DEPARTMENT OF ECOLOGY
State of Washington

As required by

the Washington State Administrative Procedures Act

Chapter 34.05 RCW

RESPONSIVENESS SUMMARY

REGARDING THE

DRAFT AIR QUALITY PERMIT FOR THE

DELL DATA CENTER PROJECT

8/8/2011

Publication: 11-02-029

As required by the Washington State Administrative Procedures Act

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RESPONSIVENESS SUMMARY

FOR THE

DELL DATA CENTER

PROJECT

Prepared by:

Washington State Department of Ecology

Air Quality Program

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I. Introduction

The Dell Data Center is proposed to be located directly north of the Microsoft Columbia Data Center, within the northwest outskirts of Quincy, Washington. Data centers house the servers that provide e-mail, manage instant messages, and run applications for our computers.

Dell has applied to the Washington Department of Ecology (Ecology) for a permit called a notice of construction (NOC) approval order. An NOC approval order is required before a new source of air contaminants can be built or modified. Its purpose is to protect air quality. The permit is needed because data centers use large, diesel-powered backup generators to supply electricity to the servers during power failures. The primary air contaminant sources at the facility would be 28 electric generators powered by diesel engines. The generators would have a power capacity of up to 84 megawatts, once the facility is fully built. The Dell Data Center would be phased in over several years, depending on customer demand.

Because of the previous work Ecology has done on data centers in Quincy, we were able to incorporate prior comments and suggestions received during the public process for the Microsoft Columbia Data Center and Yahoo! Data Center into the draft permit we created for Dell. Therefore, you may notice that, following public comment, fewer changes were made to the Dell final permit than were made to the Microsoft and Yahoo! final permits.

II. Response to Comments

Ecology received both written and oral comments regarding this permit. We want to thank everyone who provided comment for the public record on this topic. But not all testimony generated a response from Ecology. Much of what was received was provided as a statement on the topic, and all comments, including oral and written testimony, are provided verbatim in appendices C and D. In this section we have responded to questions posed throughout the comments received.

Comment 1, Danna Dal Porto, 16651 Rd 3 NW, Quincy, Washington 98848:
The Dell Notice of Construction Document has not been available on line for citizen use. I would like an explanation from Ecology as to why information is not readily available to citizens. I have been out of town and I could not view the document at the Quincy City Hall or drive to Ecology's office in Spokane. I believe this lack of available documents looks like a deliberate effort to stifle citizen knowledge of the Dell data center permit. Without knowledge, I cannot make a well-researched public statement about my concerns regarding the Dell facility.

Ecology Response:

The Ecology Air Quality Program (AQP) is required to make the information submitted by the applicant, as well as any preliminary determinations, emission analyses, and technical evaluations, available for public inspection in at least one location near the proposed project, Washington Administrative Code 173-400-171(5). We have many documents regarding the project available online, but due to the large size of the Notice of Construction application, coupled with the fact that many of the documents are submitted in multiple iterations and that we are limited by information technology resources to both post and maintain online data, we are not planning to make the application available online. There is no attempt by the AQP to withhold information or to limit public knowledge on any project, and copies of the application were made available at Quincy City Hall, the Department of Ecology office, and are currently available through the public disclosure process.

Comment 2, Danna Dal Porto:
I have studied the data center construction models and I feel that the Dell data center is flawed in that there is no way for a resident of Quincy to determine that the developer is operating inside the permitted guidelines for emission controls. The generators are to be run on limited fuel and run times as well as reduced engine power. Without access to operational records, I cannot determine if the operator of the generators is in compliance with the DOE permit. Because of this flaw in the permit from the Washington State Department of Ecology, I object to a permit allowing Dell to operate this data center.

Ecology Response:
The Preliminary Determination developed from the Dell Notice of Construction application contains requirements that Dell must follow to minimize air emissions and resulting impacts to the community. As stated in the comment above, operation of the generator engines is limited by annual fuel and runtime restrictions. The annual fuel and runtime restrictions are based on load restrictions during specific operational functions. Dell will be required to maintain continuous operational records and periodically submit operational information to Ecology for review. The information submitted to Ecology will be used with operational data collected and/or reviewed during annual inspections to determine whether Dell is in compliance with the requirements contained in the final Notice of Construction Approval Order. The information that Dell is required to maintain that is submitted to, or collected by, Ecology, is available to the public, and is sufficient to determine Dell's compliance with the Notice of Construction Approval Order.

Comment 3, Danna Dal Porto:
I am requesting that Dell be obligated to install some type of emission control device on the diesel stack. Simply raising the stack is not an adequate method of emission reduction. The stack height, I have been told, is 58 feet. The guideline for stack height, according to 42 USC- 7423, is 2.5 times the height of the source. The

stack can be only so high to account for building downwash. The stacks cannot be raised just to reduce emissions. The documents indicate that the first Dell building is 43 feet high. Is this building been designed exceptionally high to allow for tall stacks? The phased-in construction documents indicate that the next Dell building is 29 feet high, much shorter than the first building, yet the stacks remain 58 feet high. Dell has 18 months to construct the next building because the data from the first phase cannot be used in new construction, the data would not be grandfathered in to allow the correlation between stack height and building height. Because of these facts, the Dell stacks are way out of compliance and will not serve to disperse emissions.

Ecology Response:
As part of Dell's BACT analysis, Dell evaluated various control options for reducing emissions from the diesel engines. Although several possible technologies exist that can reduce pollutants from Dell's proposed engines, Ecology and Dell found them to be either economically or technically infeasible. The backup engines proposed by Dell will comply with EPA's New Source Performance Standards for emergency engines. http://www.epa.gov/ttn/atw/nsps/sinsps/fr28jn11.pdf.

Dell did not raise their exhaust stacks in order to reduce the emissions, but to reduce modeled downwind impacts. This is because modeling was conducted after BACT had been defined. BACT defines the maximum level of emissions in the exhaust. Once BACT is defined, dispersion modeling is then conducted to verify compliance with ambient air quality standards.

Under state rules, applicants are forbidden from using "excess stack height" to meet ambient air quality standards. "Excess stack height" is defined in WAC 173-400-030(31) and WAC 173-400-200(2)(a) as "that portion of a stack which exceeds the greater of: Sixty-five meters, measured from the ground level elevation at the base of the stack; or Hg = H +1.5L."

> "where Hg = "good engineering practice" (GEP) stack height, measured from the ground level elevation at the base of the stack; H = height of nearby structure(s) measured from the ground level elevation at the base of the stack; L = lesser dimension, height or projected width, of nearby structure(s), subject to the proviso below. Nearby," as used in this subsection for purposes of applying the GEP formula means that distance up to five times the lesser of the height or the width dimension of a structure, but not greater than 0.8 kilometer (1/2 mile)."

The exhaust stacks proposed by Dell comply with regulatory stack height restrictions because they are less than 65 meters, and are also less than the GEP stack height, as calculated according to WAC 173-400-200 (2)(a)(ii). For Dell's project, the GEP stack height is well above 60 feet.

Comment 4, Danna Dal Porto:
Although the electrical power from Grant Public Utility District has been considered very reliable, information is available that shows the increase in demand plus the variances in weather patterns will place serious stress on this reliable power. 2011 has seen huge amounts of snow in the Columbia River drainage. This amount of snow is not reliable. The wind power contribution has made the balance of hydro and winds a complex and volatile magic act for power managers to control. The summer energy demand will rise with population increases and that time of year is the most stressful for energy production. I mention these facts to raise the question of a long-term electrical shortage due to grid damage, solar storms or just human error in energy transmission patterning. Will the data center keep to their limit on fuel and operating limits in case of a long-term electrical outage? It is obvious that the best action to follow in the case of Quincy is to place emission controls on the diesel stacks and then the industry, Ecology, the PUD and residents can be assured that the health of the community is protected and the generators can run as necessary.

Ecology Response:
Dell will be required to comply with all permit limits regardless of any preconstruction assumptions they made in their proposal. Regardless of whether or not changes occur in the supply of power, Dell is obligated to follow the conditions of their permit. These conditions include an annual fuel limit and limits on the number of hours each engine can operate. If they violate these conditions, they are subject to enforcement under applicable laws and regulations.

Climate change and increased demand may certainly stress future power supplies. Local power suppliers are aware of these factors, and plan accordingly to maintain reliable power supplies. It is unrealistic to assume that stress to local power supplies will immediately result in increased outages. As California experienced in 2000 and 2001, stress on local power supplies resulted more in power cost increases than outages. Future improvements to local power distribution systems and changing technologies as well as cost increases should help mitigate future stress on local power supplies.

Comment 5, Danna Dal Porto:
How has Dell resolved the wastewater discharge issue with the City of Quincy? The limit has been reached on wastewater treatment for data centers by City facilities and yet the City of Quincy keeps extending the opportunity for data center construction without adequate infrastructure. I have heard that the wastewater from the data center cooling towers will be spread on the lawns for Mt. View School, Monument School and Lauzier Park. Is this correct? What concrete data can you show me and the residents of Quincy that this water spreading is safe and environmentally positive? The wastewater is concentrated and, at least in one case, the water has been treated with chemicals. I believe you would be doing this

during the part of the year that children would be using these lawns. I cannot see that this is a good long-term solution. If this water is so safe why not apply it to farm fields? One option for wastewater discharge was to run that water into the Bureau of Reclamation Irrigation canal. Is this solution still an option? In discussion as well was a plan to run the water downhill into the Columbia River. Is this still an option for wastewater discharge?

Ecology Response:
This public comment period and responsiveness summary addresses Air Quality permitting issues only. For information regarding water and wastewater issues please contact the City of Quincy and/or the Department of Ecology Water Quality and Water Resources Programs (509) 329-3400.

Comment 6, Danna Dal Porto:
How many gallons of water will be used by Dell over the course of one year? What is the source of your water? Do you have a State permit to withdraw this much water annually? Do you have a permit to discharge this much water annually?

Ecology Response:
This public comment period and responsiveness summary addresses Air Quality permitting issues only. For information regarding water and wastewater issues please contact the City of Quincy and/or the Department of Ecology Water Quality and Water Resources Programs (509) 329-3400.

Comment 7, Danna Dal Porto:
How much power will Dell require to operate the entire project, all phases?
Do you have any specific arrangement with Grant PUD regarding the source of power, the rate of power or the long-term supply of power?

Ecology Response:
For purposes of air quality permitting, Ecology only reviewed equipment that was subject to pre-construction air permitting. Because only the diesel engines were subject to air permitting, Ecology only asked Dell to supply information on the gross power output from the proposed diesel engines. We did not ask for information on the power needs of the other portions of the facility. Ecology believes that knowledge of whether or not the facility will need more power than the diesel engines can supply in a power emergency is not pertinent to the current permitting action.

Comment 8, Danna Dal Porto:
Did you have any contacts with the Grant County Economic Development Council regarding your choosing Quincy for your company development? Do you have contacts with the Port of Quincy regarding your choosing Quincy for construction?

Did you receive any concessions or promises from the City of Quincy for building here?

Ecology Response:
This public comment period and responsiveness summary addresses Air Quality permitting issues only. Because this question is not within the purview of Ecology, we have no answer to this question.

Comment 9, Danna Dal Porto:
Have you taken advantage of the tax incentives offered by the State of Washington for choosing the build in Quincy? Does this tax incentive require you to have a specific number of employees to provide local jobs? How many people will be working in the first phase of the Dell facility? How many people are expected to be employed in the final build-out of Dell?

Ecology Response:
This public comment period and responsiveness summary addresses Air Quality permitting issues only. Because this question is not within the purview of Ecology, we have no answer to this question.

Comment 10, Danna Dal Porto:
I have recently learned that the ultimate decision about diesel emissions and control devices rests totally with the Director of the Department of Ecology. That is a huge responsibility and a terribly important decision because of the long-range implications of the decision, especially if the decision is continued to be made not to require control devices. Quincy has been selected as a city to be monitored in the National Children's Health Study. As part of this Study, the air will be monitored to see the effects that local industry and agriculture have on young children. I bet the Quincy test will be interesting with the Microsoft and Dell facilities just up wind of the pre-school/K-2 elementary school. All 327 children in that school will be affected each and every school day with diesel exhaust and when most of these children go home they live in town and get more exhaust emissions. I do not understand why the Director of the Department of Ecology would not require emission controls on these diesel stacks. Ecology admits that it has never permitted this many industrial generators in one small area therefore an arbitrary limit of cancers has been set to provide some protection. I have to say that this looks like a guess by Ecology as to how to proceed and that controls should be in place for these 141 generators instead of just guessing about public safety.

Ecology Response:
Although the Director has overall authority over actions taken by the Department of Ecology, the authority to permit new sources of air pollution has been delegated to the Air Quality Program. In some cases, the director is directly involved in making

risk management decisions (i.e., third tier review). In this case, the Air Quality Program was tasked with making decisions regarding emission control technology.

Comment 11, Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848:
I would like to complain that the documents needed to gain a decent understanding of Dell's impact on the community, including the HIA, NOC application, NOC Support Document and amendments, are not online. It cost me over $110 at City Hall for copies of documents (Dell and Sabey), and 3 days waiting to have them copied. There is absolutely no reason to keep this information from the public when these documents are generated electronically and easily added to a webpage.

Ecology Response:
The Ecology Air Quality Program (AQP) is required to make the information submitted by the applicant, as well as any preliminary determinations, emission analyses, and technical evaluations, available for public inspection in at least one location near the proposed project, Washington Administrative Code 173-400-171(5). We have many documents regarding the project available online, but due to the large size of the Notice of Construction application, coupled with the fact that many of the documents are submitted in multiple iterations and that we are limited by information technology resources to both post and maintain online data, we are not planning to make the application available online. There is no attempt by the AQP to withhold information or to limit public knowledge on any project, and copies of the application were made available at Quincy City Hall, the Department of Ecology office, and are currently available through the public disclosure process.

Comment 12, Patricia Anne Martin:
I also object to Ecology's having scheduled the Dell and Sabey public hearings for Wednesday nights after Danna Dal Porto had made it very clear that Wednesday nights are absolutely the worst night of the week to schedule meetings because of church commitments. Also, the timing of the hearings may be convenient for Ecology, but 5:30 PM in an agricultural community is still working hours to many, many affected individuals. Ecology did a grave disservice to our community by their total lack of consideration. Please do not repeat this mistake and move the Sabey hearing to Thursday night and schedule it for much later in the evening.

Ecology Response:
Ecology first became aware of the Wednesday night conflict from Danna Dal Porto's Dell oral testimony, received on 7/13/11. No comments or concerns regarding this day of the week had previously been received. We carefully and conscientiously attempt to plan hearings during a day and time when most people will be able to attend. Although it is too late to change the day and time of the upcoming Sabey hearing, your comments will help to plan future meetings and hearings in the Quincy area.

Comment 13, Patricia Anne Martin:
Why was Dell not required to model for a 48 hour "worse-case scenario" outage as was required of Yahoo! and Microsoft? If Microsoft, Yahoo! and Intuit are without power for 48 hours then Dell will be as well. Even Dell's proposed "redundant supply" originates from the same source. Dell should be required to model a 48 hour outage.

Ecology Response:
Dell was required to model emissions as proposed in their NOC application. Dell requested only 8 hours of outage per year and only between 50.75 and 54.75 hours of total operation per engine per year (averaged over a rolling 36 month period). Any engine operation beyond this would be noncompliant with the permit and be subject to enforcement actions.

Comment 14, Patricia Anne Martin:
Dell does not have an agreement for more than 7 MW of redundant power at this time, nor does the Grant County PUD have a redundant power policy. Permitting Dell based on assumptions of redundancy to assure compliance with NAAQS and other hazardous air pollutants (HAPs) is inappropriate and underestimates risk to our community.
a. What effect does power redundancy play in reducing the operation of Dell's generators and their impact on Quincy?
b. How many hours are reduced based on this approach?
c. Will Dell be allowed to use the fuel allocation and engine hours of the future engines to cover for the "redundant power" that they currently do not have?

Ecology Response:
Dell requested limits on engine operation hours and annual fuel usage based partly on their projected need for standby backup power and testing and maintenance requirements. Whether or not Dell will need their full allotment of engine operation is not currently known, but in assessing ambient impacts, Ecology assumed that Dell would use its full allotment of fuel each and every year forever. Dell must abide by the limits outlined in their permit (even if redundant power does not become a reality) or be subject to enforcement actions.

Dell has limits on both hours of operation for each engine and fuel consumption. Nineteen of Dell's 28 engines must not be operated more than 54.75 hours per year per engine (rolling 36 month average), and the remaining nine engines are limited to 50.75 hours per year per engine. The annual fuel limit of 175,013 gallons per year applies to the full build out at Dell. Dell's permit also requires them to track and report the purpose, duration, and load each time their engines are operated. The reported durations and loads are required to be within the limits that are specified in the permit.

Comment 15, Patricia Anne Martin:
Please produce the EPA 2011 Model Year Certificate of Conformity for all stationary diesel engines for use at Dell. If these are not required please explain why.

Ecology Response:
Each engine used to power the 3.0 MWe electrical generators is required to be certified by the manufacturer to meet 40 CFR 89 Tier II emission levels or other specifications as required by the EPA at the time the engines are installed. A copy of the EPA Model Year Certificates of Conformity for 2011 Caterpillar large engines is provided below:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF TRANSPORTATION AND AIR QUALITY
WASHINGTON, DC 20460

CERTIFICATE OF CONFORMITY
2011 MODEL YEAR

Manufacturer:	**CATERPILLAR, INC.**
Engine Family:	**BCPXL106.NZS**
Certificate Number:	**CPX-STNRCI-11-19**
Intended Service Class:	**NR 9 (>560)**
Fuel Type:	**DIESEL**
FELs:	NMHC + NOx: **N/A** NOx: **N/A** PM: **N/A**
Effective Date:	**10/12/2010**
Date Issued:	**10/12/2010**

Karl J. Simon, Director
Compliance and Innovative Strategies Division
Office of Transportation and Air Quality

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60 and Part 89, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following stationary engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and 89, and produced in the stated model year.

This certificate of conformity covers only those new stationary compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and 89 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 89.129-96 and 89.506-96 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to a revocation or suspension of this certificate for reasons specified in 40 CFR Part 89. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void ab initio for other reasons specified in 40 CFR Part 89.

This certificate does not cover stationary engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate

Comment 16, Patricia Anne Martin:
I object to the use of Tier II diesel engines when Tier IV engines are available and will significantly reduce the amount of DPM, CO, NOx and VOCs released. Because diesel engines last a long time this represents years of unnecessary emissions.

Ecology Response:
Your objection is noted. While we agree that Tier IV engines are available, Ecology has no legal basis to mandate the use of Tier IV engines. Under current federal rules, emergency engines are not subject to Tier IV standards. Because Dell proposed Tier II engines, Ecology looked at options for reducing emissions from the proposed engines.

Comment 17, Patricia Anne Martin:
I was pleased to see in the Second Tier TSD that Ecology is requiring Dell to use "a two- stage oxidation catalyst system (i.e., 3-way catalysts) that is guaranteed by the catalyst manufacture to remove 35% of nitrogen oxides, and capable of reducing at least 50% each of carbon monoxide, volatile organic compounds, and particulate matter from the exhaust stream." This technology was also determined to be BACT for the Titan Data Center in Moses Lake. When combined with Tier IV engines as requested in #5 above there will be a significant reduction in DPM and VOCs.

Ecology Response:
This statement in the Second Tier Review technical support document is incorrect. A two-stage catalyst system is not required at Dell. We apologize for this error, however, the emissions limits and modeled emissions used to determine Dell's ambient impacts reflect pollutant emission rates without two-stage catalysts. Ecology has posted an erratum at www.ecy.wa.gov to notify the public of our error.

Comment 18, Patricia Anne Martin:
There is mention of a Grant County PUD grid-wide 15 minute scheduled outage. I have never heard of anything like this. Where can this information be found and has modeling been conducted on all the generators operating during this time?

Ecology Response:
We have no knowledge of a scheduled grid-wide outage. We suggest contacting Grant County PUD to find out about any planned grid wide outages. Regardless, this 15 minute outage would be counted towards Dell's allowed 8 hours of outage per year. Additionally, full outage scenarios were modeled as part of previous data center analyses (see Yahoo! Third Tier technical support document at http://www.ecy.wa.gov/programs/air/quincydatacenter/docs/Yahoo_Tier3_TSD_2-8.pdf.

Comment 19, Patricia Anne Martin:

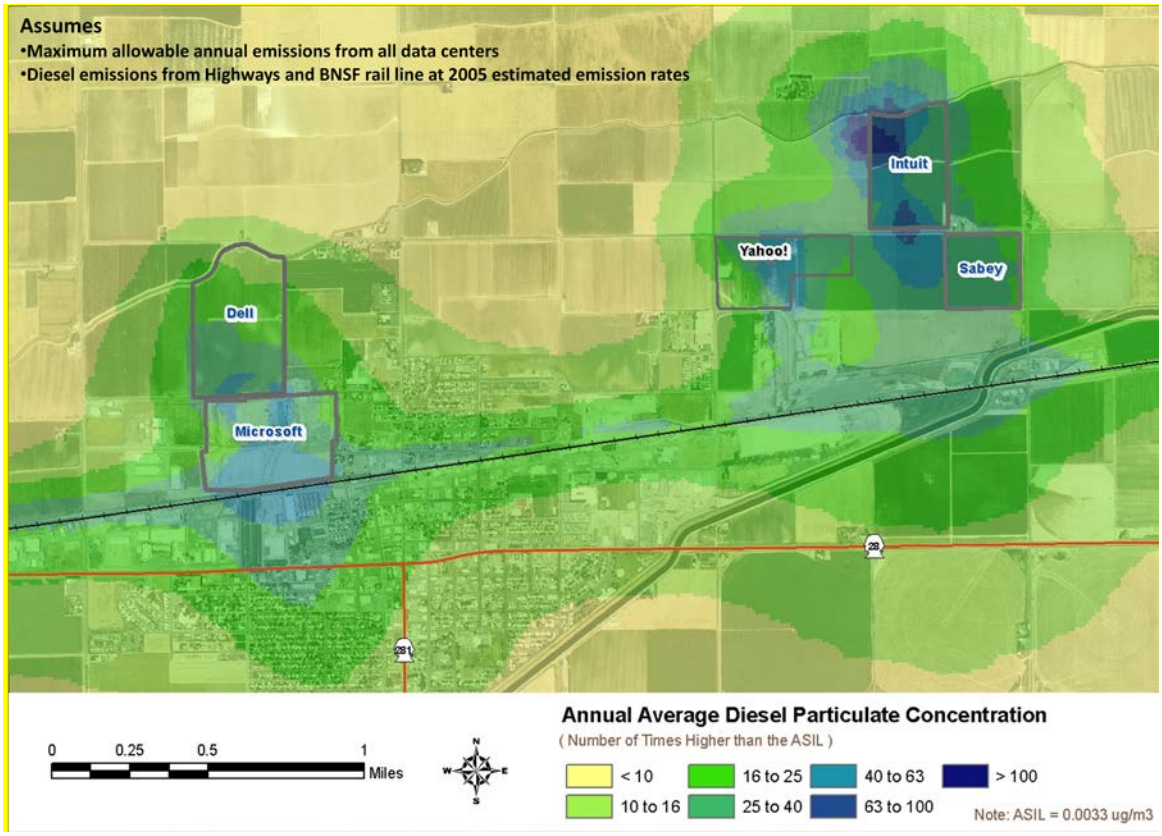
A question was raised during the meeting about the modeling of DPM over the community and the impacts of Yahoo, Sabey and Intuit on the plume. Ecology stated that they had a map available but not with them. I would like to see the map of this modeling. It is my understanding that the emissions from Yahoo, Intuit and Sabey – and Celite – were not modeled because Dell was instructed they did not have to model them. Please produce the map or explain why Dell was not required to model the emissions from these 4 sources.

Ecology Response:
The following city-wide map shows the cumulative concentration of diesel particulate. The map displays the concentrations as the number of times higher than the acceptable source impact level (ASIL). The diesel particulate ASIL equals 0.00333 μg/m3.

The estimated concentrations include maximum allowable emissions from:

Microsoft, Yahoo!, Intuit, Dell (proposed), and Sabey (proposed)

The mobile source (trucks and trains) emissions are taken from 2005 estimates. This is the latest year of data for which mobile source emissions data were available. The 2008 emission inventory is still being compiled.



Comment 20, Patricia Anne Martin:
During the public hearing David Ogulei mentioned that it had not been determined which engines were going to be used. Please explain how emissions can be accurately calculated without knowing what engines, including manufacturer, are going to be used?

Ecology Response:
This statement is incorrect, and we do not believe this specific response was given at the Dell hearing. Regardless, as of the date of the public hearing (July 13, 2011) the serial numbers of the engines that Dell ordered was not known. It was known, however, the Dell intends to install Caterpillar model C175-16 engines. The emissions of this model of engine were used in the ambient air quality impact analysis.

Comment 21, Patricia Anne Martin:
Please identify all engines to be installed at Dell including model number, engine number, manufacturing date and manufacturer.

Ecology Response:
Dell has purchased the first five engines for their project. The information on the Caterpillar engines and generators is contained in Table 1 below. This information will be added to the final draft Notice of Construction approval order. Dell is required to notify Ecology of the installation of all engines installed at the project.

Table 1: 3.0 MWe Caterpillar Engine & Generator Serial Numbers

Project	Unit ID	Capacity MWe	Engine SN	Generator SN	Build date
Phase 1	DE111202	3.0	WYB00458	G8F00106	05/23/2011
"	DE111203	3.0	WYB00459	G8F00107	05/23/2011
"	DE111204	3.0	WYB00461	G8F00108	05/25/2011
"	DE111205	3.0	WYB00462	G8F00109	05/25/2011
"	DE111206	3.0	WYB00457	G8F00104	05/20/2011

Comment 22, Patricia Anne Martin:
The satellite map of Quincy is not current. Because buildings affect the movement of emissions, the plume of DPM and other contaminants may behave differently if the AHO neighborhood and other homes and apartments are included in the model. Please model the plume using the accurate housing data in the model.

Ecology Response:
The aerial image shown in the map from response to question 19 is from 2006, so the imagery is not current. This map was used for visualization purposes only.

The only buildings that must be accounted for in the model are those buildings that have the potential to cause building downwash. In this case, these are the data center buildings (or source related buildings).

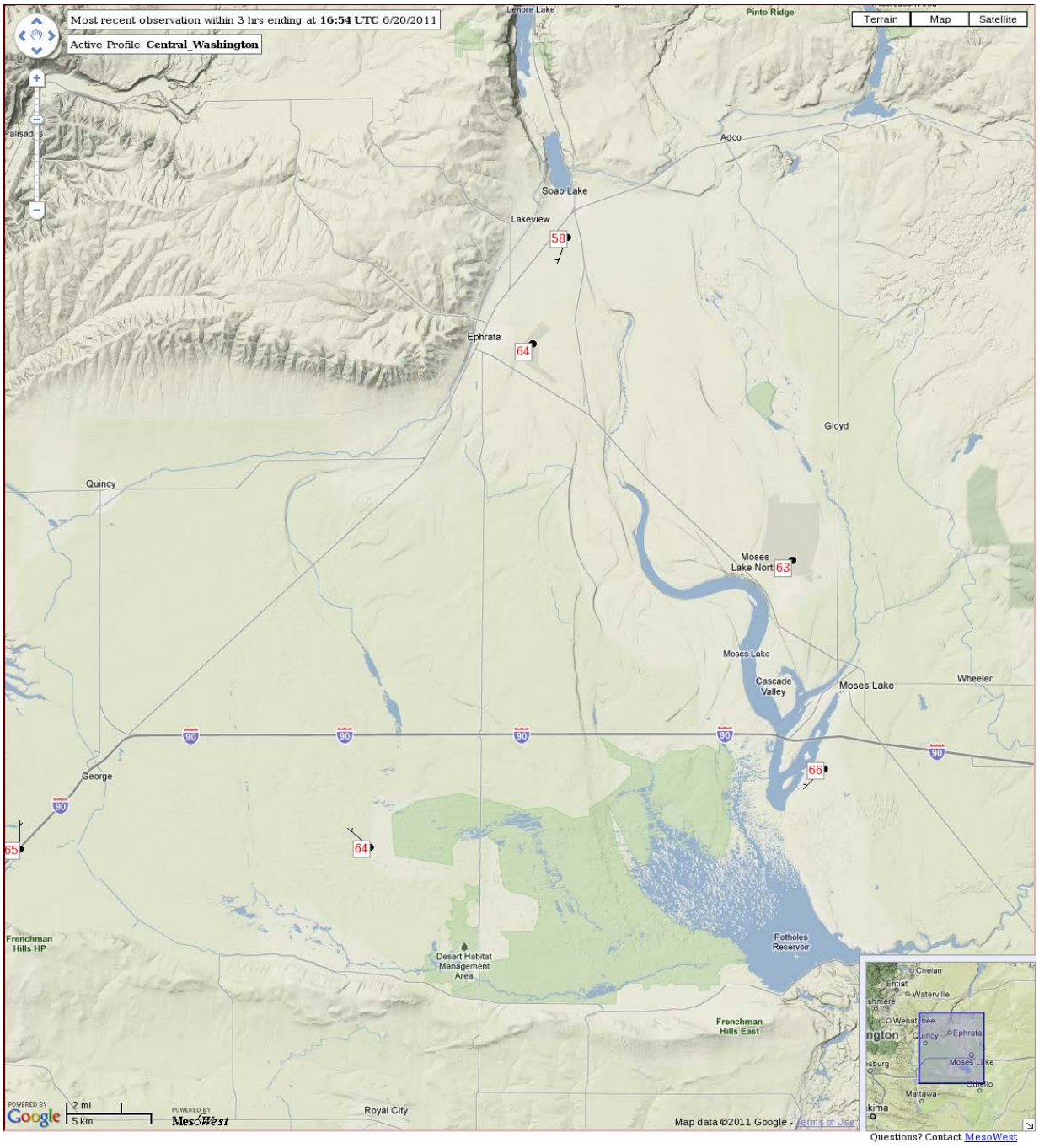
The AERMOD dispersion model considers only the buildings that have the most significant effect on dispersion of the plume of emissions. Only buildings located within the "area of influence" of the new source are considered in the building downwash calculations. The most significant building may be different depending on wind direction. Both future buildings proposed by Dell and existing structures were considered in this analysis.

Comment 23, Patricia Anne Martin:
Did Ecology and/or Dell use 40 CFR 51 Appendix W? If not, why not?

Ecology Response:
Yes, Dell followed this guidance.

Comment 24, Patricia Anne Martin:
Explain why meteorological data from the Moses Lake Airport is being used rather than the meteorological data from the Ephrata Airport?

Ecology Response:
In 2006 when it became necessary to start modeling air dispersion in Quincy, Ecology looked at meteorological data from both Ephrata and Moses Lake. The potential for topographical influence is readily seen in the figure below.



The Ephrata airport (marked with a temperature of 64 just southeast of the town) is approximately two kilometers from a southwest – northeast running ridge, which could affect wind speed and direction. Quincy is more than 5 kilometers from a gentler portion of that ridge, which, at that point, runs east-west. The Grant County Airport, which is where the Moses Lake meteorological data is gathered and marked with a temperature of 63, is northwest of the town of Moses Lake and near Moses Lake, which could also affect wind speed and direction. Ecology found that

the data from Ephrata and Moses Lake were similar, with a few differences, as shown in the following tables from the Western Regional Climate Center:

WASHINGTON
1996-2006
PREVAILING WIND DIRECTION

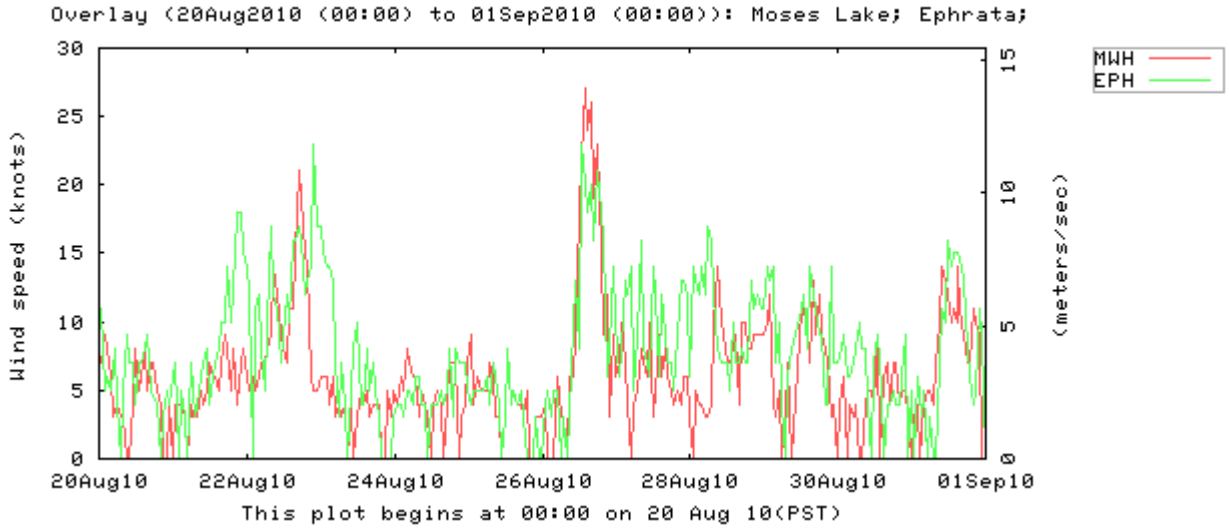
STATION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
KEPH	N	N	N	N	S	S	S	S	N	N	N	N	N
KMWH	N	N	N	N	S	SSW	S	N	N	N	N	N	N

AVERAGE WIND SPEED - MPH

STATION	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
KEPH	6.9	7.9	8.8	9.1	9.5	10	9.7	8.8	8.2	7.6	6.9	6.6	8.3
KMWH	6.4	6.9	8.1	8.1	8.5	8.6	7.9	7.3	6.9	7	6.5	5.9	7.3

KEPH, Ephrata: Ephrata Municipal Airport, 47.30750, -119.51583
KMWH, Moses Lake: Grant County Airport, 47.19306, -119.31333

The tables show that the prevailing wind directions are the same for Ephrata and Moses Lake for ten months out of the year. The tables also show that the average wind speed in Moses Lake is typically lower than the average wind speed in Ephrata. The lower average wind speeds at Moses Lake will tend to produce somewhat higher modeled concentrations. When modeling projected emissions in the face of uncertainty, it is good practice to use assumptions that overestimate emission concentrations than to use assumptions that underestimate emission concentrations.



The above figure compares the hourly wind speeds at Ephrata (EPH) with those at Moses Lake (MWH). This figure shows that the two locations in this sample period track each other quite well and that generally the Ephrata wind speed is often higher than the wind speed at Moses Lake. The close agreement between these two sites at both long and short averaging times lends support for the conclusion that meteorological conditions in the region are nearly uniform and that either location would be equally representative of meteorology at Quincy.

Based on this data, Ecology determined that it would be slightly more appropriate to use meteorological data from Moses Lake than from Ephrata.

Comment 25, Patricia Anne Martin:
The Grant County PUD has suggested that Dell run their generators during "A to B feed Switchovers". How much time will the generators run during these events? How many events like this are there?

Ecology Response:
Page 7 of Dell's NOC support document includes the following explanation:

"The initial configuration of the dual-feed system presents one minor issue related to discretionary generator operation. Until the Quincy X Substations is fully operational in 2012-2013 (according to Grant PUD's plans), Dell will not be able to switch between A-Feed and B-Feed while both feeds are fully operational. This is because the voltages and phasing in the two independent feeds are not always identical, so if Dell instantly switched from A-Feed to B-Feed it might cause a power disruption upstream of Dell, which might impact Grant PUD's other customers. Therefore, in the years 2012-2013, to make that switchover when both A-Feed and B-Feed are intact, Dell must activate all of its generators for a few minutes at 70% load while the switchover is conducted. Dell anticipates this event might be required for up to 4 times each year, whether due to a request from Grant PUD to allow them to do maintenance upstream of Dell, or due to Dell's own discretionary maintenance activities within the data center. The sequence of events during the manual switchover is similar to a 10-15 minute power outage as follows:

1. While Dell is operating on A-Feed or B-Feed, the generators are activated at idle load.
2. All generators that are required to serve the entire data center's electrical demand are increased to nominal 70% load for 5-10 minutes, during which time Dell is completely disconnected from either A-Feed or B-Feed. During that 5-10 minute period Dell's generator emissions are the same that would occur during a full power outage. Note that switchover will involve fewer than the maximum number of generators because it will apply only through 2013 (prior to full buildout) and as a result of seasonal load differences (non-summer loads require fewer generators).

3. During that 5-10 minute period the A-to-B- switchover is completed. Utility power is restored to the data center the stipulated A- or B-Feed, and the generators are disconnected from the data center power delivery system.
4. The generators automatically drop to idle load, and operate for the prescribed cool-down period 5 minutes after dropping to idle load.
5. When the maintenance is complete, the data center power would be restored to the dual feed by initiating the procedure delineated in notes 1 through 4 above."

Comment 26, Patricia Anne Martin:
I understand that there is an uncertainty factor associated with the toxicity of DPM that ranges up to 1200% deviation. What is Ecology's understanding of the uncertainty factor associated with DPM toxicity?

Ecology Response:
Ecology acknowledges that there is a great deal of uncertainty with regard to the toxicity of diesel particulate. The following is taken from page 29 of the Second Tier TSD:

"One of the largest sources of uncertainty in any risk evaluation is associated with the scientific community's limited understanding of the toxicity of most chemicals in humans following exposure to the low concentrations generally encountered in the environment. To account for uncertainty when developing toxicity values (e.g., RfCs), EPA and other agencies apply "uncertainty" factors to doses or concentrations that were observed to cause adverse non-cancer effects in animals or humans. EPA applies these uncertainty factors so that they derive a toxicity value that is considered protective of humans including susceptible populations. In the case of EPA's Diesel Particulate RfC, EPA acknowledges (EPA 2002):

"…the actual spectrum of the population that may have a greater susceptibility to diesel exhaust (DE) is unknown and cannot be better characterized until more information is available regarding the adverse effects of diesel particulate matter (DPM) in humans."

Quantifying diesel particulate cancer risk is also uncertain. Although EPA classifies diesel particulate as probably carcinogenic to humans, they have not established a URF for quantifying cancer risk. In their health assessment document, EPA determined that "human exposure-response data are too uncertain to derive a confident quantitative estimate of cancer unit risk based on existing studies." However, EPA suggested that a URF based on existing diesel particulate toxicity studies would range from 1x10-5 to 1 x 10-3 per µg/m3. OEHHA's diesel particulate URF (3 x 10-4 per µg/m3) falls within this range. Regarding the range of URFs, EPA states in their health assessment document for diesel exhaust (EPA 2002):

"Lower risks are possible and one cannot rule out zero risk. The risks could be zero because (a) some individuals within the population may have a high tolerance to exposure from [diesel exhaust] and therefore not be susceptible to the cancer risk from environmental exposure, and (b) although evidence of this has not been seen, there could be a threshold of exposure below which there is no cancer risk."

Comment 27, Patricia Anne Martin:
Please explain how a doubling of hours of operation from those proposed in the NOC application (21.68 -25.68 hrs/year/engine) to those in the Second Tier TSD (53.5 hrs/year/engine) only results in a 12% increase in permitted fuel usage (154, 946 gallons in the NOC application to 175,031 gallons in the TSD)? How is that possible?

Ecology Response:
The January 21, 2011 version of Dell's NOC Support Document incorrectly refers to a fuel use of 154,946 gallons per year. At the operating conditions and durations requested in that document, the actual fuel usage would be approximately 89,000 gallons of fuel per year. Dell submitted a revised NOC Support Document in April 2011 that requested approximately 175,031 gallons of fuel per year. This fuel amount represents an accurate estimate of the fuel need for the engines at specified durations and loads as reported in Dell's NOC support document.

Comment 28, Patricia Anne Martin:
In Dell's NOC application Dell estimates the fuel consumption between 156 gph at 70% load to 213 gph at full load. The Second Tier TSD allows 175,031 gallons for 1498 total generators hours or approximately 116 gph. Explain why the fuel consumption is estimated to be so low and also what average load this fuel consumption equates to. How much less NOx is generated at this reduced engine load compared to 70% load?

Ecology Response:
About 20 hours of Dell's 50.75 to 54.75 hours of allotted per engine operation will occur during weekly testing. During these tests, the engine will be used at low load (approximately 10%). At this low load, the engines will use only about 48 gallons per hour per engine compared to 156 gallons per hour at 70% load and 213 gallons per hour at full load.

NOx emissions will be lower when engines are at low load. Table 2a of the Preliminary Determination (permit) shows NOx emission rates at various loads.

Comment 29, Patricia Anne Martin:
Dell's NOC application does not include a Gas Velocity for each stack. Why not? What effect does lower load engine operation have on gas velocity at the stack?

Ecology Response:
Appendix E of Dell's NOC Support Document shows gas velocity as it exits the stack for each engine load. At 100% load, stack velocity is about 54 m/sec. The exit velocity at 70% and 10% load is 44m/sec and 18 m/sec respectively.

Comment 30, Patricia Anne Martin:
What affect does Dell's building position have on Microsoft's plume? What affect did Microsoft's emission plume have on the placement of Dell's building?

Ecology Response:
Both Dell and Microsoft's buildings are of comparable size, therefore, the most significant building will be the building associated with the data center's own buildings.

Comment 31, Patricia Anne Martin:
In the Executive Summary for Dell's original NOC Support Document it states that the "maximum modeled annual-average ambient concentration of DPM at the project boundary for the full power outage scenario is 0.022 μg/m3" (6.7 cancers). In the amended NOC Support Document dated April 27, 2011 this number is amended to read 0.062 μg/m3 or 18.8 cancers. Where is this point or boundary located and why wasn't this level, i.e., 18.8 cancers, used in determining the Tier level under which Dell applied for their permit?

Ecology Response:
The maximum annual diesel particulate concentration is estimated to occur along the western edge of Dell's property fence line. This location is currently undeveloped and zoned industrial. As part of a health impact assessment, Ecology considers the likelihood of exposure. Because the likelihood of frequent exposure is very low at this location, the risk from exposure is also relatively low. On the other hand, if this location was currently used as a residence, zoned residential, or was a planned residential area, then the estimated increased cancer risk would indeed be about 19 in one million assuming someone was continuously exposed to a concentration of 0.062 μg/m3 of diesel particulate for their entire lifetime (assumed to be 70 years of continuous exposure).

Comment 32, Patricia Anne Martin:
Formaldehyde is a listed carcinogen. Was any consideration -- to the community's health -- given to cumulative releases of formaldehyde and other HAPs around Dell? If not, why not?

Ecology Response:
Chapter 173-460 WAC employs a screening process to identify those pollutants that require additional review. Any pollutants that exceed a screening level (i.e., ASIL) are subject to additional review. In the case of Dell, only diesel particulate

exceeded its ASIL, therefore Dell was only required to evaluate the health impacts associated with diesel particulate.

The specific requirement regarding what constitutes information necessary for a health impacts assessment is mentioned in WAC 173-460-090(2)(d):

"*The ambient impact of the emissions increase* ***of each TAP that exceeds acceptable source impact levels*** *has been quantified using refined air dispersion modeling techniques as approved in the health impact assessment protocol*."

With regard to evaluating the cumulative release of other pollutants that are not subject to second tier review, WAC 173-460-090(5) requires consideration of background concentrations of TAPs as part of a second tier review. Background concentrations can be estimated using the sources identified in WAC 173-460-090(5):

(a) The latest National Ambient Toxics Assessment data for the appropriate census tracts; or

(b) Ambient monitoring data for the project's location; or

(c) Modeling of emissions **of the TAPs subject to second tier review** from all stationary sources within 1.5 kilometers of the source location.

Comment 33, Patricia Anne Martin:
I asked the question regarding if Dell will shut down their generators when they meet their allocated hours or fuel usage and Sarah Gibson said "yes". What authority does Sarah Gibson have to guarantee that operations will cease when these limits are met? Please provide us with a letter from the company stating that if there is an extended power outage that they will not continue to run past their fuel and hour allocations.

Ecology Response:
Sarah Gibson is a project manager for the Dell Data Center in Quincy, and she represented Dell during the public hearing on July 13, 2011. Her response was made as a representative of the company, and it is unknown whether Ms. Gibson will be further involved with proposed construction and operation the Dell Data Center. Ecology does not rely on the word of any single representative or officer of a company to guarantee compliance with applicable requirements. The proposed Notice of Construction approval order, if issued, will be a legally binding and enforceable document. Ecology does not intend to solicit further statements from Dell as to their intentions to comply with applicable Washington State laws, regulations, permits, orders, and requirements.

Comment 34, Patricia Anne Martin:
What obligation does Ecology have to notify and inform the citizens of Quincy that Dell is a "major source" taking a voluntary emissions reduction? I would like a copy of the Public Notice that includes this information.

Ecology Response:
Ecology does not believe that Dell is a "major source" of air pollution as defined at WAC 173-401-200(19). By design, Dell's potential to emit any regulated pollutant is less than the major source thresholds.

WAC 173-400-171 outlines when public notice is required. Ecology is required to provide public notice for several reasons. For the Dell permit, public notice was required because emissions of toxic and criteria air pollutants exceeded defined thresholds. Ecology deemed that there was significant public interest in the project; therefore, Ecology held a public hearing.

Comment 35, Patricia Anne Martin:
Ecology claims that they have to permit any facility that meets the standards. Please cite to the regulation or statute that requires approval, i.e., includes a shall or must directive.

Ecology Response:
The following statutory citations are provided to address this comment:

RCW 70.94.152(3) states:
"*If on the basis of plans, specifications, or other information required under this section, the department of ecology or board determines that the proposed new source will be in accord with this chapter, and the applicable rules and regulations adopted under this chapter, it* ***shall issue*** *an order of approval for the establishment of the new source or sources, which order may provide such conditions as are reasonably necessary to assure the maintenance of compliance with this chapter and the applicable rules and regulations adopted under this chapter. Every order of approval under this chapter must be reviewed prior to issuance by a professional engineer or staff under the supervision of a professional engineer in the employ of the department of ecology or board.*"

WAC 173-400-113 states:

"*The permitting authority that is reviewing an application to establish a new source or modification in an attainment or unclassifiable area* ***shall issue*** *an order of approval if it determines that the proposed project satisfies each of the following requirements*:

(1) The proposed new source or modification will comply with all applicable new source performance standards, national emission standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, emission standards adopted under chapter 70.94 RCW and, for sources regulated by an authority, the applicable emission standards of that authority.

(2) The proposed new source or modification will employ BACT for all pollutants not previously emitted or whose emissions would increase as a result of the new source or modification.

(3) Allowable emissions from the proposed new source or modification will not cause or contribute to a violation of any ambient air quality standard.

….

(5) If the proposed new source or the proposed modification will emit any toxic air pollutants regulated under chapter 173-460 WAC, then the source must meet all applicable requirements of that program."

Comment 36, Patricia Anne Martin:
Where in the regulations, including those adopted under the WA SIP, does it allow Ecology to permit multiple phases of a project to span an indeterminate period of time without another review at time of construction or installation of the generators? Please cite the regulation and statute. I understand this to be "circumvention" as defined under clean air regulations.

Ecology Response:
WAC 173-400-111(7)(c) allows for limited phased construction of a project. Approved phases of a project must commence construction no later than eighteen months after the approved dates in the final permit. The proposed Notice of Construction approval order contains dates of July 1, 2013 for phase 1 construction and January 1, 2017 for phase 2 and phase 3 constructions. Circumvention is a concept discussed in federal air quality regulations that apply to major sources, and refers to a project being permitted in parts to avoid triggering specific regulatory requirements. Dell permitted their entire project, and is phasing construction. Dell is not circumventing any regulatory requirements.

Comment 37, Patricia Anne Martin:
Dell's project has inordinately high stacks compared to other data centers. When asked about the stack height David Ogulei responded that Dell "wants to go that high to assure compliance." Federal Statute 42 USC 7423 allows for 2.5 times the height of the source – in this case a 10 ft. high locomotive – unless building downwash requires additional height. Any stack height in excess of what is necessary is a prohibited dispersion technique under the statute and regulation.

Ecology Response:
Dell raised their exhaust stacks in order to reduce modeled downwind impacts. The commenter is correct that under state and federal rules, applicants are forbidden from using "excess stack height" to meet ambient air quality standards. "Excess stack height" is defined in WAC 173-400-030(31) and WAC 173-400-200(2)(a) as "that portion of a stack which exceeds the greater of: Sixty-five meters, measured from the ground level elevation at the base of the stack; or Hg = H +1.5L."

"where Hg = "good engineering practice" (GEP) stack height, measured from the ground level elevation at the base of the stack; H = height of nearby structure(s) measured from the ground level elevation at the base of the stack; L = lesser dimension, height or projected width, of nearby structure(s), subject to the proviso below. "Nearby", as used in this subsection for purposes of applying the GEP formula means that distance up to five times the lesser of the height or the width dimension of a structure, but not greater than 0.8 kilometer (1/2 mile)."

The exhaust stacks proposed by Dell comply with regulatory stack height restrictions because they are less than 65 meters, and are also less than the GEP stack height, as calculated according to WAC 173-400-200 (2)(a)(ii). For Dell's project, the GEP stack height is well above 60 feet.

Also see response to Question 3.

Comment 38, Patricia Anne Martin:
As confirmed at the Public Hearing, there was no cost benefit analysis to the community as to health effects from Dell. Why was this not conducted?

Ecology Response:
Ecology's rules do not specifically require a cost benefit analysis with regard to health effects.

WAC 173-460-090 requires that a health impact assessment be completed by the applicant if projected emissions of one or more TAPs results in an impact greater than the ASIL. A health impact assessment quantifies risks to residents, workers, or other people who might be exposed to those pollutants subject to second tier review. The maximum increased risk to an individual is then compared to the threshold of what is acceptable under a second tier review.

Comment 39, Patricia Anne Martin:
David Ogulei mentioned that there is a problem complying with NO2. Would there be a problem complying with NO2 if each data center had been required to deal with NO2, NO or NOx when they first located in Quincy?

Ecology Response:

Challenges associated with complying with NO2 standards are a result of the new national ambient air quality standard (NAAQS) for NO2 that was promulgated in April, 2010. Before this standard became effective, demonstrating compliance with NO2 requirements was not a challenge. Yes, each data center located in Quincy was required to demonstrate compliance with all NAAQS and state toxics requirements. This included demonstrating compliance with the annual NO2 NAAQS, and the NO ASIL. NO2 was not a regulated toxic air pollutant prior to June 2009.

Comment 40, Patricia Anne Martin:
Who decided that there would be no "mitigation or offsets" required of the data centers in Quincy until the 100 cancers per million had been met? What role if any did the City of Quincy and/or Port play in this decision?

Ecology Response:
The cumulative risk goal is independent of the BACT decisions under WAC 173-460. This goal was established with the intent of preventing multiple new sources of diesel particulate from causing repeated incremental risks on the same individuals in Quincy. If a data center proponent's incremental risk would result in a cumulative risk greater than this goal, Ecology would explore all available options to mitigate background risk before the project can be approved. State law does not currently define an upper bound for acceptable cancer risk in any community in Washington.

Comment 41, Patricia Anne Martin:
If operational hours are exceeded can Ecology require filters or other controls later?

Ecology Response:
Ecology will require Dell to comply with all terms and conditions of the proposed final Notice of Construction approval order. If for any reason Dell is unable to comply with the emission limits and other conditions of operations, Ecology will use its statutory authority to enforce the Notice of Construction approval order. One possible remedy to reduce emissions or extend hours of operation could be to require emission control equipment to be installed on the engines.

Comment 42, Patricia Anne Martin:
What is Dell's environmental benefit to the state?

Ecology Response:
Dell was not required to show "environmental benefit to the state" since the proposed project is being reviewed under Washington Administrative Code 173-460-090, Second Tier Review. A finding of "greater environmental benefit" is only required under Third Tier Review, Washington Administrative Code 173-460-100(3)(c).

Comment 43, Patricia Anne Martin:
How much was Dell's tax incentive savings? What is the cost of the most stringent control that could have been used on Dell?

Ecology Response:
Dell's "tax incentive savings" is outside of the air quality review of the project, and is unknown to the Ecology AQP. The most stringent emission control option that was reviewed for the Dell project was a diesel particulate filter (DPF). Cost effectiveness measured in dollars per ton of diesel engine exhaust particulate matter removed was $1,541,088 per ton.

Comment 44, Patricia Anne Martin:
Why isn't Ecology advising incoming data centers about Quincy's participation in the National Children's Health Study? This is a potential liability for the incoming data centers that should be discussed with them.
http://www.nationalchildrensstudy.gov/Pages/default.aspx

Ecology Response:
Although Ecology bases emission standards on health and safety data, we are not a public health agency. We are just not aware of all the studies, reports, requirements, or causations of health related issues. Ecology is not the only agency with responsibilities pertaining to the Dell Data Center. This question should be directed to the local or state health departments, or to local government. These organizations are more able to address community specific health issues than Ecology. The review conducted under the State Environmental Policy Act prior to local government approval may be the most appropriate time to inform the applicants of community specific health issues.

Comment 45, Patricia Anne Martin:
While Dell is ramping up to 28 generators which governs their compliance, the fuel allocation or the hours of operation per engine?

Ecology Response:
Dell has limits on both hours of operation and fuel consumption. Each engine is restricted to no more than between 50.75 to 54.75 hours of operation per year per engine (rolling 36 month average). Dell must also keep monthly and annual records regarding the duration, purpose and load of each engine's operation for compliance purposes. The annual fuel limit of 175,013 gallons per year applies to the full build out at Dell.

Comment 46, Patricia Anne Martin:
Was commissioning of the engines included in the modeling, including for determining the ASIL?

Ecology Response:

Yes. Page 18 of NOC Support Document includes this discussion: "The emission calculations in this permit application include first-year engine commissioning for each set of newly-delivered generators. The requested facility-wide limits include an estimate of 8 hours per year (4 hours per year for redundant generators). This is adequate to cover the first-year commissioning runs. Therefore, Dell does not request an exemption for the first-year commissioning tests."

Comment 47, Patricia Anne Martin:
What are the sources of Clint Bowman's regional background levels? What are the sources of Clint Bowman's local background levels? Why wasn't Dell required to model these numbers themselves by using the available data? Was engine commissioning exempted from the NAAQS?

Ecology Response:
A combination of observed and Air Indicator Report for Public Awareness and Community Tracking (AIRPACT) modeled concentrations were used to define the regional background concentrations of NO2 and PM2.5. The local background levels were determined by Ecology using the same meteorology used in the Dell analysis and included the local data center emissions and emissions from Celite and Con Agra.

Engine commissioning was considered when determining compliance with the NO2 NAAQS (page 37 of NOC Support Document). The emission rates of PM2.5 are so low that they are not significant.

Comment 48, Patricia Anne Martin:
What is the average ozone level recorded by the monitor at the Quincy Airport? Whose monitor is it? Why was it placed at the Quincy Airport?

Ecology Response:
Ecology sited the portable (non-Federal Reference Method) ozone monitor at the Quincy Airport to evaluate the performance of the AIRPACT air quality forecasts. The monitor was only operated for between 4 and 5 months during the summer of 2010, and did not provide enough data to calculate an annual average. However, the monitor averaged about 30 ppb during the time it operated, which is considered the time of year when ozone values would be the highest. The Quincy Airport monitoring correlated well with the AIRPACT forecasts.

Comment 49, Patricia Anne Martin:
I did not see any information on the contribution of NOx breakdown to increasing ozone levels. Why not? If NO2 compliance is an issue doesn't that mean that ambient levels of ozone are also high? Please provide supporting documentation for use of 40 ppb for background ozone.

Ecology Response:

The figure below shows the ratio of the AIRPACT predicted ozone concentration to the observed concentration for the 2010 ozone season. It can be seen that the AIRPACT model reproduces the daytime ozone concentrations very well—the median ratio of the modeled to observed concentration is very close to 1.0 from 8:00 am to 5:00 pm. At other times the AIRPACT model predicts higher concentrations. Based on this performance evaluation, Ecology is confident that the concentrations shown on the map of Washington in the second figure below represent good, conservative estimates of regional ozone concentrations. Because the portable monitor was sited for only the four-and-a-half month ozone season, it cannot be used to estimate the annual concentrations required for dispersion modeling.

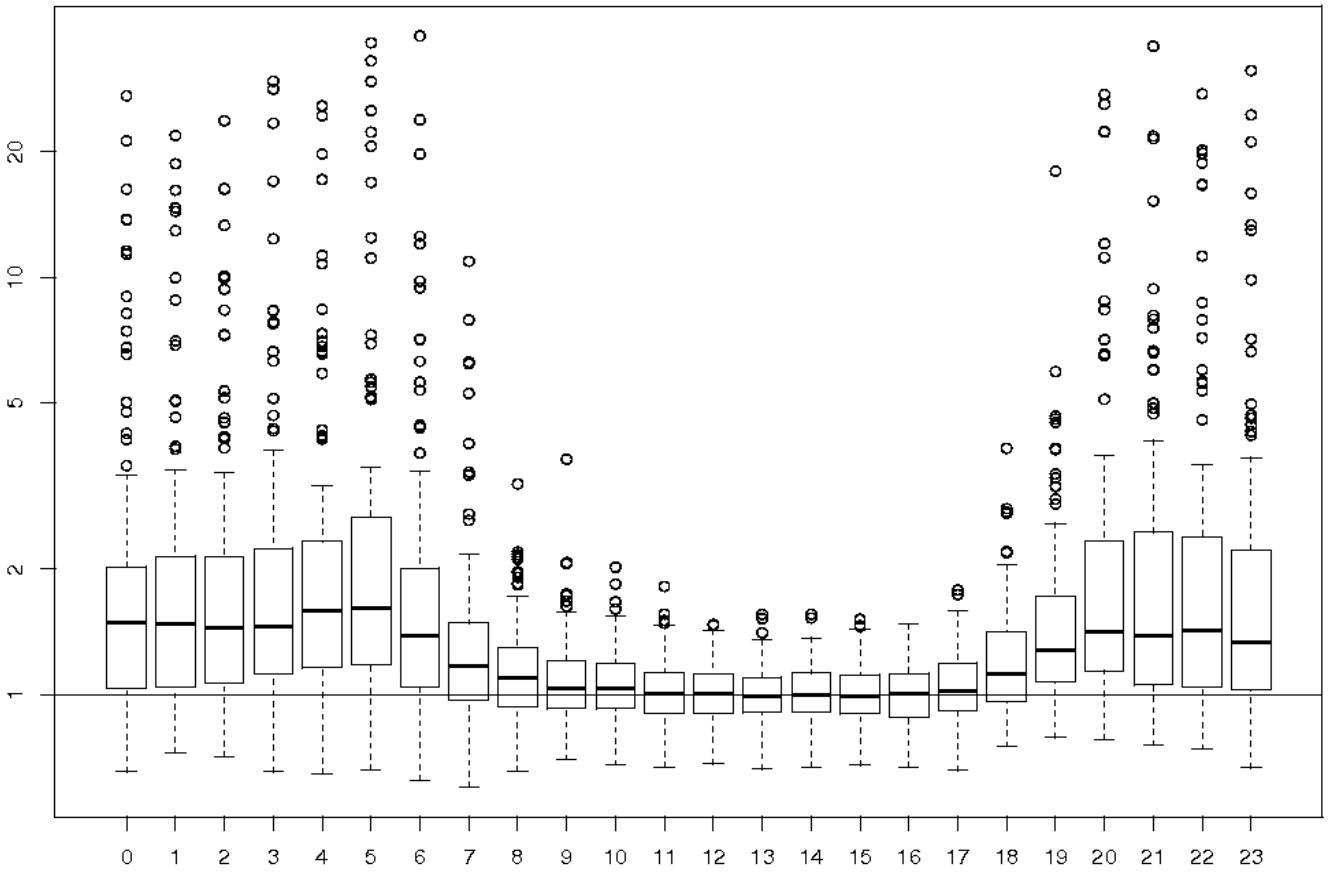


Figure 1.

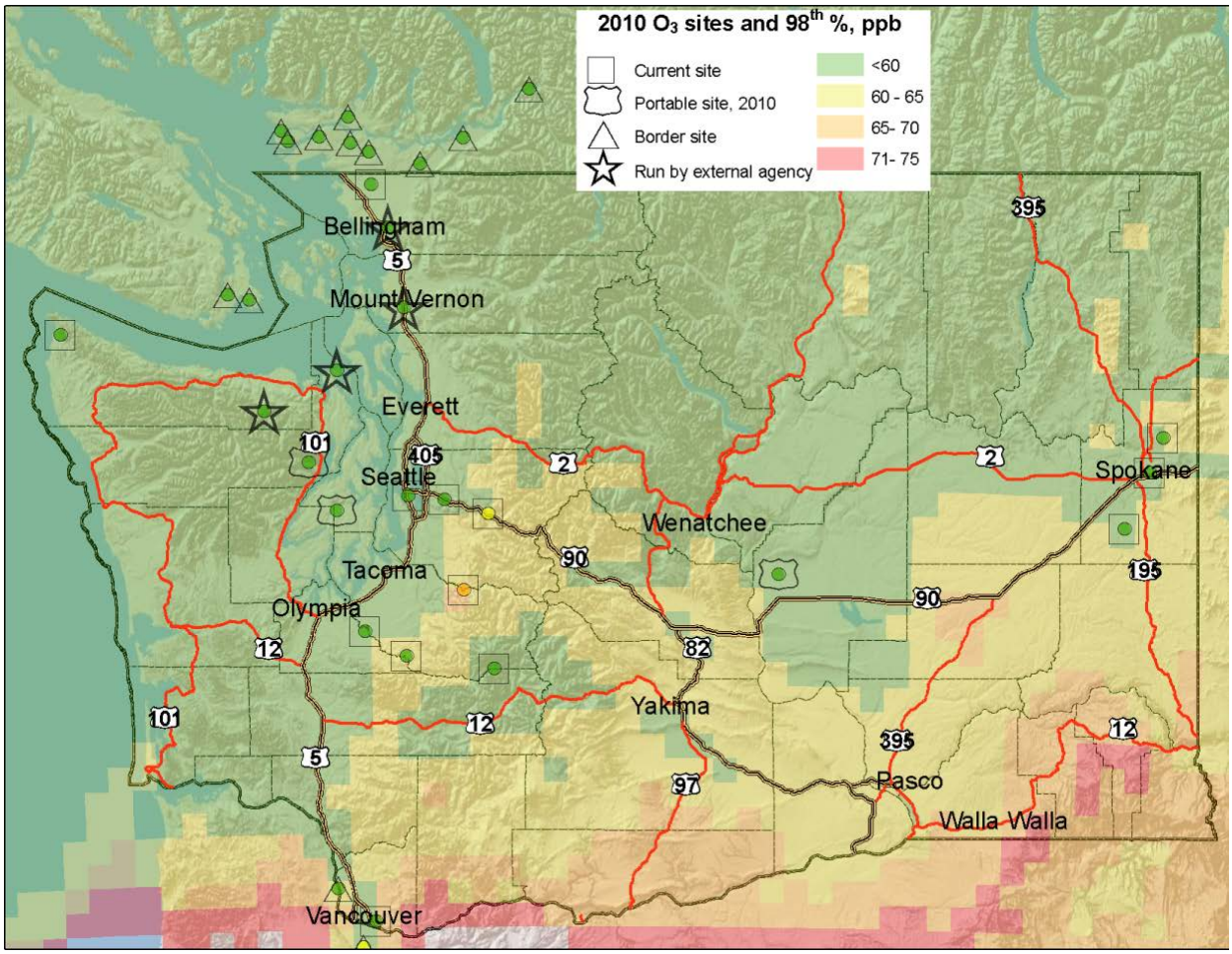


Figure 2.

Comment 50, Patricia Anne Martin:
Why isn't there information on secondary formation of PM2.5 in Dell's NOC Support Document?
Ecology Response:
The Quincy area is unclassifiable/attainment for PM2.5 and there is no requirement to evaluate secondary formation from a source with Dell's emissions.

Comment 51, Patricia Anne Martin:
Why haven't incoming data centers been required to control for fugitive dust?

Ecology Response:
It would be almost impossible for any regulatory agency to list all applicable regulatory requirements for any project or action. However, just because an applicable requirement is not stated in a permit or approval does not mean that it is not applicable. Dell, as well as any other company responsible for construction work in Washington State, must control fugitive emissions under the provisions of Washington Administrative Code 173-400-040.

Comment 52, Patricia Anne Martin:

If NO2 compliance is difficult why isn't real time monitoring being used?

Ecology Response:
Dell demonstrated through modeling that their project would not cause or contribute to a violation of the NO2 NAAQS. Dell assumed their worst case emissions when running the models. Accordingly, we did not see justification to require expensive real-time emissions monitoring.

Comment 53, Patricia Anne Martin:
What consideration is given to emission factors changing over time with aging engines? What consideration is given to increasing problems with power transmission lines, etc. and its affect on the need for emergency power generation? What consideration is given to the climatic changes that will occur over time due to climate change? These issues are discussed in the Sabey Second Tier TSD, but not in Dell's. Why not?

Ecology Response:
Dell applied both engine-specific and EPA's Tier II emission factors to describe the emission rates from the diesel engines. The most conservative (i.e., highest) emission rate was used in dispersion modeling to ensure that ambient impacts are not underestimate. For example, at high loads, Dell used Tier II emission rate (0.2 g/kw-hr) instead of the engine-specific emission rate supplied by Caterpillar.

On the other-hand, Dell used engine-specific emission factors from Caterpillar for lower loads instead of the Tier II emission rate. While the exact amount of diesel particulate emitted from Dell's diesel-powered generators over time is uncertain, the use of the most conservative (i.e., highest) emission estimate ensures that we consider a higher rate of emissions over time.

Comment 54, Patricia Anne Martin:
If Dell or any of the other data centers needed to use their emergency generators more than the current permit could they come back to Ecology and ask for additional hours?

Ecology Response:
The direct answer to this question is "yes" since Ecology has no control over the requests any company can submit. However, Ecology is under no obligation to approve any request unless all regulatory requirements are meet. Washington Administrative Code 173-400-111(8) allows for conditional changes to conditions or revisions to orders of approval. If emissions increased above regulatory thresholds in Chapters 173-400 or 173-460 WAC, new source review would be required. This would include additional modeling and review of best available control technology at least as stringent as was conducted for the initial approval.

Comment 55, Patricia Anne Martin:

Rain flaps can affect the velocity at which emissions are released. Please provide documentation that this has been accounted for during modeling.

Ecology Response:
Engine exhaust stack vent flow restrictions can affect the stack velocity, although plume lift is more temperature dependant. The engine exhaust stack vents used on the Dell project do not have any flow restrictions or rain flaps. Engine exhaust gas temperature and flow velocity is provided by the manufacturer, and submitted by the applicant in the Notice of Construction application. That information from the manufacturer is used in the modeling, and reflects the actual configuration of the engine exhaust stack vent.

Comment 56, Patricia Anne Martin:
How many of the public notices, articles or other methods to advertise the Public Hearing included the word "risk" or similar words or indicated that that a danger existed from the incoming Dell data center?

Ecology Response:
The Ecology AQP took the issue of community risk very seriously, and adopted a community wide approach to risk for the data center projects. We assigned an Ecology risk communicator to help us better explain risk to the community from the data center projects. However, locating all "risk" language in our transcripts and documents falls outside our statutory obligations for identifying public records (WAC 44-14-04002).

Comment 57, Patricia Anne Martin:
What's the penalty for violating the terms and conditions of the permit? Other than a fine payable to the state, what do the citizen's of Quincy get other than more air pollution?

Ecology Response:
There is no pre-scheduled penalty assessment matrix to address potential violation of each requirement or condition contained in a Notice of Construction Approval Order. The Ecology Air Quality Program has been authorized under Chapter 70.94 Revised Code of Washington, Washington Clean Air Act to assess penalties in response to violation of both regulations and orders. The purpose of Ecology enforcement is to encourage behavior changes that result in compliance with applicable requirements. The residents of Quincy are provided protection under the laws and regulations that require Ecology approval of air pollution sources. Compliance assurance activities are designed to verify compliance with those laws and regulations, and provide continuous protection to Quincy residents.

Comment 58, Patricia Anne Martin:
When Dell has an unintended release who must they notify and when?

Ecology Response:
Generator engine operations at the Quincy Data Centers are primarily pre-scheduled, and the only operating scenario that could be described as unintentional would be power disruption. Approval Condition 8.4 contained in the Preliminary Determination developed from the Dell Notice of Construction application contains requirements that Dell notify Ecology in writing within 24 hours of any generator engine operation resulting from power disruption of greater than 60 minutes. These generator engine runtimes must also be reported annually by January 31 of each year as required in Approval Condition 8.2.

Comment 59, Patricia Anne Martin:
Since Dell's stacks are so high, how much further will their plume travel? What interactions will it have with other elevated plumes such as Celite's and Con Agra's? Why isn't there a map showing the dispersion over the resident on the northside of the tracks?

Ecology Response:
The one-hour averaging period of the NO2 standard decreases the likelihood of any significant interaction among the plumes of Microsoft, Dell, Celite, and Con Agra. The higher stacks at Dell will reduce the frequency that the plume behavior will be dominated by building downwash and reduce the ground-level concentrations. The farther a plume travels before dispersing down to ground level, the lower the maximum ground-level concentration.

Comment 60, Patricia Anne Martin:
The following should be conditions of this permit:

1. "Daily engine use logs, fuel consumption, meter readings and any other information that would be needed to establish the actual operation of the engines shall be made available to the public upon request and published online"

2. Nighttime operations are forbidden under the permit.

3. Dell will install an air quality monitor.

Ecology Response:
Items 1 and 2 that you recommend above are in the draft Notice of Construction Approval Order. Approval Conditions 8 and 9 require recordkeeping and reporting that include the information you recommend in item 1. Approval Condition 3.4 states, "To mitigate engine emission impacts, the Dell Data Center engines will perform all maintenance and testing, scheduled bypass operations, and load testing during daylight hours", which addresses item 2. At this time Ecology has made no decision on air quality monitoring in Quincy.

Comment 61, Debbie & Mark Koehnen, 11443 Road P NW, Quincy, WA 98848:

I have a question about the emission information presented at the meeting. Dell's emissions were reported at 0.062, below the limit of 5. With the community approach, we were never given the combined totals of emissions. What are the combined emissions of Dell & Microsoft? How about the combined emissions of all the data centers? And the total overall emissions in our community?

Ecology Response:
Page 22 of the Second Tier Review technical support document presents the cumulative concentrations near the proposed Dell Data Center. (See Appendix F.)

The maximum estimated cumulative diesel particulate concentration at residentially-zoned area near Dell is about 0.168 μg/m3. This concentration is about 30 times less than reference concentration (RfC) of 5 μg/m3 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…"

Based on this analysis, non-cancer health effects from long-term exposure to diesel particulate are not likely to occur.

It's important to note that this analysis assumes that each data center will operate to the fullest extent allowed in their permit each and every year forever. This assumption likely overestimates the amount of diesel particulate that data centers will emit over time, but Ecology made this assumption to ensure that we do not underestimate risk.

Comment 62, Debbie & Mark Koehnen:
Your website (DOE Air Quality > Commercial Industrial Air Permits > Tier II Analysis Information > Data Center projects) clearly states construction cannot begin unless the permits have been approved.

"All new projects must obtain approval from Ecology before construction of a project begins."

Construction on the Dell site began before the public hearing. Why is this being allowed? To beat the July 1 deadline for the tax exemption? The system is set up to protect the stakeholders, and every time an exception is made, it undermines the validity of the system.

Ecology Response:
Under state rules governing new sources of air pollution (Chapter 173-400 WAC), no new source of air pollution that is required to file a notice of construction

application under WAC 173-400-110 shall "begin actual construction" of the proposed new source or modification prior to issuance of an approval order. WAC 173-400-030(11) defines construction as the "initiation of physical on-site construction activities on an emission unit which are of a permanent nature." To Ecology's knowledge, Dell has not begun any construction on the emission units, in this case, the diesel generators. The Ecology Air Quality Program has no authority to limit other construction activities unrelated to the emission units.

Comment 63, Debbie & Mark Koehnen:
The DOE set accepted risk levels for DEEP at 10 per million. Yet you found the risk for adding Dell to be 49 in one area, (page 27 & 28) above your level for approval. This should trigger a tier 3 review but you are still allowing this project to continue without any further modifications to the plan. (page 9 - 3.1 paragraph 4, page 15-3.6.b). With only 2 plants supposedly adding emissions, their impact should only be 20 combined.

Ecology Response:
Ecology permitted the construction of three data centers (Microsoft, Yahoo!, and Intuit) in Quincy, WA between 2006 and 2008. In total, these three data centers were permitted to operate 46 diesel-powered generators ranging from 2 to 2.5 MW generating capacity each. When Ecology permitted these facilities, diesel engine exhaust particulate was not regulated as a toxic air pollutant under Chapter 173-460 WAC. As a result, the existing data center permits probably allowed more hours of operation (and diesel fuel use) than would likely be permitted under the revised toxics rule in effect since June 2009.

Cancer risk from both the Microsoft and the Yahoo! data centers were re-evaluated in 2010 during their respective expansion projects. These projects were evaluated under third tier review in part because the existing permit allowed many hours of operation. Through this process, potential cancer risk was significantly reduced due to operating reductions agreed to by Microsoft and Yahoo.

It is easy to confuse cumulative cancer risk (from all sources in Quincy) with individual project cancer risk. Dell did not trigger Third Tier Review because no toxic air pollutant (diesel particulate being the pollutant of most concern) from that project triggered the individual project Third Tier threshold contained in Washington Administrative Code 173-460-100 of 10 cancers per million.

The Second Tier review that we required for the Dell project included the same community-wide look at health impacts that we required for Microsoft and Yahoo!. It was just as thorough and just as in-depth as the Third Tier review we required for Microsoft's Columbia Data Center and the Yahoo! Data Center.

The difference is that Microsoft and Yahoo! had existing permits for existing diesel-powered backup generators. By going to a Third Tier review with those companies, we were able to work with them to modify their permit limits and significantly lower the amount of time they can operate the backup generators and the amount of diesel fuel they can burn. Those were major wins for air quality in the Quincy area.

The Dell Notice of Construction application contained very limited engine operating runtimes that resulted in decreased levels of emissions, and the project did not trigger Third Tier review.

Comment 64, Debbie & Mark Koehnen:
Were these documents available in Spanish? We have a large Hispanic population. While I speak Spanish, I do not have enough technical language specific to this type of work to adequately translate the information to the people who will be affected by these projects. Many parents in our area rely on their children for translation, and those children wouldn't know the technical terms either. Since the Hispanic population is actually in the majority by leaps and bounds, it seems like the validity of the community responses might not be valid, on this project or the previous permits, and a small minority of English speaking members may be over-represented as a result.

Ecology Response:
The documents themselves were not available in Spanish. Ecology advertised the opportunity for individuals to make comments on the proposal in both English and in Spanish. Ecology also had interpretive services available at the hearing for Spanish speakers. Ecology has had no requests to have the documents translated.

Comment 65, Debbie & Mark Koehnen:
I liked reading about the top-down model you apply to the process, but I am curious as to how you come up with your figures when calculating costs? How were those figures derived? When were they derived? Was inflation taken into account? The additional cost of adding filters is insignificant with regards to the cost of the entire project. Purchasing generators is a large expense, adding a filter minimal and much cheaper than adding the filters later, if that is even possible.

Ecology Response:
The EPA Office of Air Quality Planning and Standards developed a Control Cost Manual that was based on recognized engineering cost estimate procedures. The Control Cost Manual has been considered the definitive procedure for calculating the cost of air pollution controls for several decades. Cost estimates are based on capital cost of the equipment as well as annualized operating and maintenance costs. Inflation is not considered in the cost calculations although the forward cost of money is factored into the equations. Cost estimates are normally, as in the case of the Dell project, conducted by the applicant, and verified by our permit writers.

Cost analysis is necessary for the top-down best available control technology (BACT) evaluation, and is submitted with the Notice of Construction application.

The cost estimates are used to calculate the cost of emission control equipment, and is stated in dollars per ton of pollutant controlled over the life of the equipment. The AQP uses standard cost per ton triggers to determine if the cost of emission control equipment is justified in the BACT analysis. However, in no case can an emission unit exceed the state emission standards no matter how much it costs to control emissions. You are correct in that usually, the cost to retro-fit an emission unit with air pollution controls is much more costly that purchasing original equipment with air pollution controls.

Comment 66, Debbie & Mark Koehnen:
You can tell a lot about a company by how it treats its employees. It seems like these computer companies would be worrying about what's happening inside the fence line as well. Those fall-out figures don't comply with safe levels. How do these exposures fit in with workers' rights in our state?

Ecology Response:
The Washington Department of Labor & Industries is responsible of worker safety oversight in Washington. They have a list of permissible exposure levels that is designed to ensure worker safety. Those permissible exposure levels are generally much higher than the pollutant levels estimated to impact Quincy from data centers. Labor & Industries does not currently have a permissible exposure limit specific to diesel particulate. However, they use a permissible exposure limit for respirable particulate matter that is 5 mg/m3 (5,000 μg/m3) over a 8-hour time-weighted average concentration.

Comment 67, Debbie & Mark Koehnen:
When you compare the population and pollution levels of Seattle (only counting Seattle, not all the surrounding towns, or even Tacoma), using a map shown of the State of the Puget Sound area at the permit hearing, emission levels were 700-800 and the population supporting that level from the 2010 census is 582,454. Yet when you compare Quincy, the city population (not including the surrounding area) is only 6,156 a much smaller population, and yet you want us to support an emission level of 100. Less people, less industry and yet you want us to suffer an emission level that's only an 8th of that in Seattle? The ratios don't add up and aren't equitable. We want to protect our area & our quality of life, not move closer to the levels of a highly populated & industrialized area like Seattle. I feel like we are trying to play catch up and are behind in our efforts to control these emissions. The tier 3 permits of Microsoft & Yahoo should never have been allowed, and seem to be setting precedent for these smaller tier 2 permits. If Microsoft, Yahoo, Dell, Sabey & Intuit truly want to be a part of our community, they should be helping to protect us, not cutting corners.

Ecology Response:
The intent of the community wide approach was not to "play catch up" with more urbanized locations of the State, but to try to limit the cumulative impact of several new proposed sources of emissions. Ecology's goal in Quincy is to prevent relatively high exposures to diesel particulate, such as those experienced in more urban areas. Please realize that EPA's National Air Toxics Assessment estimates that some areas of the Seattle area are impacted by diesel particulate at levels that would increase a continuously exposed population's lifetime cancer risk by as much as 2,700 cancer cases per million residents.

Ecology was never part of the discussion to encourage companies to build data centers in Quincy. The Ecology Air Quality Program's has responsibility to ensure that the data centers comply with all applicable air quality requirements, and to ensure that the residents of Quincy are not exposed to unacceptable impacts.

Comment 68, Debbie & Mark Koehnen:
Do any of those people in favor of this permit live in the dispersion paths? Do they have children at Mountain View?

Ecology Response:
Ecology does not have comprehensive and specific information on who in the community supports the data center projects, where those residents reside, and whether they have children.

Comment 69, Debbie & Mark Koehnen:
At the Dell permit meeting in Quincy, David explained the permit process to us. Could you tell me if I understand this correctly:
1. Our first safe guard is our city planners. They should be looking out for safety concerns when they approve sites for projects with hazardous emissions, since they know more about the community and where residential areas and schools are located.
2. If the proposed project raises possible health concerns, the city planners can deny it, relocate it to a less populated area or approve it with conditions such as asking for a higher standard level of protection.
3. Once the city has approved the project, it moves onto the DOE for an evaluation, where it is required to only meet the minimum standards, even if the location was poorly chosen by the city.

Ecology Response:
Local city and county government determine the zoning requirements under their comprehensive plans. These zones delineate where industrial, residential, business, and agricultural activities can occur. When a project is proposed, and any agency or local government must issue any type of approval, the State Environmental Policy Act (SEPA) review process is required. SEPA review provides an opportunity for state

and local agencies, as well as area residents, to comment on environmental impacts that may result from a proposed project. The local government usually has the responsibility as SEPA "lead agency" and coordinates the review process. Environmental impacts caused by the proposed projects can be mitigated by conditions placed in permits and approvals.

It is misleading to characterize the environmental protections in Washington State as minimum standards. Washington has some of the most protective air quality regulations in the country, and can in no way be considered "minimal" in any sense. A company must meet our stringent air quality standards before they can build and/or operate any air emission source. Compliance with state environmental requirements is a cost of doing business in Washington State. If any proposed project cannot meet the state air quality requirements, they will not be allowed to either build or operate their project.

Comment 70, Debbie & Mark Koehnen:
If I can't trust the companies to make more of an effort, how can I trust them to follow the guidelines and the hours set forth in the permit? How will we know if the guidelines are being followed?

Ecology Response:
Dell will be required to maintain continuous operational records and periodically submit operational information to Ecology for review. The information submitted to Ecology will be used with operational data collected and/or reviewed during annual inspections to determine whether Dell is in compliance with the requirements contained in the final Notice of Construction Approval Order. The information that Dell is required to maintain that is submitted to, or collected by Ecology, is available to the public, and is sufficient to determine Dell's compliance with the Notice of Construction Approval Order. The Ecology Air Quality Program is authorized under Chapter 70.94 Revised Code of Washington, Washington Clean Air Act to assess penalties in response to violation of both regulations and orders. The purpose of Ecology enforcement is to encourage behavior changes that result in compliance with applicable requirements such as the Notice of Construction Approval Order that Dell has requested.

III. Special Response Section

This portion of Ms. Dal Porto's written testimony is difficult to incorporate into the comment/response portion of the Responsiveness Summary. It does not contain specific questions to respond to, yet expresses many concerns that we would like to address. Therefore, we have made a separate section for this response.

From: Danna Dal Porto
16651 Road 3 NW
Quincy, WA 98848

I have followed the data center construction in Quincy since 2010. The more I learn the more I am convinced that the correct course of action to protect my community is for some kind of device to be placed on the diesel emission stacks. At this point, I believe that Ecology has determined that no control devices will be required no matter how compelling the evidence is to require controls. Several different Ecology engineers, experts in this field, have recommended controls for other Quincy data centers and each and every time the experts have been ignored. A supposed "community wide" approach has been instituted to provide community protection. I do not believe that this approach is going to protect Quincy. I believe the "community wide "approach is going to allow construction of data centers until a huge number of cancers are permitted with no concern for the more dangerous emissions that cause cardiopulmonary and respiratory disease. These decisions are being made as if the town of Quincy were a science experiment instead of a community of hard-working residents who did not ask to be invaded by highly technical industry. The trade-off in local jobs has not happened. In this instance, the industry gets the profits while we get the cancer, strokes and heart attacks.

Ecology has a double standard. The Olympia data center has emission controls and the Titan data center in Moses Lake has emission controls. The location of the Quincy data centers directly affects more individuals in their homes and at work that either one of these other data centers. Ecology's answer when asked about emission controls is that controls are not cost effective. At the same time, Ecology has exempted all of the hours of initialization and pre-operational testing from the permit limitations. Hours and hours of run time (without controls) is being allowed to spill toxic emissions over Quincy. Then Ecology says that the diesel engines only operate for one hour a month. That is not true if one knows that hard facts about the ins-and-outs of the permitting process. The permitting process is designed to favor industry at the expense of local residents. To have 141 diesel generators, without controls, in one small area is not ethical and I do not care how much the controls cost; controls are necessary for Quincy to have any kind of quality of life.

Ecology is moving ahead with the Quincy data centers because there is no one to stop them. The Governor, Director of Ecology, State legislators and Quincy City

Administrators and Council members have all agreed that building data centers in Quincy is the best action for the State of Washington. These individuals have set a price on the health of Quincy residents and Quincy children and that price is the taxes collected from these industries.

I want the record to show that I object to the construction of data centers in Quincy without benefit of diesel emissions controls as an unethical and unprofessional act by the Washington State Department of Ecology. Ecology has traded emission controls for reduced fuel consumption, adjusted engine load and reduced run times. Ecology states that this is an environmental benefit for the State of Washington and that reducing all of these functions is the "best available control technology" (tBACT). I disagree with their conclusions and believe that control devices are the only way to have these industries in Quincy and have the industries operate safely for everyone.

Ecology Air Quality Program Response:

We appreciate your point of view about the risks from the data centers and we applaud you for the time and energy devoted to protecting your community. Although it is very unlikely that some industries will ever have zero emissions, we work with every project proponent to make sure that they are following the air quality laws and regulations that apply in the state of Washington. The Washington Clean Air Act requires us to protect public health while still allowing economic development. Ecology's Air Quality Program accomplishes this mandate by implementing state regulations that are enacted through a comprehensive public involvement process.

Some of your concerns appear to be targeted at the adequacy of existing state regulations governing new sources of air emissions. Such concerns can only be addressed through rulemaking. We strongly encourage you to participate in future rulemakings to ensure that your concerns are considered. Never-the-less, if you asked industries that work in Washington or national air quality advocacy organizations about the stringency of state air quality regulations you will likely hear that our permitting requirements are among the most stringent in the nation. For example, the level of scrutiny Ecology requires for emergency generators locating in our jurisdiction is above and beyond what is required by most agencies, including some local air agencies within Washington! In the case of the data centers in Quincy, our review involves an extensive investigation into the potential health effects of diesel particulate matter and nitrogen dioxide in diesel engine exhaust. Our review not only focuses on the proposed projects themselves, but also on other sources of those pollutants within the Quincy area.

We recognize your frustration that Ecology is not mandating the use of add-on controls to reduce emissions from the proposed emergency generators. For the Quincy data center projects, the determination of whether or not add-on controls are needed for each project is determined at two steps in the review process: during review of the Notice of Construction (NOC) application in accordance with WAC 173-400-110 (i.e.,

Best Available Control Technology (BACT) determination), and during review of toxic air pollutant emissions under Chapter 173-460 WAC (i.e., mitigations). Unfortunately, Ecology's authority to require add-on controls is limited to what is codified in state law and regulations. We are not authorized to over-step our authority by mandating more than what is required by state requirements. Ecology's role is that of a "reviewer" of, and "decision maker" for, proposed projects. The primary responsibility for designing and proposing a project, including pollution controls, rests on the applicant. Ecology then reviews the proposal to determine whether it meets all applicable state requirements. If it does, we are obligated to approve the project.

Under state rules (WAC 173-400-113), Ecology "shall issue an order of approval if it determines that the proposed project satisfies each of the following requirements:" [1]

1. "The proposed new source will comply with all applicable new source performance standards, national emission standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, emission standards adopted under chapter 70.94 RCW and, for sources regulated by an authority, the applicable emission standards of that authority."

2. "The proposed new source will employ BACT for all pollutants not previously emitted or whose emissions would increase as a result of the new source."

3. "Allowable emissions from the proposed new source will not cause or contribute to a violation of any ambient air quality standard."

4. "If the proposed new source will emit any toxic air pollutants regulated under chapter 173-460 WAC, then the source must meet all applicable requirements of that program."

You question why BACT for Dell's generators, as required by WAC 173-400-113(2) and WAC 173-460-060(2), was not determined to be add-on control technology, such as diesel oxidation catalysts (DOCs). As you may know, the requirement to install BACT does not imply that add-on control technology is required for each source. By definition, BACT:

> "*means an emission limitation based on the maximum degree of reduction for each air pollutant …, 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*

1 This is an abbreviated list to emphasize those requirements that are applicable to Dell's project. See WAC 173-400-113 for other requirements.

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..." See WAC 173-400-030(12).

Best available control technology (BACT) is a case-by-case emission limitation. This emission limitation can often be achieved through a variety of ways such as 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 pollutant subject to BACT.

Under state regulations and Air Quality Program guidance, the process for determining the appropriate emission limitation such as BACT for any specific project follows a procedure called a "top-down" analysis. The top-down analysis is currently required by federal EPA regulations for all large (major) sources that are subject to federal permitting requirements. Although the proposed Dell Data Center does not qualify as a major (large) stationary source that is subject to federal pre-construction permitting requirements[2], Ecology uses the top-down process when determining BACT for minor air pollution sources. You can find details about the top-down procedure at: http://www.epa.gov/ttn/nsr/gen/wkshpman.pdf (go to Page B.5)

The top-down analysis involves the identification of all available control technologies for each pollutant subject to BACT, it eliminates technically infeasible control options, and ranks feasible options. The top-down procedure involves ranking the feasible control technology options by considering the following information (see Pages B.7 & B.8):

- Control efficiencies (percent pollutant removed);
- Expected emission rate (tons per year, pounds per hour);
- Expected emissions reduction (tons per year);
- Economic impacts (cost effectiveness);
- Environmental impacts (includes any significant or unusual other media impacts (e.g., water or solid waste), and, at a minimum, the impact of each control alternative on emissions of toxic or hazardous air contaminants);
- Energy impacts.

After the available and technically feasible control technology options have been identified, the applicant then considers energy, environmental, and economic impacts to arrive at the final level of control which is expressed as an emissions limit. For each option the applicant is responsible for presenting an objective evaluation of each impact. However, "[an] applicant proposing the top control alternative need not

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2 These requirements are called "Prevention of Significant Deterioration (PSD)" requirements. See 40 CFR 52.21 and WAC 173-400-720.

provide cost and other detailed information in regard to other control options. In such cases the applicant should document that the control option chosen is, indeed, the top, and review for collateral environmental impacts."[3]

Dell submitted a technical analysis demonstrating to Ecology's satisfaction that the majority of control technologies were neither available nor technically feasible for the proposed emergency generators. In proposing BACT for their project, Dell considered environmental and economic impacts of the technically-feasible technologies. For diesel particulate, Dell and Ecology determined that the only feasible and demonstrated control options were diesel particulate filters (DPFs) and diesel oxidation catalysts (DOCs). Of these technologies, diesel particulate filters have been demonstrated to be the most effective at reducing diesel particulate emissions. On the contrary, the effectiveness of DOCs at reducing diesel particulate from diesel engines is not fully understood. Available data indicate that a reduction in diesel particulate of no more than 25-30% can be achieved by DOCs. The use of diesel particulate filters or diesel oxidation catalysts in emergency generators is very limited due to their economic and technical feasibility. Despite our reservations with the effectiveness of DOCs, Ecology asked Dell to justify elimination of DPFs and DOCs as BACT based on energy, environmental and economic factors.

Like the commenter, Ecology recognized that the Department of Information Services (DIS) in Olympia, WA, and the Titan Data Center in Moses Lake, WA, have been required to install DOCs to meet the emission limits in their permits. We know of no similar situations where emergency generators were required to install and operate DPFs in order to meet BACT emission limits.

Ultimately, Dell was able to justify that neither diesel particulate filters nor DOCs were economically justifiable for meeting BACT emission limits for their specific emergency generators. While comparison with other similar sources is critical in the top-down analysis, source-specific circumstances may be used to rule out a specific method of control. The following statements are taken from EPA's guidance document[4] regarding BACT:

> "*The determination that a control alternative [is] inappropriate involves a demonstration that circumstances exist at the source which distinguish it from*

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3 New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting. Draft October 1990, Chapter B. http://www.epa.gov/ttn/nsr/gen/wkshpman.pdf

4New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting. Draft October 1990, Chapter B. http://www.epa.gov/ttn/nsr/gen/wkshpman.pdf

other sources where the control alternative may have been required previously, or that argue against the transfer of technology or application of new technology. Alternately, where a control technique has been applied to only one or a very limited number of sources, the applicant can identify those characteristic(s) unique to those sources that may have made the application of the control appropriate in those case(s) but not for the source under consideration. In showing unusual circumstances, objective factors dealing with the control technology and its application should be the focus of the consideration. The specifics of the situation will determine to what extent an appropriate demonstration has been made regarding the elimination of the more effective alternative(s) as BACT."

"*In the economical impacts analysis,* ***primary consideration should be given to quantifying the cost of control and not the economic situation of the individual source.*** *Consequently, applicants generally should not propose elimination of control alternatives on the basis of economic parameters that provide an indication of the affordability of a control alternative relative to the source*." *…To justify elimination of an alternative on these grounds, the applicant should demonstrate to the satisfaction of the permitting agency that costs of pollutant removal (e.g., dollars per total ton removed) for the control alternative are disproportionately high when compared to the cost of control for the pollutant in recent BACT determinations. Specifically, the applicant should document that the cost to the applicant of the control alternative is significantly beyond the range of recent costs normally associated with BACT for the type of facility (or BACT control costs in general) for the pollutant*. [Emphasis added.]

Therefore, as allowed by both federal and state air quality guidance, we reviewed source-specific factors and determined that there were unusual circumstances in both the DIS and Titan projects that are not replicated in the Dell project. For example, the Titan Data Center needed additional emissions reductions so that they could demonstrate compliance with the 1-hour National Ambient Air Quality Standard (NAAQS) for nitrogen dioxide (NO_2).

DIS and the Olympic Region Clean Air Agency (ORCAA) performed an economic feasibility analysis for the use of DOCs and DPFs in the emergency generators proposed by DIS.[5] ORCAA and DIS concluded that the cost effectiveness of installing and operating DOCs would be about $5000 per ton of the sum of diesel particulate, carbon monoxide and volatile organic compounds reduced. ORCAA determined that DOCs, at approximately $5000 per ton, were cost-effective for the DIS Data Center under BACT

5 See "ORCAA Responses to Comments from October 25, 2010 Public Hearing", November 9, 2010. http://data.orcaa.org/permits-applications/all-permits-applications-entries/department-of-information-services-09noc712/

guidelines. For the Dell Data Center, Ecology and Dell estimated that the cost effectiveness of installing and operating DOCs would be much greater than $5000 per ton of the sum of diesel particulate, carbon monoxide and volatile organic compounds reduced. Therefore, based on our review of recent BACT determinations, Ecology concluded that the costs of reducing Dell's diesel particulate emissions using DOCs are not within the normal range of acceptable BACT costs. As explained by EPA, "*where a control technology has been successfully applied to similar sources in a source category, an applicant should concentrate on documenting significant cost differences, if any, between the application of the control technology on those other sources and the particular source under review.*"

ORCAA also reported the cost effectiveness value for DPFs as approximately $50,000 per ton of diesel particulate removed. ORCAA then concluded that DPFs, at $50,000 per ton, were not economically feasible for the DIS Data Center. The $50,000 per ton value is much lower than the $1,500,000 per ton value estimated by Dell and Ecology for the Dell Data Center. Therefore, DPFs are clearly not cost-effective for Dell's project under current BACT guidelines.

IV. Summary of public involvement opportunities

A. Summary of public involvement opportunities for this permit:

1. A legal ad with information on the draft permit, associated public hearing and comment period was placed in the Columbia Basin Herald on June 13, 2011. A corrected legal notice changing the time of the hearing ran in the Columbia Basin Herald on June 27, July 5 and July 11, 2011.

2. On June 16, 2011, Ecology issued a press release to all news media--radio, TV, and newspapers—in Adams, Douglas, Franklin, Grant, Lincoln and Spokane counties.

3. Display ads inviting people to the hearing were published in the Quincy Valley Post Register on June 30 and July 7, 2011, the Wenatchee World on July 3, July 8 and July 12, 2011, and in the Columbia Basin Herald on July 1, July 6, July 8 and July 11, 2011. A Spanish version of the same display ad was placed in the East Edition of El Mundo, a Washington State Spanish newspaper. The ad ran in El Mundo June 30 and July 7, 2011.

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 during the week of July 4-8, 2011. The flyers were posted by Ecology staff at the following locations:

- Tacos Jalisco, 22 C St SW, Quincy
- Akins Grocery, 106 F St. SW, Quincy
- Quincy Library, 108 B St. SW, Quincy
- St. Pius Catholic Church, 805 Central Ave. N, Quincy
  (note: Presbyterian and Nazarene churches did not have someone at the church when we came by)
- Quincy Aquatic Center, 724 F St. SE, Quincy

6. On June 28, 2011, an email reminder of the hearing and comment period was sent to all those on the listserv of interested parties for Quincy data centers—about 100 people

V. Appendices

A. Individuals and Organizations Providing Comments

B. List of Public Comment Submittals

C. Copies of All Written Comments

D. Hearing Transcript and Oral Comments

E. Public Notices

F. Technical Support Document

G. Final Permit

Appendix A
Individuals and Organizations Providing Comments

Document Number	Name and Affiliation	Comment Number(s)
1	Danna Dal Porto	1-10
2	Patricia Anne Martin	11-60
3	Mark and Debbie Koehnen	61-70
4	Beth Thomsen-Miracle	
5	Curt Morris	
6	Terry Brewer	
7	Mick Qualls	
8	Patrick Boss	
9	Tom Flint	
10	Steve Verhey	

Appendix B
List of All Public Comment Submittals

1. Danna Del Porto, 16651 Road 3 NW, Quincy, WA 98848. Oral comments as testimony, written comments submitted in e-mail dated July 15, 2011, 12:22 PM.
2. Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848. Oral comments given as testimony, written comments submitted in e-mail dated July 18, 2011, 4:45 PM.
3. Mark and Debbie Koehnen, 11443 Road P NW, Quincy, WA 98848. Oral comments as testimony, written comments submitted in e-mails dated July 15, 2011, 9:30 AM and July 18, 2011, 9:21 PM.
4. Beth Thomsen-Miracle, cmiracle@gennext.net. Written comments submitted in e-mail dated July 18, 2011, 10:34 PM.
5. Curt Morris, Port of Quincy, 202 G St. SE, Quincy, WA 98848. Written comments submitted in email dated July 18, 2011, 4:08 PM.
6. Terry L. Brewer, Executive Director, Grant County Economic Development Council, 6594 Patton Blvd. NE, Moses Lake, WA 98837. Written comments submitted in letter dated July 15, 2011.
7. Mick Qualls, Qualls Agricultural Laboratory, 3759 Dodson Rd., Ephrata, WA 98823. Oral comments as testimony, written comments submitted in e-mail dated July 15, 2011.
8. Patrick Boss, Port of Quincy, 202 G St. SE, Quincy, WA 98848. Oral comments as testimony.
9. Tom Flint, Grant County PUD, 5842 Rd. 2 NW, Ephrata, WA 98823. Oral comments as testimony.
10. Steve Verhey, Central Washington Biodiesel, 1000 N Prospect St 1, Ellensburg, WA 98926. Oral comments as testimony.

Appendix C
Copies of All Written Comments

1. July 11, 2011

Department of Ecology
4601 N. Monroe
Spokane, Washington 99205

This is my public statement regarding the permit for the Dell data center in Quincy, Washington.

Submitted by:

Danna Dal Porto
16651 Road 3 NW
Quincy, WA 98848

Sir,
I have followed the data center construction in Quincy since 2010. The more I learn the more I am convinced that the correct course of action to protect my community is for some kind of device to be placed on the diesel emission stacks. At this point, I believe that Ecology has determined that no control devices will be required no matter how compelling the evidence is to require controls. Several different Ecology engineers, experts in this field, have recommended controls for other Quincy data centers and each and every time the experts have been ignored. A supposed "community wide" approach has been instituted to provide community protection. I do not believe that this approach is going to protect Quincy. I believe the "community wide " approach is going to allow construction of data centers until a huge number of cancers are permitted with no concern for the more dangerous emissions that cause cardiopulmonary and respiratory disease. These decisions are being made as if the town of Quincy were a science experiment instead of a community of hard-working residents who did not ask to be invaded by highly technical industry. The trade-off in local jobs has not happened. In this instance, the industry gets the profits while we get the cancer, strokes and heart attacks.

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That is not true if one knows that hard facts about the ins-and-outs of the permitting process. The permitting process is designed to favor industry at the expense of local residents. To have 141 diesel generators, without controls, in one small area is not ethical and I do not care how much the controls cost; controls are necessary for Quincy to have any kind of quality of life.

Ecology is moving ahead with the Quincy data centers because there is no one to stop them. The Governor, Director of Ecology, State legislators and Quincy City Administrators and Council members have all agreed that building data centers in Quincy is the best action for the State of Washington. These individuals have set a price on the health of Quincy residents and Quincy children and that price is the taxes collected from these industries.

I want the record to show that I object to the construction of data centers in Quincy without benefit of diesel emissions controls as an unethical and unprofessional act by the Washington State Department of Ecology. Ecology has traded emission controls for reduced fuel consumption, adjusted engine load and reduced run times. Ecology states that this is an environmental benefit for the State of Washington and that reducing all of these functions is the "best available control technology" (tBACT). I disagree with their conclusions and believe that control devices are the only way to have these industries in Quincy and have the industries operate safely for everyone.

These are my concerns:

1. The Dell Notice of Construction Document has not been available on line for citizen use. I would like an explanation from Ecology as to why information is not readily available to citizens. I have been out of town and I could not view the document at the Quincy City Hall or drive to Ecology's office in Spokane. I believe this lack of available documents looks like a deliberate effort to stifle citizen knowledge of the Dell data center permit. Without knowledge, I cannot make a well-researched public statement about my concerns regarding the Dell facility

2. I have studied the data center construction models and I feel that the Dell data center is flawed in that there is no way for a resident of Quincy to determine that the developer is operating inside the permitted guidelines for emission controls. The generators are to be run on limited fuel and run times as well as reduced engine power. Without access to operational records, I cannot determine if the operator of the generators is in compliance with the DOE permit. Because of this flaw in the permit from the Washington State Department of Ecology, I object to a permit allowing Dell to operate this data center.

3. I am requesting that Dell be obligated to install some type of emission control device on the diesel stack. Simply raising the stack is not an adequate method of emission reduction. The stack height, I have been told, is 58 feet. The guideline for stack height, according to 42 USC- 7423, is 2.5 times the height of the source. The stack

can be only so high to account for building downwash. The stacks cannot be raised just to reduce emissions. The documents indicate that the first Dell building is 43 feet high. Is this building been designed exceptionally high to allow for tall stacks? The phased-in construction documents indicate that the next Dell building is 29 feet high, much shorter than the first building, yet the stacks remain 58 feet high. Dell has 18 months to construct the next building because the data from the first phase cannot be used in new construction, the data would not be grandfathered in to allow the correlation between stack height and building height. Because of these facts, the Dell stacks are way out of compliance and will not serve to disperse emissions.

4. Although the electrical power from Grant Public Utility District has been considered very reliable, information is available that shows the increase in demand plus the variances in weather patterns will place serious stress on this reliable power. 2011 has seen huge amounts of snow in the Columbia River drainage. This amount of snow is not reliable. The wind power contribution has made the balance of hydro and winds a complex and volatile magic act for power managers to control. The summer energy demand will rise with population increases and that time of year is the most stressful for energy production. I mention these facts to raise the question of a long-term electrical shortage due to grid damage, solar storms or just human error in energy transmission patterning. Will the data center keep to their limit on fuel and operating limits in case of a long-term electrical outage? It is obvious that the best action to follow in the case of Quincy is to place emission controls on the diesel stacks and then the industry, Ecology, the PUD and residents can be assured that the health of the community is protected and the generators can run as necessary.

5. How has Dell resolved the wastewater discharge issue with the City of Quincy? The limit has been reached on wastewater treatment for data centers by City facilities and yet the City of Quincy keeps extending the opportunity for data center construction without adequate infrastructure. I have heard that the wastewater from the data center cooling towers will be spread on the lawns for Mt. View School, Monument School and Lauzier Park. Is this correct? What concrete data can you show me and the residents of Quincy that this water spreading is safe and environmentally positive? The wastewater is concentrated and, at least in one case, the water has been treated with chemicals. I believe you would be doing this during the part of the year that children would be using these lawns. I cannot see that this is a good long-term solution. If this water is so safe why not apply it to farm fields? One option for wastewater discharge was to run that water into the Bureau of Reclamation Irrigation canal. Is this solution still an option? In discussion as well was a plan to run the water downhill into the Columbia River. Is this still an option for wastewater discharge?

6. How many gallons of water will be used by Dell over the course of one year? What is the source of your water? Do you have a State permit to withdraw this

much water annually? Do you have a permit to discharge this much water annually?

7. How much power will Dell require to operate the entire project, all phases?

Do you have any specific arrangement with Grant PUD regarding the source of power, the rate of power or the long-term supply of power?

8. Did you have any contacts with the Grant County Economic Development Council regarding your choosing Quincy for your company development? Do you have contacts with the Port of Quincy regarding your choosing Quincy for construction? Did you receive any concessions or promises from the City of Quincy for building here?

9. Have you taken advantage of the tax incentives offered by the State of Washington for choosing the build in Quincy? Does this tax incentive require you to have a specific number of employees to provide local jobs? How many people will be working in the first phase of the Dell facility? How many people are expected to be employed in the final build-out of Dell?

10. I have recently learned that the ultimate decision about diesel emissions and control devices rests totally with the Director of the Department of Ecology. That is a huge responsibility and a terribly important decision because of the long-range implications of the decision, especially if the decision is continued to be made not to require control devices. Quincy has been selected as a city to be monitored in the National Children's Health Study. As part of this Study, the air will be monitored to see the effects that local industry and agriculture have on young children. I bet the Quincy test will be interesting with the Microsoft and Dell facilities just up wind of the pre-school/K-2 elementary school. All 327 children in that school will be affected each and every school day with diesel exhaust and when most of these children go home they live in town and get more exhaust emissions. I do not understand why the Director of the Department of Ecology would not require emission controls on these diesel stacks. Ecology admits that it has never permitted this many industrial generators in one small area therefore an arbitrary limit of cancers has been set to provide some protection. I have to say that this looks like a guess by Ecology as to how to proceed and that controls should be in place for these 141 generators instead of just guessing about public safety.

I am emailing this document to Ecology after I attended the public hearing. I am complementing the organizers of the meeting for being professional and focused to the task on hand, educating the public about air quality issues. The choice of room is poor and I still think the city of Quincy has better places to hold meetings than the room over the council chambers. I think it is interesting that the two announced meetings are on Wednesday night. Rural Washington communities reserve Wednesday nights for church night and no one schedules meetings for Wednesday night because of that conflict.

Thank you for considering my comments and my questions.

Danna Dal Porto

2. July 18, 2011

Karen Wood
Washington State Department of Ecology
Eastern Regional Office
4601 N. Monroe St. Spokane, WA 99205-1295

RE: Dell Air Quality Permit Proposal

Dear Ms. Wood,

I am writing with many concerns (and many questions) regarding Dell's air quality permit. I would appreciate it if you and your staff would make every effort to answer the questions as the affected community has every right to know and fully understand the impacts of Ecology's decision on our health.

Before I begin, however, I would like to complain that the documents needed to gain a decent understanding of Dell's impact on the community, including the HIA, NOC application, NOC Support Document and amendments, are not online. It cost me over $110 at City Hall for copies of documents (Dell and Sabey), and 3 days waiting to have them copied. There is absolutely no reason to keep this information from the public when these documents are generated electronically and easily added to a webpage.

I also object to Ecology's having scheduled the Dell and Sabey public hearings for Wednesday nights after Danna Dal Porto had made it very clear that Wednesday nights are absolutely the worst night of the week to schedule meetings because of church commitments. Also, the timing of the hearings may be convenient for Ecology, but 5:30 PM in an agricultural community is still working hours to many, many affected individuals. Ecology did a grave disservice to our community by their total lack of consideration. Please do not repeat this mistake and move the Sabey hearing to Thursday night and schedule it for much later in the evening.

Because the issues I raise are numerous I will number them for ease of reference and ask them in question format.
1. Why was Dell not required to model for a 48 hour "worse-case scenario" outage as was required of Yahoo! and Microsoft? If Microsoft, Yahoo! and Intuit are without power for
48 hours then Dell will be as well. Even Dell's proposed "redundant supply" originates from the same source. Dell should be required to model a 48 hour outage.
2. Dell does not have an agreement for more than 7 MW of redundant power at this time, nor does the Grant County PUD have a redundant power policy. Permitting Dell based on assumptions of redundancy to assure compliance with NAAQS and other hazardous air pollutants (HAPs) is inappropriate and underestimates risk to our community.

a. What effect does power redundancy play in reducing the operation of Dell's generators and their impact on Quincy?
b. How many hours are reduced based on this approach?
c. Will Dell be allowed to use the fuel allocation and engine hours of the future engines to cover for the "redundant power" that they currently do not have? Redundant power won't be available until late 2012 or 2013, if a redundant policy is even put into place. It seems highly inappropriate to base Dell's air quality permit on this assumption. Model assumptions should represent risk without redundant power
until a redundant power policy is in place and redundant power is available.
3. Please produce the EPA 2011 Model Year Certificate of Conformity for all stationary diesel engines for use at Dell. If these are not required please explain why.
4. I object to the use of Tier II diesel engines when Tier IV engines are available and will significantly reduce the amount of DPM, CO, NOx and VOCs released. Because diesel engines last a long time this represents years of unnecessary emissions.
5. I was pleased to see in the Second Tier TSD that Ecology is requiring Dell to use "a two- stage oxidation catalyst system (i.e., 3-way catalysts) that is guaranteed by the catalyst manufacture to remove 35% of nitrogen oxides, and capable of reducing at least 50% each of carbon monoxide, volatile organic compounds, and particulate matter from the exhaust stream." This technology was also determined to be BACT for the Titan Data Center in Moses Lake. When combined with Tier IV engines as requested in #5 above there will be a significant reduction in DPM and VOCs.
6. There is mention of a Grant County PUD grid-wide 15 minute scheduled outage. I have never heard of anything like this. Where can this information be found and has modeling been conducted on all the generators operating during this time?
7. A question was raised during the meeting about the modeling of DPM over the community and the impacts of Yahoo, Sabey and Intuit on the plume. Ecology stated that they had a map available but not with them. I would like to see the map of this modeling. It is my understanding that the emissions from Yahoo, Intuit and Sabey – and Celite – were not modeled because Dell was instructed they did not have to model them. Please produce the map or explain why Dell was not required to model the emissions from these 4 sources.
8. During the public hearing David Ogulei mentioned that it had not been determined which engines were going to be used. Please explain how emissions can be accurately calculated without knowing what engines, including manufacturer, are going to be used?
9. Please identify all engines to be installed at Dell including model number, engine number, manufacturing date and manufacturer.
10. The satellite map of Quincy is not current. Because buildings affect the movement of emissions, the plume of DPM and other contaminants may behave differently if the AHO neighborhood and other homes and apartments are included in the model. Please model the plume using the accurate housing data in the model.
11. Did Ecology and/or Dell use 40 CFR 51 Appendix W? If not, why not?
12. Explain why meteorological data from the Moses Lake Airport is being used rather than the meteorological data from the Ephrata Airport?

13. The Grant County PUD has suggested that Dell run their generators during "A to B feed
Switchovers". How much time will the generators run during these events? How many events like this are there?
14. I understand that there is an uncertainty factor associated with the toxicity of DPM that ranges up to 1200% deviation. What is Ecology's understanding of the uncertainty factor associated with DPM toxicity?
15. Please explain how a doubling of hours of operation from those proposed in the NOC application (21.68 -25.68 hrs/year/engine) to those in the Second Tier TSD (53.5 hrs/year/engine) only results in a 12% increase in permitted fuel usage (154, 946 gallons in the NOC application to 175,031 gallons in the TSD)? How is that possible?
16. In Dell's NOC application Dell estimates the fuel consumption between 156 gph at 70% load to 213 gph at full load. The Second Tier TSD allows 175,031 gallons for 1498 total generators hours or approximately 116 gph. Explain why the fuel consumption is estimated to be so low and also what average load this fuel consumption equates to. How much less NOx is generated at this reduced engine load compared to 70% load?
17. Dell's NOC application does not include a Gas Velocity for each stack. Why not? What effect does lower load engine operation have on gas velocity at the stack?
18. What affect does Dell's building position have on Microsoft's plume? What affect did Microsoft's emission plume have on the placement of Dell's building?
19. In the Executive Summary for Dell's original NOC Support Document it states that the "maximum modeled annual-average ambient concentration of DPM at the project boundary for the full power outage scenario is 0.022 ug/m3" (6.7 cancers). In the amended NOC Support Document dated April 27, 2011 this number is amended to read 0.062 ug/m3 or 18.8 cancers. Where is this point or boundary located and why wasn't this level, i.e., 18.8 cancers, used in determining the Tier level under which Dell applied for their permit?
20. Formaldehyde is a listed carcinogen. Was any consideration -- to the community's health -- given to cumulative releases of formaldehyde and other HAPs around Dell? If not, why not?
21. I asked the question regarding if Dell will shut down their generators when they meet
their allocated hours or fuel usage and Sarah Gibson said "yes". What authority does Sarah Gibson have to guarantee that operations will cease when these limits are met? Please provide us with a letter from the company stating that if there is an extended power outage that they will not continue to run past their fuel and hour allocations
22. What obligation does Ecology have to notify and inform the citizens of Quincy that Dell is a "major source" taking a voluntary emissions reduction? I would like a copy of the Public Notice that includes this information.
23. Ecology claims that they have to permit any facility that meets the standards. Please cite to the regulation or statute that requires approval, i.e., includes a shall or must directive.
24. Where in the regulations, including those adopted under the WA SIP, does it allow Ecology to permit multiple phases of a project to span an indeterminate period of time

without another review at time of construction or installation of the generators? Please cite the regulation and statute. I understand this to be "circumvention" as defined under clean air regulations.
25. Dell's project has inordinately high stacks compared to other data centers. When asked about the stack height David Ogulei responded that Dell "wants to go that high to assure compliance." Federal Statute 42 USC 7423 allows for 2.5 times the height of the source
– in this case a 10 ft. high locomotive – unless building downwash requires additional height. Any stack height in excess of what is necessary is a prohibited dispersion technique under the statute and regulation.
26. As confirmed at the Public Hearing, there was no cost benefit analysis to the community as to health effects from Dell. Why was this not conducted?
27. David Ogulei mentioned that there is a problem complying with NO2. Would there be a problem complying with NO2 if each data center had been required to deal with NO2, NO or NOx when they first located in Quincy?
28. Who decided that there would be no "mitigation or offsets" required of the data centers in Quincy until the 100 cancers per million had been met? What role if any did the City
of Quincy and/or Port play in this decision?
29. If operational hours are exceeded can Ecology required filters or other controls later?
30. What is Dell's environmental benefit to the state?
31. How much was Dell's tax incentive savings? What is the cost of the most stringent control that could have been used on Dell?
32. Why isn't Ecology advising incoming data centers about Quincy's participation in the National Children's Health Study? This is a potential liability for the incoming data centers that should be discussed with them.
http://www.nationalchildrensstudy.gov/Pages/default.aspx
33. While Dell is ramping up to 28 generators which governs their compliance, the fuel allocation or the hours of operation per engine?
34. Was commissioning of the engines included in the modeling, including for determining the ASIL?
35. What are the sources of Clint Bowman's regional background levels? What are the sources of Clint Bowman's local background levels? Why wasn't Dell required to model these numbers themselves by using the available data?
36. Was engine commissioning exempted from the NAAQS?
37. What is the average ozone level recorded by the monitor at the Quincy Airport? Whose monitor is it? Why was it placed at the Quincy Airport?
38. I did not see any information on the contribution of NOx breakdown to increasing ozone levels. Why not? If NO2 compliance is an issue doesn't that mean that ambient levels
of ozone are also high? Please provide supporting documentation for use of 40 ppb for background ozone.
39. Why isn't there information on secondary formation of PM2.5 in Dell's NOC Support

Document?
40. Why haven't incoming data centers been required to control for fugitive dust?
41. If NO2 compliance is difficult why isn't real time monitoring being used?
42. What consideration is given to emission factors changing over time with aging engines?
What consideration is given to increasing problems with power transmission lines, etc. and its affect on the need for emergency power generation? What consideration is given to the climatic changes that will occur over time due to climate change? These issues are discussed in the Sabey Second Tier TSD, but not in Dell's. Why not?
43. If Dell or any of the other data centers needed to use their emergency generators more than the current permit could they come back to Ecology and ask for additional hours?
44. Rain flaps can affect the velocity at which emissions are released. Please provide documentation that this has been accounted for during modeling.
45. How many of the public notices, articles or other methods to advertise the Public Hearing included the word "risk" or similar words or indicated that that a danger existed from the incoming Dell data center?
46. What's the penalty for violating the terms and conditions of the permit? Other than a fine payable to the state, what do the citizen's of Quincy get other than more air pollution?
47. When Dell has an unintended release who must they notify and when?
48. Since Dell's stacks are so high, how much further will their plume travel? What interactions will it have with other elevated plumes such as Celite's and Con Agra's? Why isn't there a map showing the dispersion over the resident on the northside of the tracks?

Issues I want noted for the record:
1. David Ogulei when asked about BACT stated that "because a goal was established" that controls would not be required until the 100 cancers per million was reached. This is supported by the excerpt from the Microsoft Third Tier TSD which I inserted into the public record at the Public Hearing.
2. When Danna Dal Porto asked about stack heights David responded that Dell "wants to go that high to assure compliance."

The following should be conditions of this permit:
1. "Daily engine use logs, fuel consumption, meter readings and any other information that would be needed to establish the actual operation of the engines shall be made available to the public upon request and published online"
2. Nighttime operations are forbidden under the permit.
3. Dell will install an air quality monitor.

I know this is a lot of material to cover, but then the information needed to review in advance of the Public Hearing was not available online for viewing and I was dependent

on the city for the documents which I didn't receive until 3 PM the afternoon of the hearing.

I continue to be disillusioned by Ecology's lack of concern over the increasing amount of emissions released over our community and by the continued use of the 100 cancers per million.

I look forward to receiving some meaningful responses to my concerns. Sincerely,

Patricia Martin
MYTAPN
Quincy, WA 98848

3. (From e-mail dated July 15, 2011)
Hi Kendra:
I attended the meeting about the proposed Dell permit, asked several questions, and provided testimony during the hearing. I have a few more comments I would like to add. Please advise if I need to send these elsewhere.

I realize that this permit meets the 'minimum' requirements, but I am concerned about our quality of life in the Columbia Basin. With all the technology and advances, it surprises me that minimum is good enough. Where else is 'the minimum' acceptable? Do we expect our medical profession to provided only minimal service, or do we expect the best? How about teachers? If I only taught the minimum requirements to my students, would that be acceptable? I too work for the state, and know that is not the case. The State is striving for all educators to use 'best' practices, not minimal practices when teaching. And when it comes to data storage, would Dell's customers be satisfied with only minimal results, or would they expect the best? Customers would take their business elsewhere if only minimal service was supplied. Since our city planners do not seem interested in protecting our community, I am standing up to say minimal is not acceptable - use the safeguards available or please take your pollutants elsewhere. If the technology is out there to protect our quality of life and our environment, it seems like we should step up and require more safeguards.

Also, I would like to see the permit process changed so any new 'minimum' standards could be required when projects include 'phases'. I am curious by nature and like to ask why. Why the rush to get all these permits in place so quickly? What regulations are coming along that the data server companies are trying to avoid? Grandfathering in old regulations which may not protect us as well doesn't seem fair to the community or the world.

I appreciate the community approach you are taking, but I was shocked you didn't show the entire community on your disbursement maps at the meeting. The overall level of emissions you are trying to stay under is 100, but just the 2 companies alone are up to

50 in one area. That exceeds the normal 10 per company. The highest emissions should only be 20 in that area, not 50. What about the value of the land in that area? It was stated that the zoning is residential and someone could build a house on that property just outside the fence line of Microsoft & Dell in the future. I ask you, who would want to live there? Do you feel secure enough about this permit to live their yourself or have children living in that area? If not, you shouldn't expect someone else to want to live there. The value of that property is being destroyed and measures should be now taken to prevent that from happening.

I have a question about the emission information presented at the meeting. Dell's emissions were reported at 0.062, below the limit of 5. With the community approach, we were never given the combined totals of emissions. What are the combined emissions of Dell & Microsoft? How about the combined emissions of all the data centers? And the total overall emissions in our community? Please send that information to me.

I will be unable to attend the next meeting about the Sabey permit on August 3rd as I will be out of town. Am I allowed to write a letter to be read into the testimony? One man suggested our community wasn't concerned anymore because of the lack of attendance at the DOE meeting. Anyone who has ever planned a wedding knows that projected attendance drops dramatically in the summer - not because people don't care, but because everyone is busier when the sun is shining Please know we are concerned and care deeply about what happens in our community, and not just monetary gain, but quality of life.

Here is a correction about the information presented at the meeting as well, by a man in the back row. He wanted to make a correction and stated the actual distance between the data servers is 2 1/2 miles. That is not the correct mileage either. It is only 2 miles between Road P, where Yahoo is located, and Road R. Microsoft is located between Road Q & R so the distance is less than 2 miles. I doubt emissions have to follow the rules of the road and actually move as the crow flies.

Thank you,
Debbie Koehnen
11443 Road P NW - PO Box 185
Quincy WA 98848

(From e-mail dated July 18, 2011)
Hi Kendra & Karen:
I took some time this weekend read some of the documents regarding the permit & recommendation, in particular the Second Tier Review Technical Support Document. I am confused at the way regulations and rules are seeming to be bent or ignored.

#1. Your website (DOE Air Quality > Commercial Industrial Air Permits > Tier II Analysis Information > Data Center projects) clearly states construction cannot begin unless the permits have been approved.
"All new projects must obtain approval from Ecology before construction of a project begins."
Construction on the Dell site began before the public hearing. Why is this being allowed? To beat the July 1 deadline for the tax exemption? The system is set up to protect the stakeholders, and every time an exception is made, it undermines the validity of the system.

#2. The DOE set accepted risk levels for DIESEL PARTICULATE at 10 per million. Yet you found the risk for adding Dell to be 49 in one area, (page 27 & 28) above your level for approval. This should trigger a tier 3 review but you are still allowing this project to continue without any further modifications to the plan. (page 9 - 3.1 paragraph 4, page 15- 3.6.b). With only 2 plants supposedly adding emissions, their impact should only be 20 combined.

#3. Were these documents available in Spanish? We have a large Hispanic population. While I speak Spanish, I do not have enough technical language specific to this type of work to adequately translate the information to the people who will be affected by these projects. Many parents in our area rely on their children for translation, and those children wouldn't know the technical terms either. Since the Hispanic population is actually in the majority by leaps and bounds, it seems like the validity of the community responses might not be valid, on this project or the previous permits, and a small minority of English speaking members may be over-represented as a result.

#4. I liked reading about the top-down model you apply to the process, but I am curious as to how you come up with your figures when calculating costs? How were those figures derived? When were they derived? Was inflation taken into account? The additional cost of adding filters is insignificant with regards to the cost of the entire project. Purchasing generators is a large expense, adding a filter minimal and much cheaper than adding the filters later, if that is even possible.

#5. You can tell a lot about a company by how it treats its employees. It seems like these computer companies would be worrying about what's happening inside the fence line as well. Those fall out figures don't comply with safe levels. How do these exposures fit in with workers' rights in our state?

#6. When you compare the population and pollution levels of Seattle (only counting Seattle, not all the surrounding towns, or even Tacoma), using a map shown of the State of the Puget Sound area at the permit hearing, emission levels were 700-800 and the population supporting that level from the 2010 census is 582,454. Yet when you compare Quincy, the city population (not including the surrounding area) is only 6,156 a much smaller population, and yet you want us to support an emission level of 100. Less

people, less industry and yet you want us to suffer an emission level that's only an 8th of that in Seattle? The ratios don't add up and aren't equitable. We want to protect our area & our quality of life, not move closer to the levels of a highly populated & industrialized area like Seattle. I feel like we are trying to play catch up and are behind in our efforts to control these emissions. The tier 3 permits of Microsoft & Yahoo should never have been allowed, and seem to be setting precedent for these smaller tier 2 permits. If Microsoft, Yahoo, Dell, Sabey & Intuit truly want to be a part of our community, they should be helping to protect us, not cutting corners.

#7. My daughter has a very rare disease, and we have already 'won the lottery' when it comes to seemingly small odds. If you are the one affected by the 100 in a million chance, which is really 1 in 10,000 - not that small when you do the simple math & reduce the ratio - it is devastating. I don't accept the risk. Unfortunately, the men making the money from these permits, who supported it at the hearing will not be the ones getting the cancer or having the health problems, even though they are 'accepting' the risk for our entire community. Do any of those people in favor of this permit live in the dispersion paths? Do they have children at Mountain View?

At the Dell permit meeting in Quincy, David explained the permit process to us. Could you tell me if I understand this correctly.
1. Our first safe guard is our city planners. They should be looking out for safety concerns when they approve sites for projects with hazardous emissions, since they know more about the community and where residential areas and schools are located.
2. If the proposed project raises possible health concerns, the city planners can deny it, relocate it to a less populated area or approve it with conditions such as asking for a higher standard level of protection.
3. Once the city has approved the project, it moves onto the DOE for an evaluation, where it is required to only meet the minimum standards, even if the location was poorly chosen by the city.
Does that sound about right?

I appreciate your efforts and time but these inconsistencies do not bode well for the integrity of this system. Please do not allow this project or others to continue unless other accommodations are in place to reduce the emission levels below those set to protect the citizens in our community. On page 2, the Dell document states Dell should:

communicate health risks posed by Dell’s emissions to current residents near Dell, and potential new homeowners at undeveloped parcels adjacent to Dell, or to the local regulatory agency responsible for zoning and development in the affected area.

This project is destroying the involved property values and placing the current residents at risk. Talk will not remedy this fact and is insufficient. I am shocked that an agency set up to protect the interests of our citizens would suggest this option in light of the scientific data generated and reported. I stopped at a residence on the west side of the

Dell & Microsoft projects tonight. It was a Hispanic family. Funny, they didn't know anything about harmful emissions, the public meeting we had last week, or the comment period which ends today. Why is that? Doesn't seem like the communication is working. If I can't trust the companies to make more of an effort, how can I trust them to follow the guidelines and the hours set forth in the permit? How will we know if the guidelines are being followed? Won't running the generators more hours increase the toxic emissions? And I was here when the power on the west end of town was out for days, not hours, before the lines could be replaced. 2006 or 2007? How do I know that? Schools in the district were closed when the town lost electricity, but Monument Elementary missed more days since the power could not be restored. 2 members of the family returned to school, but one did not.

I have another question about the timing of these meetings. I have planned a camp for children in our area. Reservations and plans have been made. Now I need to decide which is more important, giving these kids a summer camping experience or attending the next permit meeting, especially in light of the comments made about attendance at the Dell meeting. Summer is a notorious time for outdoor plans & activities. It's also an important & busy time for agriculture, and many people work until it gets dark at this of year. Even during the school year, most parents request the 7:00 time slot for conferences as they don't get off work early enough for the earlier time slots, and as parents, they have children to care for before they can attend extra meetings. They simply do not have the luxury of money for 'free' time and meetings with a start time of 5:15. Plus Wednesdays are traditionally 'church night' for Quincy. As an unwritten rule, teachers do not even give homework on Wednesdays. It's hard to meet everyone's needs, but a later start, or more options for meeting dates & times would be appreciated.

Please consider these comments. I live and own property in this area. I am raising my children in this area. My family has lived here for more than 100 years and paid taxes to live here. It is unfair to have our quality of life & property values damaged by companies who can afford to further protect this community but are choosing increased profits over health and because the 'city planners' who are supposed to be the first line of defense in keeping us safe obviously didn't plan appropriately.

Debbie & Mark Koehnen
11443 Road P NW
Quincy, WA 98848

4. (From e-mail dated July 18, 2011)
I would like to submit my comments on the draft permit for Dell and Sabey's Intergate-Quincy Data Center. I own irrigated farm property along Road P NW directly north of the town of Quincy and some of the data warehouses. Our property is located directly across the fence line from one data warehouse and down the road from another.

First I would like to say that I opposed the data warehouses being built where they are currently located. It was a poor choice to say the least. The City of Quincy and the Port District were negligent in their planning by allowing these projects to be constructed in such close proximity to residential areas and schools and on both sides of the town, too. I firmly believe that there were better choices for location that were deliberately "overlooked." But the data centers are where they are now, so the most prudent thing to do at this point in time is to make sure that they are managed in a way that is the least harmful to the residents and the surrounding property.

I am VERY surprised to hear that the companies that own the data warehouses are not stepping up and offering to install the additional filters on the diesel generators without being required to. The costs to install the additional filters are insignificant in relationship to the costs they've already invested in the data warehouses. It makes me wonder what kind of companies they are that they don't even care about the health of their employees working in close proximity to the diesel generators let alone the surrounding community. If it was just one generator running at a time, it wouldn't be as big a problem, but they won't be run one at a time. They will all be run at the same time, which is a serious concern.

I see a potential impact to the value of my family's property, as well. Obviously we have chosen to continue to maintain a family farm that has been in our family since 1901 - six generations so far. I see this as a serious threat - a heath hazard. I don't believe that the right thing to do is to create a toxic hazard and then try to figure out how to clean it up after the fact. Let's work to prevent it instead.

The City of Quincy and the Port District should have done a better job planning the location of the data warehouses in relationship to the proximity to residential areas and schools. Since they haven't and since the companies obviously will not do the right thing on their own, I think the Department of Ecology needs to require the additional filters be installed on the diesel generators.

Please add my email address to your list and let me know the outcome and if you have any questions about my comments.

Thanks for your consideration.

Beth Thomsen-Miracle
cmiracle@genext.net

5. July 18, 2011

Department of Ecology
Greg Flibbert (gfli461@ecy.wa.gov)
Eastern Regional Office, Air Quality Program

4601 N. Monroe St.
Spokane, Washington 99205

Re: **Comments in support of the Department of Ecology's proposed "notice of construction" order (permit) for the construction of the Dell Data Center in Quincy, WA**

Dear Greg Flibbert,
On behalf of the Port of Quincy, I am submitting the following comments in support of the Department of Ecology's proposed "notice of construction" order (permit) for the construction of the Dell Data Center facility in Quincy that will allow Dell to install backup diesel generators for use during infrequent power failures to support the new facility's data or computer servers.
According to Grant County PUD, Quincy has a very 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 transmission lines). More specifically, the new Dell Data Center will draw its power from the west transmission lines (along with Microsoft), while Intuit and Yahoo! and other data centers on other side of Quincy 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 nation.

Moreover, given that the Quincy Valley air shed covers a very large geographic area with a small, low density population, and Dell and the other data centers are situated in locations where the wind generally blows away from Quincy, the impact of backup diesel generators is even further minimized.

Furthermore, even though Dell 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 last 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, I thank the Department of Ecology for the opportunity to provide these comments, and on behalf of the Port of Quincy, I strongly support the Department of Ecology Director's recent approval of the permit for new Dell Data Center in Quincy, thus allowing Dell to install its backup diesel generators.

Sincerely,
Curt Morris
Chair, Port of Quincy
202 G Street SE
Quincy, WA

6. July 15, 2011

Mr. Greg Flibbert
Eastern Regional Office, Air Quality Program
Washington State Department of Ecology
4601 N. Monroe St.
Spokane, WA 99205

RE: Comments in support of the Department of Ecology's proposed "Notice of Construction" order for the Dell Data Center in Quincy, Washington

Dear Mr. Flibbert:

I am writing to comment in support of the Department of Ecology's proposed Notice of Construction Approval Order No. 11AQ-E4XX.

As someone without a scientific background, I appreciate the hard work and study that you and your staff perform when examining permit applications on behalf of the State of Washington.

As a 14 year resident of Grant County and a 5th year Commissioner at Grant County Public Utility District I can speak with knowledge about the redundancy and reliability of the electric grid in Grant County. While it is true that outages are not unheard of, it is also true that they are generally of a very short nature. The multiple transmission circuits that serve the power substations in the Quincy area allow for line sectionalizing and rerouting of energy around line faults to restore service in short order when line faults do occur.

While the number of data centers in Quincy is growing, we have seen a significant reduction of run time of diesel generators for routine test purposes at existing data centers. I know that your department staff have evaluated the impacts of the new Dell Data Center diesel generators and I for one trust your methods of analysis and your conclusions. Thank you for your work.

Sincerely,
Terry L. Brewer
Executive Director

7. (From e-mail dated July 15, 2011)

Greg: I attended the July 13th Hearing in Quincy Washington and did not hear of any adverse affects to human health from running Diesel Generators near or around the City. I want to be counted as a vote that is not concerned about the miniscule amount of Diesel Particulates that are emitted from starting and running back-up generators. Diesel engines are used in many businesses nearby without harmful consequences to the personnel living there.

Mick Qualls

Qualls Agricultural Laboratory
3759 Dodson Rd NW
Ephrata, WA 98823
509-787-4210 x16 office
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Appendix D
Hearing Transcript and Oral Comments

Public Hearing
Proposed Dell Data Center in Quincy, WA

Formal Comment

Date: July 13, 2011
Location: Quincy, Washington

Tami Dahlgren: And I have eight people who have signed up to testify, so I will be calling you up in the order that I received your cards from you. If there's anybody who decides in the course of the testimony that they would also like to testify, I'll check in with you after everybody's done and make sure that everybody who wants to comment gets a chance to do that.

So, let's see. I'd like to ask that when you do comment, you just keep in mind that there are quite a few people who are commenting and try to be courteous and keep your remarks as concise as you can. I don't want to limit what you say, but just try to be courteous and leave plenty of time for other people to also give their comments.

So, let the record show it is 7:18 PM on July 13th, 2011. This hearing is being held at Quincy City Hall in Quincy, Washington. This hearing is on Dell's proposed new data center in Quincy.

Legal notice of the hearing was published in the *Columbia Basin Herald Newspaper* on June 13th, 2011. A corrected legal notice changing the time of the hearing then ran in the *Columbia Basin Herald* on June 27, July 5th and July 11th.

Display ads – English-language display ads were published in the *Quincy Valley Post-Register* on June 30th and July 7th, *The Wenatchee World* on July 3rd, 8th and 12th, and the *Columbia Basin Herald* on July 1st, 6th, 8th and 11th. Spanish-language display ads were placed in *El Mundo News* on June 30th and July 7th.

A press release, including information for public broadcast, was distributed to radio, TV and newspapers on June 16th, 2011.

Information about the hearing was placed on the Department of Ecology's online public calendar and flyers advertising the hearing in English and Spanish were posted at public locations around Quincy the week of July 4th through 8th.

Is that the correct week? Okay.

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 prepares.

If you would like to send Ecology written comments, please mail them to Kendra Robinson-Harding at the Department of Ecology by midnight on July 18th, 2011. They can also be faxed to (509) 329-3529 or e-mailed to Kendra and her e-mail address is available there on the easel.

So, eight people so far have indicated they would like to provide testimony. When I call your name, please come up to the front of the room and state your name, any company or organization you're representing and your address.

And if you do have any questions that are not for the record, we'll be available to talk with you after the hearing.

So, the first person we have signed up is Curt Morris.

Curt Morris: Not to speak, I just _____.

Tami Dahlgren: Okay. Patrick Boss?

Patrick Boss: I guess I'm their representative. I'm the representative he was referring to, so.

Tami Dahlgren: Okay. Did you want to make a comment?

Patrick Boss: Yeah, _____. Thank you.

Tami Dahlgren: You can have a seat or stand, whichever you're most comfortable doing.

Patrick Boss: I'll sit.

Tami Dahlgren: Okay.

Patrick Boss: Thank you. First of all, I have just – I have an HP computer, so I apologize. We do have a Dell computer at home though. This is one _____, so.

But for the record, I'm Patrick Boss and I'm here this evening to provide to comments on behalf of the Port of Quincy and the Port of Quincy is located here on G Street here in Quincy, Washington 98848.

And the Port of Quincy is in agreement and supports the Department of Ecology's Proposed Notice of Construction Order for the construction of the Dell data center facility in Quincy, Washington, that will allow Dell to install back-up diesel generators to provide temporary power to the new facility's data servers and computer servers for use during infrequent and rare power failures in Quincy.

The Port of Quincy appreciates Ecology's hard work on this issue and commends Ecology's air quality staff for their rigorous review and permitting process relating to the data centers in the Quincy area. Moreover, the Port of Quincy thanks Governor Gregoire and our local legislators for their leadership in supporting the development of high-tech industries in rural communities in Washington State, such as Quincy.

According to the Grant County PUD, the Quincy area has a very high level of electrical power redundancy, because it is drawing electrical power from two different sets of transmission lines. In fact, Quincy is the only community in the region with this sort of redundancy. As a result, according to the PUD, the probability of Quincy having a complete power blackout is extremely low, because half of Quincy gets power from one set of transmission lines while the other half of Quincy gets power from a different set of transmission lines.

Moreover – or, more specifically, the new Dell data center will draw its power from the west transmission lines along with Microsoft, while Intuit and Yahoo! and the other data centers on the other side of Quincy will draw their power from the east transmission lines.

In addition to the power redundancy in Quincy, it is important to note that Grant PUD has some of the lowest rates of power outages and shortest downtimes in the nation.

Moreover, given that the Quincy Valley airshed covers a very large geographic with a small, low-density population and Dell and the other data centers are generally situated in locations where the wind generally blows away from Quincy or around Quincy, the impact of the back-up diesel generators is even further minimized. In fact, according to recent EPA data, the Quincy Valley airshed scored nearly 90 out of 100 points with 100 being the best for having very few ozone alert days and extremely low level of pollutants in the air. The Quincy score was much better than neighboring communities and much better than the national average.

Furthermore, even though Dell and the other data centers in Quincy have to periodically test their back-up diesel generators, the data centers and other parties, such as the Department of Ecology, the Port of Quincy, the City of Quincy worked together last year to come up with a cooperative arrangement so that each data center does not test its back-up diesel generators on the same day as other data centers in Quincy. In other words, the data centers in Quincy are proactively working together to make sure that they greatly minimize air emission impacts when they test their generators.

In conclusion, on behalf of the Port of Quincy, and I'm reading very fast here to make good use of my time, we thank the Department of Ecology for the opportunity to provide these comments and support the Department of Ecology Director's recent approval of the permit for the new Dell data center in Quincy, thus allowing Dell to install its back-up diesel generators. Thank you.

Tami Dahlgren: Thank you. Next is Dana Dal Porto.

Dana Dal Porto: My name is Dana Dal Porto. I live at 16651 Road 3 NW, Quincy, Washington. I appreciate this opportunity to speak.

I'd like to go on record as saying that I object to the construction of the Dell facility, as I have objected to all the other data centers in the area, because the community-wide approach that's been instituted by the Department of Ecology really doesn't protect the

community. It allows the data centers to be constructed until a very high level, 100 cancers at a million, is reached.

The focus on cancer is kind of disingenuous because really the cardiopulmonary and respiratory issues are much more dangerous to our community and that doesn't really been discussed.

These decisions are being made as if the town of Quincy was a science experiment instead of a community of hardworking residents who did not ask to be invaded by this highly technical industry. The tradeoff in jobs has not happened. And in this instance, the industry gets the profits, while we get the cancer.

Ecology is moving ahead with the Quincy data centers, because no one will stop them. The governor, the director of ecology, state legislators, Quincy city administrators and councilmembers have all agreed that building the data centers in Quincy is the best action for the State of Washington. These individuals have set a price on the health of Quincy residents and Quincy children. And that price is the taxes that have been collected from these industries.

I would like to have it known that the Dell Notice of Construction document has not been available online and I find that really quite disturbing. I've been in and out of town and have been unable to view the document in City Hall or to drive to Ecology's office in Spokane to view it. This lack of documentation is really a way to stifle citizen knowledge about the data center permit from Dell. And without that knowledge, I really can't make a very well researched public statement.

I have some concerns about the amount of water being used by the data centers, including Dell. And I'm curious about how the resolution has been made with the City of Quincy regarding wastewater discharge. I have heard that the wastewater might be used on the lawns at Mountain View School and Monument School and Lauzier Park. And I'm checking with the district. Apparently, that has been discussed. If this is such good water, why not stick it on a farm?

The other thing is that if the build out continues, there'll be enough electrical power used by the data centers to run 300,000 houses? Now, that's a figure that I got partly from Ecology. I

don't think there's 300,000 people in Grant County. So, that's an awful lot of power being used for some very specific industries that don't seem to be benefiting our community.

I appreciate the fact that Ecology has had these meetings and I appreciate their hard work. Specific individuals, I think, have really tried to protect us. Unfortunately, I think that control devices on the diesel stacks are really the only way to satisfy me that emissions will be safe. Thank you.

Tami Dahlgren: Thank you. Next is Tom Flint. Hi.

Tom Flint: Hello. Tom Flint, 5842 Road 2 NW, Ephrata, Washington. I'm a farmer and PUD commissioner.

I just kind of want to set the record straight here that I'm supportive of the Dell application and also the other data centers. As a power user, they're pretty much a clean industry in reference to a lot of other industries.

And there's been reference made to – speculation about the PUD buying generator output from their server farms and there is no agreement to do that. And so, I just kind of wanted to set that record straight. Thank you.

Tami Dahlgren: Thank you. Mick Qualls, is it?

Mick Qualls: Thank you.

Tami Dahlgren: Hi.

Mick Qualls: My name is Mick Qualls. I own and operate an agricultural research facility. It's called The Laboratory, though. It's not a research farm. I've lived here for 40 years, but I've had my business for around 21 years. I have 7 full-time professionals that work for me and we conduct agricultural studies on your food supply. That's why we're as healthy as we are. You hear no complaints anymore about pesticides causing cancer in people or getting into groundwater. We went through years of that.

But I'm very concerned about the opposition to this business here. The Columbia Basin is an enormous agricultural area, tremendous technology here. There's no place in the world like it. But we want more business. I mean this county owns two dams

on the Columbia River and we have electricity to sell and we are encouraging other businesses to come here and that's what we want to do.

I also head up a group of about 100 people who are called the Grant County Fiber Active Group. We meet about every 2 weeks and we talk about electricity, how to sell it, how to encourage business, but our biggest thing is fiber optics.

These data centers would not be here if we didn't have commissioners like Tom Flint, ten years ago to start spending millions of dollars on a fiber optic system that brought those data centers here.

So, we're still right – our biggest goal right now is to get fiber optics to every house in this county. Right now, probably, half the houses in Grant County have a big fiber. It comes right into the house. It brings television, telephone and Internet.

That's why I'm saying, you're in one of the most high-tech areas in the world right here and we want to encourage that and keep it going.

But I want to make sure that the DOE people do not go away from here thinking that everybody in this room is terribly concerned about their health. I'm not at all. I own ten diesel tractors myself and we even bring those into the buildings in the winter and run them in the buildings and work on them. I mean sure there's diesel emissions, but I mean we've lived with that all of our lives.

But I also – I went to the Microsoft meeting. We had probably 100 people there. The meeting here with Yahoo!, we probably had almost twice this many.

But you can see that the community is not showing up with concern. There's a few people that are, but, I mean, I don't know – I'm telling you I know hundreds of people in this county and I have yet to meet one person, except in this room, that voices concern about diesel emissions and their health.

So, I want to always say welcome to the data centers, but can we give them – I want 'em to – you guys show your hands as to who is really concerned about your health here from diesel emissions. I know we have some.

Okay, how many people are not concerned about your health? I'm going to – okay, I just want to make sure. Now, if we'd have done that at the fire hall or here, I think you'd see it. But I think if we have another meeting in a couple of weeks, I don't think anybody is going to show up here.

So, with that _____.

Tami Dahlgren: Thank you. Steve Verhey. Did I pronounce that right?

Steve Verhey: No.

Tami Dahlgren: Sorry.

Steve Verhey: My name is Steve Verhey. I'm with Central Washington Biodiesel. I grew up just over the hill in Royal City. Now, I live in Ellensburg.

And just to start my comments with issues about diesel particulates. If you look at the black-and-white handout on Page 3, there's a pie chart that shows airborne carcinogens, cancer risk from airborne carcinogens, and it shows that diesel particles are responsible for 80 percent of the cancer risk from airborne pollutants.

Not to drum up any sort of fear or anything, but diesel particulates, whether we feel friendly toward them or not, are the most carcinogenic substance most of us ever come into contact with. That doesn't mean that I'm personally particularly concerned about them, but we do need to keep in perspective that it is the most prevalent carcinogen in the air.

So, as I say, I represent a biodiesel company. We already have experience supplying biodiesel to a server farm during the construction phase in response to environmental concerns. The switch from using ordinary diesel to using B99, 90 percent, 99 percent biodiesel resulted in an enormous increase in the quality of life for people working inside of Phase 2 of the Microsoft facility. It was like night and day. And the workers in there, the plumbers and electricians and the other trades, were really appreciative about what we were doing.

It's clear that biodiesel is a potential solution to air quality problems. There are some issues as we've already heard this evening.

For the record, we've heard about concerns with nitrogen oxides. I'll be following up and writing on this. But my understanding is that the production of nitrogen oxides, the increased production of nitrogen oxides from biodiesel is not well established science, certainly, not nearly as well established as the 90 percent reduction in particulates.

Another concern with biodiesel is its shelf life. And, in fact, back when we were helping build the Microsoft facility, someone asked me about putting biodiesel in the generator storage tanks and I recommended against it because of the shelf-life issue. The storage tanks were already in the ground. There was no way to modify the fuel delivery system.

It's easy to imagine designing a system for a new facility where there would be small tanks that could supply fuel to the generators for a short amount of time, say an hour, which is generous considering how nice the power is over here on this side of the river.

And so, biodiesel is a potentially good fit for reducing the particulate load from these facilities.

Another concern is whether the equipment is approved by the manufacturer for use with biodiesel. And I'm actually not suggesting that this server farm run its generators on 99 percent biodiesel. However, it is very unusual these days to find engine manufacturers that do not permit the use of B20, 20 percent biodiesel, which results in a proportionate reduction of particulates. I can't do the math in my head, but there's a significant reduction in particulates from using B99.

Now, this is a non-capital intensive, non-technological solution to the situation, but it's one that I've come to call Ecology's and Dell's attention to.

And so, with that, thank you for your time.

Tami Dahlgren: Thank you. Debbie Koehnen.

Debbie Koehnen: I just want to make sure that, you know, that _____ out – I just want to make sure.

Tami Dahlgren: Yeah, it should be. It's pretty sensitive.

Debbie Koehnen: I'm Debbie Koehnen. I live at 11443 Road P NW on the family homestead that's been there for over 100 years. My nearest neighbors are now data storage places.

And so, I just wanted to – kind of some food for thought here in the bigger picture of development.

Attended University of Washington. I was in the Husky marching band. Luckily enough, I was able to go to two Rose Bowls with the Husky marching band and the football team.

And the first time we went to Los Angeles, we were all on the plane and excited. And then we saw Los Angeles and the brown haze that covered Los Angeles. And we thought, "we're going into that?" And sure enough we did. And most of us got smog flu that week and it was not fun to come home, because that year we lost also. And so, between the smog flu and losing, we were not happy campers when we got home.

And then, you know, I graduated from the University of Washington. Worked over there for several years. Married a husband who came from the Seattle area. But my roots were here. And so, we, you know, came back. And that had been a lot of commuting across the pass to see mom and dad and the family. And his family was all from Seattle so we were going the other way now commuting across the pass.

And I will never forget the day, we rounded the bend at Issaquah to go down into the valley and saw the same brown haze over the Seattle area. And I went, "Oh, my gosh, the Seattle area is becoming like Los Angeles." And we don't want that here.

And I would like to be a little more proactive in our community, in our county knowing that with change things are going to happen and the reason they have to put the filters on in different areas is because their air quality isn't as good as ours, but they started with the same air quality as we did. And if they can get that brown smoggy haze over Seattle, then we can too. And so, I would like to be a little more proactive and putting maybe some

filters on things so that we don't get to the point where, boom, we're up there and it's too late.

The other comment I had is that I just sent away a daughter to leadership camp. She's leadership in training. And she was fine until the week before camp. And she's going to be working with younger kids and wants to be a teacher. And I'm thinking, "Why do you want to be a teacher? I'm a teacher. Haven't I taught you anything? It's a noble profession, but you don't get paid a lot."

But she said, "What do I do if the kids don't listen to me, mom? I'm just really nervous and afraid. You know, what if they just, you know, don't look at me as a role model and they're not listening to me?"

And I, you know, said, "Well, here, honey, here's the golden rule that you learn as a parent or a teacher, if you're not hurting anybody and they're not going to hurt themselves and they're not going to destroy anything, then sometimes you just let – you just have to let them do it, because they're going to discover from their mistakes. As long as they're not going to hurt themselves, somebody else or destroy property, it's probably okay just to let them, you know, make that mistake if they're not going to listen to you. If the other thing is happening, then you should stop them and do whatever you have to to stop them."

And so, she was like, "Okay, I'll try it, mom," and was a little nervous.

And I'm looking at these figures and my closest neighbors, of course, are now the data storage centers. And I'm looking at those dispersion things going that's getting a little close to home for what I'm comfortable for.

And as we're planning this, thinking we're already at 50 and we can only get to 100, I love progress, but is it going to destroy something or hurt somebody or hurt ourselves?

And, again, let's be a little proactive so that we don't find ourselves all of a sudden at that threshold going, uh, now what? We can't modify those diesels. It's too expensive now. It would have been cheaper if we would have just put those filters on in the long run.

And as I say I'm a teacher. I, you know, don't make a whole lot of money. It's a noble profession. So, I'm thinking, you know, the whole cost effectiveness thing, how much profit is enough profit? And how much should we put in to protecting our environment and our kids?

And I deal with the future all the time when I'm looking at those second graders. How much is our future worth?

I don't want to get there and say, ah, should have, could have, would have. We should have.

So that's my food for thought for tonight. And, hopefully, I won't have to bulldoze the family farm, put it in my will and never have my kids come back, because I don't want them to be exposed to those horrible toxins, but thank you.

Tami Dahlgren: Thank you. And our last person for now at least, unless somebody else decides they want to testify is Patty Martin.

Patty Martin: I've asked a lot of the questions for clarification and I'd like to, first, as I mentioned earlier, object to the fact that we're using Tier 2 engine, when the Tier 4 engines are available, reduce the diesel particulate by 90 percent and since – and I wish I could remember your first name –

Steve Verhey: Steve.

Patty Martin: Yeah, Steve mentioned diesel is the number one toxin in Washington State. It is the most toxic toxin that they know of. In fact, one of the reports I read says it's 7 ½ times more toxic than all 181 hazardous air pollutants combined. So, I'd just like to make a point of noting that.

I also object again to the arbitrary and capricious nature of the 100 cancers per million that's been established for Quincy. That's unheard of. Okay. The EPA standard is not 100 cancers in a million.

David Ogulei was very kind and I'd like it noted for the record that he mentioned that one of the reasons that the backed policy – that there's not anything more stringent being used is that the back policy that I'm going to insert for the record was basically established in the Tier 3 with Microsoft that established a goal of

100 cancers per million as an ample margin of safety for the City of Quincy and that until the above which a new source of DEEP, which is the diesel emission particulate, would not be approved to locate in Quincy without requiring offsets or other mitigation. So, until we get to the 100 cancers in a million, there is not going to be any mitigation or other offset.

Something that Deborah Koehnen spoke to is that the 50 cancers around the Dell and Microsoft. What she doesn't know is that they're already at 100 around the Yahoo! and Intuit centers and that there will have to be some sort of – I mean we will see what happens when Sabey comes in there. So, they're looking at the town as 2 separate 100 cancers per million.

Okay. I wanted to note that one of the reasons that Dell was claiming that they can have these lower hours of operation is in part due to the claim of redundant power. And just, coincidentally, I happen to have a lot of Grant County PUD hours, because I was concerned about Microsoft's outages at the West Sub-Quincy station not just from power outages that occur in Grant County because of unplanned outages, because there's a lot of outages that occur at these substations that are planned, right? And the generators operate during those times just as they operate during emergency times.

So, just, coincidentally, the two feeders that Dell is talking about using for redundant power and then placing another feeder substation at a later date are known as Q6 and Q11, which I have five years of data on.

And it turns out that the Q11 substation which feeds the southern part of town, which I am, which we always have outages, has had 4,668 minutes, which is 77.8 hours of outage in the last – since 2006. So, that's, I don't know, does somebody want to do the math? That's 6 ½ hours is twice –

And then, the Q6 is 2,861.

I'm going to object also to the increase stack height and the fact that Ecology is allowing this project to be phased and not have reviews at the different, you know, Phase 2 and Phase 3, because there are new air quality rules coming down and that's a way of grandfathering in Dell's construction. It's inappropriate. It's a prohibited dispersion technique. And allowing for increased stack

height is also – it's not 65 meters, that's not a cut-and-dry rule. The rule is 2 ½ times the height of the source and then only if – you can continue to raise it as much as you want as long as it's because of building downwash, and that doesn't seem to fit the protocol.

And had Dell's emissions been considered at a height that was similar to Microsoft's initial one, they would have been in the neighborhood of 25 to 30 cancers. Dell's original proposal before they raised their stacks was 22.2 cancers or 21.2 cancers. So, there's comparison of stack heights and cancers related to them as the stacks go up.

I also didn't get – I didn't ask this question, but I want to object to the Ecology's – most of what the data centers do is not at the data centers' whim, it's at the urging of Ecology, and the meteorological data from Moses Lake rather than using meteorological data from Ephrata. Ephrata sits next to the mountains like Quincy does. There's 61 years' worth of hourly data at the Ephrata airport. There's 10 years of hourly data at the Moses Lake airport. Moses Lake is wide open. There aren't hills right by the international airport. There's a water body. All of those things influence wind flow and dispersion modeling, so I wanted to note that for the record.

I'm concerned that there was no cost to health. You know, absolutely, no cost to the impact on the community's health from diesel or from the NOx. And also that there is absolutely no review, no review of cumulative, synergistic or additive effects on cancers that were already or exposures we're already having in this community. And there's no impact whatsoever considered on farms or farmland from the deposition of these materials.

DPM, the diesel toxic particulate matter has other chemicals in it. I mean it has benzene. It has benzoidpyrene. It has cadmium. It has other heavy metals and none of that – and dioxin, I think – none of that's been factored.

And then, to support my claim of arbitrary and capricious, Michele Vazquez, who has left the Department of Ecology Office of Regulatory Assistance, left some memos. And I apologize, I didn't' bring the whole document, but I did in largest part, because somebody blacked it all out so we couldn't read it.

But it says here that Tier 3 analysis is to be conducted. The acceptable risk level has not yet been determined. Okay, this is talking about Quincy. The acceptable risk level has not yet been determined. They're working on it.

Okay, and we're all being told that 100 cancers in a million is EPA standard. Okay. It's what's considered an upper level of standard as you're trying to alleviate something. It's not a standard you put in place and shoot for, okay?

So, we're not getting any diesel oxidation catalysts or anything as other communities have gotten, not because it's not that, because it is that. And there's funding available through the Diesel Emission Reduction Act, which was just reauthorized last year for anybody that can't afford to put them on. Okay? So, there's no reason to say it's not affordable. It's affordable, but we're not getting it, not because it's not that. We're not getting it, because Ecology has set a policy of 100 cancers in a million.

Thank you.

Tami Dahlgren: Thank you.

That's all the folks we had signed up to comment, but is there anyone else who would like to comment for the record tonight?

Okay. Seeing nobody, let the record show this hearing was adjourned at 7:50 PM. Thank you, everyone.

[End of Audio]

Appendix E
Public Notices

1. **News release:**

DEPARTMENT OF ECOLOGY
State of Washington

News Release

Department of Ecology News Release - June 16, 2011

11-166

Ecology seeks comment on Dell Data Center in Quincy

SPOKANE — The Washington State Department of Ecology (Ecology) invites the public to comment on a proposed "notice of construction" order (permit) for the "Dell Marketing, LP" (Dell) Data Center proposed to be located in Quincy to store data and run software applications.

The Dell Data Center would be located directly north of the Microsoft Columbia Data Center and would be phased in over several years depending on customer demand.

To build a data center, Dell needed first to apply to Ecology for the "notice of construction" permit, which is written to protect air quality. The permit is needed because data centers use large, diesel-powered backup generators to supply electricity to the servers during power failures.

The primary air contaminant sources at the facility would be 28 electric generators powered by diesel engines. The generators would have a power capacity of up to 84 megawatts, once the facility is fully built. They would provide emergency backup power to the facility in case Grant County PUD electrical power service is ever disrupted.

As part of the permit review process, Ecology carefully evaluates whether the diesel exhaust from a data center's backup generators could cause health problems.

Diesel engine exhaust carries toxic air pollutants. Because of this, Ecology requires a thorough evaluation of the potential health risks posed by the project. This evaluation was conducted under what's called a "second-tier review of the health impact assessment." The second tier review is required when emissions of pollutants are expected to reach a certain threshold.

A summary of the potential health effects caused by diesel engine exhaust is available online (http://www.ecy.wa.gov/pubs/1102005.pdf).

Before the permit is final, public comment will be taken into consideration. The public may comment in writing to Ecology until midnight on July 18, 2011. In addition, a public hearing is scheduled to be held at 6:30 p.m. Wednesday, July 13 in the upstairs meeting room at Quincy City Hall, 104 B St. SW. Pre-hearing presentations and discussion will begin at 5:15 p.m. The hearing will continue until everyone who wants to testify has had the opportunity to do so.

Copies of the draft permit and the health assessment are available for review at the offices of the City of Quincy, 104 B St. SW, Quincy and at the Department of Ecology, Eastern Regional Office, 4601 N. Monroe St., Spokane, WA. For more information or to view the documents online (http://www.ecy.wa.gov/programs/air/quincydatacenter).

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

###

Media Contact: Jani Gilbert, Communications, 509-329-3645; jagi461@ecy.wa.gov

For more information on the Quincy Data Center
(http://www.ecy.wa.gov/programs/air/quincydatacenter)

2. Public Notice required under WAC 173-400-171(2)(a)(i) and WAC 173-460-100(6)

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY
NOTICE TO CONSTRUCT A NEW AIR POLLUTION SOURCE,
ANNOUNCEMENT OF PUBLIC HEARING,
& SECOND TIER PETITION APPROVAL RECOMMENDATION

The State of Washington Department of Ecology (Ecology) has received application to construct a new air pollution source. Dell Marketing, LP has proposed to build the Dell Data Center located within the north half of Section 7, Township 20 North, Range 24 EWM and accessed by Road D NW, Quincy in Grant County. The Dell Data Center will contain three separate building once it is fully constructed, and will install and operate up to 28 diesel engines. Each of the 28 diesel engines will power 3.0 megawatt electrical generators for a total of 84 megawatts of emergency backup electrical power. The diesel engine exhaust particulate (DEEP) emissions from the diesel engines were reviewed under a Second Tier Health Impact Assessment to evaluate health risks posed by the project. After review of the completed Notice of Construction application and other information on file with the agency, Ecology has decided that this project proposal will conform to all requirements as specified in Chapter 173-400 WAC. After review of the Second Tier Health Impact Assessment, Ecology concluded that impacts to the community will meet the requirements that are protective of health as contained in Chapter 173-460 WAC. Copies of the Notice of Construction Preliminary Determination, the Second Tier Petition Approval, and supporting application documents are available for public review at Department of Ecology, Eastern Regional Office, 4601 N. Monroe, Spokane, WA 99205-1295, and at the City of Quincy, 104 B Street SW, Quincy, WA 98848. A public hearing has been scheduled to start at 5:15 PM on July 13, 2011 in the upstairs meeting room at the Quincy City Hall located at 104 B Street SW in Quincy. The public hearing will include presentations by Ecology and Dell on the proposed project, the air quality regulatory requirements, and the results of our analysis. Public comment will be taken starting at 6:30 PM. In addition to public comments taken at the public hearing, the public is invited to comment on this project proposal by submitting written comments no later than July 18, 2011 to Kendra Robinson-Harding at the above Spokane Ecology address or by email at krob461@ecy.wa.gov. Please note the change to the starting time of the hearing as well as the change in who will receive written comments.

3. Display ad, English

You Are Invited to a

Public Hearing

on the

Dell Data Center

Proposed Permit

Wednesday, July 13th, 2011

- **Meet and Greet at 5:15pm**
- **Presentations at 5:30pm**
- **Formal Hearing at 6:30pm**

Quincy City Hall, Upper Meeting Room
104 B Street SW, Quincy, WA

We want to hear from you!

The public comment period is open now. Comments will be accepted until midnight on July 18th, 2011

To comment or for more information:

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

Email: krob461@ecy.wa.gov

DEPARTMENT OF ECOLOGY
State of Washington

4. Display ad, Spanish

Le invitamos a una

Audiencia Pública

sobre el propuesto permiso

para la

Dell Data Center

Miércoles, el 13 de julio de 2011

- **Reunir a las 5:15 p.m.**
- **Presentaciones a las 5:30 p.m.**
- **Audiencia Oficial a las 6:30 p.m.**

Quincy City Hall, Sala de Reuniones Superior
104 B Street SW, Quincy, WA

¡Queremos escuchar sus comentarios!

El periodo de aceptar comentarios está abierto ahora hasta la medianoche del 18 de julio de 2011.

Para entregar sus comentarios o obtener más información:

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

E-mail: krob461@ecy.wa.gov

DEPARTMENT OF ECOLOGY
State of Washington

Appendix F
Technical Support Document

DEPARTMENT OF
ECOLOGY
State of Washington

Technical Support Document for Second Tier Review

Dell Data Center
Quincy, Washington

June 10, 2011

Reviewed By:

David Ogulei, Project Manager: (360) 407-6803

Gary Palcisko, Toxicologist: (360) 407-7338

Clint Bowman, Modeler: (360) 407-6815

Approved By:

Jeff Johnston, Risk Manager: (360) 407-6115

Washington State Department of Ecology
Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600

www.ecy.wa.gov

Fax: (360) 407-7534

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1. EXECUTIVE SUMMARY

1.1. Proposal Summary

Dell Marketing, LP (Dell) proposes to build a new data center located in Quincy, Grant County, Washington. The project will consist of two main buildings to house server equipment and three smaller buildings to house a total of 28 diesel-powered backup generator sets each rated at 3,000 electrical kilowatts (kWe).

Potential emissions of diesel engine exhaust particulate (DEEP) from the proposed backup engines exceed regulatory trigger levels called Acceptable Source Impact Levels (ASILs). Therefore, Dell is required to submit a second tier petition per Chapter 173-460 Washington Administrative Code (WAC).

The Washington State Department of Ecology (Ecology) determined that a community-wide approach to permitting data centers was warranted for the Quincy urban growth area (UGA) because of the relatively close geographic proximity of existing and planned large data centers in Quincy. As part of the community-wide approach, Ecology considered the cumulative impacts of DEEP from existing permitted data centers and other nearby sources of diesel engine emissions.

1.2. Health Impacts Evaluation

Dell retained ICF International (ICF) to prepare a Health Impact Assessment (HIA) to evaluate the potential health risks attributable to operation of the diesel-powered generators from Dell's data center project. The HIA demonstrated that emissions of DEEP from the proposed project could result in an increased cancer risk of up to five in one million (5×10^{-6}) at the maximally impacted residential location, which is an undeveloped residentially zoned property immediately to the east of Dell. Because the increase in cancer risk attributable to the new data center alone is less than the maximum risk allowed by a second tier review, which is 10 in one million, the project could be approvable under WAC 173-460-090.

1.3. Cumulative Health Risks

Ecology also evaluated emissions from other nearby emission sources to determine the cumulative long-term health impacts associated with DEEP.

Ecology estimates the maximum potential cumulative cancer risk posed by DEEP emitted from Dell and other nearby sources to be approximately 49 in one million (49×10^{-6}) at a location directly adjacent to Microsoft Columbia Data Center's northern boundary and Dell's southeast boundary. This parcel is currently not developed, and parcel information from Grant County reports this parcel's current land use as "General Trade-Merchandise." Quincy's zoning and planning map indicates that the parcel is zoned "multi-family residential."

1.4. Conclusions and Recommendation

Ecology recommends approval of the proposed project because project-related health risks are permissible under WAC 173-460-090, and the cumulative risk from DEEP emissions in Quincy is less than the cumulative risk goal established by Ecology for permitting data centers in Quincy (100 per million or 100 x 10^{-6}). Ecology recommends that Dell be required to communicate health risks posed by Dell's emissions to current residents near Dell, and potential new homeowners at undeveloped parcels adjacent to Dell, or to the local regulatory agency responsible for zoning and development in the affected area.

The remainder of this document describes the technical review performed by Ecology.

2. DELL QUINCY DATA CENTER PROJECT

Dell proposes to build a new data center complex in Quincy, Washington. The Dell Data Center is located directly north of the Microsoft Columbia Data Center and will be utilized by Dell to store data and run software applications. The project will be located in the northeastern portion of Quincy's UGA (Figure 1), and include two main buildings to house server equipment and twenty-eight (28) backup generators. The primary air contaminant sources at the facility consist of the twenty-eight (28) electric generators each powered by 3,298 mechanical kilowatts (kWm) (i.e., 4,423 brake horse power (bhp)) Caterpillar C175-16 diesel engines. Each generator has the capacity to produce 3,000 electrical kilowatts (kWe) and provide emergency backup power to the facility during infrequent disruption of Grant County Public Utility District's (PUD) electrical power service. At full buildout, the generators will have a combined power capacity of up to 84 megawatts electrical (MWe). The project will be phased in over several years depending on demand.

The Dell Data Center consists of phased construction of three buildings, i.e., Phase 1, Phase 2, and Phase 3. Phase 1 construction of 100,866 square feet (ft^2) will commence during 2011, and includes fourteen (14) 3.0 MWe generators powered by 4,423 bhp Caterpillar C175-16 engines. Phase 2 and 3 construction will be 56,659 ft^2 and 57,508 ft^2 of space each, respectively, and each phase will include seven (7) 3.0 Megawatts (MWe) electric generators powered by 4423 brake horse power Caterpillar C175-16 engines. The 14 engines that are part of Phase 2 and Phase 3 will be installed at an undetermined date.

Three generator buildings near the western edge of the proposed facility boundary will house the engines (Figure 2). Exhaust from each engine will be routed through vertical stacks that extend to 58 feet above grade through the roof of the generator buildings.

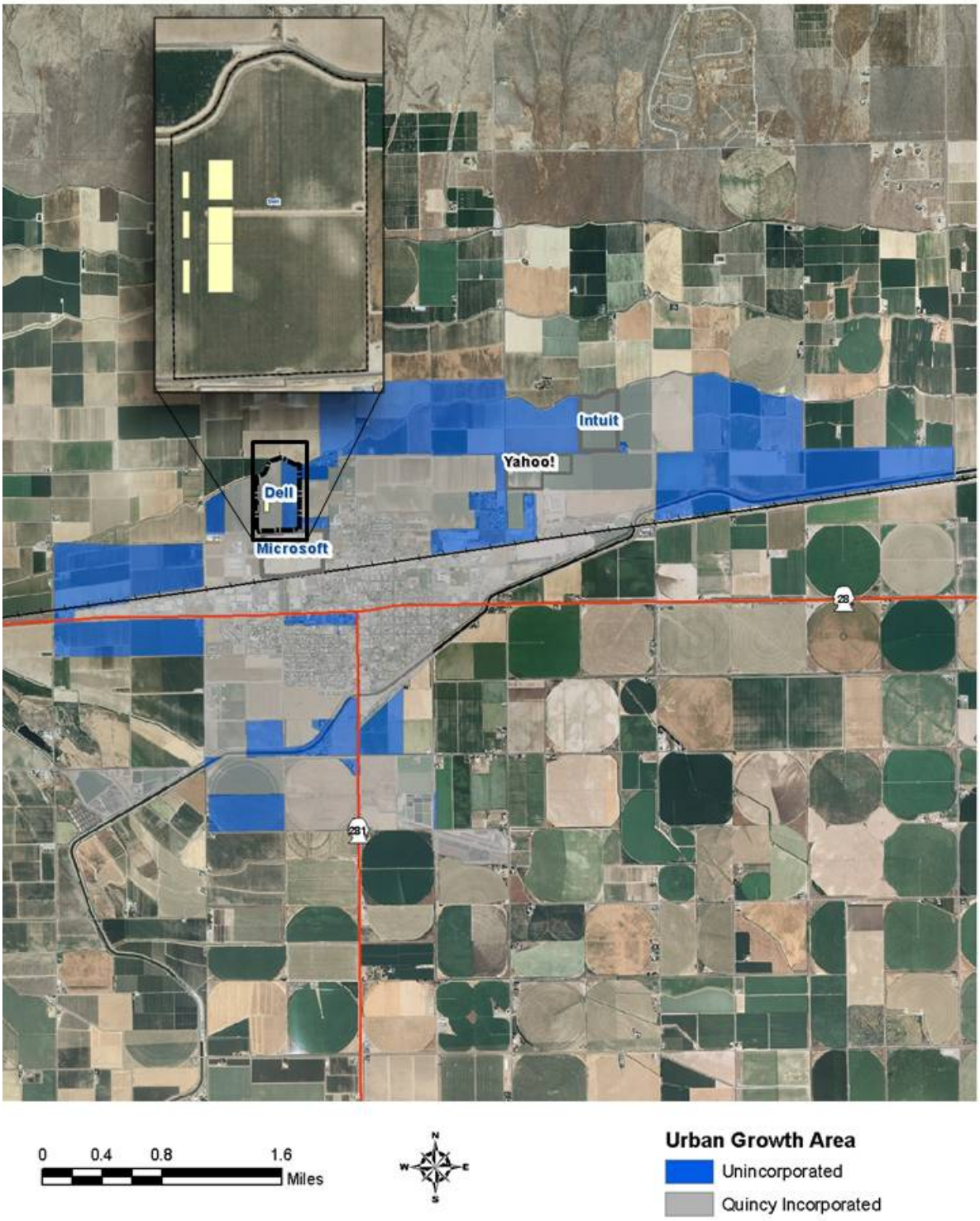

Figure 1. Dell Data Center location within Quincy, WA's UGA

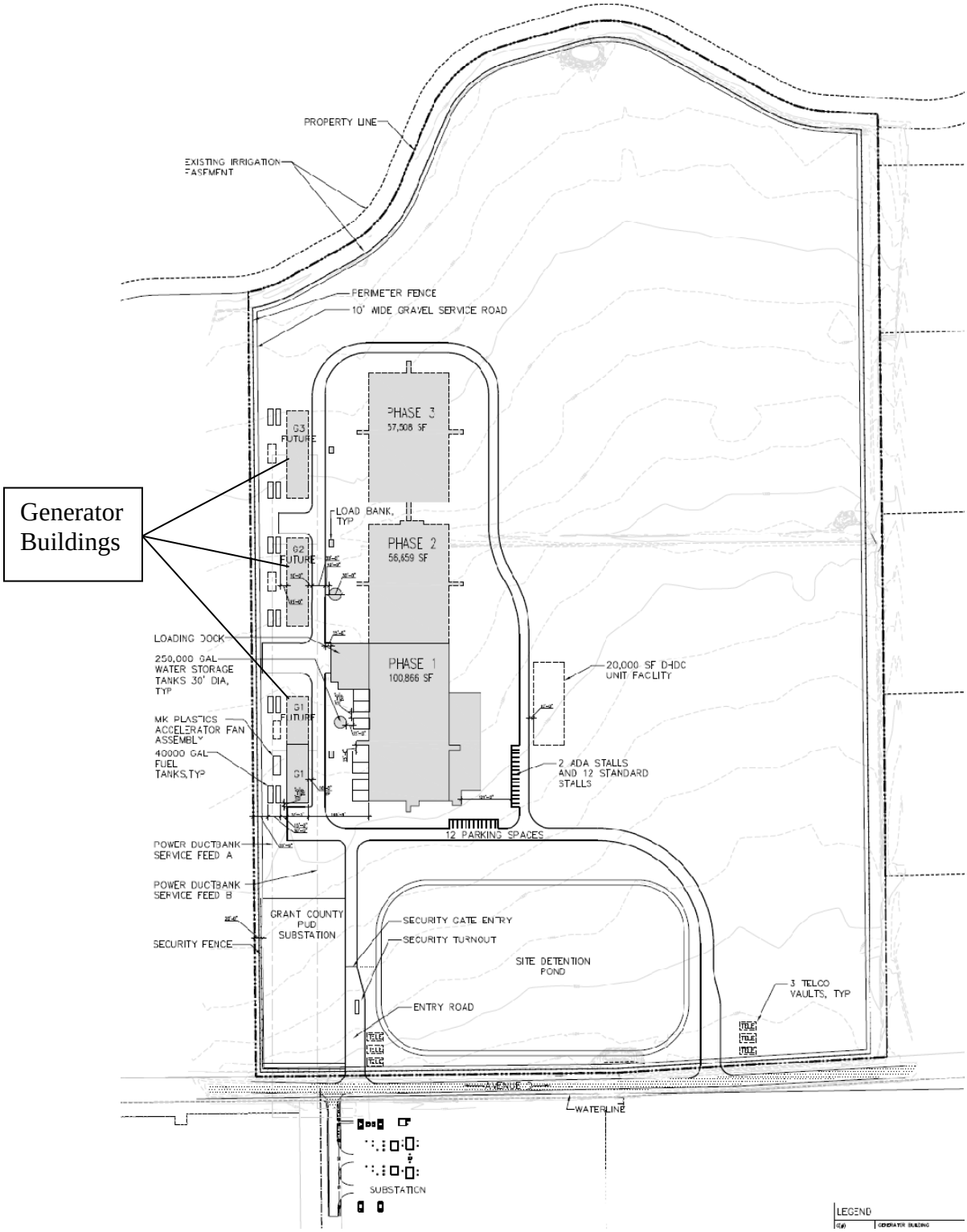

Figure 2. Site plan drawing showing general location of air emission units (ICF, 2011a)

In order to minimize air quality impacts from the proposed project, Dell proposes to limit the duration of engine testing, maintenance, and other usage. The 28 engines will operate for an average of 53.5 hours per year (averaged over three years). Engines will operate for varying durations and loads depending on the type of test being ran. The only time all 28 engines would operate simultaneously is during a complete power outage. The May 19, 2011, draft Notice of Construction (NOC) approval order imposes a facility-wide fuel usage limit of 175,031 gallons per year of ultra-low sulfur (less than 0.0015 wt percent), EPA on-road specification No. 2 distillate fuel oil. Total annual fuel consumption by the facility may be averaged over a three-(3) year period using monthly rolling totals. Table 1 provides a summary of Dell's proposed operating durations (ICF 2011a).

Table 1. Operating Time Limits for Dell's Proposed Data Center Diesel Engines

Scenario	Engine Load	Hours per Test	Tests per Year	Average Hours per Year per Engine*	Maximum # of Engines Tested per Day	# of Engines Operating Concurrently
Weekly Testing	10%	0.5	40	20	14	1
Monthly Testing	70%	1.25	10	12.5	8	1
Semi-Annual Testing	70%	1.5	1	1.5	8	Engines run one at a time for 1hr of the test, then simultaneously for the last ½ hour of the test time
Annual Testing	100%	4	1	4	2	1
	70%	0.75	1	0.75	8	8
Maintenance	70%	As needed	As needed	8	1	1
Power Outage	70%	As needed	As needed	8	All	19
	Reserves @ idle (10%)			4		9
* The 5/19/2011 draft NOC approval order allows 3-year averaging of average hours of operation.						

2.1. Dell Data Center Power Reliability and Infrastructure

Dell designed the first phase of their proposed data center to achieve a tier 4 data center industry classification. To attain this classification, Dell must ensure that their electrical supply is stable and can be maintained almost continuously. For this reason, Dell will have several backup generators and redundant backup generators.

The design calls for a dual-feed electrical supply system that can receive power from two independent substations. These substations will receive power from two separate supply lines (A-feed and B-feed) (ICF, 2011b). If Grant County PUD suffers a complete loss of power to either A-feed or B-feed, then Dell's electrical system will instantly and automatically switch to the other intact feed. This automatic feed switch will not activate any of Dell's backup generators. Therefore, a total loss of Grant County PUD's line power to either A-feed or B-feed would not result in any generator emissions. In the unlikely event that Grant County PUD suffers a loss of power to its entire Quincy transmission system from its two independent transmission lines, Dell's backup generators would automatically activate. This is the only type of event in which a loss of Grant County PUD line power would cause every generator at Dell to activate simultaneously.

Dell's redundant power supply means that generators will not need to operate when transformers within the Dell buildings are taken off-line for scheduled maintenance. Dell will be able to manually switch power from one feed line to the other without engaging backup generators.

2.2. Land Use

Dell's property is located in an industrial-zoned area along the northeastern portion of Quincy city boundary (Figure 3). Several nearby parcels are currently used as agricultural parcels (Figure 4), but the Quincy area zoning map (Figure 3) shows that these areas are planned for residential use in the future. Table 2 describes current and planned land uses in properties surrounding the Dell facility (Grant County, 2011; City of Quincy, 2011).

Table 2. General Land Use Zone Near Dell Data Center in Quincy, WA

Direction From Dell	Current Land Use (from Tax Parcel Information)	Planned Zoning (from Quincy map)	Notable Development
North	Agriculture	Open	
Northeast	Agriculture Residential	Residential	
East Southeast	Agriculture Residential	Residential	Mountain View Elementary School
South	Industrial	Industrial	Microsoft Data Center
Southwest	Industrial	Industrial	
West	Agriculture	Industrial	
Northwest	Agriculture	Open	

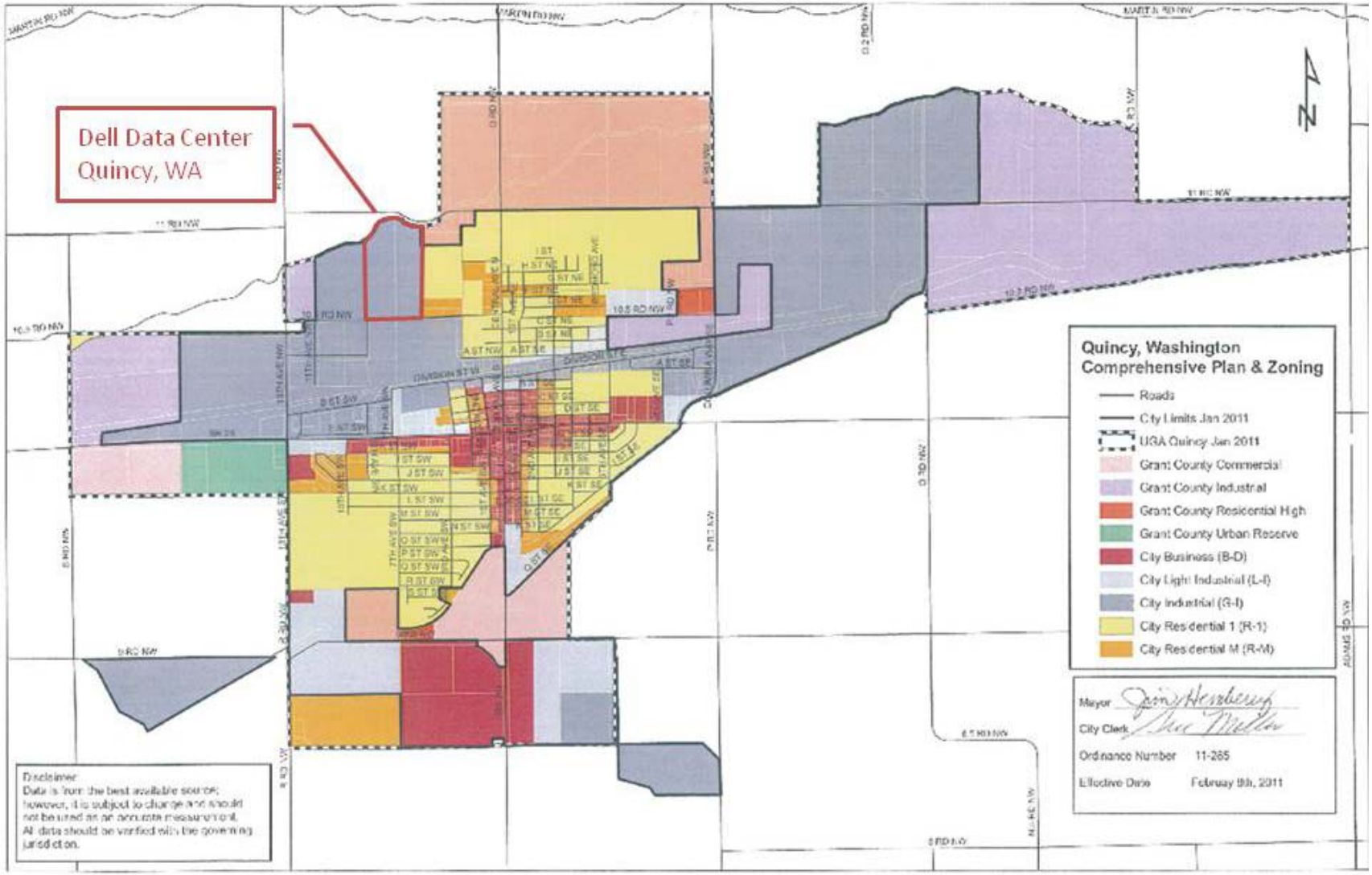

Figure 3. Land use planning and zoning map
(ICF, 2011b; City of Quincy, 2011)

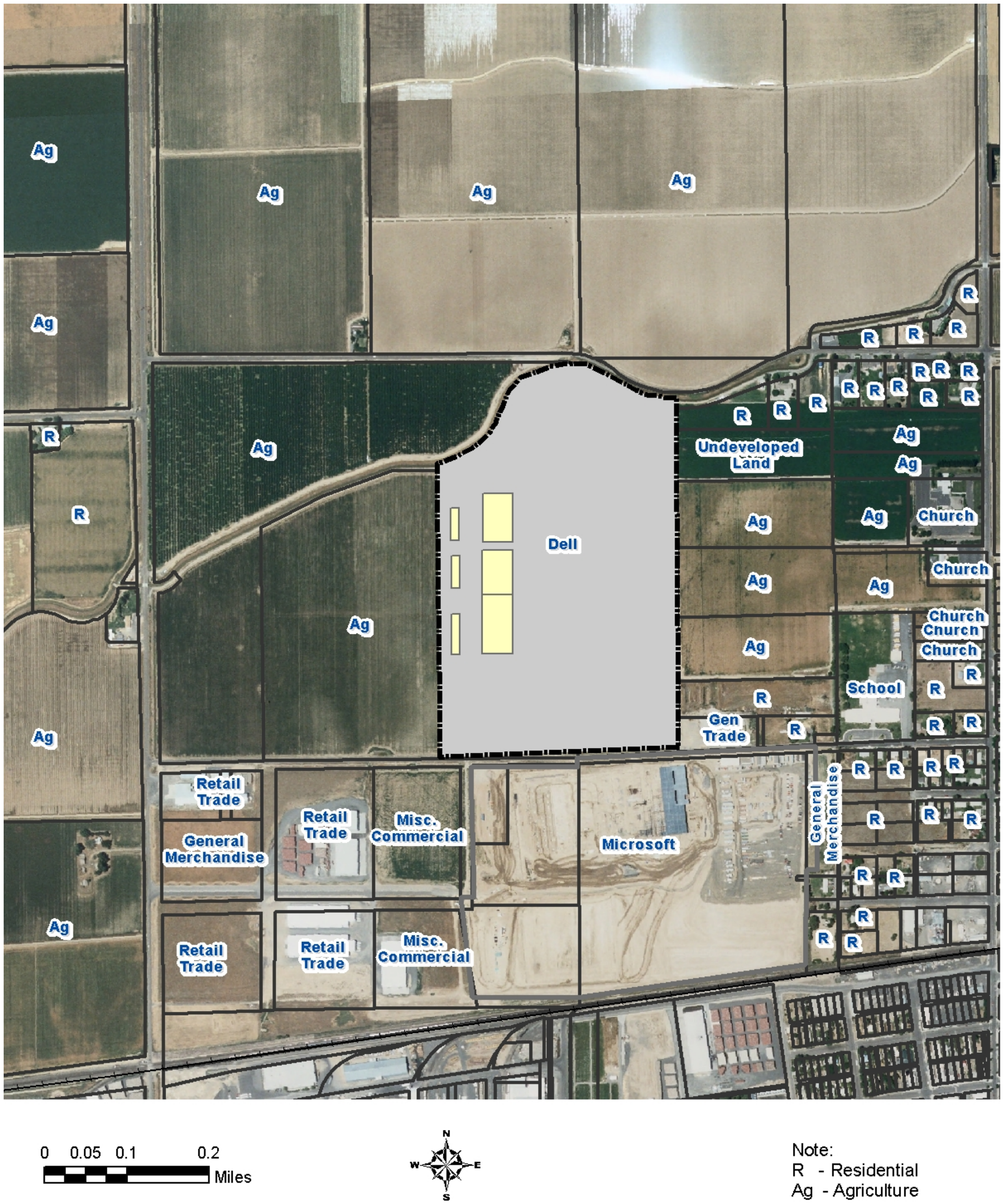

Figure 4. Current land use designation according to Grant County Parcel Information (Grant County, 2011)

3. PERMITTING REQUIREMENTS FOR NEW SOURCES OF TOXIC AIR POLLUTANTS

3.1. Overview of the Regulatory Process

The requirements for performing a toxics screening are established in Chapter 173-460 WAC. This rule requires a review of any non-de minimis[1] increase in toxic air pollutant (TAP) emissions for all new or modified stationary sources in the state of Washington. Sources subject to review under this rule must apply best available control technology for toxics (tBACT) to control emissions of all TAPs subject to review.

There are three levels of review when processing a NOC application for a new or modified emissions unit emitting TAPs in excess of the de minimis levels: (1) first tier (toxic screening), (2) second tier (health impacts assessment), and (3) third tier (risk management decision).

All projects with emissions exceeding the de minimis levels are required to undergo a toxics screening (first tier review) as required by WAC 173-460-080. The objective of the toxics screening is to establish the systematic control of new sources emitting TAPs in order to prevent air pollution, reduce emissions to the extent reasonably possible, and maintain such levels of air quality to protect human health and safety. If modeled emissions exceed the trigger levels called acceptable source impact levels (ASILs), a second tier review is required.

As part of a second tier petition, described in WAC 173-460-090, the applicant submits a site-specific health impacts assessment (HIA). The objective of a HIA is to quantify the increase in lifetime cancer risk for persons exposed to the increased concentration of any carcinogen, and to quantify the increased health hazard from any noncarcinogen that would result from the proposed project. Once quantified, the cancer risk is compared to the maximum risk allowed by a second tier review, which is 10 in one million, and the concentration of any noncarcinogen that would result from the proposed project is compared to its effect threshold concentration.

In evaluating a second tier petition, background concentrations of the applicable pollutants must be considered. If the emissions of a TAP result in an increased cancer risk of greater than 10 in one million (equivalent to one in one hundred thousand), then an applicant may request Ecology perform a third tier review. For noncarcinogens, a similar path exists, but there is no bright line associated with when a third tier review is triggered.

A third tier review is a risk management decision in which Ecology makes a decision that the risk of the project is acceptable 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, and related factors associated with the facility and the surrounding community.

[1] If the estimated increase of emissions of a TAP or TAPs from a new or modified project is below the de minimis emissions threshold(s) found in WAC 173-460-150, the project is exempt from review under Chapter 173-460 WAC.

3.2. BACT and tBACT for the Dell Data Center Project

Ecology is responsible for establishing BACT and tBACT for controlling criteria and TAPs emitted from the new diesel generators. The proposed generators will use EPA Tier 2 combustion controls to reduce emissions of particulate matter, oxides of nitrogen (NO_X), including nitrogen dioxide (NO_2), unburned hydrocarbons, and other pollutants. Ecology's BACT and tBACT determinations are summarized in Tables 3 and 4, respectively (Ecology, 2011a).

Table 3. Summary of BACT Determination

Pollutant(s)	BACT Determination
Particulate matter (PM), carbon monoxide, and volatile organic compounds	a. Use of good combustion practices; b. Use of EPA Tier 2 certified engines if the engines are installed and operated as emergency engines, as defined at 40 CFR§60.4219; or applicable emission standards found in 40 CFR Part 89.112 Table 1 and 40 CFR Part 1039.102 Tables 6 and 7 if Model Year 2011 or later engines are installed and operated as nonemergency engines; and c. Compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Nitrogen oxides (NO_X)	a. Use of good combustion practices; b. Use of an engine design that incorporates fuel injection timing retard, turbocharger and a low-temperature aftercooler; c. Use of EPA Tier 2 certified engines if the engines are installed and operated as emergency engines, as defined at 40 CFR§60.4219; or applicable emission standards found in 40 CFR Part 89.112 Table 1 and 40 CFR Part 1039.102 Tables 6 and 7 if Model Year 2011 or later engines are installed and operated as nonemergency engines; d. Compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII; and e. Installation of a two-stage oxidation catalyst system (i.e., 3-way catalysts) that is guaranteed by the catalyst manufacturer to remove 35% of nitrogen oxides, and capable of reducing at least 50% each of carbon monoxide, volatile organic compounds, and particulate matter from the exhaust stream.
Sulfur dioxide	Use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

Table 4. tBACT for Air Toxics Emitted by Dell's Diesel Engines

Toxic Air Pollutant(s)	tBACT Determination
Acetaldehyde, carbon monoxide, acrolein, benzene, benzo(a)pyrene, 1,3-butadiene, diesel engine exhaust particulate, formaldehyde, propylene, toluene, total PAHs, xylenes	Compliance with the VOC BACT requirement
Nitrogen dioxide	Compliance with the NO_X BACT requirement
Sulfur dioxide	Compliance with the SO_2 BACT requirement

Additional restrictions proposed by Ecology in the May 19, 2011, draft preliminary approval order include:

- Limiting DEEP emissions from the 28 new engines (combined) to 0.71 tons per year.
- Limiting NO_2 emissions from the 28 new engines (combined) to 76 pounds per hour.
- Limits on NO_X and NO_2 emissions from each of the 28 new engines.
- Limiting NO_2 emissions from each of the 28 new engines to the following emission rates at the stated loads, based on emission factors provided by the engine manufacturer.

Operating Scenario	Operating Load	Emissions Limit per engine in g/kWm-hr	Emissions Limit per engine in lb/hr
Weekly Testing	10% (idle)	0.612	0.615
Monthly Testing	70%	0.716	3.712
Semi-Annual Testing	70%	0.716	3.712
Annual Testing	95%	0.823	5.700
Maintenance	70%	0.716	3.712
Power Outages	70%	0.716	3.712

- Limits on the total amount of hours that engines operate.
- Use of ultra-low sulfur diesel fuel (15 parts per million sulfur content).
- Compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.

The project review team for the second tier review concurs with this tBACT determination.

3.3. First Tier Review Toxics Screening for the Dell Data Center Project

Dell's consultant, ICF, used a combination of EPA emission factors, EPA Tier 2 engine emission limits, and manufacturer test data to estimate emission rates of TAPs from Dell's diesel-powered generators (ICF, 2011a).

Table 5. Comparison of Emission Rates to SQER

Pollutant	Averaging Period	Total Emissions	SQER	Emissions Above SQER
		See Averaging Period for Units	See Averaging Period for Units	Yes or No
Acetaldehyde	lb/yr	0.6043	71	No
Acrolein	lb/24-hr	0.027	0.00789	**Yes**
Benzene	lb/yr	18.6	6.62	**Yes**
Benzo(a)pyrene (TEQ*)	lb/yr	0.0119	0.174	No
Benz(a)anthracene	lb/yr	0.0149	1.74	No
Benzo(a)pyrene	lb/yr	0.0031	0.174	No
Benzo(b)fluoranthene	lb/yr	0.0226	1.74	No
Benzo(k)fluoranthene	lb/yr	0.0026	1.74	No
Chrysene	lb/yr	0.0367	17.4	No
Dibenz(a,h)anthracene	lb/yr	0.0041	0.16	No
Indeno(1,2,3-cd)pyrene	lb/yr	0.005	1.74	No
1,3-Butadiene	lb/yr	0.4688	1.13	No
Carbon Monoxide	lb/hr	401	50.4	**Yes**
DEEP	lb/yr	1418	0.639	**Yes**
Formaldehyde	lb/yr	1.89	32	No
Naphthalene	lb/yr	3.12	5.64	No
Nitrogen Dioxide	lb/hr	76	1.03	**Yes**
Propylene	lb/24-hr	9.7	394	No
Sulfur dioxide	lb/hr	0.7	1.45	No
Toluene	lb/24-hr	0.977	657	No
Xylenes	lb/24-hr	0.672	29	No
* TEQ – toxic equivalent (sum of relative toxicity of several polycyclic aromatic hydrocarbons similar to benzo(a)pyrene)				

Table 5 shows each TAP's proposed emissions compared to its respective small quantity emission rate (SQER).[2] DEEP, nitrogen dioxide, carbon monoxide, benzene, and acrolein emission rates exceed their respective SQER.

[2] An SQER is an emission rate that is not expected to result in an off-site concentration that exceeds an ASIL.

ICF used refined dispersion modeling (briefly described in Section 4.2.2) to model ambient concentrations of those TAPs that exceed their SQER. Table 6 shows a comparison of the modeled concentrations of pollutants that exceeded SQERs to their respective ASILs. Only DEEP levels exceeded the ASIL, therefore, Dell was required to prepare a HIA that evaluates potential risks from exposure to Dell's DEEP emissions.

Table 6. Comparison of Modeled Off-Site TAP Concentrations to ASILs

Pollutant	CAS#	Averaging Time	Highest Modeled Off-Site Concentration ($\mu g/m^3$)	ASIL ($\mu g/m^3$)	Exceeds ASIL
Acrolein	107-02-8	24-hr	0.0025	0.06	No
Benzene	71-43-2	Annual	0.00081	0.0345	No
Carbon monoxide	630-08-0	1-hr	1,760	23,000	No
DEEP	--	Annual	0.0062	0.00333	**Yes**
Nitrogen dioxide	10102-44-0	1-hr	468	470	No

Although NO_2 is not predicted to exceed its ASIL, and therefore not subject to a second tier review, our analysis also discusses potential impacts of exposure to NO_2 emissions from Dell (see Section 6.2).

3.4. The Community-Wide Approach

Between 2006 and 2008, Ecology permitted the construction of three data centers in Quincy, WA. Each data center installed multiple large backup diesel-powered generators to be used during power failures. In total, the three existing data centers currently operate a total of 46 diesel-powered generators each rated at 2.0 MWe electrical generating capacity or higher. Microsoft and Yahoo!'s recent expansion permits increased the total permitted diesel-powered emergency engines at Quincy area data centers to 69.

When Ecology permitted these facilities in 2006-2007, DEEP was not regulated as a TAP under Chapter 173-460 WAC, Controls for Toxic Air Pollutants. In June 2009 Ecology revised Chapter 173-460 WAC, and began regulating DEEP as a TAP, along with a number of other new pollutants. The revised rule established an ambient trigger level or ASIL for DEEP of 0.00333 $\mu g/m^3$, annual average, above which predicted ambient concentrations of DEEP are subject to second tier review. Primarily because DEEP was not previously regulated, data centers were permitted more hours of operation and fuel use than would likely be permitted under this revised rule.

On March 25, 2010, the governor signed into law a bill (ESSB 6789)[3] passed by the Washington State Legislature to promote the development of additional data centers in rural Washington.

[3] http://apps.leg.wa.gov/documents/WSLdocs/2009-10/Pdf/Bills/Session%20Law%202010/6789-S.SL.pdf

The final law gives anyone who starts constructing a data center between April 1, 2010 and July 1, 2011, an exemption from the sales tax for server equipment and power infrastructure. Among other requirements, eligible data centers have to be located in a rural county, cover at least 20,000 square feet dedicated to servers, and completed by April 1, 2018.

The passage of this *Computer Data Centers–Sales and Use Tax Exemption* Act of 2010 prompted much interest from companies wanting to build new data centers in Quincy and other parts of central and eastern Washington. To date, four companies have submitted proposals to Ecology to build or expand their Quincy data centers, including Microsoft Corporation; Yahoo!, Inc.; Dell Marketing, LP; and Sabey Corporation.

Given the interest in building several more data centers clustered within the Quincy UGA, and the potential for overlapping DEEP plumes, Ecology's Air Quality Program (AQP) recognized the need to consider the cumulative impacts of new and existing data centers on a community-wide basis (Ecology, 2010).

Under the community-wide risk evaluation approach, Ecology estimated background DEEP concentrations by modeling contributions from:

- The existing data centers assuming each of the data centers was operating at their allowed maximum rate; and
- Other known sources of DEEP in the Quincy area.

Section 4 of this document summarizes Ecology's review of Dell's HIA and presents results of our evaluation of cumulative DEEP concentrations in Quincy.

3.5. Second Tier Review Processing Requirements

In order for Ecology to review the second tier petition, each of the following regulatory requirements under Chapter 173-460-090 must be satisfied:

(a) The permitting authority has determined that other conditions for processing the NOC Order of Approval have been met, and has issued a preliminary approval order.

(b) Emission controls contained in the preliminary NOC approval order represent at least tBACT.

(c) The applicant has developed a HIA protocol that has been approved by Ecology.

(d) The ambient impact of the emissions increase of each TAP that exceeds ASILs has been quantified using refined air dispersion modeling techniques as approved in the HIA protocol.

(e) The second tier review petition contains a HIA conducted in accordance with the approved HIA protocol.

Ecology provided comments to ICF's HIA protocol (item (c)) on December 21, 2010. These comments were addressed as part of the submittal of the final HIA (item (e)) received by Ecology on April 28, 2011. The project review team found the refined modeling conducted by Dell to be acceptable.

Acting as the "permitting authority" for this project, Ecology's Eastern Regional Office (ERO) satisfied items (a) and (b) above on May 19, 2011. The applicant has therefore satisfied all of the five requirements above.

3.6. Second Tier Review Approval Criteria

As specified in WAC 173-460-090(7), Ecology may recommend approval of a project that is likely to cause an exceedance of ASILs for one or more TAPs only if it:

(a) Determines that the emission controls for the new and modified emission units represent tBACT;

(b) The applicant demonstrates that the increase in emissions of TAPs is not likely to result in an increased cancer risk of more than one in one hundred thousand; and

(c) Ecology determines that the noncancer hazard is acceptable.

The remainder of this document discusses the HIA review performed by Ecology.

4. HEALTH IMPACT ASSESSMENT

The HIA reviewed by Ecology was conducted according to the requirements of WAC 173-460-100. It addressed the public health risk associated with exposure to DEEP from Dell's proposed diesel-powered emergency generators and existing sources of DEEP in Quincy, WA. Dell's consultant (ICF) prepared the HIA (ICF, 2011b).

While the HIA is not a complete risk assessment, it loosely follows the four steps of the standard health risk assessment approach proposed by the National Academy of Sciences (NAS, 1983, 1994). These four steps are: (1) hazard identification, (2) exposure assessment, (3) dose-response assessment, and (4) risk characterization.

4.1. Hazard Identification

Hazard identification involves gathering and evaluating toxicity data on the types of health injury or disease that may be produced by a chemical, and on the conditions of exposure under which injury or disease is produced. It may also involve characterization of the behavior of a chemical within the body and the interactions it undergoes with organs, cells, or even parts of cells. This information may be of value in determining whether the forms of toxicity known to be produced by a chemical agent in one population group or in experimental settings are also likely to be produced in human population groups of interest. Note that risk is not assessed at this stage.

Hazard identification is conducted to determine whether and to what degree it is scientifically correct to infer that toxic effects observed in one setting will occur in other settings (e.g., are chemicals found to be carcinogenic or teratogenic in experimental animals also likely to be so in adequately exposed humans?).

4.1.1. Overview of DEEP Toxicity

Diesel engines emit very small fine (<2.5 micrometers [µm]) and ultrafine (<0.1 µm) particles. These particles can easily enter deep into the lung when inhaled. Mounting evidence indicates that inhaling fine particles can cause numerous adverse health effects.

Studies of humans and animals specifically exposed to DEEP show that diesel particles can cause both acute and chronic health effects including cancer. Ecology has summarized these health effects in "Concerns about Adverse Health Effects of Diesel Engine Emissions" available at http://www.ecy.wa.gov/pubs/0802032.pdf.

The following health effects have been associated with exposure to diesel particles:

- Inflammation and irritation of the respiratory tract
- Eye, nose, and throat irritation along with coughing, labored breathing, chest tightness, and wheezing
- Decreased lung function
- Worsening of allergic reactions to inhaled allergens
- Asthma attacks and worsening of asthma symptoms
- Heart attack and stroke in people with existing heart disease
- Lung cancer and other forms of cancer
- Increased likelihood of respiratory infections
- Male infertility
- Birth defects
- Impaired lung growth in children

It is important to note that the estimated levels of Dell-related DEEP emissions that will potentially impact people will be much lower than levels associated with many of the health effects listed above. For the purpose of determining whether or not Dell's project-related and community-wide DEEP impacts are acceptable, Ecology quantifies and presents noncancer hazards and cancer risks in the remaining sections of this document.

4.2. Exposure Assessment

Exposure assessment involves estimating the extent that the public is exposed to a chemical substance emitted from a facility. This includes:

- Identifying routes of exposure.
- Estimating long- and/or short-term off-site pollutant concentrations.
- Identifying exposed receptors.
- Estimating the duration and frequency of receptors' exposure.

4.2.1. Identifying Routes of Potential Exposure

Humans can be exposed to chemicals in the environment through inhalation, ingestion, or dermal contact. The primary route of exposure to most air pollutants is inhalation; however, some air pollutants may also be absorbed through ingestion or dermal contact. Ecology uses guidance provided in California's Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments to determine which routes and pathways of exposure to assess for chemicals emitted from a facility (CalEPA, 2003). Table 7 shows a table of chemicals for which Ecology assesses multiple routes and pathway of exposure. It's possible that levels of polycyclic aromatic hydrocarbons (PAHs) and the few other persistent chemicals in DEEP will build up in food crops, soil, and drinking water sources near Dell. However, given the very low amounts of PAHs and other multi-exposure route-type TAPs that will be emitted from Dell, quantifying exposures via pathways other than inhalation is very unlikely to yield significant concerns. Further, inhalation is the only route of exposure to DEEP that has received sufficient scientific study to be useful in human health risk assessment. In the case of Dell's backup engine emissions, Ecology will evaluate only inhalation exposure to DEEP.

Table 7. California's Air Toxics Hotspots Risk Assessment Guidance on Specific Pathways to be Analyzed for Each Multi-Pathway Substance

Substance	Ingestion Pathway									
	Soil	Dermal	Meat, Milk & Egg	Fish	Exposed Vegetable	Leafy Vegetable	Protected Vegetable	Root Vegetable	Water	Breast Milk
4,4'-Methylene dianiline	X	X		X	X	X	X	X	X	
Creosotes	X	X	X	X	X	X			X	
Diethylhexylphthalate	X	X		X	X	X	X	X	X	
Hexachlorocyclohexanes	X	X		X	X	X			X	
PAHs	X	X	X	X	X	X			X	
PCBs	X	X	X	X	X	X	X	X	X	X
Cadmium & compounds	X	X	X	X	X	X	X	X	X	
Chromium VI & compounds	X	X	X	X	X	X	X	X	X	
Inorganic arsenic & compounds	X	X	X	X	X	X	X	X	X	
Beryllium & compounds	X	X	X	X	X	X	X	X	X	
Lead & compounds	X	X	X	X	X	X	X	X	X	
Mercury & compounds	X	X		X	X	X	X	X	X	
Nickel	X	X	X		X	X	X	X	X	
Fluorides (including hydrogen fluoride)	To be determined									
Dioxins & furans	X	X	X	X	X	X	X		X	X

4.2.2. Estimating Pollutant Concentrations

Dell's DEEP emissions will be carried by the wind and possibly impact people living and working in the immediate area. The level of these pollutants in off-site air depends in part on how much is emitted, wind direction, and other weather-related variables at the time the pollutants are emitted. To estimate where pollutants will disperse after they are emitted from Dell's backup engines, ICF conducted air dispersion modeling. Air dispersion modeling incorporates emissions, meteorological, geographical, and terrain information to estimate pollutant concentrations downwind from a source.

Each of Dell's backup engines was modeled as individual discharge points. ICF used the following model inputs to estimate ambient impacts:

- American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) with Plume Rise Model Enhancements (PRIME) algorithm for building downwash.
- Five years sequential hourly meteorological data from Moses Lake Airport (2004-2008).
- Twice-daily upper air data from Spokane (2004-2008) to define mixing heights.
- Quincy area digital elevation model (DEM) files (which describe local topography and terrain).
- Quincy area digital land classification files (which describe surface characteristics).
- Each engine's emissions were modeled with a stack height of 58 feet above local ground level and a stack inside diameter of 20 inches (0.508 meters). Engine-specific exhaust gas temperature and velocity were used.
- The data center building dimensions were included to account for building downwash.
- The receptor grid for the AERMOD modeling domain was established using a 10-meter grid spacing along the facility boundary extending to a distance of 350 meters from each of the stacks. A grid spacing of 25 meters was used for distances 350 to 800 meters from the stacks. Grid spacing of 50 meters was used for distances 800 to 2000 meters from the stacks.
- Plume Volume Molar Ratio Method (PVMRM) option, which is used to model the conversion of nitrogen oxides (NO_X) to NO_2. One-hour NO_2 concentrations were modeled using PVMRM module, with default concentrations of 40 parts per billion (ppb) of ozone, and an equilibrium NO_2/NO_X ambient ratio of 90 percent. For purposes of modeling NO_2 impacts, the primary NO_X emissions were assumed to be 10 percent NO_2 and 90 percent nitric oxide (NO) by mass.

ICF modeled both short- and long-term impacts to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and derive DEEP concentrations for the HIA. Because Dell's emissions are intermittent, several operating scenarios were assumed when

estimating ambient impacts. For the purpose of estimating maximum annual DEEP concentrations, ICF used the sum of emissions from each operating scenario shown in Table 1. Because maximum 1-hour NO_2 concentrations would occur in a power outage, ICF assumed all 28 generators were operating for the purpose of estimating maximum 1-hour NO_2 concentrations. Details of the ambient impacts analysis conducted by ICF are found in the NOC application materials received by Ecology on January 25, 2011 and April 27, 2011.

4.2.3. Identifying Potentially Exposed Receptors

As described in Section 2.3, the proposed Dell facility is located among commercial/industrial-zoned properties, but several different land uses are located within the vicinity of Dell's property. ICF identified locations where people could be exposed to project-related emissions. Typically, Ecology considers exposures occurring at maximally exposed boundary, residential, and commercial areas to capture worst-case exposure scenarios. In this case, ICF identified these locations and the most impacted school.

4.2.3.1. Receptors Maximally Exposed to DEEP

Table 8 shows maximally exposed receptors of different types and the direction and distance from Dell's proposed data center. These receptors represent locations of various land uses that are most impacted by Dell's DEEP emissions. This table also shows the estimated average exposure concentration at each maximally exposed receptor.

Table 8. Maximally Exposed Receptors–Annual Average DEEP

Receptor Type	Direction From Nearest Project-Specific DEEP Emission Source	Estimated Distance From Nearest Project-Specific DEEP Emission Source		Estimated Project-Related Increase in Average Annual DEEP Concentration ($\mu g/m^3$) at Receptor Location
		Feet	Meters	
Point of Maximum Impact [a]	W	130	40	0.062
Maximum Impacted Residence (existing)	NW	1,200	366	0.014
Maximum Impacted Residential Land Use (currently undeveloped)[b]	E	1,400	427	0.018
Maximum Impacted Business/Office	S	1,300	396	0.011
Maximum Impacted School	SE	2,500	762	0.003

a. Occurs at property fence line.
b. Location identified by Ecology as the maximum impacted residential land use (undeveloped) differs from that identified in the HIA.

Figure 5 shows a color-coded map of estimated annual average off-site DEEP concentrations attributable to Dell's DEEP emissions relative to the ASIL. This figure represents the ambient impacts of Dell's project and each of the maximally exposed receptors representing different land uses. Each modeled DEEP concentration shown in the figure has been divided by the ASIL. Areas outside the shaded area in Figure 5 are those with an estimated impact below the ASIL. Ecology estimates that Dell's emissions impact 30 to 40 residentially zoned parcels (including developed and undeveloped parcels) at a level exceeding the ASIL.

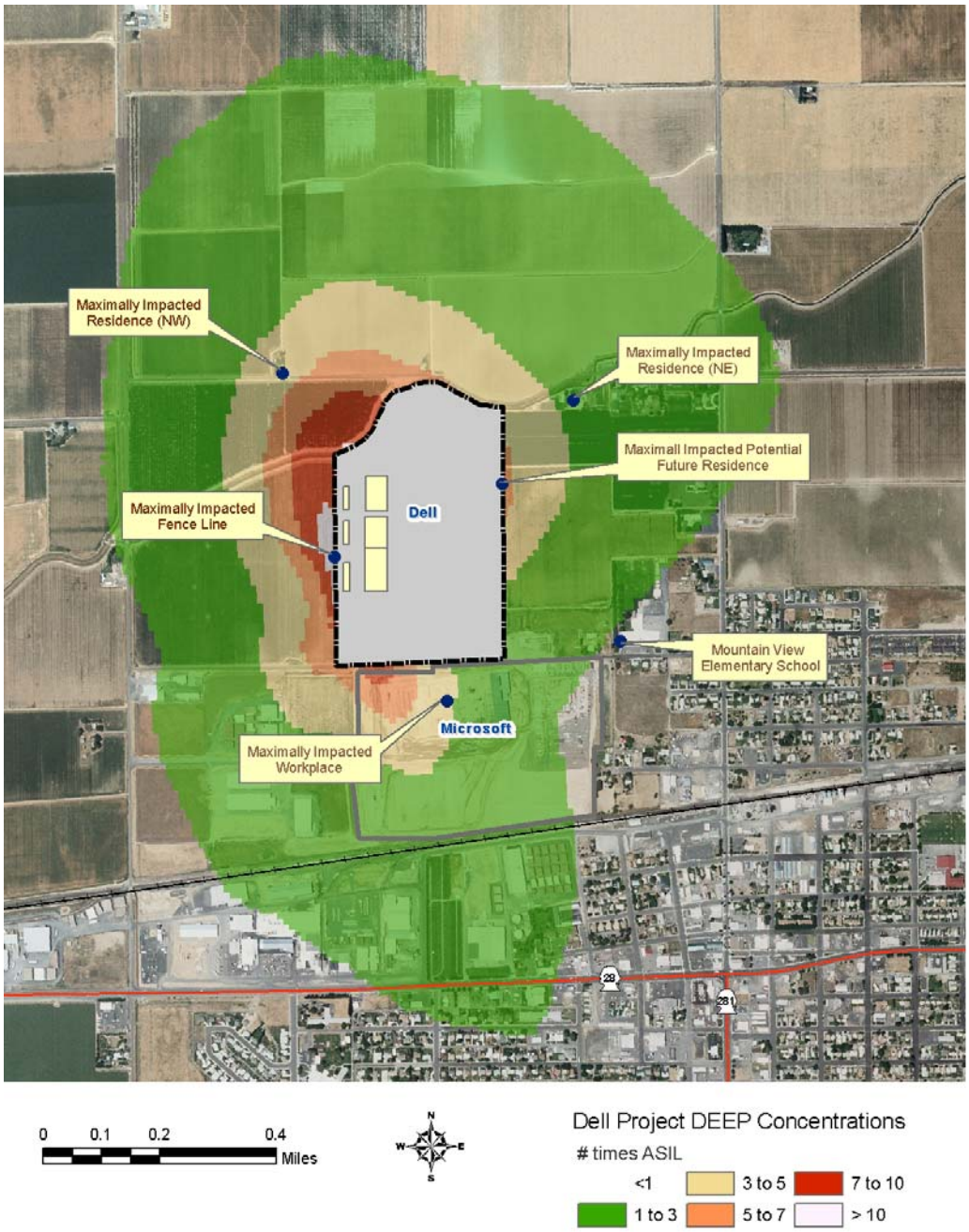

Figure 5. Dell Project DEEP Concentrations

4.2.4. Exposure Frequency and Duration

The likelihood that someone is exposed to DEEP from Dell's backup diesel engines depends on local wind patterns (meteorology), how frequently engines operate, and how much time people spend in the immediate area. As discussed previously, the air dispersion model uses emissions and meteorology information (and other assumptions) to determine ambient DEEP concentrations in the vicinity of the proposed Dell Data Center.

Ecology considers the land use surrounding the Dell facility to estimate the amount of time a given receptor could be exposed. For example, people are more likely to be exposed frequently and for a longer duration if the source impacts residential locations because people spend much of their time at home. People working in offices or commercial buildings in the area are likely only exposed to Dell-related emissions during the hours that they spend working near the facility.

Ecology typically makes simplified assumptions about receptors' exposure frequency and duration. Ecology assumes people located at residential receptors are potentially continuously exposed, meaning they never leave their property. Ecology recognizes that these behaviors are not typical; however, these assumptions are intended to avoid underestimating exposure so that public health protection is ensured. Workplace and other nonresidential exposures are also considered, but adjustments are often made because the amount of time that people spend at these locations is more predictable than time that people could spend at their homes. These adjustments are presented in Section 4.4.2 of this document when quantifying cancer risk from intermittent exposure to DEEP.

4.2.5. Background Exposure to Pollutants of Concern

WAC 173-460-090 states, "Background concentrations of TAPs will be considered as part of a second tier review."[4] The word "background" is often used to describe exposures to chemicals that come from existing sources, or sources other than those being assessed.

Given the renewed interest in building data centers within the Quincy UGA, Ecology determined that the cumulative risk of all sources of DEEP (including existing and proposed data centers' emissions) should be considered during the permitting process.

4.2.5.1. Cumulative Exposure to DEEP in Quincy

Ecology used an EPA-recommended dispersion model, AERMOD, to estimate concentrations of DEEP in Quincy emitted from locomotives traveling on the Burlington Northern–Santa FE (BNSF) rail line, trucks on State Route 281 and State Route 28, and the permitted emissions from existing data centers: Yahoo!, Microsoft, and Intuit. Data center emissions were derived from existing permits from Microsoft (2010), Yahoo! (2011), and Intuit (2007). The rail and highway emissions were taken from 2005 emissions inventories.

[4] http://apps.leg.wa.gov/WAC/default.aspx?cite=173-460-090

Table 9 and Figure 6 shows the calculated cumulative concentrations (presented as the number of times greater than the ASIL of 0.0033 µg/m^3) near Dell based on allowable emissions from all existing permits, proposed Dell emissions, rail, and highway emissions. The maximum cumulative concentration at a residentially zoned parcel near Dell and Microsoft is about 50 times the DEEP ASIL. It is important to note that the ambient levels of DEEP estimated by Ecology are based on allowable (permitted) emissions instead of actual emissions. Actual emissions are likely to be much lower than what Ecology assumed, but Ecology calculated worst-case emissions to avoid underestimating cumulative DEEP exposure concentrations.

Table 9. Maximally Exposed Receptors–Cumulative Annual DEEP

Attributable To:	Annual DEEP Concentration (µg/m^3) at Various Receptor Locations–Dell						Annual DEEP Concentration at Maximum Cumulatively Impacted Residentially Zoned Location Near Dell
	Fence Line Receptor	Current Residence (NW)	Current Residence (NE)	Possible Future Residence	Workplace	Students/ Teachers	
Dell	**0.062**	**0.014**	**0.009**	**0.018**	**0.011**	**0.003**	**0.0059**
Yahoo	0.00073	0.00092	0.0011	0.00089	0.00067	0.00079	0.00071
Intuit	0.00064	0.00070	0.00078	0.00072	0.00062	0.00062	0.00062
Microsoft	0.032	0.010	0.016	0.029	0.083	0.035	0.138
BNSF	0.013	0.008	0.010	0.012	0.022	0.023	0.0230
Highways	0.00016	0.00013	0.00016	0.00018	0.00021	0.00027	0.00023
Proposed Sabey[a]	<0.00094	<0.00094	<0.00094	<0.00094	<0.00094	<0.00094	<0.00094
Cumulative (post-project)	0.109	0.034	0.037	0.061	0.12	0.063	0.168

a. Proposed Sabey data center is located approximately 2 miles east of Dell. Sabey's modeling grid did not extend into the area near Dell. The value shown is the maximum concentration at the western most edge of Sabey's modeling grid (closest to Dell). Sabey's contribution to cumulative DEEP near Dell is likely to be lower than the value shown.

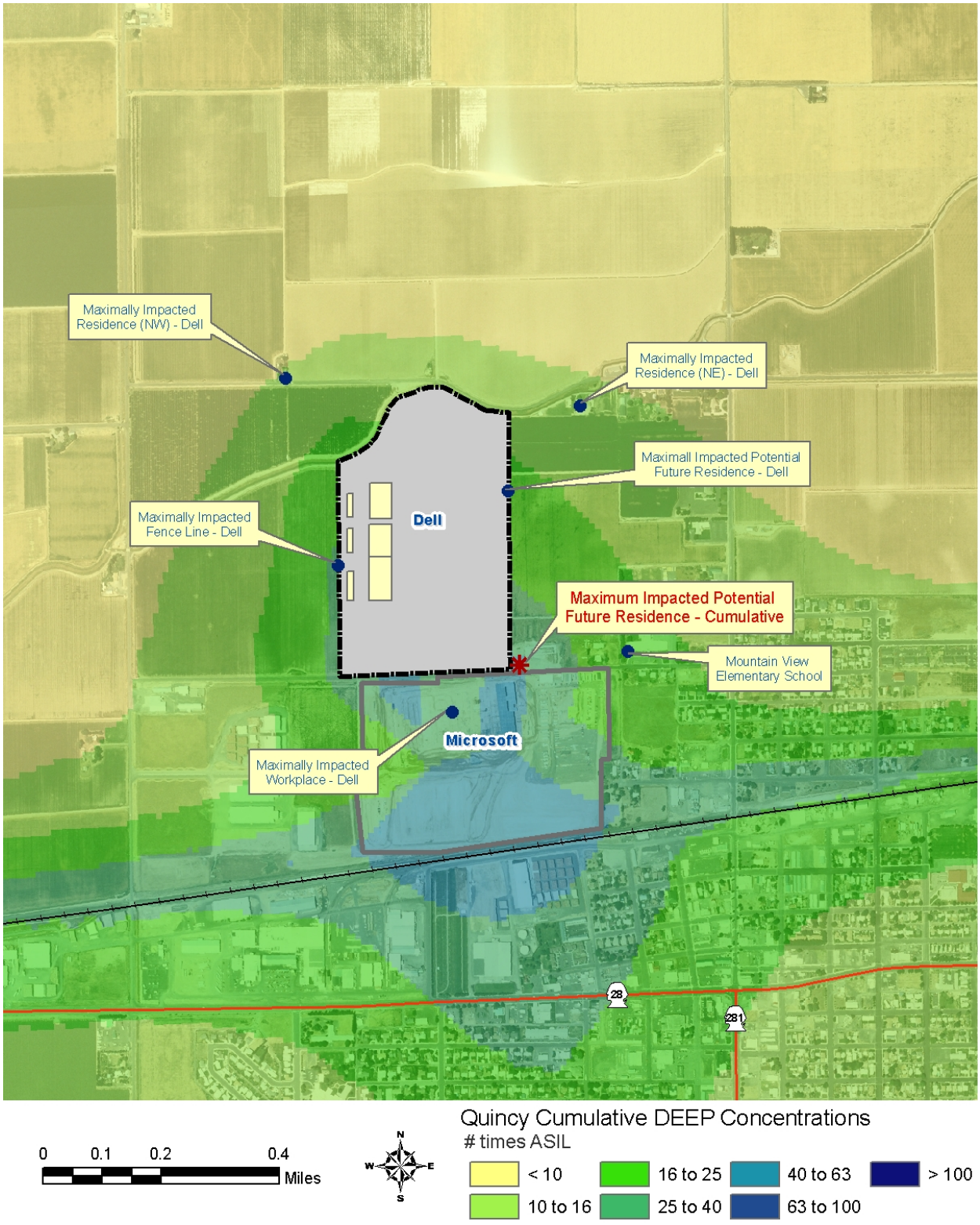

Figure 6. Cumulative DEEP concentrations near Dell (magnitude of ASIL exceedance)

4.3. Dose-Response Assessment

Dose-response assessment describes the quantitative relationship between the amounts of exposure to a substance (the dose) and the incidence or occurrence of injury (the response). The process often involves establishing a toxicity value or criterion to use in assessing potential health risk.

4.3.1. Dose-Response Assessment–DEEP

The U.S. Environmental Protection Agency (EPA) and California Office of Environmental Health Hazard Assessment (OEHHA) developed toxicological values for DEEP evaluated in this project (EPA, 2002; EPA, 2003; CalEPA, 1998). These toxicological values are derived from studies of animals that were exposed to a known amount (concentration) of DEEP, or from epidemiological studies of exposed humans, and are intended to represent a level at or below which adverse noncancer health effects are not expected, and a metric by which to quantify increased risk from exposure to a carcinogen. Table 10 shows DEEP noncancer and cancer toxicity values.

EPA's reference concentration (RfC) and OEHHA's reference exposure level (REL) for diesel engine exhaust (measured as DEEP) was derived from dose-response data on inflammation and changes in the lung from rat inhalation studies. Each agency established a level of 5 $\mu g/m^3$ as the concentration of DEEP in air at which long-term exposure is not expected to cause adverse noncancer health effects.

NAAQS and other regulatory toxicological values for short- and intermediate-term exposure to particulate matter have been promulgated, but values specifically for DEEP exposure at these intervals do not currently exist.

OEHHA derived a unit risk factor (URF) for estimating cancer risk from exposure to DEEP. The URF is based on a meta-analysis of several epidemiological studies of humans occupationally exposed to DEEP. URFs are expressed as the upper-bound probability of developing cancer, assuming continuous lifetime exposure to a substance at a concentration of one microgram per cubic meter (1 $\mu g/m^3$), and are expressed in units of inverse concentration [i.e., $(\mu g/m^3)^{-1}$]. OEHHA's URF for DEEP is 0.0003 $(\mu g/m^3)^{-1}$ meaning that a lifetime of exposure to 1 $\mu g/m^3$ of DEEP results in an increased individual cancer risk of 0.03 percent or a population cancer risk of 300 excess cancer cases per million people exposed.

Table 10. Toxicity Values Used to Assess and Quantify Noncancer Hazard and Cancer Risk

Pollutant	Agency	Noncancer	Cancer
DEEP	U.S. Environmental Protection Agency	RfC = 5 µg/m3	NA[a]
	California EPA–Office of Environmental Health Hazard Assessment	Chronic REL = 5 $\mu g/m^3$	URF = 0.0003 per $\mu g/m^3$

a. EPA considers DEEP to be a probable human carcinogen, but has not established a cancer slope factor or unit risk factor.

4.4. Risk Characterization

Risk characterization involves the integration of data analyses from each step of the HIA to determine the likelihood that the human population in question will experience any of the various forms of toxicity associated with a chemical under its known or anticipated conditions of exposure.

4.4.1. Evaluating Noncancer Hazards

In order to evaluate the potential for noncancer adverse health effects that may result from exposure to air pollutants, exposure concentrations at each receptor location are compared to relevant noncancer toxicological values (i.e., RfC, REL). If a concentration exceeds the RfC or REL, this indicates only the potential for adverse health effects. The magnitude of this potential can be inferred from the degree to which this value is exceeded. This comparison is known as a hazard quotient (HQ) and is given by the equation below:

$$HQ = \frac{\text{concentration of pollutant in air } (\mu g/m^3)}{\text{RfC or REL}}$$

A HQ of one or less indicates that the exposure to a substance is not likely to result in adverse noncancer health effects. As the HQ increases above one, the probability of human health effects increases by an undefined amount. However, it should be noted that a HQ above one is not necessarily indicative of health impacts due to the application of uncertainty factors in deriving toxicological reference values (e.g., RfC and REL).

4.4.1.1. Hazard Quotient–DEEP

The chronic HQ for DEEP exposure is calculated using the following equation:

$$\text{Chronic HQ} = \frac{\text{annual average DEEP concentration } (\mu g/m^3)}{5\ \mu g/m^3}$$

HQs were calculated for the maximally exposed residential and workplace receptors. Because chronic toxicity values (RfCs and RELs) are based on a continuous exposure, an adjustment is sometimes necessary or appropriate to account for people working at commercial properties who are exposed for only eight hours per day, five days per week. While EPA risk assessment guidance recommends adjusting to account for periodic instead of continuous exposure, OEHHA does not employ this practice. For the purpose of this evaluation, Ecology determined the RfC or REL (5 $\mu g/m^3$) will be used as the chronic risk-based concentration for all scenarios where receptors could be exposed frequently (e.g., residences, work places, or schools).

Table 11 shows chronic HQs at the maximally exposed receptors near Dell attributable to DEEP exposure from all sources. HQs are several-fold lower than unity for all receptors' cumulative exposure to DEEP. This indicates adverse noncancer effects are not likely to result from chronic exposure to DEEP emitted from Dell and other local sources.

Table 11. Chronic Noncancer Hazards for Residential, Student, and Occupational Scenarios

Attributable To:	Chronic Hazard Quotient at Various Receptor Locations						Maximum Cumulative Impacted Residentially Zoned Location Near Dell
	Fence Line Receptor	Current Residence (NW)	Current Residence (NE)	Possible Future Residence	Workplace	Students/ Teachers	
Dell	**0.012**	**0.003**	**0.002**	**0.004**	**0.002**	**0.001**	**0.001**
Yahoo	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Intuit	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Microsoft	0.006	0.002	0.003	0.006	0.017	0.007	0.028
BNSF	0.003	0.002	0.002	0.002	0.004	0.005	0.005
Highways	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Proposed Sabey	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cumulative (post-project)	0.022	0.007	0.007	0.012	0.024	0.013	0.033

4.4.2. Quantifying an Individual's Increased Cancer Risk

Cancer risk is estimated by determining the concentration of DEEP at each receptor point and multiplying it by its respective URF. Because URFs are based on a continuous exposure over a 70-year lifetime, exposure duration and exposure frequency are important considerations.

The formula used to determine cancer risk is as follows:

$$\text{Risk} = \frac{\text{CAir} \times \text{URF} \times \text{EF}_1 \times \text{EF}_2 \times \text{ED}}{\text{AT}}$$

Where:

Parameter	Description	Value Based on Receptor Type					Units
		Residential	Worker	School-Staff	School-Student	Boundary	
CAir	Concentration in air at the receptor	See Table 9					$\mu g/m^3$
URF	Unit Risk Factor	0.0003					$(\mu g/m^3)^{-1}$
EF_1	Exposure Frequency	365	250	200	180	250	days/year
EF_2	Exposure Frequency	24	8	8	8	2	hours/day
ED	Exposure Duration	70	40	40			years
AT	Averaging Time	25550					days

Current regulatory practice assumes that a very small dose of a carcinogen will give a very small cancer risk. Cancer risk estimates are, therefore, not yes or no answers but measures of chance (probability). Such measures, however uncertain, are useful in determining the magnitude of a cancer threat because any level of a carcinogenic contaminant carries an associated risk. The validity of this approach for all cancer-causing chemicals is not clear. Some evidence suggests that certain chemicals considered carcinogenic must exceed a threshold of tolerance before initiating cancer. For such chemicals, risk estimates are not appropriate. Guidelines on cancer risk from EPA reflect the potential that thresholds for some carcinogenesis exist. However, EPA still assumes no threshold unless sufficient data indicate otherwise.

In this document, cancer risks are reported using scientific notation to quantify the increased cancer risk of an exposed person, or the number of excess cancers that might result in an exposed population. For example, a cancer risk of 1×10^{-6} means that if 1,000,000 people are exposed to a carcinogen, one excess cancer might occur, or a person's chance of getting cancer in their lifetime increases by one in one million or 0.0001 percent. The reader should note that these estimates are for excess cancers that might result in addition to those normally expected in an unexposed population. Cancer risks quantified in this document are upper-bound theoretical estimates. In other words, each is the estimate of the plausible upper limit, or highest likely true value of the quantity of risk.

The following table (Table 12) shows ranges of estimated worst-case residential (current and potential future), off-site worker, school staff, students, and fence line receptor's increased cancer risks attributable to DEEP exposure near the proposed Dell facility. As shown in Table 12, cancer risks attributable to the data center project are less than one in one hundred thousand (1×10^{-5}). The highest risk occurs at undeveloped residential parcels to the east of the Dell facility (5.4×10^{-6}). This area is currently undeveloped, so the estimated risks would apply if this parcel were indeed developed in the future. Under Chapter 173-460 WAC, Ecology may recommend approval of a project if the applicant demonstrates that the increase in emissions of TAPs is not likely to result in an increased cancer risk of more than one in one hundred thousand (1×10^{-5}).

As part of the community-wide approach in Quincy, Ecology also considers the cumulative impacts of DEEP emissions in the Quincy UGA. Ecology established a cumulative risk management goal of 100 excess cancer cases in one million people exposed (1×10^{-4}) representing the cumulative level of concern for Quincy residents (also called an "ample margin of safety")[5] above which a new source of DEEP would not be approved to locate in Quincy, without requiring offsets or other mitigation. It therefore represents a limit on permissible DEEP-associated cancer risk to the community. Note that Chapter 173-460 WAC **does not** currently contain a numerical limit on allowable cumulative cancer risks.

As shown in Table 12, the maximum cumulative cancer risk for the maximally impacted current residential receptor near Dell is 11 in one million. This risk occurs at the existing residence to

[5] "Ample margin of safety" is the phrase used in the federal clean air act to describe the goal of National Emission Standards for Hazardous Air Pollutants.

the northeast of the Dell facility. This residence is more impacted by allowable DEEP emissions from the existing Microsoft Data Center and locomotives on the BNSF rail line than by emissions from Dell. In the event residential parcels to the west of Dell are developed, maximum cumulative risks approach 49 in one million. Occupational, near boundary, and student receptors' cumulative risks from DEEP exposure are much lower than 10 in one million.

Because these cumulative risks are less than 100 in one million, the cumulative risks attributable to Dell's project are permissible pending public comment.

Table 12. Estimated Increased Cancer Risk for Residential, Occupations, and Student Scenarios

Attributable To:	Risk Per Million From DEEP Exposure at Various Receptor Locations							Maximum Cumulative Impacted Residentially Zoned Location Near Dell
	Fence Line Receptor	Current Residence (NW)	Current Residence (NE)	Possible Future Residence	Workplace	Students	Teachers	
Dell	**0.6**	**4.2**	**2.7**	**5.4**	**0.4**	**0.01**	**0.1**	**1.7**
Yahoo	0.01	0.3	0.3	0.3	0.03	0.004	0.02	0.2
Intuit	0.01	0.2	0.2	0.2	0.02	0.003	0.02	0.2
Microsoft	0.3	3.0	4.8	8.7	3.2	0.2	1.1	41.4
BNSF	0.1	2.4	3.0	3.6	0.9	0.1	0.7	6.9
Highways	0.002	0.04	0.05	0.05	0.01	0.001	0.008	0.07
Proposed Sabey	<0.01	<0.3	<0.3	<0.3	<0.04	<0.005	<0.03	<0.3
Cumulative (post-project)	1.1	10.2	11.1	18.3	4.7	0.3	2.0	49.2

5. UNCERTAINTY CHARACTERIZATION

Many factors of the HIA are prone to uncertainty. Uncertainty relates to the lack of exact knowledge regarding many of the assumptions used to estimate the human health impacts of DEEP emissions from Dell's backup generators and "background" sources of DEEP in Quincy. The assumptions used in the face of uncertainty may tend to over- or underestimate the health risks estimated in the HIA.

5.1. Exposure Uncertainty

It is difficult to characterize the amount of time that people can be exposed to Dell's DEEP emissions. For simplicity, Dell and Ecology assumed a residential receptor is at one location for 24 hours per day, 365 days per year for 70 years. These assumptions tend to overestimate exposure.

The duration and frequency of power outages is also uncertain. Dell estimates that they will use the generators during emergency outages for no more than eight hours per year. Since 2003 the average outage for all Grant County PUD power customers has been about 2.5 hours per year.

While this small amount of power outage provides some comfort that power service is relatively stable, Dell cannot predict future outages with any degree of certainty. Dell accepted a limit of emergency operation for eight hours per year and estimated that this limit should be more than sufficient to meet their emergency demands.

5.2. Emissions Uncertainty

The exact amount of DEEP emitted from Dell's diesel-powered generators is uncertain. Dell applied both engine-specific and EPA's Tier 2 emission factors to describe the emission rates from the diesel engines. The most conservative (i.e., highest) emission rate was used in dispersion modeling to ensure that ambient impacts are not underestimated.

5.3. Air Dispersion Modeling Uncertainty

The transport of pollutants through the air is a complex process. Regulatory air dispersion models are developed to estimate the transport and dispersion of pollutants as they travel through the air. The models are frequently updated as techniques that are more accurate become known but are written to avoid underestimating the modeled impacts. Even if all of the numerous input parameters to an air dispersion model are known, random effects found in the real atmosphere will introduce uncertainty. Typical of the class of modern steady-state Gaussian dispersion models, the AERMOD model used for the Dell analysis will likely slightly overestimate the short-term (24-hour average) impacts and somewhat underestimate the annual concentrations. The expected magnitude of the uncertainty is probably similar to the emissions uncertainty and much lower than the toxicity uncertainty.

5.4. Toxicity Uncertainty

One of the largest sources of uncertainty in any risk evaluation is associated with the scientific community's limited understanding of the toxicity of most chemicals in humans following exposure to the low concentrations generally encountered in the environment. To account for uncertainty when developing toxicity values (e.g., RfCs), EPA and other agencies apply "uncertainty" factors to doses or concentrations that were observed to cause adverse noncancer effects in animals or humans. EPA applies these uncertainty factors so that they derive a toxicity value that is considered protective of humans including susceptible populations. In the case of EPA's DEEP RfC, EPA acknowledges (EPA, 2002):

> *". . . the actual spectrum of the population that may have a greater susceptibility to diesel exhaust (DE) is unknown and cannot be better characterized until more information is available regarding the adverse effects of diesel particulate matter (DPM) in humans."*

Quantifying DEEP cancer risk is also uncertain. Although EPA classifies DEEP as probably carcinogenic to humans, they have not established a URF for quantifying cancer risk. In their health assessment document, EPA determined that "human exposure-response data are too uncertain to derive a confident quantitative estimate of cancer unit risk based on existing studies." However, EPA suggested that a URF based on existing DEEP toxicity studies would

range from 1 x 10^{-5} to 1 x 10^{-3} per µg/m^3. OEHHA's DEEP URF (3 x 10^{-4} per µg/m^3) falls within this range. Regarding the range of URFs, EPA states in their health assessment document for diesel exhaust (EPA, 2002):

> *"Lower risks are possible and one cannot rule out zero risk. The risks could be zero because (a) some individuals within the population may have a high tolerance to exposure from [diesel exhaust] and therefore not be susceptible to the cancer risk from environmental exposure, and (b) although evidence of this has not been seen, there could be a threshold of exposure below which there is no cancer risk."*

Other sources of uncertainty cited in EPA's health assessment document for diesel exhaust are:

- Lack of knowledge about the underlying mechanisms of DEEP toxicity.
- The question of whether toxicity studies of DEEP based on older engines is relevant to current diesel engines.

Table 13 presents a summary of how the uncertainty affects the quantitative estimate of risks or hazards.

Table 13. Qualitative Summary of how the Uncertainty Affects the Quantitative Estimate of Risks or Hazards

Source of Uncertainty	How Does it Affect Estimated Risk From This Project?
Exposure assumptions	Likely overestimate of exposure
Emissions estimates	Possible overestimate of emissions concentrations
Air modeling methods	Possible underestimate of average long-term ambient concentrations and overestimate of short-term ambient concentration
Toxicity of DEEP at low concentrations	Possible overestimate of cancer risk, possible underestimate of noncancer hazard for sensitive individuals

6. OTHER CONSIDERATIONS

6.1. Short-Term Exposures to DEEP

As discussed previously, exposure to DEEP can cause both acute and chronic health effects. However, as discussed in Section 4.3.1, reference toxicological values specifically for DEEP exposure at short-term or intermediate intervals do not currently exist. Therefore, Ecology did not quantify short-term risks from DEEP exposure. By not quantifying short-term health risks in this document, Ecology does not imply that they have not been considered. Instead, we have assumed that compliance with the 24-hour $PM_{2.5}$ NAAQS is an indicator of acceptable short-term health effects from DEEP exposure. In our analysis, we assumed all DEEP emissions to be $PM_{2.5}$. The May 19, 2011, Technical Support Document (TSD) for the draft preliminary NOC

approval prepared by Ecology concludes that Dell's emissions are not expected to cause or contribute to an exceedance of any NAAQS.

Relevant to Dell's DEEP emissions, the 24-hour $PM_{2.5}$ NAAQS was set by EPA to protect people from short-term exposure to small particles (which include DEEP). Ecology determined that Dell adequately demonstrated compliance with the $PM_{2.5}$ NAAQS. Therefore, short-term impacts from DEEP exposure were considered and found to be acceptable.

6.2. Short-Term Exposures to NO_2

In the event of a system-wide power outage in Quincy, dozens of backup diesel engines could run simultaneously resulting in higher short-term emission rates of nitrogen dioxide (NO_2) and other TAPs. The impacts of higher short-term emission rates from the existing unmodified engines have not been evaluated in this document because only DEEP emissions from the project exceeded the ASIL. Because emissions of NO_2 and other TAPs from the project were below the ASIL, no further review was required for those pollutants. Emissions below the ASIL suggest that increased health risks from these pollutants are acceptable.

The short-term NO_2 impacts were evaluated as part of the Yahoo! expansion project (Ecology, 2011b). Ecology considered the infrequent meteorological conditions required to cause a high NO_2 impact coincident with the infrequent occurrence of emergency outages to determine the probability and frequency with which receptors could be impacted at levels of concern. This analysis also included proposed emissions from Dell and showed that the likelihood of an event causing a NO_2 level of concern could happen about one hour every 100 years or so in the vicinity of Dell (Figure 7). The analysis demonstrates that individual receptors are not likely to be frequently and repeatedly exposed to short-term NO_2 levels above 470-$\mu g/m^3$.

7. SUMMARY OF HEALTH RISKS, CONCLUSIONS, AND SECOND TIER REVIEW RECOMMENDATIONS

7.1. Project Summary

Dell proposes to build a new data center in Quincy, Grant County, Washington. The project will consist of two buildings to house server equipment and 28 diesel-powered backup engine-generator sets each rated at 3,000 kWe. The engines will be housed in three buildings.

Potential emissions of DEEP from the proposed backup engines exceeded regulatory trigger levels called ASILs. Therefore, the proponent was required to submit a second tier petition per Chapter 173-460 WAC.

Due to the relatively close geographic proximity of existing and planned large data centers in Quincy, Ecology determined that a community-wide approach for permitting data centers is warranted for the Quincy UGA. The community-wide approach considers the cumulative impacts of DEEP which includes consideration of background emissions from existing permitted data centers and other sources of DEEP.

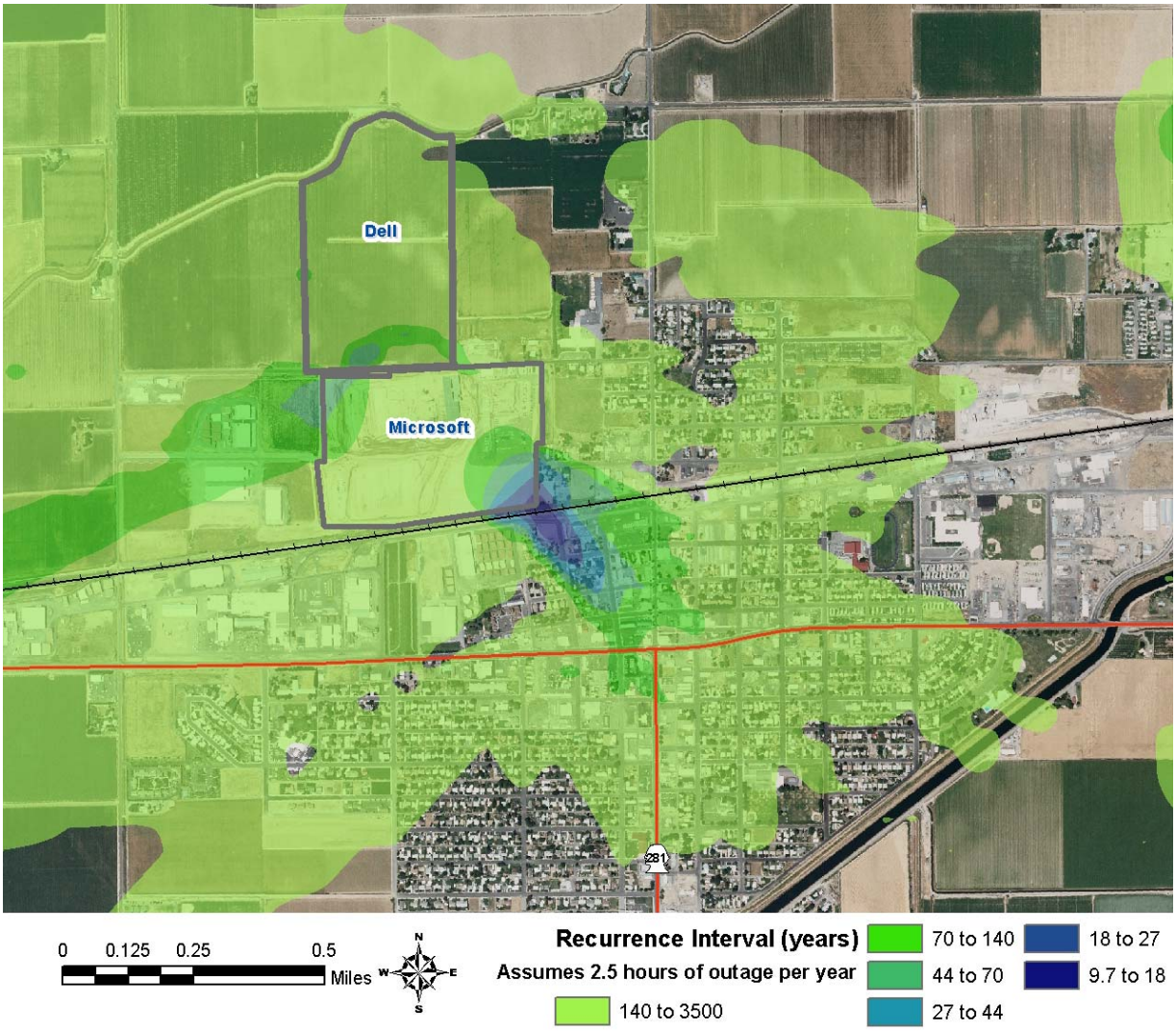

Figure 7. Frequency with which 1-hour NO_2 concentrations could exceed 441 µg/m^3 assuming continuous power outage emissions from all existing and proposed Quincy data centers (presented as a recurrence interval in years)

7.2. Potential Health Risks

Dell retained ICF International (ICF) to prepare a HIA to evaluate the potential health risks attributable to operation of the diesel-powered generators from the data center project. The HIA demonstrated that emissions of DEEP from the proposed data center alone could result in an increased cancer risk of up to 5 in one million (5×10^{-6}) at an undeveloped residentially zoned property located to the east of Dell.

While Dell's proposed project alone results in increased health risks within the range that Ecology may approve for proposed new sources of TAPs under the second tier review provisions

of WAC 173-460-090(7), Ecology also considered the cumulative impact of long-term onroad, nonroad, and existing data center emissions of DEEP.

The maximum cumulative cancer risk at an existing residence northeast of Dell is 11 per million (1.1×10^{-5}). The maximum cumulative risk at any residentially zoned area near Dell is approximately 49 per million (4.9×10^{-5}). This occurs at a location directly adjacent to Microsoft's northern boundary and Dell's southeast property boundary. This parcel is currently undeveloped, but parcel information from Grant County states that this parcel's land use is "General Trade-Merchandise." Quincy's zoning and planning map indicates that the parcel is zoned "multi-family residential."

7.3. Second Tier Review Criteria

Section 3.5 lists the minimum approval criteria for a second tier review. The criteria are restated below followed by a brief summary of how Dell satisfied each approval criterion for a second tier review:

(a) Proposed emission controls represent at least tBACT.

ERO determined that tBACT for DEEP 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. Ecology verifies that in this case, the technology described represents at least tBACT.

(b) The applicant demonstrates that the increase in emissions of TAPs is not likely to result in an increased cancer risk of more than one in one hundred thousand.

The maximum increased cancer risk attributable to Dell's emissions is one half the new source risk limit of one in one hundred thousand. This risk occurs at an undeveloped residentially zoned parcel to the east of Dell. Ecology also evaluated the cumulative risk from exposure to all known sources of DEEP in Quincy and found that risks are approximately one half the cumulative risk goal established as part of the community-wide approach to permitting data centers in Quincy.

(c) Ecology determines that the noncancer hazard is acceptable.

The HQs describing the noncancer hazard are less than one. This means that adverse noncancer health effects from long-term exposure to DEEP are unlikely to occur.

7.4. Conclusions and Recommendations

Assuming that Dell does not exceed the emission rates relied upon for modeling ambient impacts, the overall increased cancer risk impact from the proposed project and other sources of DEEP is acceptable because it is within a range considered by Ecology to reflect an "ample

margin of safety." Ecology concludes that cancer and noncancer risks from the proposed engines are acceptable under Chapter 173-460 WAC.

Ecology recommends that Dell communicate their potential impacts to:

- Current residents near Dell;
- Potential new homeowners at undeveloped parcels adjacent to Dell or the local agency responsible for zoning and development in the affected area.

8. LIST OF ACRONYMS AND ABBREVIATIONS

AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AQP	Department of Ecology, Air Quality Program
ASIL	Acceptable Source Impact Level
AT	Averaging Time (days)
BACT	Best Available Control Technology
BNSF	Burlington Northern Santa Fe
CAir	Concentration in air
CalEPA	California Environmental Protection Agency
CAS #	Chemical Abstracts Service Number
DEEP	Diesel engine exhaust particulate
Dell	Dell Marketing, LP
DEM	Digital Elevation Model
Ecology	Washington State Department of Ecology, Headquarters Office
ED	Exposure Duration (years)
EF	Exposure Frequency
EF_1	Exposure Frequency (days per year)
EF_2	Exposure Frequency (hours per day)
EPA	United States Environmental Protection Agency
ERO	Washington State Department of Ecology, Eastern Regional Office
ESSB 6789	Engrossed Substitute Senate Bill 6789 – Computer Data Centers – Sales and Use Tax Exemption
HIA	Health Impact Assessment
HQ	Hazard Quotient
hr	Hour(s)
ICF	ICF International
kW	kilowatt
kWe	kilowatt, electrical
kWm	kilowatt, mechanical

$\mu g/m^3$	Micrograms per cubic meter
μm	Micron or micrometer
NAAQS	National Ambient Air Quality Standards
NAS	National Academies of Science
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOC	Notice of Construction Order of Approval
NO_X	Oxides of nitrogen
OEHHA	California Environmental Protection Agency's Office of Environmental Health Hazard Assessment
PAHs	Polycyclic Aromatic Hydrocarbons
PM	Particulate matter
$PM_{2.5}$	Particulate matter less than 2.5 micrometers in diameter
ppb	parts per billion
PRIME	Plume Rise Model Enhancements
PUD	Public Utility District
PVMRM	Plume Volume Molar Ratio Method
REL	OEHHA Reference Exposure Level
RfC	Reference Concentration
SQER	Small Quantity Emission Rate
TAP	Toxic Air Pollutant
tBACT	Best Available Control Technology for Toxics
TEQ	Toxic Equivalent
UGA	Urban Growth Area
URF	Unit Risk Factor
WAC	Washington Administrative Code

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Appendix G
Final Permit

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A NEW) Preliminary Determination Notice of Construction Approval
AIR CONTAMINANT SOURCE FOR) Draft ORDER No. 11AQ-E4xx21
DELL MARKETING LP) for review purposes only
DELL MARKETING DATA CENTER)

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TO: Dane Parker, Executive Director, Facilities
Dell Marketing, LP
One Dell Way
Round Rock, Texas 78682-7000

PROJECT SUMMARY

The Ecology Air Quality Program (AQP) received a Notice of Construction (NOC) application from Dell Marketing, LP, hereafter referred to as Dell, for the Dell Data Center in Quincy on January 24, 2011. The Dell Data Center consists of phased construction of 3 buildings, i.e., Phase 1, Phase 2, and Phase 3. Phase 1 construction of a 100,866 square foot building will commence during 2011, and includes fourteen (14) 3.0 Megawatt (MWe) electric generators each powered by 4423 brake horse power Caterpillar Model C175-16 engines. Phase 2 and Phase 3 construction will occur as server demand dictates, and will include a total of fourteen (14) additional electric generators.

EQUIPMENT

The equipment that was evaluated for the Dell Data Center order of approval consists of twenty-eight (28) 3.0 MWe Caterpillar diesel fired generators with a total capacity of 84 MWe upon final build out of the three Phases. Dell has asked to restrict annual diesel fuel usage at the Dell Data Center to 175,031 gallons of road specification diesel fuel with annual generator operation time of 1497 hours. There was no other project equipment that required review under the state and federal air quality requirements.

Table 1: 23.0 MWe Caterpillar Engine & Generator Serial Numbers

Project	Unit ID	Capacity MWe	Engine SN	Generator SN	Build date
Phase 1	P1-1	3.0	WYB000458	G8F00106	5/23/2011
"	P1-2	3.0	WYB00459	G8F00107	5/23/2011
"	P1-3	3.0	WYB00461	G8F00108	5/25/2011
"	P1-4	3.0	WYB00462	G8F00109	5/25/2011
"	P1-5	3.0	WYB00457	G8F00104	5/20/2011
"	P1-6	3.0			
"	P1c-1	3.0			
"	P1c-2	3.0			
"	P1abc-1	3.0			
"	P1abc-2	3.0			
"	P1abc-3	3.0			
"	P1abc-4	3.0			

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"	P1abc-5	3.0			
"	P1abc-6	3.0			
Phase 2	P2-1	3.0			
"	P2-2	3.0			
"	P2-3	3.0			
"	P2-4	3.0			
"	P2-5	3.0			
"	P2-6	3.0			
"	P2-7	3.0			
Phase 3	P3-1	3.0			
"	P3-2	3.0			
"	P3-3	3.0			
"	P3-4	3.0			
"	P3-5	3.0			
"	P3-6	3.0			
"	P3-7	3.0			
Total	28	84.0			

Air contaminant emissions from the Dell Data Center project have been calculated based entirely on operation of the 28 emergency generator engines. Table 2a contains criteria pollutant potential to emit for the Dell Data Center project. Table 2b contains toxic air pollutant potential to emit for the Dell Data Center project.

Table 2a: Criteria Pollutant Potential to Emit for the Dell Data Center

Pollutant	**Emission Factor (EF) Reference**	**Emission Factors**	**Facility Emissions**
Criteria Pollutant		g/kWm-hr	tons/yr
2.1.1 NOx Total			19.87
2.1.1a NOx 10% load (idle)	EPA Tier 2	6.12	na
2.1.1b NOx 70% load	Caterpillar	7.16	na
2.1.1c NOx 95% load	Caterpillar	8.23	na
2.1.2 CO			10.46
2.1.2a CO 10% load (idle)	Caterpillar	6.30	na
2.1.2b CO >10% load	EPA Tier 2	3.50	na
2.1.3 SO_2	Mass Balance	na	0.0185
2.1.4 $PM_{2.5}$/DEEP Total	EPA Tier 2	0.20	0.71
2.1.4a DEEP 10% load (idle)	Caterpillar	0.59	na
2.1.4b DEEP 70% load	EPA Tier 2	0.20	na
2.1.4c DEEP 95% load	EPA Tier 2	0.20	na
2.1.5 VOC	EPA Tier 2	0.282	1.47

Table 2b: Toxic Air Pollutant Potential to Emit for the Dell Data Center		
Pollutant	**AP-42 Section 3.4 EF**	**Facility Emissions**
Organic Toxic Air Pollutants	Lbs/MMBtu	tons/yr
2.1.6 Propylene	2.79E-03	3.35E-02
2.1.7 Acrolein	7.88E-06	9.45E-05
2.1.8 Benzene	7.76E-04	9.30E-03
2.1.9 Toluene	2.81E-04	3.37E-03
2.1.10 Xylenes	1.93E-04	2.31E-03
2.1.11 Napthalene	1.30E-04	1.56E-03
2.1.12 1,3 Butadiene	1.96E-05	2.34E-04
2.1.13 Formaldehyde	7.89E-05	9.46E-04
2.1.14 Acetaldehyde	2.52E-05	3.02E-04
2.1.15 Benzo(a)Pyrene	1.29E-07	1.54E-06
2.1.16 Benzo(a)anthracene	6.22E-07	7.46E-06
2.1.17 Chrysene	1.53E-06	1.83E-05
2.1.18 Benzo(b)fluoranthene	1.11E-06	1.33E-05
2.1.19 Benzo(k)fluoranthene	1.09E-07	1.31E-06
2.1.20 Dibenz(a,h)anthracene	1.73E-07	2.07E-06
2.1.21 Ideno(1,2,3-cd)pyrene	2.07E-07	2.48E-06
2.1.22 PAH (no TEF)	3.88E-06	4.65E-05
2.1.23 PAH (apply TEF)	4.98E-07	5.97E-06
State Criteria Pollutant Air Toxics		
2.1.24 DEEP/$PM_{2.5}$	EPA Tier 2	0.71
2.1.25 Carbon monoxide	EPA Tier 2	10.46
2.1.26 Sulfur dioxide	Mass Balance	0.0185
2.1.27 Primary NO_2*	10% total NOx	1.987

*Assumed to be equal to 10% of the total NOx emitted.

The Dell Data Center relies on cooling systems to dissipate heat from electronic equipment at the facility. It was determined during review of the application that the cooling system has no air contaminant emissions, and does not require approval under state and federal air quality requirements. Additional cooling systems will be added to the facility as necessary to meet the cooling needs of tenants.

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:

Table 3: Best Available Control Technology Requirements	
Pollutant(s)	**BACT Determination**
Particulate matter (PM), carbon monoxide and volatile organic compounds	a. Use of good combustion practices; b. Use of EPA Tier 2 certified engines if the engines are installed and operated as emergency engines, as defined at 40 CFR§60.4219; or applicable emission standards found in 40 CFR Part 89.112 Table 1 and 40 CFR Part 1039.102 Tables 6 and 7 if Model Year 2011 or later engines are installed and operated as non-emergency engines; and c. Compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Nitrogen oxides (NOx)	a. Use of good combustion practices; b. Use of an engine design that incorporates fuel injection timing retard, turbocharger and a low-temperature aftercooler; c. Use of EPA Tier 2 certified engines if the engines are installed and operated as emergency engines, as defined at 40 CFR§60.4219; or applicable emission standards found in 40 CFR Part 89.112 Table 1 and 40 CFR Part 1039.102 Tables 6 and 7 if Model Year 2011 or later engines are installed and operated as non-emergency engines; and d. 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:

Table 3:4 Best Available Control Technology for Toxics Requirements	
Toxic Air Pollutant(s)	**tBACT Determination**
Acetaldehyde, carbon monoxide, acrolein, benzene, benzo(a)pyrene, 1,3-butadiene, diesel engine exhaust particulate, formaldehyde, propylene, toluene, total PAHs, xylenes	Compliance with the VOC BACT requirement.
Nitrogen dioxide	Compliance with the NOx BACT requirement.
Sulfur dioxide	Compliance with the SO_2 BACT requirement.

4. The modeled ambient concentrations of one toxic air pollutant – diesel engine exhaust particulate matter – exceed the Acceptable Source Impact Levels (ASILs) as defined in Chapter 173-460 WAC. Ecology has evaluated the health risks associated with diesel engine exhaust particulate from the proposed project, in accordance with WAC 173-460-090. Ecology has concluded that the health risks from the project are acceptable as defined in WAC 173-460-090(7). 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 are met:

APPROVAL CONDITIONS

1. **ADMINISTRATIVE CONDITION**

1.1 Dell shall schedule a meeting with Mountain View Elementary School administrators and Quincy School District officials by no later than June July 15, 2011. The purpose of the meeting will be to both communicate, and better understand, any potential concerns or complaints that the Mountain View Elementary School administrators and the Quincy School District officials may have regarding emergency generator maintenance testing and operation. In addition, Dell will provide school officials and administrators with the telephone number for the Dell Data Center and a 24 hour contact number for a Dell Data Center manager. The school officials and administrators shall also be provided a maintenance testing schedule as developed by Dell. The Dell Data Center will notify the Mountain View Elementary School administrators whenever (Ecology) approved changes occur in the maintenance testing schedule. As decided by the school officials and administrators and the Dell Data Center, an ongoing relationship shall be established to facilitate future communications.

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1.2 Dell shall make available information on diesel engine exhaust health risks and emergency generator operations to existing residents, and commercial and industrial facilities within 0.25 miles of the Dell Data Center property boundaries. Information on diesel exhaust health risks and emergency generator operations shall be provided to the City of Quincy Building and Planning Department for distribution to new homeowners and businesses that locate on undeveloped parcels within 0.25 miles of the Dell Data Center property boundary. The health risk information may be, or should be similar to, Ecology Focus on Diesel Exhaust Health Risks dated February 2011, Publication Number 11-02-005. A copy of the materials to be used to comply with this condition shall be provided to Ecology for review, and distributed prior to starting Phase 1 operations.

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2. **EQUIPMENT RESTRICTIONS**

2.1. The twenty-eight (28) Caterpillar Model C175-16 engines used to power the 3.0 MWe electrical generators shall be certified by the manufacturer to meet 40 CFR 89 Tier II emission levels or other specifications as required by the EPA at the time the engines are installed. Each engine to be installed must be permanently labeled by the

manufacturer as an emergency engine in accordance with 40 CFR § 60.4210(f). Each engine approved in this Order must operate as an emergency engine as defined at WAC 173-400-930(3).

2.2. The only Caterpillar Model C175-16 engines and electrical generating units approved for operation at the Dell Data Center are those listed by serial number in Table 1 above.

2.3. Replacement of failed engines with identical engines (same manufacturer and model) requires notification prior to installation but will not require new source review unless there is an emission rate or modeled impact increase. The installation of any engines after July 1, 2013 will require engine manufacturer's specification sheets along with the notification. Ecology will decide whether new source review (NSR) is required based on whether the new engines will have either an increased emission rate or emission concentration that will increase community impacts over those evaluated for this approval Order.

2.4. The twenty-eight (28) Caterpillar Model C175-16 engines exhaust stack heights shall be greater than or equal to 58 feet above ground level and will be no more than 20 inches in diameter.

2.5. Manufacture and installation of the first fourteen (14) of the engine/generator sets proposed for Phase 1 of the project shall occur by July 1, 2013. The manufacture and installation of the final fourteen (14) engine/generator sets proposed for Phase 2 and Phase 3 of the project shall occur by January 1, 2017.

2.6. This Order only applies to the twenty-eight (28) Caterpillar Model C175-16 engines, each with a rated full standby capacity of 4423 hp that were evaluated in the Notice of Construction application and second tier review.

3. **OPERATING LIMITATIONS**

3.1. The fuel consumption at the Dell Data Center facility shall be limited to a total of 175,031 gallons per year of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil (less than 0.00150 weight percent sulfur). Total annual fuel consumption by the facility may be averaged over a three (3) year period using monthly rolling totals.

3.2 Except as provided in Condition 3.5, the twenty-eight (28) Dell Data Center engines are limited to the following average annual hours of operation, fuel limits and number of engines operating concurrently:

Table 3.2: Engine Operating Restrictions

Operating Activity	Average hours/year, monthly 3-year rolling annual average	Approximate Operating Load (%)	Diesel Fuel Gallons/year, monthly 3-year rolling annual average	Engines Operating Concurrently
Weekly Testing	20	10%		1
Monthly Testing	12.5	70%		8
Semi-Annual Testing	1.5	70%		8
Annual Testing	4.75	95%		8
Maintenance	8	70%		1
Power Outage	4-8	70%		28

Total	Average 53.5[1]		175,031	

[1] range of 50.75 to 54.75 annual hours of operation

3.3. A load bank or the building load will be used for electrical energy dissipation whenever prescheduled maintenance testing, corrective testing or annual load bank testing occurs above idle.

3.4. The twenty-eight (28) Caterpillar Model C175-16 engines at the Dell Data Center require periodic scheduled operation. To mitigate engine emission impacts, the Dell Data Center engines will perform all maintenance testing, scheduled bypass operations, and load testing during daylight hours. The Dell Data Center shall develop an a operating testing schedule prior to starting operating that is coordinated with the Microsoft Columbia Data Center testing schedule. The Dell Data Center testing schedule shall be available for review by Ecology upon request. Changes to the operating testing schedule will not trigger revision or amendment of this Order as long as the number of engines operating concurrently do not exceed the restrictions contained in Table 3.2 in this Order.

3.5. Initial start-up (commissioning) testing of each of the twenty-eight (28) Caterpillar Model C175-16 engines at the Dell Data Center is restricted to 48 hours per generator and no more than 7469 gallons of fuel per generator, averaged over all generators installed during any consecutive 3 year period. The commissioning operating load for individual engines will vary between 10% and 100%. Site integrated system testing with multiple engines will average 70% load.

3.5.1 Except during site integration system testing as specified below, only one engine shall be operated at any one time during initial start-up testing.

3.5.2 During a site integration test, no more than eight (8) generator engines may operate concurrently for up to 32 hours at a load of 70%.

3.5.3 All initial startup and commissioning testing shall be conducted during daylight hours.

3.5.4 Total fFuel use limits contained in Approval Conditions 3.1 and emission limits contained in Approval Conditions 5, remain in effect during initial start-up testing and commissioning.

4. GENERAL TESTING AND MAINTENANCE REQUIREMENTS

4.1. The Dell Data Center will follow engine-manufacturer's recommended diagnostic testing and maintenance procedures to ensure that each of the twenty-eight (28) Caterpillar Model C175-16 engines will conform to 40 CFR 89 emission specifications throughout the life of each engine.

4.2 Within 12 months of installation of any new expansion engine approved in this Order, the Dell Data Center shall measure concentrations of nitric oxide (NO), nitrogen dioxide (NO_2), total nitrogen oxides (NOx), carbon monoxide (CO), and oxygen (O_2) leaving that engine's exhaust stack in accordance with Approval Condition 4.3. This

testing will serve to demonstrate compliance with the emission limits contained in Approval Conditions 5.2, 5.3, 5.4, and 5.8. Additional periodic testing will be conducted at the conclusion of the manufacturer's warranty term for each engine, or every 60 months from engine delivery date, or 3,000 hours of operation, whichever occurs first. Dell may request relaxation of periodic testing if the manufacturer's emissions warranty is extended and as long as manufacturer's maintenance procedures are followed.

4.3 The following procedures shall be used for nitric oxide, nitrogen dioxide, total nitrogen oxides (NOx), and carbon monoxide exhaust stack testing of new engines required by Approval Condition 4.2. After initial performance testing to verify compliance with Approval Conditions 5.2, 5.3, and 5.4, Dell may request alternative test methods. The alternative test methods must be approved in writing by Ecology prior to the testing.

4.3.1 Initial emissions testing should be combined with start-up and commissioning testing. Subsequent periodic emissions testing shall be combined with pre-scheduled maintenance and annual load bank engine testing. Additional operation of the engines for the purpose of emissions testing, beyond the operating hours contained in this Order, may be allowed by Ecology upon request.

4.3.2 Total nitrogen oxides, NO_2, and CO emissions measurement shall be conducted at each of the proposed average engine loads of 10% (idle), 70%, and 100% that correspond to scheduled engine operating scenarios in Approval Condition 3.2. Initial performance testing for nitric oxide, nitrogen dioxide, total nitrogen oxides (NOx), and carbon monoxide from no fewer than two engines to be chosen by Ecology shall be conducted using EPA 40 CFR 60 Reference Methods 7E and 10.

4.3.3 A portable emissions instrument analyzer may be requested as an alternative test method after compliance verification of the two engines. The analyzer model and calibration procedures must be approved in writing by Ecology prior to being used as an alternative test method. The analyzer shall be calibrated using EPA Protocol 1 gases according to the procedures for drift and bias limits outlined in EPA Methods 7E and Method 10, or as approved in advance by Ecology.

4.3.4 Three runs shall be conducted for each engine tested with a portable emissions instrument analyzer. Each run must last at least 15 minutes. Analyzer data shall be recorded at least once every minute during the test. Fuel usage and operational time shall be recorded at the beginning of, and end of, each test for each engine.

4.3.5 The F-factor method, as described in EPA Method 19, may be used to calculate exhaust flow rate through the exhaust stack. The fuel meter and operating time data, as measured according to Approval Conditions 4.4 and 4.5, shall be included in the test report, along with the emissions calculations.

4.3.6 If the measured nitrogen oxides, NO_2 and CO emission rates from the first eight (8) Phase 1 engines are found to be consistent and less than the emission limits contained in this order, the Dell Data Center may request approval from Ecology to discontinue emission testing for the remainder of the twenty (20) engines.

4.3.7 Ecology will use discretion to grant testing requirement relaxation that can include when and where the engines are manufactured, and design modifications that may affect emissions. Approval to relax exhaust stack engine testing will not require revision of this Order, or a Notice of Construction application.

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

4.5 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.

5 EMISSION LIMITS

The twenty-eight (28) Caterpillar Model C175-16 engines shall meet the emission rate limitations contained in this section. If required to demonstrate compliance with the g/kW-hr EPA Tier 2 average emission limits through stack testing, the Dell Data Center shall average emission rates for 5 individual operating loads (10%, 25%, 50%, 75% and 100%) according to 40 CFR §89.410 and Table 2 of Appendix B to 40 CFR Part 89, Subpart E.

5.1 Each engine shall not exceed average NO_x emissions of 6.12 g/kWm-hr. Engine nitrogen oxide emissions shall comply with 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are manufactured and installed.

5.2 Nitrogen oxide (NOx) emissions from each of the twenty-eight (28) Caterpillar Model C175-16 engines shall not exceed the following emission rates at the stated loads, based on emission factors provided by the engine manufacturer:

Table 5.2: Nitrogen oxide (NOx) emission rate limits

	Operating Scenario	Operating Load	Emissions Limit per engine in g/kWm-hr	Emissions Limit per engine in lb/hr
5.2.1	Weekly Testing	10% (idle)	6.12	6.15
5.2.2	Monthly Testing	70%	7.16	37.12
5.2.3	Semi-Annual Testing	70%	7.16	37.12
5.2.3	Annual Testing	100%	8.34	60.09
5.2.4	Maintenance	70%	7.16	37.12
5.2.5	Power Outages	70%	7.16	37.12

5.3 Nitrogen dioxide (NO_2) emissions from each of the twenty-eight (28) Caterpillar Model C175-16 engines shall not exceed the following emission rates at the stated loads, based on emission factors provided by the engine manufacturer:

Table 5.3: Nitrogen dioxide emission rate limits

	Operating Scenario	Operating Load	Emissions Limit per engine in g/kWm-hr	Emissions Limit per engine in lb/hr
5.3.1	Weekly Testing	10% (idle)	0.612	0.615
5.3.2	Monthly Testing	70%	0.716	3.712
5.3.3	Semi-Annual Testing	70%	0.716	3.712
5.3.3	Annual Testing	100%	0.834	6.009
5.3.4	Maintenance	70%	0.716	3.712
5.3.5	Power Outages	70%	0.716	3.712

5.4 Carbon monoxide (CO) emissions from each of the twenty-eight (28) Caterpillar Model C175-16 engines shall not exceed the following emission rates at the stated loads, based on emission factors provided by the engine manufacturer:

Table 5.4: Carbon monoxide emission rate limits

	Operating Scenario	Operating Load	Emissions Limit per engine in g/kWm-hr	Emissions Limit per engine in lb/hr
5.4.1	Weekly Testing	10% (idle)	6.30	6.33
5.4.2	Monthly Testing	70%	3.50	18.14
5.4.3	Semi-Annual Testing	70%	3.50	18.14
5.4.3	Annual Testing	100%	3.50	25.45
5.4.4	Maintenance	70%	3.50	18.14
5.4.5	Power Outages	70%	3.50	18.14

5.5 Total engine carbon monoxide emissions shall not exceed 10.46 tons/year and shall comply with 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are installed.

5.6 Engine particulate matter emissions shall comply with 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are installed. All PM emissions shall be considered diesel engine exhaust particulate and $PM_{2.5}$ emissions.

5.7 Particulate matter emissions from all 28 engines combined shall not exceed 0.71 tons/yr. All PM emissions from the engines shall be considered diesel engine exhaust particulate (DEEP) and $PM_{2.5}$ emissions.

5.8 Nitrogen dioxide (NO_2) emissions from all 28 engines combined shall not exceed 76 lb/hr and 1.987 tons/year.

5.9 Total engine volatile organic compound emissions shall not exceed 1.47 tons/year and shall comply with 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are installed.

5.10 Visual emissions from each diesel electric generator exhaust stack shall be no more than 5 percent, with the exception of a one (1) minute period after unit start-up. Visual emissions shall be measured by using the procedures contained in 40 CFR 60, Appendix A, Method 9.

5.11 Sulfur dioxide emissions from all 28 engines combined shall not exceed 0.018 tons/yr (36 lbs/yr).

6 OPERATION AND MAINTENANCE MANUALS

A site-specific O&M manual for the Dell Data Center facility equipment shall be developed and followed. Manufacturers' operating instructions and design specifications for the engines, generators, 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 and testing schedule.

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67 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

78 RECORDKEEPING

All records required 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. Any records required to be kept under the provisions of this Order shall be provided within 30 days to Ecology upon request.

7.18.1 Fuel receipts with amount of diesel and sulfur content for each delivery to the facility.

7.28.2 Monthly and annual hours of operation for each diesel engine., including reasons for each type of operation.

7.38.3 Purpose, electrical load and runtime duration for each engine start-upof each operation of each diesel engine.

7.48.4 Annual gross power generated by the electric generation station all generators at the facility.

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

7.68.6 Any recordkeeping required by 40 CFR Part 60 Subpart IIII.

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

89 REPORTING

8.19.1 At least 30 business days before installation of a new engine/generator set listed in Equipment Table 1.1 above, the Dell Data Center will submit the serial number, manufacturer make and model, standby capacity, and date of manufacture will be submittedof each new engine to Ecology.

8.29.2 The following information will be submitted to the AQP by January 31 of each calendar year. This information may be submitted along with any other annual emissions information requested by the AQP.

8.2.19.2.1 Monthly rolling annual total summary of air contaminant emissions.
8.2.29.2.2 Monthly rolling hours of operation with annual total.
8.2.39.2.3 Monthly rolling gross power generation with annual total.
9.2.4 A listing of Eeach start-up of each diesel engine that shows the purpose, fuel usage, load, and duration for and during each runtime operation.
8.2.49.2.5 Written notification that the O&M manual has been developed and updated within 60 dyas after the issuance of this Order.

8.39.3 Any air quality complaints resulting from operation of the emissions units or activities engines shall be promptly assessed and addressed. A record shall be maintained by each tenant of the action taken to investigate the validity of the complaint and what, if any, corrective action was taken in response to the complaint. Ecology shall be notified within three (3) days of receipt of any such complaint by e-mail.

9.4 The Dell Data Center shall notify Ecology by e-mail or in writing within 24 hours of any engine operation of greater than 60 minutes if such engine operation occurs as the result of a power outage. This notification does not alleviate the tenantDell from annual reporting of operations contained in any other section of Approval Condition 89.

910 GENERAL CONDITIONS

9.110.1 **Commencing/Discontinuing Construction and/or Operations:** This approval shall become void if the construction or operation of the diesel electric generators atof the facility is not begun within 18 months of permit issuance or if facility operation is discontinued for a period of eighteen (18) months or more. In accordance with WAC 173-400-111(7)(c), each phase must commence construction within 18 months of the projected and approved commence construction date.

9.210.2 **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.

9.310.3 **Availability of Order:** Legible copies of this Order shall be available to employees in direct operation of the diesel electric generators, and be available for review upon request by Ecology.

9.410.4 **Equipment Operation:** Operation of the 28 Caterpillar Model C175-16 diesel engines used to power emergency electrical generators and related equipment shall be conducted in compliance with all data and specifications submitted as part of the NOC application unless otherwise approved in writing by Ecology.

9.510.5 **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.

9.610.6 **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.

9.710.7 **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.

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 provision to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this authorization, shall not be affected thereby.

YOUR RIGHT TO APPEAL

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

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

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

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

ADDRESS AND LOCATION INFORMATION

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

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

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

DATED this 4th 5th day of August, 2011, 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

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_____

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