impacts, Microsoft Corporation will perform at least 80% of all maintenance testing from 7:00 AM until 5:00 PM on Monday through Wednesday with no more than 3 engines tested concurrently. Engine maintenance and testing may take place outside of these restrictions upon coordination by Microsoft with the other data centers in Quincy to minimize engine emission impacts to the community. Microsoft shall maintain records of the coordination communications with the other data centers, and those communications shall be available for review by Ecology. This schedule can be re-negotiated at any time as approved in writing by Ecology, and will not trigger revision or amendment of this Order.

3.8. CO1 and CO2 each have 1 bank of 6 cooling units with a total of 18 cooling towers each. Each individual unit shall have a mist eliminator that will maintain the maximum drift rate to no more than 0.001 percent of the circulating water rate.

4. GENERAL TESTING AND MAINTENANCE REQUIREMENTS

4.1. MSN will follow engine-manufacturer's recommended diagnostic testing and maintenance procedures to ensure that each of the thirty-seven 2.5 MW engines will conform to 40 CFR 89 emission specifications throughout the life of each engine.

4.2. At the conclusion of the manufacturer's warranty term (60 months from engine delivery date or 3,000 hours of operation), MSN shall pursue one of the following options:

4.2.1 Emission testing of each engine for NOx, CO, and non-methane hydrocarbon (NMHC) emission rates to determine continuing compliance with the 40 CFR 89 Tier II emission standards (the applicant may replace the dynamometer requirement in Subpart E of 40 CFR 89 with corresponding measurement of gen-set electrical output). The testing of

each engine shall be repeated every 60 months after its first test. The engine testing may be staged to test 5 engines in each 12 month period.

4.2.2 Re-evaluating BACT and ~~T~~ tBACT and health risks of the facility's operations.

4.2.3 Show compliance with the manufacturer's maintenance requirements by renewing or extending engine manufacturer's maintenance contracts.

4.2.4 Any combination of the above three options, or an alternative method approved by Ecology in writing.

4.3 Each engine shall be equipped with a properly installed and maintained non-resettable meter that records total operating hours.

4.4 Each engine shall be connected to a properly installed and maintained fuel flow monitoring system that records the amount of fuel consumed by that engine during each operation.

4.5 Periodic emission testing of each engine is not required by this Approval Order unless Condition 4.2.1 is selected as the compliance verification option. Ecology may require stack testing as allowed in WAC-173-400-105(4) at its discretion.

5. EMISSION LIMITS

The thirty-seven 2.5 eMW ~~E~~engine-g~~G~~enerators shall meet the follow emission rate limitations:

5.1 Each existing CO1 and CO2 engine shall not exceed NO_x plus NMOC emissions of 6.4 g/kW-hr.

5.2 Each new CO1, CO2, CO3.1, CO3.2, and CO3.3 engine shall not exceed NO_x emissions of 6.12 g/kW-hr if built before January 1, 2011. The NO_x emission factor for engines built after January 1, 2011 shall comply with ~~with~~ 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are installed.

5.3 Each new CO1, CO2, CO3.1, CO3.2, and CO3.3 engine shall not exceed VOC emissions of 0.28 g/kW-hr.

5.4 Each existing CO1 and CO2 engine shall not exceed CO emissions of 3.5 g/kW-hr.

5.5 Each new CO1, CO2, CO3.1, CO3.2, and CO3.3 engine shall not exceed CO emissions of 3.50 g/kW-hr if built before January 1, 2011. The CO emission factor for engines built after January 1, 2011 shall comply with ~~with~~ 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are installed.

5.6 Each existing CO1 and CO2 engine shall not exceed PM emissions of 0.20 g/kW-hr. All PM shall be considered diesel engine exhaust particulate.

5.7 Each new CO1, CO2, CO3.1, CO3.2, and CO3.3 engine shall not exceed PM emissions of 0.20 g/kW-hr if built before January 1, 2011. The PM emission factor for engines built after January 1, 2011 shall comply with ~~with~~ 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are installed.

5.8 The total amount of PM emissions from operating all 37 engines during each year shall not exceed 1.03 tons/yr. All PM emissions shall be considered diesel engine exhaust particulate (DEEP) emissions and all DEEP emissions shall be considered $PM_{2.5}$ emissions.

5.9 Visual emissions from each diesel electric generator exhaust stack shall be no more than 5 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.

5.10 SO_2 emissions from each diesel electric generator exhaust stack shall not exceed 0.03 lbs/hr.

6 OPERATION AND MAINTENANCE MANUALS

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A site-specific O&M manual for the MSN CDC facility equipment shall be developed and followed. Manufacturers' operating instructions and design specifications for the engines, generators, cooling towers, and associated equipment shall be included in the manual. 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. The O&M manual for the diesel engines and associated equipment shall at a minimum include:

6.1 Manufacturer's testing and maintenance procedures that will ensure that each individual engine will conform to the EPA Tiered Emission Standards appropriate for that engine throughout the life of the engine.

6.2 Normal operating parameters and design specifications.

6.3 Operating maintenance schedule.

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

8 RECORDKEEPING

All records, Operations and Maintenance 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. 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 Annual hours of operation for each diesel engine.

8.3 Annual number of start-ups for each diesel engine.

8.4 Annual gross power generated by the electric generation station.

8.5 Upset condition log for each engine and generator that includes date, time, duration of upset, cause, and corrective action.

8.6 Recordkeeping required by 40 CFR Part 60 Subpart IIII.

8.7 Air quality complaints received from the public or other entity, and the affected emissions units.

9 REPORTING

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9.1 Within 10 business days after entering into a binding agreement to purchase the engine/generator sets identified in Equipment Table 1.1 above, Microsoft Corporation shall notify Ecology in writing. The serial number of the engine and the 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.

9.2.1 Monthly rolling annual total summary of air contaminant emissions, monthly rolling hours of operation with annual total, and monthly rolling gross power generation with annual total.

9.2.2 Written notification that the O&M manual has been developed and updated within 60 days after the issuance of this Order.

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9.3 Any air quality complaints resulting from operation of the proposed 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.

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10 STACK TESTING

10.1 Any emission testing performed to verify conditions of this Approval Order or for submittal to Ecology in support of this facility's operations shall be conducted as follows:

10.1.1 At least 30 days in advance of such testing, the Permittee shall submit a testing protocol for Ecology approval that includes the following information:

10.1.1.1 The location and Unit ID of the equipment proposed to be tested.

10.1.1.2 The operating parameters to be monitored during the test and the personnel assigned to monitor the parameters during the test.

10.1.1.3 A description of the source including manufacturer, model number and design capacity of the equipment, and the location of the sample ports or test locations.

10.1.1.4 Time and date of the test and identification and qualifications of the personnel involved.

10.1.1.5 A description of the test methods or procedures to be used.

10.1.2 Test Reporting: test reports shall be submitted to Ecology within 45 days of completion of the test and shall include, at a minimum, the following information:

10.1.2.1 A description of the source including manufacturer, model number and design capacity of the equipment, and the location of the sample ports or test locations.

10.1.2.2 Time and date of the test and identification and qualifications of the personnel involved.

10.1.2.3 A summary of results, reported in units and averaging periods consistent with the applicable emission standard or limit.

10.1.2.4 A summary of control system or equipment operating conditions.

10.1.2.5 A summary of production related parameters.

10.1.2.6 A description of the test methods or procedures used including all field data, quality assurance/quality control procedures and documentation.

10.1.2.7 A description of the analytical procedures used including all laboratory data, quality assurance/quality control procedures and documentation.

10.1.2.8 Copies of field data and example calculations.

10.1.2.9 Chain of custody information.

10.1.2.10 Calibration documentation.

10.1.2.11 Discussion of any abnormalities associated with the results.

10.1.2.12 A statement signed by the senior management official of the testing firm certifying the validity of the source test report.

11 GENERAL CONDITIONS

11.1 **Commencing/Discontinuing Construction and/or Operations:** This approval shall become void if the construction or operation of this diesel electric generation facility is discontinued for a period of eighteen (18) months, unless prior written notification is received by Ecology at the address in Condition 6 above.

11.2 **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.

11.3 **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 diesel electric generation station, and be available for review upon request by Ecology.

11.4 **Equipment Operation:** Operation of the Caterpillar Model 3516C units 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.

11.5 **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.

11.6 **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 determination, shall be subject to Ecology enforcement under applicable regulations.

11.7 **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.

11.8 **Fees:** Per WAC 173-455-120, this Approval Order and related regulatory requirements have a fee associated for review and issuance. This Order is effective upon Ecology's receipt of the fee, for which Ecology's fiscal office will provide a billing statement.

All plans, specifications, and other information submitted to the Department of 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.

Nothing in this approval shall be construed as obviating compliance with any requirement of law other than those imposed pursuant to the Washington Clean Air Act and rules and regulations thereunder.

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

a. Violation of any terms or conditions of this authorization;

b. 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 reminder of this authorization, shall not be affected thereby.

You have a right to appeal this permit. To appeal this you must:

- File your appeal with the Pollution Control Hearings Board within 30 days of the "date of receipt" of this document. Filing means actual receipt by the Board during regular office hours
- Serve your appeal on the Department of Ecology within 30 days of the "date of receipt" of this document. Service may be accomplished by any of the procedures identified in WAC 371-08-305(10). "Date of receipt" is defined at RCW 43.21B.001(2).

Be sure to do the following:

- Include a copy of (1) the permit you are appealing and (2) the application for the permit.
- Serve and file your appeal in paper form; electronic copies are not accepted.

1. To file your appeal with the Pollution Control Hearings Board

Mail appeal to:

The Pollution Control Hearings Board
PO Box 40903
Olympia WA 98504-0903

OR

Deliver your appeal in person to:

The Pollution Control Hearings Board
4224 – 6th Ave SE Rowe Six, Bldg 2
Lacey, WA 98503

2. To serve your appeal on the Department of Ecology

Mail appeal to:

The Department of Ecology
Appeals Coordinator
P.O. Box 47608
Olympia, WA 98504-7608

OR

Deliver your appeal in person to:

The Department of Ecology
Appeals Coordinator
300 Desmond Dr SE
Lacey, WA 98503

3. And send a copy of your appeal to:

Karen K. Wood
Air Quality Program
Department of Ecology
4601 N. Monroe Street
Spokane, WA 99205-1295

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 14th day of October, 2010, at Spokane, Washington.

Reviewed By:

_____
David Ogulei, P.E.
Science & Engineering Section
Department of Ecology
State of Washington

Approved By:

_____
Karen K. Wood, Section Supervisor
Eastern Regional Office
Department of Ecology
State of Washington

Prepared By:

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Gregory S. Flibbert, Unit Manager
Eastern Regional Office
Department of Ecology

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State of Washington

Microsoft's Request to Expand the Columbia Data Center in Quincy, WA

Between 2006 and 2008, Microsoft, Yahoo! and Intuit built three data centers in Quincy, Wash. Data centers house the servers that provide e-mail, manage instant messages, and run applications for our computers.

Combined, the data centers have 46 diesel-powered backup generators for use during power failures. Each generator produces about two megawatts of electricity. The generators also produce diesel engine exhaust, which has toxic air pollutants. These pollutants include nitrogen dioxide, carbon monoxide, organic compounds and small particles called diesel engine exhaust particles, or DEEP.

Microsoft's permit request

Microsoft's Columbia Data Center operates on a 70-acre site on the outskirts of Quincy. Microsoft has applied to the Washington Department of Ecology (Ecology) for a permit called a "notice of construction order" (NOC). An NOC is required when industries upgrade or modify their equipment. Its purpose is to protect air quality. Microsoft's NOC application proposes to install and operate 13 additional diesel-powered backup generators to support expanded operations.

Ecology's review of the requested permit

Ecology's review of Microsoft's NOC application has mainly focused on emissions of DEEP. This is because the other toxic air pollutants (TAPs) produced by diesel engines were found not to be a health concern at this site.

Before 2009, DEEP was not regulated as a toxic air pollutant. Recent health studies have shown that DEEP can cause serious health problems. In June 2009, Ecology adopted regulations that require careful consideration of DEEP coming from new or expanding industries or facilities. The NOC is Ecology's tool for evaluating possible health effects of DEEP and other air pollutants.

WHY IT MATTERS

Microsoft needs an Ecology permit to install more diesel-powered generators. As part of the permit review process, Ecology will hold a public hearing where Microsoft and Ecology will explain:

- the results of a health impact analysis;
- proposed emission controls;
- proposed pollution prevention methods; and
- any public health risks the project might pose.

The hearing will be held as shown below:

Quincy, Wash.

Sept. 28, 2010

Quincy City Council Chambers

104 B St. SW

- 5:30 p.m.: Presentations and Questions
- 7 p.m.: Hearing begins

View documents online at: http://www.ecy.wa.gov/programs/air/Tier2/Tier2_final.html

Contact information:

Greg Flibbert

509-329-3452

gfli461@ecy.wa.gov

Special accommodations:

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The review process

State law determines how Ecology reviews and makes decisions about NOC permits. There are three possible levels of review:

- **First-tier review: Toxic screening**

  In first-tier review, Ecology or a local air quality agency screens the project to determine if it will emit TAPs. The goal of this review is to prevent air pollution by:

  - controlling new sources of toxic air pollutants,
  - reducing emissions as much as reasonably possible, and
  - maintaining air quality to protect human health and safety.

  If the project emits TAPs, air quality scientists use computer generated models to predict effects on air quality. If the predicted levels of TAPs are more than a specific amount (called an acceptable source impact level, or ASIL), a second-tier review is required.

- **Second-tier review: Health impacts analysis**

  In second-tier review, Ecology determines health impacts of the TAPs emitted by the project. This review estimates the increased cancer risk a person might have over his or her lifetime because of breathing the pollutant the new source would emit. The risk of cancer is then compared to the maximum risk allowed for a second-tier review. This maximum risk is 10 cancers in one million people. The second-tier review also considers the risk of health effects other than cancer, as well as levels of pollutants in the air emitted by other sources.

  If the estimated increased cancer risk is greater than 10 in one million, a third-tier review is required.

- **Third-tier review: Risk management decision**

  In third-tier review, Ecology determines how to best manage the health risks of the emitted TAPs. This review requires the Director of Ecology to evaluate the health risks of the proposed project and decide whether the risks are acceptable. The Director looks at two things in making this decision:

  - use of available preventive measures to reduce pollution, and
  - environmental benefit of the project.

  The Director's decision is preliminary. The permit is not final until the public has had an opportunity to comment. Ecology offers a 30-day public comment period and holds a public hearing to receive formal testimony. Ecology evaluates all comments received before making a final determination about the permit.

Which level of review did Ecology use for Microsoft's permit application?

Ecology used third-tier review for Microsoft's permit application.

Factors considered in Microsoft's third-tier review

Community-wide approach

By itself, the Microsoft expansion would not require a third-tier review. But other data companies are also interested in building or expanding in Quincy. Because the existing and proposed data centers are relatively close together, Ecology decided to use a community-wide approach in reviewing Microsoft's application for the 13 new generators. The community-wide approach adds together the various sources of DEEP, such as trucks and cars on highways, trains on railroads, and backup generators from data centers, to evaluate the overall impact of DEEP. This approach triggered a third-tier review.

Engine operating hours and fuel use

When Microsoft built the Columbia Data Center, DEEP was not yet regulated. The permit Ecology issued at that time allowed more hours of generator use and more fuel use than would likely be allowed today.

As part of the third tier review, Ecology and Microsoft staffs worked together to find ways to minimize potential health effects from DEEP. Microsoft offered to reduce by half the maximum amount of diesel fuel authorized in its existing permits. Microsoft is also limiting the amount of engine testing, maintenance, and other engine use. Each engine will be limited to less than 44 hours of operation per year for storm avoidance and "electrical bypass." Each of the 13 new engines will be tested for an average of 12 hours per year. Total operation will be, at most, 104 hours per engine per year.

The existing permit allows:

- up to 285 hours of engine operation per engine per year for the original 24 engines; and
- a total of about 900,000 gallons of diesel fuel use per year.

The new permit will allow:

- up to 104 hours of engine operation per engine per year for the additional 13 engines; and
- a total of no more than 450,000 gallons of diesel fuel use per year for all 37 engines (the 24 existing engines plus the 13 new ones).

Even with the addition of new generators, these changes significantly lower the amount of DEEP predicted by the computer models.

Ecology's decision

As a result of the community-wide approach to the permit review, along with Microsoft's willingness to adjust its fuel use and engine operating hours, Ecology's Director decided in August 2010 to approve Microsoft's permit. However, the permit is not considered final until public comment is taken into account.

Microsoft Columbia Data Center Expansion

Microsoft's Columbia Data Center operates on a 70-acre site on the outskirts of Quincy, Wash. Data centers house the servers that provide e-mail, manage instant messages, and run applications for our computers.

Microsoft has applied to the Washington Department of Ecology (Ecology) for a permit called a "notice of construction order" (NOC). An NOC is required when industries upgrade or modify their equipment. Its purpose is to protect air quality. Microsoft's NOC application would allow them to install and operate 13 additional diesel-powered backup generators to support expanded operations.

Ecology's review of the requested permit

Ecology regulations require us to carefully consider the potential health effects of toxic air pollutants coming from new or expanding industries or facilities. The NOC is Ecology's tool for evaluating health risks.

As part of the NOC, Ecology reviewed Microsoft's emissions of toxic air pollutants to see if they might be a health concern. Ecology found that only diesel engine exhaust needed a closer look.

Health effects of diesel engine exhaust

Diesel engine exhaust contains very small particles. When breathed, these tiny particles can easily make their way deep into a person's lungs. Studies show this can cause many health problems, including:

- Inflamed and irritated lungs and breathing passages
- Irritated eyes, nose, and throat
- Coughing, chest tightness, and wheezing
- Difficulty breathing
- More severe allergic reactions
- More asthma attacks and more severe symptoms of asthma
- Heart attack and stroke in people who already have heart disease
- Lung cancer and other forms of cancer

WHY IT MATTERS

Microsoft needs an Ecology permit to install more diesel-powered generators that emit diesel exhaust.

Diesel engine exhaust is a toxic air pollutant that can cause serious health problems. As part of the permit process, Ecology has reviewed Microsoft's emissions of diesel engine exhaust and other air pollutants to see if they are a health concern. This focus sheet gives information about Ecology's review.

Contact information:

Greg Flibbert

509-329-3452

gfli461@ecy.wa.gov

Special accommodations:

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- Higher chance of lung infections
- Male infertility
- Birth defects
- Reduced lung growth in children

The amount of diesel exhaust particles that comes from Microsoft's diesel generators is not predicted to be enough to cause the health effects listed above.

Ecology's evaluation of Microsoft's diesel engine exhaust

How the evaluation was done

1. Ecology's air quality scientists used computer models to estimate where the wind would carry the particles coming from Microsoft's diesel generator exhaust.
2. Ecology's toxicologists reviewed the information from computer models. Toxicologists are scientists who specialize in understanding how pollution and chemicals affect peoples' health.
3. The toxicologists used the information from computer models to predict the amount of exhaust particles that could be in the air where people live and work outside Microsoft's property. They focused on areas closest to the Columbia Data Center because people in those areas are mostly likely to be exposed to the greatest amount of airborne particles added by Microsoft's new diesel generators.
4. Toxicologists then used risk assessment (see the heading "Risk assessment" below) to estimate potential health problems. They based these estimates on the predicted amounts of exhaust particles in the areas studied.

Sources of diesel engine exhaust particles included in the evaluation

The toxicologists looked at the potential health effects of diesel engine exhaust particles from:

- Microsoft's 13 new generators;
- other sources of diesel engine exhaust particles in the area, such as trucks on highways, trains, and the large diesel generators at other data centers in Quincy; and
- all sources of diesel engine exhaust in existence both before and after the expansion project.

Risk assessment

What is risk assessment?

Scientists use risk assessment as a tool to estimate increased health risks. A risk assessment identifies increased human health risks before people actually get sick so we can do something to prevent illness.

Risk assessment is best used as a ruler to help us decide which concerns and issues are the most important in protecting peoples' health. Risk assessment can't predict rates of a certain disease in an exposed community. However, it is a good tool for estimating potential risk based on current knowledge and many assumptions. Many of the assumptions used to assess risk overestimate risk to be sure our regulatory decisions help protect human health.

What the risk assessment found

If Microsoft does not expand: Ecology's scientists estimated that if Microsoft does not expand, the risk from diesel exhaust particles for a person who lives near the Columbia Data Center is about 41 per million, or four per 100,000. This means that if one million people lived close to the Columbia Data Center, 41 people might be expected to get cancer because of breathing diesel exhaust particles.

If Microsoft expands: When Ecology's scientists looked at the risk that might be caused by the expansion project itself, they estimated that another two people in one million might get cancer. If one million people lived close to the Columbia Data Center, this would mean a total of 43 people might be expected to get cancer because of breathing diesel exhaust particles.

If Microsoft expands and limits fuel use: Microsoft offered to voluntarily reduce the amount of diesel fuel used by the generators. They did this by cutting permitted hours of operation by more than half. If Microsoft did not do this, the cancer risk would obviously be higher after the expansion. When Ecology calculated what this meant for risk of cancer, we found that the estimated risk decreased to 30 in one million, or three in 100,000. If one million people lived close to the Columbia Data Center, 30 people might be expected to get cancer because of breathing diesel exhaust particles. **This is actually lower than the risk before the expansion.**

Results of the evaluation

Toxicologists generally consider a rate of 10 additional cancers in one million people to be the point that would cause higher concern. The U.S. Environmental Protection Agency has determined that acceptable health risk can range up to 100 additional cancers in one million people exposed to a cancer-causing chemical. The Microsoft expansion could potentially cause two additional cancers in one million people. With Microsoft's voluntary limits in operation, the risk decreases to be even lower than the risk before the expansion. As a result, the study showed that Microsoft's backup diesel generators will typically not emit enough diesel exhaust particles to cause health problems.

What does health risk really mean?

The U.S. Centers for Disease Control and Prevention (CDC) estimates that about four out of every 10 Americans will get some form of cancer in their lifetime. We could say that just by living in the U.S., a person has nearly a 50-50 chance of getting cancer. If we add the chance of cancer from living near the newly expanded Columbia Data Center, the odds of getting cancer barely rise at all.

Another way to think about the risk of cancer in Quincy caused by diesel exhaust particles is this: If everyone in Quincy (about 5,000 people) lived near the Columbia Data Center and all were exposed to diesel exhaust particles, the mathematical risk shows that less than one person (0.15 persons) would get cancer from diesel exhaust particles over a lifetime of 70 years. Since it doesn't make sense to talk about cancer in terms of "less than one person," we have to use a larger population, such as one million people, so that the risk has some meaning.

Compared to the normal risk of cancer that everyone in the U.S. has, the estimated increased risk is very small. Cancer is due to many factors in addition to pollution, such as lifestyle, age, and exposure to viruses and chemicals. The amount of risk that a person might tolerate is not the same for everyone because each person has a different opinion about how safe they think they should be.

How sure are we about these risk estimates?

Ecology's estimate of increased cancer risk is not exact. Several factors can't be known for certain:

- The amount of diesel exhaust particles used in our risk assessment is an educated guess. Because we don't know exactly how much diesel exhaust particles will be emitted, Ecology used a high-end estimate so that we don't underestimate emissions.
- We don't know how often people might be exposed to diesel exhaust particles coming from the Columbia Data Center, because people move around. We also don't know exactly where pollutants will go once they are emitted, but we used historical records of weather and wind to make an educated guess.
- We assume that low level exposure to diesel exhaust particles results in a low increased risk for cancer; however, the increased risk of cancer might actually be zero. We are fairly certain that the actual risk of getting cancer from diesel exhaust particles produced by the Columbia Data Center is less than what we've estimated. But we want to make sure we don't underestimate the risk when we make decisions based on health risk.

For more information, see Ecology's report, "Concerns about Adverse Health Effects of Diesel Engine Emissions" available online at http://www.ecy.wa.gov/pubs/0802032.pdf.