Please note: This document has been changed to address errors on Pages 7 and 60. Pages 7 and 60 state that Spanish language ads were placed in El Mundo on March 3 and 10, 2011.
Due to an error, these ads were not actually published.

RESPONSIVENESS SUMMARY

REGARDING THE

DRAFT AIR QUALITY PERMIT FOR THE

YAHOO DATA CENTER

EXPANSION PROJECT

4/1/2011

Publication: 11-02-014

As required by the Washington State Administrative Procedures Act

Chapter 34.05 RCW

RESPONSIVENESS SUMMARY

FOR THE

YAHOO! DATA CENTER

EXPANSION PROJECT

Prepared by:

Washington State Department of Ecology

Air Quality Program

4/1/2011

Publication: 11-02-014

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

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I. Introduction

Yahoo! Data Center is located at 1010 Yahoo! Way, within the northeast outskirts of Quincy, Washington. Data centers house the servers that provide e-mail, manage instant messages, and run applications for our computers.

Yahoo! 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. Yahoo!'s NOC application requested approval for expansion of their data center. The expansion project included the addition of ten (10) new diesel-powered backup generators to supply emergency backup power for the expansion project.

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 expansion into the draft permit we created for Yahoo!. Therefore, you may notice that, following public comment, fewer changes were made to the Yahoo! final permit than were made to the Microsoft final permit.

II. Response to Comments

Ecology received both written and oral comments regarding this permit. Those providing comment duplicated many of their written questions in their oral public testimony. Although we have responded to each question once, all comments, including public testimony, are provided verbatim in appendices C and D. Some of the questions posed in the comments were directed at Yahoo!. In order to have as complete a response as possible Ecology asked Yahoo! to contribute draft answers to those questions. Those responses are listed as Ecology/ Yahoo Response.

Comment 1, Danna Dal Porto, 16651 Rd 3 NW, Quincy, Washington 98848:
Is a 5-minute limit for public testimony standard practice or was it imposed because of Ecology's failure to control the meeting?

Ecology Response:
It is standard practice at public hearings to set a time limit for oral public testimony. The Ecology hearings officer sets this time limit with consensus from those attending the hearing. Testimony is limited in order to ensure that everyone wishing to testify may do so. The standard time limit per testament is three to five minutes, depending on the number of people who sign up to give testimony.

At the Yahoo! public hearing, the hearings officer asked those present whether five minutes seemed like enough time, or whether they would like more or less time. No one indicated a desire for more time, and the hearings officer stated that, by group consensus and hearing no objection, the time limit per testimony would be five minutes. She also

stated that if anyone had longer testimony, written comment could be submitted. There is no limit placed on written comment, and it carries the same weight as oral testimony.

In addition, the hearings officer for the Yahoo! public hearing asked those in attendance at the pre-hearing activities whether they preferred to adjust the informal question and answer time to accommodate all those who wished to ask questions, for as many questions as might be asked. By consensus, the group decided to adjust the time. Originally, the hearing was scheduled to begin at 7 p.m. but the questions and answers continued until 8 p.m., at which time no person in attendance designated that they had any further issues to bring up. The hearings officer announced that the hearing would begin unless anyone objected. No objections were raised.

Comment 2, Danna Dal Porto:
I feel our community is doomed because no one, none of our elected officials or governmental agencies is taking any steps to protect the health and safety of persons living around these data centers and their diesel generators. I really do think it is criminal that regulations have been altered, numbers manipulated and facts twisted to allow the construction of these data centers without any emission controls. I am frustrated because I feel so helpless and yet I am so sad that this is happening, all in the name of economic development. The lack of personal responsibility and conscience on the part of individuals involved with this series of projects is terribly disappointing.

Ecology Response:
We hear that you are concerned about the health of your community and environment. We applaud you for taking so much time and energy to make sure that you are doing everything in your power to care for your community. Getting new sources of pollution in your neighborhood is never an easy thing to hear. It is very unlikely that any business will ever be completely zero emissions, but we try to work with every permittee and make sure that we are doing what we can to make sure they are following the laws and regulations set forth by the state of Washington. The Washington Clean Air Act requires us to protect public health while still allowing economic development. The key is balance, strong regulations, and businesses that are willing to be conscientious and careful with their output. From our perspective, Yahoo! has done a good job of being conscientious about energy use and conservation, but they still have a potential need for emergency backup power.

Our evaluation process, known as a Tier III risk management decision, comprises the most stringent review available to the Department of Ecology under existing laws and regulations enacted by the Washington State Legislature. In the case of the data centers in Quincy, this level of review involves extensive investigation into the potential health effects of toxic air pollutants in diesel engine exhaust. Ecology must comply with strict guidelines for permit review and processing, as well as for public disclosure.

We have not altered any regulations. It is certainly not our intent to twist facts or manipulate numbers. The processes and decision points that our technical staff work through in determining the health risk posed by a potential project are available for public scrutiny. Our processes—and our recommendations and regulatory decisions—have been thoroughly considered by professionals in air quality science. We have made our findings and the basis for our findings openly available to public review.

Comment 3, Danna Dal Porto:
I would like to have an objection noted on the official record that the Department of Ecology has been provided (in public records) a copy of the Quincy City Ordinance No. 183, 1950, that names the Quincy Valley Post Register as the newspaper of legal record for the City of Quincy. At this public hearing tonight I have listened to the DOE Spokane official list the ways in which the public was notified of this meeting and DOE is still using the Moses Lake paper, the Columbia Basin Herald, as the newspaper for public notice. I think continuing to use that newspaper is disrespectful and I resent the fact that our local paper is not the primary method of notification for citizens. Whatever is placed in any newspaper must be printed in English and Spanish.

Ecology Response:
By law, the project proponent—in this case Yahoo!—must publish public notice in at least one newspaper, preferably the newspaper of record for the county. Yahoo! published the notice in the Columbia Basin Herald, which is the newspaper of record for Grant County. In addition, Yahoo! voluntarily published advertisements for the public comment period and the public hearing in the Columbia Basin Herald, the Quincy Valley Post Register, and El Mundo. Because data center construction is of interest to a broader audience than City of Quincy residents only, the Columbia Basin Herald was the appropriate newspaper for the public notice. The ad placed in El Mundo, the region's Spanish language newspaper, was in Spanish. The ads placed in the Columbia Basin Herald and the Quincy Valley Post Register, which are English language newspapers, were in English.

Below is a summary of the public involvement opportunities and notifications for this permit:

1. A legal ad was placed on February 14, 2011, in the Columbia Basin Herald (the largest daily newspaper in Grant County, where the project is located). In selecting the newspaper, we took into account the extent of readership throughout the city, county and region to maximize contact with the people who might have an interest in this project. The ad stated where the project documents were available to review and when/where the public hearing would be held. The ad further stated how to submit public comment and that all comments were required to be postmarked no later than March 21, 2011.

2. On February 14, 2011, Ecology issued a press release to all news media—radio, TV, and newspapers—in Spokane, Grant, Douglas, Chelan, Kittitas, Franklin, Benton, Adams, and Lincoln counties, as well as to Seattle media.

3. Display ads inviting people to the hearing were published in the Quincy Valley Post Register on March 3, March 10, and March 17, 2011, and in the Columbia Basin Herald on February 14, February 21 and February 28, 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 March 3 and March 10, 2011.

4. Information was available on Ecology's on-line public calendar and on the internet via a link on the front page of our website, www.ecy.wa.gov.

5. Flyers advertising the hearing in Spanish were posted at several locations in the community on March 7, 2011. The flyers were posted by Ecology staff at the following locations:

- La Michoacana Paleteria Y Heladeria, 6 D St, Quincy
- Princess Fashions, 317 Central Ave, Quincy
- Tacos Mi Pueblo, 800 1st Ave, Quincy

6. On Tuesday, March 15, 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.

7. The February 14 news release generated an article in the Wenatchee World, on Feb. 15, and another in the Empire Press, on Feb. 24, 2011. The Quincy Valley Post Register published articles about the public hearing on February 17 and March 17, 2011.

Comment 4, Danna Dal Porto:
I want to enter a complaint about the timing and dates of the DOE Public Hearings. When DOE has a hearing on a Thursday night and requires the public to respond by the following Monday by 5 pm, there is no way to acquire information from other individuals or agencies. Under these limitations, the DOE hearing is designed to fail. As a member of the public, this artificially limited time to prepare a concise and informed statement is unfair to citizens and does not serve the law as a requirement for dialogue about public health and safety. I think the efforts made by DOE Spokane look good on paper but are not useful to notify citizens.

Ecology Response:
Ecology's public involvement requirements are outlined in the Washington Administrative Code, WAC 173-400-171. These rules require a minimum public comment period of 30 days, and they require that the public comment period extend through the hearing date if a public hearing is held. The public comment period for the Yahoo! draft permit was open for 36 days including the 4 days following the public hearing. The draft permit and application materials were made available locally and on the Internet for public review and comment.

Comment 5, Danna Dal Porto:
I am requesting a copy of the postings that were placed in town. I want the dates the notices were posted, the locations of the postings and the name of the individual who posted the notices.

Ecology Response:
Please see Comment 3, above, for a full list of the places and times notices of this public comment period and public hearing were posted. The posting of these notices was undertaken by various staff in Ecology and Yahoo!, as well as by local and regional media outlets in the form of paid advertisements and voluntary news articles. Ecology maintains copies of all notices distributed by us to the news media. Those copies of notices are available to any member of the public who files a formal public disclosure request.

Comment 6, Danna Dal Porto:
How is Yahoo notified of an impending electrical storm? Do you subscribe to one of the weather diagnostic services? What is the procedure followed by the Yahoo team for storm avoidance? What do you use as a storm alert…the National Weather Service?

Ecology/Yahoo! Response:
The Grant County PUD provides advisory information to their clients when weather or utility systems are in jeopardy of potential interruptions. Yahoo! indicated they do not subscribe to weather advisory systems, but rely upon local forecasting. Yahoo! monitors current weather conditions with on-site systems that track outside temperature, wind speed and direction.

Comment 7, Danna Dal Porto:
How far in advance of a storm do you start the diesel generators? How long do they run after the storm passes? Some storms are very rapid and pass through quickly and some storms just sit in one spot and brood, casting lightening all around. Is the procedure to keep the engines running and prepared until the storm is a certain number of miles distant? How is it determined that it is safe to turn the generators off?

Ecology/Yahoo! Response:
The generators only operate during maintenance activities and actual utility power outages. Yahoo! responded that after the utility power has been restored there is a timed and systematic automatic function to return the plant to normal operation. To expedite this process and as part of the normal sequence of operation, Yahoo! manually returns each generator system individually to save time and cost for operating the equipment.

Comment 8, Danna Dal Porto:
What is the average number of generators you start in storm avoidance preparation and what is the percentage of “load” that the engines run at to be in idle? Is the “load” the same in all instances for storm avoidance?

Ecology Response:
Yahoo! is only permitted to operate their generators during maintenance activities and actual utility power outages.

Comment 9, Danna Dal Porto:
Have you modeled the emissions from your generators at the idle load? What are the emissions numbers for all toxic emissions created during storm avoidance, running the engines in idle, from the Yahoo generators? I would like the number of hours that Yahoo ran their engines in 2008, 2009 for storm avoidance.

Ecology/Yahoo! Response:
Again, Yahoo! does not run engines unless the utility power fails or maintenance activities require it. Idle operation is limited to a very short duration during routine maintenance intervals. Typically these intervals last long enough to warm the engine to normal temperature levels. The duration is considerably less than an hour per month per unit. There were no hours in 2008 and 2009 for storm avoidance.

Comment 10, Danna Dal Porto:
Do you run the engines at idle for windstorms, dust storms, snowstorms or any other natural event that could interrupt the electrical supply?

Ecology/Yahoo! Response:
No. The generator and electrical system is designed to react to utility interruptions; no preemptive measures are required.

Comment 11, Danna Dal Porto: Another question I have is the number of hours Yahoo has been permitted to run the generators. As the data center is not a new construction model in the world of industry, how can it be that the 400 hours in the first permit was so far above the necessary hours to adequately run the facility? Certainly Yahoo, or any other data center, would have a pretty good idea of operational details and the number of generator hours should be right up there in the decision making process. If you can cut the number of hours in half and still have enough time for proper use of the generators, why were you so far off the mark in the first permit? I would like you to explain to me the reasons for the incorrect estimate of necessary hours because, to me, it looks as if the hours could have been exaggerated in the first permit and that would allow a reduction in hours to look like a savings for the facility and create a reason to grant the operating permit without requiring mechanical mitigation. Forgive me for being suspicious but that question has been discussed in the community and I would like an explanation for this confusing series of numbers.

Ecology/Yahoo! Response:
Yahoo! originally requested permission to operate the generators for up to 400 hours per year in the case that there were multiple extended power outages. While it was known at that time that Grant County PUD had good power grid reliability on average, Yahoo!

wanted to have first-hand knowledge of the Quincy-area reliability before committing to lower limits on generator operating hours, considering it could potentially affect operations for years to come.

To address the concerns expressed in the last portion of the comment, it should be noted that when the first permit was prepared in 2007, diesel engine exhaust particles and nitrogen dioxide were not classified as toxic air pollutants, and Yahoo! had no reason to believe that they would be regulated as toxins in the future. The recent listing of diesel exhaust particles and nitrogen dioxide as toxic air pollutants – and the potential emissions associated with data center expansion – were the triggers for Ecology to require an environmental benefit (an emissions reduction, in other words) as a condition of permit approval. Since Yahoo! had no reason to believe that diesel exhaust particles or nitrogen dioxide would be regulated toxins, they had no way of knowing that if they wanted to expand in the future, they would be required to reduce emissions later as a condition of permit approval. Thus, Yahoo!'s request for 400 hours in the first permit could not have been made with the idea in mind that they would need to later "trade down" allowable operating hours.

Comment 12, Danna Dal Porto:
My question is this: In refusing some of the control options, the price was quoted per ton of material removed. The price seems quite high but what about the extended life of the facility? I assume these data centers are being built to be around for a long time. Actually, answer for me the life expectancy of the Yahoo facility. How long is it expected to operate? I guess at least 25, 35, 50, ? Years, more or less. If Yahoo extended the cost of the "filters" over the life of the facility what would the cost per ton be at that point? I would like to know how many tons of DPM would be generated over Quincy in 25 years. And how would be cost of the filters be amortized over that same time frame? And if the "filter" is removing XXX tons per year, think how much nicer and safer our community would be without all of the tons of toxic materials spreading over the hills and through the dales. I have a hard time seeing that the cost per ton spread over the life of the facility can be more than the human and environmental cost for the City of Quincy. Putting "filters" on these generator stacks is the right thing to do and I believe everyone in this room knows this fact.

Ecology Response:
The process for determining the cost per ton of pollutant removed is described in the U.S. Environmental Protection Agency (EPA) Air Pollution Control Cost Manual. When the cost per ton removal efficiency for a particular control technology is calculated by using the methodology in this manual, the key assumption is that the emitter — in this case, the backup generators at the Yahoo! Data Center — could operate indefinitely. This is a conservative assumption because shortening the operational life of the backup generators (anticipated to be about 15 years) to a duration of less than the life of the control technology (about 20 years) results in higher cost-per-ton values. Whether the Yahoo! Data Center backup generators operate for 20 years or 40 years, the cost per ton removal

efficiency would not change. This is because the cost per ton is calculated on an annual basis amortized over the 20-year lifetime of the control technology.

For a detailed description of the cost per ton calculations that were completed for each control technology, refer to the Best Available Control Technology (BACT) cost documentation that was included in the Notice of Construction application. If Yahoo!'s 10 proposed generators were to operate the maximum allowable number of hours every year for 15 years, they would generate a total of 5.2 tons of diesel exhaust particles. Whether human health is protected is evaluated based on the magnitude and frequency of exposure to concentrations of pollutants in the air. As presented in the Technical Support Document for the Third Tier Review, emissions from the generators were not found to pose a significant threat to human health.

Comment 13, Danna Dal Porto:
Has Yahoo or the Department of Ecology investigated the impact of the emission materials on adjacent farmland? Has the toxic affect of the emissions altered or impacted adjacent crops? How do emission particles affect hay, corn or fruit crops like apples or pears? How do you know the impacts? What studies have been done on the effect of emissions on agriculture and who did them? What are the effects of the emissions on agricultural livestock? Beef cattle, dairy cattle, sheep or chickens? How about health impacts to pleasure animals such as horses, dogs or cats? Or effects to wild game: pheasants, ducks or quail. Does the emission material collect in water forms like lakes or irrigation canals and could that emission material travel to other farms on the Columbia Basin Project?

Ecology Response:
This is a multipart question that addresses several separate issues. We have answered each issue separately.

Has Yahoo or the Department of Ecology investigated the impact of the emission materials on adjacent farmland?
Yahoo! conducted air dispersion modeling to evaluate the levels of diesel engine exhaust emissions in air. Ambient levels are estimated for all land use types (including farm land) within a distance of at least 3 km (about 2 miles) from the emission points.

Has the toxic affect of the emissions altered or impacted adjacent crops? How do emission particles affect hay, corn or fruit crops like apples or pears? How do you know the impacts? What studies have been done on the effect of emissions on agriculture and who did them? What are the effects of the emissions on agricultural livestock? Beef cattle, dairy cattle, sheep or chickens? How about health impacts to pleasure animals such as horses, dogs or cats? Or effects to wild game: pheasants, ducks or quail.
In setting national ambient air quality standards (NAAQS), the U.S. Environmental Protection Agency has developed primary standards with the intent of protecting public health, and secondary standards with the intent of protecting "public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and

buildings." Yahoo! demonstrated compliance with the NAAQS; therefore, crops are not expected to be adversely affected by Yahoo!'s emissions.

The Washington Administrative Code, WAC 173-460, focuses on limiting emissions of toxic air pollutants to "protect human health and safety"; therefore, the effects of emissions on crops and the health impacts on livestock or other animals are not considered as part of the health impacts assessment for permitting the expansion of the Yahoo! Data Center. However, it is likely that standards developed to protect human health will also protect crops, livestock and other animals.

Does the emission material collect in water forms like lakes or irrigation canals and could that emission material travel to other farms on the Columbia Basin Project?
Diesel particles (and chemicals attached to them) are expected to behave like a gas, so the bulk of them are expected to disperse far from their source of emission. While it is possible that some persistent chemicals in diesel particulate could build up in food crops, soil, and water bodies near a source, quantifying exposure through these media is impractical and very unlikely to yield significant concerns. Inhalation is the only route of exposure to diesel particulate that has received sufficient scientific study to be useful in human health risk assessments.

Comment 14, Danna Dal Porto:
I would like to know the total cost of ammonia scrubbers for the additional 10 engines.

Ecology Response:
Estimated total cost, including capital cost, direct and indirect installation costs, of Selective Catalytic Reduction (referred to above as ammonia scrubbers) to reduce nitrogen oxides for the 10 engines requested for data center expansion is $1,283,000.

Comment 15, Danna Dal Porto:
I want to know how much Yahoo saved through the tax exemption passed by the Legislature in 2010. How much did Yahoo save?

Ecology Response:
This question, relating to legislative action regarding tax issues, is not considered part of Ecology's permit review of Yahoo!'s project. Because this issue is not within the purview of Ecology, we have no answer to this question.

Comment 16, Danna Dal Porto:
What is the cost of air pollution caused by DPM in lost work, hospitalizations from heart attacks and strokes? I have been told that DPM is the greate4st health hazard in Washington State and is a number one priority of the government to decrease and control. I submit that the Spokane office of DOE is not decreasing DPM in Quincy. How does the Yahoo center air quality permit conform to the statewide effort to decrease DPM?

Ecology Response:
In 2009, Ecology estimated the health effects and economic impacts of fine particulate pollution in Washington. Ecology estimated that every year in Washington, fine particles (from all sources including diesel emissions) cause illness that results in direct and indirect costs of about $190 million. The full report is available at http://www.ecy.wa.gov/pubs/0902021.pdf

While impacts of diesel particulate matter (DPM) are not specifically singled out in the above-referenced report, it is correct to say that diesel particulate is the highest priority toxic air pollutant, both for its contribution to ambient levels of fine particles as well as its potential cancer risk (http://www.ecy.wa.gov/pubs/0802030.pdf). Ecology and other local air agencies have developed strategies aimed at reducing diesel particulate around the state. Yahoo!'s permit may not reduce diesel particulate, but it does require control of diesel particulate through limiting hours, requiring use of engines certified by the U.S. EPA, and requiring the use of low sulfur diesel fuel to operate the backup generators. Washington's Clean Air Act, Chapter 70.94 RCW, clearly outlines Ecology's requirement to "maintain healthy levels of air quality that protect human health and safety….and to promote the economic and social development of the state." Washington regulations WAC 173-400 and 173-460 further state that Ecology is to meet these goals through control or prevention of the emission of air contaminants. Ecology is required to review a project's potential emissions against the published air quality standards. If the project does not exceed these standards, even if an overall increase in pollutants occurs, we must approve the project through a contained permit.

Comment 17, Danna Dal Porto:
I would like an answer to this question. At the hearing I hear that Yahoo was raising the stacks on the first part of the development. It is my understanding that if there are physical changes to an existing facility then the existing facilities triggers a new source review. If changes are made to that facility I believe the operating permit becomes invalid and the permit must go through the public hearing over again. Does Yahoo have to have another public hearing if they alter the facility that has already been permitted? Also, what is the reason for the change in the stack height?

Ecology Response:
No, changes to the Yahoo! Data Center do not trigger a new source review because the proposed changes to its original facility were in the expansion Notice of Construction application. The preliminary determination proposes to rescind the existing permit (07AQ-E241) and constitutes a single new approval for the Yahoo! Data Center. The reason for the proposal to increase the stack height by 5 feet is to enhance the dispersion of air pollutants.

Comment 18, Danna Dal Porto:
I would like to see the emission rates for nitrates from both the first part of the facility plus the expansion added to the emission rates from Celite. Celite is located close enough to

Yahoo that Celite emissions cannot just be lumped into the background numbers. I believe they have to be modeled separately. I want to see a chart of these different emissions: first generators, expansion generators and Celite emissions.

Ecology Response:
Ecology assumes the question is referring to emission rates of "nitrogen oxides" and not "nitrates". Below is a summary of potential and actual nitrogen oxides (NOx) emissions from the Yahoo! facility in 2010.

Company	Potential to Emit	Actual 2010
2007 Yahoo!	35 tons/yr	0.76 tons/yr
2010 Yahoo!	11 tons/yr	0 tons/yr
Celite	38 tons/yr	20.1 tons/yr
Total Nitrogen Oxides	84 tons/yr	20.86 tons/yr

Comment 19, Danna Dal Porto:
I would like a chart showing the number of pounds/tons of DPM, and all other toxins released from the two parts of the Yahoo facility.

Ecology Response:
There is no actual emissions information for the proposed facility because it has not been built yet. Information on actual emissions from the existing facility can be obtained through our formal public disclosure process.

Below is a summary of potential emissions from the Yahoo! data center:

Table 2.1: Potential to Emit for the Yahoo! Data Center Generators			
Pollutant	**Existing Units R thru 12 Potential To Emit**	**Expansion Units 13 thru 22 Potential To Emit**	**Total Facility Potential to Emit**
Criteria Pollutant	**tons/yr**	**tons/yr**	**tons/yr**
2.1.1 Nitrogen Oxides	35	11	46
2.1.2 Carbon Monoxide	13	6.1	19.1
2.1.3 Sulfur Dioxide	80 lb/yr	22 lb/yr	102 lb/yr
2.1.4 Particulate Matter$_{2.5}$	1.2	0.35	1.6
2.1.5 Volatile Organic Compounds	80 lb/yr	349 lb/yr	429 lb/yr

Toxic Air Pollutants (TAPs)			
2.1.6 Primary Nitrogen Dioxide	3.5	1.1	4.6
2.1.7 Diesel Engine Particulate	1.2	0.35	1.6
2.1.8 Carbon Monoxide	13	6.1	19.1
2.1.9 Sulfur Dioxide	4.0E-02	1.0E-02	5.1E-02
Carbon based TAPs			
2.1.10 Acrolein	2.1E-04	5.59E-05	2.7E-04
2.1.11 Benzene	2.1E-02	5.5E-03	2.6E-02
2.1.12 Propylene	7.47E-02	1.98E-02	9.4E-02
2.1.13 Toluene	7.5E-03	1.99E-03	9.5E-03
2.1.14 Xylenes	5.2E-03	1.37E-03	6.5E-03
2.1.15 Formaldehyde	2.1E-03	5.6E-04	2.7E-03
2.1.16 Acetaldehyde	6.7E-04	1.79E-04	8.5E-04
Poly Aromatic Hydrocarbons			
2.1.17 Naphthalene	3.5E-03	9.22E-04	4.4E-03
2.1.18 Benz(a)anthracene	1.7E-05	4.41E-06	2.1E-05
2.1.19 Chrysene	4.1E-05	1.1E-05	5.2E-05
2.1.20 Benzo(b)fluoranthene	3.0E-05	7.9E-06	3.8E-05
2.1.21 Benzo(k)fluoranthene	5.8E-06	1.55E-06	7.4E-06
2.1.22 Benzo(a)Pyrene	6.9E-06	1.82E-06	8.7E-06
2.1.23 Indeno(1,2,3-cd)pyrene	1.1E-05	2.94E-06	1.4E-05
2.1.24 Dibenz(a,h)anthracene	9.2E-06	2.45E-06	1.2E-05

Comment 20, Danna Dal Porto:
Patty Martin asked specifically for the number of tons of DPM emitted by the existing facility in 2010 and also for the number of tons of DPM that will be emitted by the 10 new engines. Neither Yahoo nor all the assembled Ecology employees answered that specific question. Since the risk that the community is being asked to accept is from the actual emissions at Yahoo and the actual increase in emissions at Yahoo, this is information that cannot be denied o the community. I am asking Yahoo and Ecology to disclose the amount of DPM actually emitted in 2010 and the actual amount expected to be emitted each year after the 10 engines are installed.

Ecology Response:
Maximum diesel particulate emissions allowed under the current permit are 1.2 tons/year. The actual amount of diesel particulate reported by Yahoo! for 2010 operation is 0.015 tons/year (30 pounds per year). The 10 new engines supporting data center expansion will be restricted to 0.35 tons/year of diesel particulate in the proposed approval. It is unknown what the actual emissions will be once the 10 new expansion engines are installed and operated. However, the approval order mandates that annual diesel particulate emissions from the 10 new engines installed for the expansion must remain below 0.35 tons/year.

No. of engines	DPM Potential to Emit	Actual 2010 DPM emissions
13 original engines	Allowed: 1.2 tons/yr	0.015 tons/yr
10 expansion engines	Proposed: 0.35 tons/yr	0 tons/yr

Note that this information is also available through our formal public records request process.

Comment 21, Danna Dal Porto:
I am wondering how the emissions of nitrogen oxides, DPM, acrolein, formaldehyde and all of the other goodies from the data centers around Quincy will accumulate in people's lungs over the length of time they are running.

Ecology Response:
Emissions from diesel engines consist of gas and particles. Studies of the deposition and clearance of diesel particles in animals indicate that some inhaled diesel particles deposit in the airways and lungs. Over time, these particles are ultimately cleared by various processes. The length of time that particles stay in the lung depends in part on where in the airway the particles are deposited, and how much and how frequently exposure occurs.

Particles deposited in the upper airways are expected to be cleared relatively quickly (hours). Particles deposited deep in the lung (alveolar region) take longer to clear (weeks, months). Repeated exposure to very high concentrations is thought to overload clearance mechanisms, and therefore, diesel particles can reside in the lungs for longer periods (months to years).

Comment 22, Danna Dal Porto:
How are the nitrogen oxide emissions from the REC Silicon plant in Moses Lake different than the nitrogen oxide emissions from the emission sources in Quincy? How many pounds/tons are permitted for REC silicon, Celite, Microsoft and Yahoo?

Ecology Response:
We do not expect a significant difference in the health and atmospheric characteristics of nitrogen oxide emissions generated by generators at REC, Microsoft, Yahoo! and Celite. For most combustion units, nitrogen oxides primarily exist in the form of nitrogen dioxide and nitric oxide regardless of the type of fuel burned. Fuel for the generators at Microsoft and Yahoo! is no. 2 diesel, and for REC and Celite is natural gas.

Company	Yahoo!	Microsoft	REC	Celite
Potential to emit	46 ton/yr	44 ton/yr	68 ton/yr	38 ton/yr

Comment 23, Danna Dal Porto:
How did Ecology know that REC Silicon had violated its permit for nitrogen oxides?

Ecology Response:
REC, much like Yahoo!, had to apply for an air quality permit. In that application and during Ecology's review of the application, limits were set for certain pollutants from certain pieces of equipment. These limits were stated in the REC permit, similar to the limits placed in the existing Yahoo! Data Center permit, as well as in the draft permit for expansion. Ecology routinely verifies compliance with the permit limits. The violation you are speaking of at REC was found during a required "stack" test of the emissions from their "acid etch scrubber."

Comment 24, Danna Dal Porto:
This question is for the Department of Ecology. I would like a description of how the laws are written and put into code for the Department of Ecology. Does the Legislature participate in the writing of these laws? Is there an advisory board to consult? How does the Director of the Department of Ecology function in the creation of laws? How does the Governor of the State of Washington function in the creation of these laws? How can a law be changed or altered? Is there any coordination with the Environmental Protection agency? Can some laws be specific to Washington State and, if laws are not the same at the state and national level, which law takes precedent?

Ecology Response:
This is a multipart question that addresses several seperate issues, some of which are beyond the scope of this permitting action. We have responded to each issue separately.

How the laws are written and put into code for the Department of Ecology.
Legislators enact state laws found in the Revised Code of Washington (RCW). The procedures for writing or amending state regulations found in the Washington Administrative Code are detailed in Chapter 1-21 WAC Rule Making and Chapter 34.05 WAC Administrative Procedures Act (APA).

The major phases for the most common type of rule making are as follows:

1. *File the Pre-Proposal Statement of Inquiry Form (CR-101).*

The purpose of the CR-101 is to notify the public about Ecology's intent to adopt a new rule or amend or repeal an existing rule.

2. *File the Proposed Rule Making Form (CR-102).*

The CR-102 cannot be filed until 30-days after the CR-101 is published in the Washington State Register (WSR). After the 30-day period Ecology can file a CR-102 at any time. The purpose of the CR-102 is to officially propose the draft rule language and to invite public comment.

The CR-102 filing provides:

- A brief description of the rule.
- The associated WAC number.
- A copy of the proposed rule text.
- The date, time, and location of the public hearing(s).
- The public comment deadline and the process for how to submit comments.
- If required, a Small Business Economic Impact Statement (SBEIS).

3. *File the Rule-making Order Form (CR-103):*

- The CR-103 cannot be filed until on or after the intended adoption date written on the CR-102 (expedited and emergency rules are exceptions). The purpose of the CR-103 is to officially adopt the rule with the signature of the Agency Director. The Director of Ecology reviews and approves each WAC revision before Ecology files it with the Code Reviser.

Public comment is always welcome during this rule process. Here are the typical ways to get involved:

- *Public workshops and advisory committees (informal).* Many times Ecology will hold public workshops or create advisory committees to solicit input during the rule-making process. Look on the CR-101 for details on how to participate in the rule- making process.
- *Official public hearing (formal).* Public hearings are where you can submit your formal written or verbal "testimony". Comments you give at a public hearing become part of the official record (responsiveness summary) required by the APA. Look in the CR-102 for the location, date, and time of the public hearings.
- *Official Comment period (formal).* You may submit written comments to Ecology related to any rule making. Comments received after Ecology files the CR-102 and before the close of the comment period become part of the official rule making record. Look at the CR-102 to see to whom, where, and how you can submit comments.

Does the Legislature participate in the writing of these laws?

The original authority to write any part of the WAC comes from the Legislature. This is called "statutory authority." The State Legislature gives a State agency the permission to write and adopt a rule on a specific subject. Many of the rules administered by the Air Quality Program are authorized by Chapter 70.94 RCW, Washington Clean Air Act.

For some situations, Ecology must have specific legislative authority to amend the WAC. For other situations, Ecology is authorized to amend the WAC without a specific legislative request. An example of an amendment with specific legislative authority is the revision of Chapter 173-455 WAC, Air Quality Fee Rule. Ecology was authorized to adopt rules on this subject by Section 301(10) of the 2009 budget bill.

Is there an advisory board to consult?
While establishment of an advisory board is not mandatory, Ecology often works with a rule advisory committee during the development of rule amendments. The advisory committee might be made up of members of the public, representatives from civic organizations, environmental groups, state agencies, local government, and business or industry.

How does the Director of the Department of Ecology function in the creation of laws? How does the Governor of the State of Washington function in the creation of these laws? How can a law be changed or altered?
It is not clear from this question whether the focus is on the creation of Revised Code of Washington, RCW, or Washington Administrative Code, WAC. Here is a quick overview of how state law, RCW, is enacted.

The members of the Washington State Legislature House and Senate offer legislation, or bills, for consideration. The ideas for bills come from a number of places, including the Governor and directors of state agencies. Once a bill is passed by both houses of the Legislature it is forwarded to the Governor. The Governor may decide to sign it, veto part of it, or veto all of it. If the Governor vetoes part or all of it, the Legislature may vote to override the veto. If the Governor does not act on a bill after the allotted number of days, it is as if it was signed.

The powers of initiative and referendum are means by which citizens can impact legislation directly. Initiative is the power of the public to initiate ordinances by petition. Referendum is the means by which the public can have enacted ordinances referred to them for review. Laws can be changed by referendum and legislative action.

Please refer to the first part of this question, *How the laws are written and put into code for the Department of Ecology,* for an overview of the amendment process for the Washington Administrative Code.

Is there any coordination with the Environmental Protection agency?
The Department of Ecology Air Quality Program coordinates with the U.S. Environmental Protection Agency when we are revising any part of the WAC that implements the federal Clean Air Act.

Can some laws be specific to Washington State and, if laws are not the same at the state and national level, which law takes precedent?
Washington State and the U.S. federal government laws are not identical. Each project that is subject to regulation must comply with all applicable state and federal laws, regulations, and rules.

Comment 25, Danna Dal Porto:
I want to know, were any state laws altered or changed in the last ten years that have allowed the sitting of these data centers in Quincy? How about the dropping of the NO emission standard? Were any other changes made to the laws to drop emissions or change the standards that might have been beneficial to industry?

Ecology Response:
One state law was passed in 2010 to provide a tax incentive for data centers to locate in a place that has Quincy's characteristics. See ESSB 6789 (Chapter 1, Laws of 2010) amending RCW 80.08 and 80.12. The laws that were amended are tax laws.

Air Quality laws have not been explicitly amended to exclude industrial or commercial facility from particular locations. However, most laws amended over the past many years, including the NAAQS and Washington State WAC 173-460, are considered more restrictive and protective to human health and thus may be viewed as making it harder to site these data centers in Quincy.

There has never been an air quality emission standard for nitric oxide in state or federal law or in a state or federal regulation. However, prior to May 2009 Ecology's regulation, Controls for New Sources of Toxic Air Pollutants, WAC 173-460, contained an Acceptable Source Impact Level for nitric oxide. In 2009, this regulation was changed. The most important change was a decision concerning which chemicals were listed in the rule based on toxicological information that met a minimum level of scientific rigor. As a result of this decision, nitric oxide and a large number of other chemicals listed in the earlier rule were dropped from this list. Other chemicals were added to the list including nitrogen dioxide and diesel particulate matter. The addition of nitrogen dioxide and diesel particulate matter has tended to make it harder for diesel engines to be permitted.

Comment 26, Danna Dal Porto:
I do not see any data about the number of residents directly impacted by this project. Are there a number of residents surrounded by the emission plume and what are the cancer risks per thousand from the emissions generated by Yahoo? At a public meeting about Microsoft, a local resident made an issue about the number of cancers as if it was "No Big Deal" that there would be 100 cancers per million. I assure the audience that cancer is always a Big Deal and everything that can be done should be done to protect people. Tossing numbers around is a serious issue because those numbers represent a person's life. To downplay the number of cancers just to allow economic development is disgusting.

How many heart attacks, strokes and other non-cancer health impacts are expected from Yahoo emissions?

Ecology Response:
Page 20 of the Technical Support Document for the Third Tier Review (one of the documents available for public review and comment) states: "Ecology estimates that Yahoo!'s Phase 5 DEEP," (or DPM) "emissions impact one residentially zoned parcel at level exceeding the ASIL. This 10 acre parcel is zoned residential but currently undeveloped."

Therefore, we can say that no current resident in Quincy is likely to be exposed to emissions from the Yahoo! Data Center phase 5 expansion to such a degree that would result in a lifetime increased cancer risk of greater than one person in one million people.

In response to the second half of your question, we take the risk to human health very seriously. A Tier III review is the most stringent toxics review standard available to Ecology. A discussion of cancer risk is inherently a discussion of numbers. We have no intent of minimizing the tragedy of cancer. By using the Tier III community-wide approach to permitting, we are doing everything within our power to prevent increases in cancer risks in the Quincy community.

Comment 27, Danna Dal Porto:
Speaking of residents, were notices of this meeting posted at Lazy Acres?

Ecology Response:
No. Please see the response to Comment 3 for a full listing of where the notice was posted.

Comment 28, Danna Dal Porto:
Has the DOE taken into account the principle of Environmental Justice in the sitting of these data centers in Quincy? If not, why not?

Ecology Response:
Yes. The Air Quality Program staff consulted with staff from Ecology's Environmental Justice unit to ensure that, within our purview, issues of environmental justice were appropriately taken into account. Please keep in mind that we are not able to restrict where an industry locates. That is up to local government. By law, Ecology must provide an Air Quality permit if the permittee meets the criteria for the permit. Local government is responsible for zoning, including designating the boundaries for Urban Growth Areas. Zoning has a major impact on future industrial sources and locations in the city of Quincy.

Comment 29, Danna Dal Porto:
Are all the Yahoo generators added together considered one emission source? If not, why not? Are there any numbers that add the generator emissions together? What is the aggregate of the generator emissions at Yahoo?

Ecology Response:
Yes, all the Yahoo! generators constitute one "source" as defined at WAC 173-400-030(80). The preliminary determination which was available for public review during the comment period reports allowable emissions for the original 13 engines and the 10 expansion engines. The decision to issue approval for the expansion looks at emissions from the entire facility, but only the new engines were subject to new source review under WAC 173-400-110. Please refer back to Comment 19 for the total emissions from the original 13 engines and the 10 expansion engines.

Comment 30, Danna Dal Porto:
When I drive past the Yahoo facility, the construction has been buzzing along. Is the structure I see the expansion? If so, I was under the impression that construction was not to start until the permit was issued. This construction has been ongoing for several months. Is this building being done within the laws and guidelines for data center construction and permitting?

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, Yahoo! has not begun any construction on the emission units, in this case, the diesel generators. Therefore, Yahoo! has not begun actual construction of the proposed modification. The Ecology Air Quality Program has no authority to limit other construction activities unrelated to the emission units.

Comment 31, Danna Dal Porto:
Yahoo is receiving tax benefits from the State of Washington. The Washington Legislature allowed those benefits to data centers because data centers would create jobs in this difficult economy. How many permanent jobs will be dedicated to the Yahoo expansion? Does Yahoo meet the various criteria to qualify for the Washington State tax break? Describe, in detail, how Yahoo meets the guidelines for the tax advantage.

Ecology Response:
This question, relating to legislative action regarding tax issues, is not considered part of Ecology's permit review of Yahoo!'s project, nor within Ecology's purview. Therefore, it is not a topic to which we can provide response.

Comment 32, Danna Dal Porto:
For my records, I want a copy of the DOE "community wide" review guidelines as well as the supporting legislation/law that established this measuring tool. The community wide

model has been discussed as the tool that allows this concentration of data centers in Quincy and the ceiling on cancer deaths to rise to 100 per million. I have never seen the guidelines. When did this measuring tool begin to be used in Washington State? Has the "community wide" model been approved by the Legislature? Has the "community wide" model been approved by the EPA?

Ecology Response:
Washington's air toxics rule allows an increased cancer risk of up to 10 cases of cancer per million people for each new source or project. The community-wide approach was conceived as a result of concerns about the possibility of rapid development of data centers in Quincy. Ecology was concerned that multiple data centers could be closely located and cause incremental risks that would be allowable by rule, but yet result in cumulative impacts of concern. Washington's air toxics rule still applies to the community-wide approach, but the difference is that the community-wide approach also takes into account existing sources of diesel particulate to calculate a cumulative risk. Ecology determined that even if a project resulted in an incremental cancer risk of less than 10 cases of cancer per million people, that a cumulative cancer risk of more than 100 cases of cancer per million people would not be permitted in Quincy. This approach was intended to limit the total amount of new emissions that could affect Quincy residents.

Any information relied upon by Ecology is coming up with cumulative cancer risk goal of 100 excess cancer per million is available for public disclosure to any member of the public.

The Legislature does not customarily approve technical analysis tools used by the Department of Ecology. The primary concern of the Legislature is that Ecology implements and enforces the laws and rules related to air quality. Ecology used air dispersion models approved by the U.S. Environmental Protection Agency to estimate the cumulative impacts of diesel particulate. It should be noted that the U.S. EPA does not require a new source review process for minor sources (such as data centers in Quincy).

Comment 33, Danna Dal Porto:
My biggest "issue" with all data center operation is that as a resident of Quincy I have no method to determine if the data centers are following the criteria of their permit. How can I know if Yahoo is operating within permitting guidelines?

Ecology Response:
You can use Ecology's public disclosure process to request copies of annual emissions inventory information and other information regularly submitted by Yahoo!. Also, by maintaining a personal copy of Yahoo!'s current air quality permits, you may be able to compare their operating scenarios with those allowed in the permit.

Please see the response to Comment 35 for additional information.

Comment 34, Danna Dal Porto:
On one part of the paperwork the generators are running 100% and yet there are times some generators run 10% and then some run 40%. Why are the run times/run rates changed when utilizing the generators? I have learned enough to ask this question: Is Yahoo changing the % of run or the run amount of the generators in order to be in compliance with emissions standards?

Ecology Response:
Engine runtimes and operating loads are established based on the power demands of the facility and engine manufacturer recommendations regarding engine testing and maintenance. Once established, those runtimes and operating loads are then used to demonstrate compliance with the air quality standards.

Table 3.4b from the preliminary determination (see below) summarizes the amount of engine run time during each mode of operation for the backup generators associated with the Yahoo! Data Center expansion. The amount of load placed on the engines during each mode of operation is dependent on the purpose and power demand of that operational mode. Maintenance testing for the Yahoo! facility is primarily used to determine whether the engines will start, and is conducted at 0% load. At the other extreme, annual load testing is used to make sure the generators produce enough power, and is conducted at 100% load. Operational load during electrical bypass and power outage will be dependent on the amount of power needed to maintain data security, and is estimated in Table 3.4b.

Table 3.4b: 10 Expansion Engines Operating Restrictions

Operating Activity	Hours/year per generator	Operating Load (%)	Diesel Fuel Gallons/year	# Operating Concurrently
Maintenance Testing	12	0%	1896	1
Load Bank Testing	4	100	5892	1
Electrical Bypass	36	2 at 40, or 1 at 80	43,020	2
Power Outage	48	8 at 90, 2 at 10	52743	10
Total	100		103,551	

Comment 35, Danna Dal Porto:
I want an answer to this question. And, how am I to know as a resident that Yahoo is following the guidelines of their permit? To be able to verify compliance with the permit is the heart of my dissatisfaction with the air quality permits issued by DOE Spokane.

Ecology Response:
The permit limits the number of hours the backup generators can run. It also limits the amount and type of fuel the backup generators can consume annually. Yahoo! faces fines and penalties if conditions of its permit from Ecology are violated. Yahoo! is required by regulation to report emissions and be inspected every 3 years, however, Ecology requests emission inventories annually. In addition, Ecology would inspect the facility more often if warranted. Permit violations frequently result in significant fines. It is Ecology's standard practice to publicize such fines. If Yahoo! were to significantly violate the conditions of its permit, this fact would be disclosed in a news release from Ecology.

Comment 36, Danna Dal Porto:
With only limits on the total hours of operation, how can I access those Yahoo operating records? I have been denied access to the Microsoft operating information so I cannot know, with certainty, that the permit is being honored. Also, I cannot know that Yahoo is following the permit. The only way to have some certainty about generator operational safety is to insist that control devices must be installed on the generator stacks.

Ecology Response:
The preliminary determination, which was available for public review during the comment period, contains approval condition 9.2.1, which requires the annual reporting of "…a listing of each start-up of each diesel engine that shows the purpose and duration of each type of operation." In addition to the existing language in the preliminary determination, a new reporting condition will be added that will require Yahoo! to notify Ecology within 24 hours of any operation caused by a power outage that lasts longer than one hour. A copy of the proposed changes to the preliminary determination is included in Appendix G. Ecology has files for every facility we regulate and any member of the public can request access to view them at any time. For example, Ecology has provided access to everyone requesting permitting or annual reporting data from the Microsoft Columbia Data Center.

Comment 37, Leonard Bauhs, Washington Department of Social and Health Services, IT Specialist:
Was reading the attached email from DOE a bit chagrinned. There are hydrogen fuel cell back-up generators that are tested, proven and selling commercially. Ballard Power Systems in Seattle could help take the green thing one step further by keeping the purchase local. I've been tracking another company, Plug Power, for some years, too. It has a similar product that has also sold around the world. No reason to burn diesel!

Ecology Response:
Unfortunately, we don't always have control over what type of emissions source is proposed by an applicant. Our regulatory obligation is to review the proposed source for compliance with air quality requirements, as codified at WAC 173-400-112 & 113. While we agree that there are other technologies that could satisfy the project's power needs, we don't have the regulatory authority to impose those technologies on an applicant.

Comment 38, Joe Wichmann, PhD, 4268 WIlcox Rd, Northport, WA 99157:
I believe that the proposed new generator capacity for the Yahoo site should be propane or natural gas fueled rather than diesel. Propane and natural gas fueled generators are quieter and cleaner than diesel.

While propane and natural gas are marginally more expensive, these are backup generators and as such are not expected to be used extensively in any year. Yearly operating fuel costs are expected to be low regardless of the fuel.

Ecology Response:
The fuels identified by the commenter would require a re-design of the proposed engines to accommodate those short chain hydrocarbon fuels. Redesigning the engines to accommodate propane or natural gas would constitute re-defining the source, which is prohibited under state and federal guidance. Additionally, we do not believe that the project area (Quincy) is currently served by a natural gas pipeline.

While we agree that there may be other technologies that would satisfy the project needs, we don't believe that other fuels could be used in the proposed engines without significant changes to the engines. Our regulatory authority only allows us to review the projects as submitted, and either approve or deny the permit.

Comment 39, Russell Schwaberow, whitefrogsrule@frontier.com:
There seems to be concern about the diesel generators being used on occasion by the data centers and causing pollution problems for residents in Quincy. In a blog I read, there are a lot of trains that go through Quincy, some running through and some idling for hours. Where stands the foundation of complains against these generators that will be rarely used compared to the trains diesel engines and has a study been done about the pollution that Quincy receives from the trains?

Ecology Response:
We took into account diesel particulate from other sources in Quincy, including trains and diesel transport trucks, and used this information to establish a prevailing level of diesel particulate in Quincy. The background levels were added to the amount of diesel particulate emitted by the backup generators of the data centers.

Comment 40, Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848:
Establishing a "goal" of 100 cancers per million is a standard that is less stringent than used elsewhere in the state and is an environmental injustice, and I believe a violation of Title VI of the Civil Rights Act of 1964. Quincy being predominantly low-income and Hispanic is being disproportionately burdened with these toxic polluters, and what laws should protect us have been impermissibly amended, manipulated, or simply not enforced. In any case, Yahoo and Ecology cannot escape their responsibilities under the law.

The standard of 100 cancers per million has arbitrarily been established for Quincy and is not supported by state law. If it were supported under state law, the Department of Ecology would be able to cite the statute.

Ecology Response:
Chapter 173-460 of the Washington Administrative Code (WAC) says that Ecology may recommend approval of a project if the increase in emissions of toxic air pollutants is not likely to result in an increased cancer risk of more than one case of cancer in one hundred thousand (10 per million). This risk level still applies to all new or modified sources in Quincy and every other area of the state. The difference in Quincy is that Ecology established a cumulative risk level above which sources of toxic air pollutants would not be permitted. This would apply to sources even if their increase in emissions results in an increased risk of less than one case of cancer in one hundred thousand people. In no other area of the state has Ecology set a limit on cumulative risk from multiple sources - stationary as well as mobile - of toxic air pollutants. Quincy is being treated differently, but the intent is to be more protective, not to disproportionately burden Quincy's resident's with toxic air pollutants.

The state and federal Clean Air Acts do not establish an acceptable risk level for exposure to toxic air pollutants. The federal clean air act mandated that the U.S. EPA establish emission standards for hazardous air pollutants to protect public health with an "ample margin of safety." The Act did not state what risk level constitutes an "ample margin of safety." It was during rule making for the benzene National Emission Standard for Hazardous Air Pollutants (NESHAP) that the U.S. EPA established a numeric risk value that constitutes an "ample margin of safety":

"[I]n protecting public health with an ample margin of safety, we strive to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1-in-1 million; and (2) limiting to no higher than approximately 1-in-10 thousand [i.e., ***100 in a million****] the estimated risk that a person living near a facility would have if he or she were exposed to the maximum pollutant concentrations for 70 years."*

Based on this statement, the U.S. EPA aims to keep the risk caused by emissions from a single facility to less than 100 cases of cancer in one million people. In Quincy, Ecology aims to keep the increased risk from exposure to cumulative emissions of diesel engine exhaust (from multiple sources, both stationary and mobile) to less than 100 cases of cancer per one million people.

The maximum cumulative exposure to diesel particulate for a resident near Yahoo! results in an increased risk of about 25 cases of cancer per one million people. Yahoo!'s current expansion will not affect any existing residences by more than 1 case of cancer in one million people.

Comment 41, Patricia Anne Martin:
Additionally, Ecology's decision to lower the standard is not consistent with Washington Legislature Policy:

The Legislature further recognizes that air emissions from thousands of small individual sources are major contributors to air pollution in many regions of the state. As the population of a region grows, small sources may contribute an increasing proportion of that region's total air emissions. It is declared to be the policy of the state to achieve significant reductions in emissions from those small sources whose aggregate emissions constitute a significant contribution to air pollution in a particular region.

Ecology Response:
Revised Code of Washington (RCW) 70.94.011 establishes public policy and purpose of the Washington Clean Air Act. Actual implementation of the law is carried out under state regulations, policy, and procedural guidance. As stated in the response to Comment 40, above, 100 cases of cancer in one million people has been established by the U.S. EPA as providing an "ample margin of safety" for human health for individual air contaminant sources. Ecology is setting an uppermost limit of tolerable risk as 100 cases of cancer in one million people as a way to minimize risk to the entire community from multiple sources of air contaminants. In no way does this limit constitute a "lower standard" of public policy set by the Washington Clean Air Act.

Comment 42, Patricia Anne Martin:
Amending Washington's clean air regulations WAC 173-460 and WAC 173-400 in 2009 to facilitate the placement of multiple data centers in Quincy, and again in 2011 in what appears to be an attempt to undermine MYTAPN's appeal before the PCHB. (see attached "2009 changes to air quality regulations; "2011 clean air changes" and "Chart – changes to WA air standards"). Had these provisions been properly enforced, including those federal requirements removed in 2009, I believe that emissions controls would have been required on all data centers currently located in Quincy and their expansions where appropriate.

Ecology Response:
Ecology disagrees with this comment. In 2009, WAC 173-460 was updated based on toxicological information that met a minimum level of scientific rigor. As a companion action with the changes to WAC 173-460, revisions to WAC 173-400 updated that regulation for consistency with the updated toxics regulation.

In 2009, WAC 173-400 was updated to address specific concerns of the U.S. EPA over portions of the rule for delegation of the Potential for Significant Deterioration (PSD) permitting program and other aspects of the rule related to updating the State Implementation Plan.

In 2011, WAC 173-400 was updated to meet additional requirements of the Federal Clean Air Act and U.S. EPA rules. This includes rules adequate to attain and maintain the National Ambient Air Quality Standards.

None of the above actions were initiated or influenced by the data center projects.

Comment 43, Patricia Anne Martin:
Yahoo is claiming an emission reduction, but state law requires emission reductions must be based on "actual emissions[1]" and "shall equal the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during a two-year period which precedes the particular date and is representative of normal source operation." WAC 173-400-030(1)

Ecology Response:
The definition of "actual emissions" contained in WAC 173-400-030(1)(b) allows Ecology to "presume that source specific allowable emissions" for the unit are equivalent to the actual emissions of the emissions unit. If the emissions unit has not begun normal operations (typically the first two years after it first operated), actual emissions are equal to the potential to emit of the emissions unit.

Although state rules allow for the use of "allowable emissions" or "potential to emit" depending on the situation and the usage of the term, we did not have to rely on the regulatory definition of "actual emissions" while reviewing Yahoo!'s proposal. Air emissions and resulting impacts from the Yahoo! Data Center were evaluated based on the potential to emit in order to estimate Yahoo!'s worst-case impacts.

Because Yahoo! agreed to have Ecology review their proposal under third tier review (WAC 173-460-100), Yahoo! was not required to offset their emissions under WAC 173-460-090(6). Therefore, no offsets were taken. If they had opted for offsets in order to avoid third tier review, such offsets would have to be based on "actual emissions" as defined at WAC 173-400-030(1). Instead, as allowed by WAC 173-460-100(4), Yahoo! proposed to reduce toxic air pollutants by reducing potential to emit limits from their original approval order (07AQ-E241). The purpose of this reduction was to reduce community exposure to diesel PM emissions from Yahoo!. Ecology considers the reduction to be significant since maximum community exposure to Yahoo!'s diesel particle emissions will be significantly lower after the expansion than before the expansion.

Comment 44, Patricia Anne Martin:
I am requesting an answer to my question in tons per year. I want to know how much diesel exhaust was emitted by Yahoo in 2010 and how much will be emitted from the new engines in tons per year.

Ecology Response:
Please see our response to Comment 20.

Comment 45, Patricia Anne Martin:
The Clean Air Act, Washington State statute and clean air regulations apply LAER (lowest achievable emission rate) to "any source", and require that:

"The maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the emissions control that is achieved in practice by the best controlled similar source..." 42 USC 7412(d)(3).

Ecology Response:
In Washington State, Lowest achievable emission rate (LAER) is not required for minor new source review of air pollution sources. The requirements for issuance of a Notice of Construction approval order to a new source or modification that is located in an attainment or unclassifiable area, such as Grant County, are provided in WAC 173-400-113, Requirements for new sources attainment or unclassifiable areas. That section of state rules clearly does not require the application of LAER to any minor new source.

On the other hand, major sources that are located in nonattainment areas (such as parts of Pierce County) are required to apply LAER (among other things) before the project can be approved. Nonattainment new source review requirements are found in WAC 173-400-112 (or the new WAC 173-400-810).

Comment 46, Patricia Anne Martin:
Washington State's Clean Air statute RCW 70.94.030(14) and air pollution regulations (WAC 173-400-030(43)) mirror the application of LAER to all sources, not just major sources. Recent regulations finalized March 1, 2011 (see attached "2011 clean air changes") attempt to limit LAER's applicability to major sources only by repositioning the definition under a new section of WAC 173-400 dealing with major facilities. Not only was this amendment to the regulation not part of the rule put out for public comment, but we believe this action is not statutorily supported and may have been exercised to undermine our legal challenge in the PCHB. Whatever the reason, it does not absolve Yahoo from the requirement to maximally reduce their emissions by using "the emissions control that is achieved in practice by the best controlled similar source".

Ecology Response:
As stated above, Lowest Achievable Emission Rate (LAER) only applies in a nonattainment New Source Review. At the end of the public comment period, the LAER definition was located in two places. The duplicate definition in WAC 173-400-030 was removed. The definition in new section WAC 173-400-810 was kept.

In the pre-2011 revision, the inclusion of LAER as a defined term in section 030 was to support its usage in WAC 173-400-112, which addressed the permitting of major stationary sources in nonattainment areas. The program contained in section 112 did not fulfill the

current requirements for a federally approvable nonattainment new source review program. The new program language located in the 800 sections of the rule is intended to meet the current federally required program requirements. As a result, the program requirements in section 112 were deleted, as was the need to keep the definition of LAER in section 030.

As required by the U.S. EPA and implemented in state regulations, LAER is only required at major stationary sources located in nonattainment areas and emitting the pollutant for which the area is not in attainment with the national ambient air quality standard.

Comment 47, Patricia Anne Martin:
Yahoo is extending their stacks 5 feet which may constitute an impermissible dispersion technique[2] for purposes of the Act, and as a modification may subject the existing facility to the requirements of 42 USC 7411, i.e., standards of performance for new stationary sources, including LAER. Although Ecology has removed this provision under the 2011 changes, Washington regulations cannot be less stringent than federal law.

Ecology Response:
Ecology disagrees with this comment. The 5-foot increase in stack height does not constitute an impressible dispersion technique as defined at WAC 173-400-200(2)(b), or referenced federal rules, nor does it cause Yahoo!'s engines' stacks to exceed the Good Engineering Practice (GEP) height as calculated according to WAC 173-400-200. While state rules prohibit the use of "excess stack heights" to meet ambient air quality standards, the resulting stack height must exceed the GEP stack height for the increase in stack height to constitute an "excess stack height."

Additionally, there is no evidence that Yahoo! increased final exhaust gas plume rise by manipulating source process parameters, exhaust gas parameters, stack parameters, or combining exhaust gases from several existing stacks into one stack; or other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise.

Please refer to answers to Comments 17 and 45 above for additional information.

Comment 48, Patricia Anne Martin:
Ecology has an obligation under the Federal Clean Air Act to enforce compliance with NAAQS. Part of this obligation is modeling required under 40 CFR 51 Appendix W Section 8.2.3 (a) which requires that, "In multi-source areas, two components of background should be determined: contributions from nearby sources and contributions from other sources." The regulation then goes on to state regarding "nearby sources", that "All sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled."

Even though Ecology has attempted to remove this obligation under the 2009 rule changes (see attached "2009 changes to clean air regulations" page 19 of 51) – the state cannot be

less stringent than federal requirements. Despite Greg Flibbert's assertion at the Public Hearing on March 17, 2011 that Ecology is not required to use 40 CFR 51 Appendix W, that is patently not true. Ecology must enforce the provisions of the Federal Clean Air Act, and the agency's failure to do so does not absolve Yahoo from compliance with the law.

Ecology Response:
In demonstrating compliance with air quality standards, Ecology added our estimate of background concentrations to the modeled concentrations from Yahoo!'s expansion engines. We believe our approach adequately addresses all requirements of state and federal guidance pertaining to ambient impacts analyses for minor new sources of air pollution. We believe that contributions from nearby sources, including Yahoo!'s existing engines, are adequately accounted for in our estimate of background emissions.

Ecology works everyday with the National Ambient Air Quality Standards (NAAQS) and related guidance documents published by the U.S. EPA. We take our obligations under these rules and guidance systems very seriously. The Washington Clean Air Act, RCW 70.94.152, directs that Ecology ensure that the predicted emissions from Yahoo!'s expansion in Quincy will not result in a violation of any air quality standard, including the NAAQS and Washington Ambient Air Quality Standards (WAAQS). It also requires that we rely on guidance from the U.S. EPA to consistently apply these rules in our jurisdiction.

Ecology did not attempt to "remove this obligation under the 2009 rule change." Because this is a requirement of the Clean Air Act, which is federal legislation, Ecology cannot change it. In other words, we are required by law to ensure that a project will not violate the NAAQS. Like all the sources of industrial air pollution in Quincy, Yahoo!'s facility is permitted under Washington State's Minor New Source Review permitting rules, WAC 173-400-113. None fall within the definition of "Major Source," and thus none are permitted as Major Sources under the federal rules you have cited.

Ecology also determined background levels of toxic air pollutants in Quincy by taking into account the most relevant nearby sources of toxic air pollutants.

Comment 49, Patricia Anne Martin:
Yahoo's diesel generators do not qualify as "Emergency stationary internal combustion engine" under 40 CFR 60.4219 because they are used for purposes other than power outages and required testing and maintenance, e.g., electrical bypass. Because Yahoo's engines are not for "emergency" purposes as defined under federal regulation, Yahoo must use diesel generators that comply with federal regulations effective January 1, 2011, i.e., Tier IV. Only those diesel engines meeting the definition of "emergency" may continue to use Tier II engines.

Ecology Response:
We do not have information verifying that the 13 engines currently approved to operate at the Yahoo! Data Center as well as the proposed 10 new engines supporting data center expansion, meet the definition of "emergency stationary internal combustion engine" and

"emergency engine" in both the federal regulation, 40 CFR 60.4219, and the revised state regulation, WAC 173-400-930(3).

The commenter is correct that 40 CFR 60.4219 currently defines an emergency engine as "any stationary internal combustion engine whose operation is limited to emergency situations and required testing and maintenance". State rules at WAC 173-400-930(3)(a) provide a similar definition for an "emergency engine".

Neither the federal nor the state definition clarifies whether the "required testing and maintenance" applies only to the engine itself, or if it also applies to occasional maintenance on the electrical power supply hardware that is connected to the engine.

On June 8, 2010 EPA proposed a revision to 40 CFR Part 60, Subpart IIII that would change the definition of "emergency" to allow up to 50 hours/year/engine for non-income generating engine usage during periods when line power to the facility is available. See 75 Federal Register, Page 32612, June 8, 2010. The 50 hours per year would comprise a portion of the maintenance and testing hours' allocation. See Proposed Section 60.4211, 75 Fed. Reg. 32624-32625.

Yahoo! has agreed that they will operate their engines in compliance with 40 CFR Part 60, Subpart IIII and any other applicable state and federal rules. This means that Yahoo! will install engines that comply with the emissions standards in that rule, as required by approval condition 2.1 of the final NOC approval order. We expect Yahoo! to maintain a certification by EPA that explains that their engines comply with applicable EPA emissions standards.

Although state rules require BACT to be as stringent or more stringent as any applicable federal requirement, we do not have information indicating that Tier IV requirements are currently applicable to the proposed engines. If Ecology finds that Yahoo!'s operating scenarios qualify the engines as non-emergency engines that are subject to Tier IV requirements, Yahoo! will be required to install Tier-IV compliant engines according to approval condition 2.1 of Order No. 11AQ-E399. Since we currently believe that Yahoo! engines meet the definition of "emergency engine", the proposed engines are required to meet EPA Tier II, not Tier IV, emission limits.

Comment 50, Patricia Anne Martin:
I suspect that Ecology is exempting the "utility feed swap" and generator "initialization" from compliance with NAAQS. As Ecology is aware, startup operations cannot be exempted. I will also assume that this action has already taken place since that is Ecology's modus operandi.

Ecology Response:
Ecology is not exempting "utility feed swap" or generator "initialization" from compliance with the NAAQS. Start-up testing emissions were modeled to demonstrate compliance with the NAAQS.

Comment 51, Patricia Anne Martin:
Yahoo was originally permitted to generate emergency power for the Grant County PUD, but as we learned at the Public Hearing on March 17, 2011 has never been wired to do so. Washington's clean air regulations state that failing to construct the facility -- in this case to configure the facility as permitted to provide backup generation to the PUD -- within the 18 month time limit allowed under WAC 173-400-110(9)[3] invalidates that portion of the permit.

In addition to our claim that Yahoo is not reducing "actual emissions", we also assert that Yahoo is no longer entitled to the excessive hours or fuel allocation allowed under the permit issued in 2007, specifically, that allocated to emergency backup power for the Grant County PUD.

Ecology Response:
Yahoo! misspoke at the Public Hearing on March 17th. Neither the existing permit nor the draft permit allow for "feeding back to the grid." Yahoo! is permitted only for emergency and maintenance operations of the diesel generators only. Their systems do not allow feedback into the grid.

Comment 52, Patricia Anne Martin:
In addition to our claim that Yahoo is not reducing "actual emissions", we also assert that Yahoo is no longer entitled to the excessive hours or fuel allocation allowed under the permit issued in 2007, specifically, that allocated to emergency backup power for the Grant County PUD.

Ecology Response:
As stated above, the 2007 Yahoo! Data Center permit did not allow electrical power to be supplied to the Grant County PUD. In response to the question about "actual emissions", the 2007 Yahoo! Data Center project was evaluated to make sure that air emissions would not result in impacts to the community that would cause harm to people or the environment. The 2007 permit was issued to restrict engine operations to minimize emissions so that the impacts remained at a protective level. That protective level of emissions was based on potential to emit, and not actual emissions. Yahoo! agreed to reduce facility engine hours of operation and fuel usage. That reduction lowered the amount of emissions the facility was allowed to generate from both the existing data center and the expansion. There is no way to anticipate annual "actual emissions", and no way to evaluate community impacts on future "actual emissions". Actual emissions can never exceed potential to emit that were the basis of the risk evaluation.

Comment 53, Patricia Anne Martin:
Yahoo intends to run the additional 10 generators at low-load in what appears to be a circumvention of 1-hr NO2 NAAQS compliance. Higher-load operation of diesel generators produces more NOx, and therefore NO2. In light of the significant amount of NOx emitted by Celite's 24/7 operation 322 days/year, it must be nearly impossible for Yahoo to comply

with the 1-hr NO2 NAAQS without manipulating the operation of the generators. We believe this constitutes a violation under 40 CFR 60.12.4

Ecology Response:

Please refer to the answers to Comments 18 and 34, above.

Ecology does not believe that operating Yahoo!'s engines at low loads constitutes circumvention under the Part 40 CFR 60.12 as long as a federally enforceable order requires the limitation of operation. Ecology issued Notice of Construction approval Orders are federally enforceable under the Washington State Implementation Plan (SIP). The potential for Celite to emit of nitrogen dioxide (38 tons per year) is less than for Yahoo! (46 tons per year).

Comment 54, Patricia Anne Martin:
Finally, there are real health implications from Yahoo's pollution in our community that have not been addressed by Ecology because of regulation changes in 2009 that removed requirements to assess the impact on sensitive populations, environmental fate of emissions and exposure to mixtures of toxic air pollutants. Ecology has an obligation under the Federal Clean Air Act to use the appropriate guidance tools to assess the consequences of air pollution on our community and has not done so.

Ecology Response:
Ecology's primary goal in the Air Quality Program is to protect the public's health and well-being. We do this by minimizing the impact of toxic air pollutants on the communities near the potential source of toxic emissions, accomplished through regulation, enforcement and education. The rule revision in 2009 did not remove requirements to assess the impact on sensitive populations, environmental fate of emissions, or exposure to mixtures of toxic air pollutants. In fact, the 2009 revisions to the Toxic Air Pollutant Rule, WAC 173-460, is actually what gave us the tools to more thoroughly review the toxic air pollutants generated by data centers. The new rules added several new toxic pollutants of concern, including diesel particulate. Washington is one of only a few states that regulate diesel particulate as a toxic air pollutant, and the rule is among the most protective of human health in the country. Additionally, Washington requires far greater review of new sources of air pollution than is mandated by federal rules. Refer to our response to Comment 32 for more information.

Remember that under the pre-2009 toxics rule, diesel generators at data centers could be allowed to operate for as many as 400 or more hours per year without triggering a review of cancer risks from the project. Under the post-2009 toxics rules, such hours of operations would probably not be approvable.

Comment 55, Gloria Ogoshi, 219 C Street SE, Quincy, WA 98848:
I know that DOE may use references to statutes and regulations to bolster the fact that they have ignored many factors in urging the approval of the latest round of unmodified polluting generators. However, there are two aspects to any law. The general rule is that

when the actual statutes and regulations mitigate the intent of the law, or even go against the intent of the law, they are held to be invalid. The environmental laws are meant to protect the health and welfare of the populace-not to impose "acceptable" health risks upon them. Those health risks are to be plainly discovered to the people upon whom they are to be imposed, explained in such a way that all of the real risks are in fact plain to everyone. To that end, explanations by the agency, here, Washington State Department of Ecology, Spokane branch, must be fulsome, clear, and fully made.

Ecology Response:
The Third Tier Review Technical Support Document, or TSD, for the Yahoo! Data Center expansion permit is a 59-page document that fully discloses our review of the Health Impacts Assessment. This is one of the documents available for public review and comment in association with the proposed permit. It is our intent to clearly and fully explain our determination. Lacking a specific reference to the materials that you feel are not clear or fully explained, we are unable to fill your request for more information.

Comment 56, Gloria Ogoshi:
A system has predictable results; after we use it for a while, we can assign these predictable results a number that says how probable it is that the predictable will happen. (Like winning the Power Ball with a ticket from Safeway!) We can say that so many times out of a hundred times, a certain thing will most likely happen. That is why Ecology says we will have a predictable number of cancers from the operation of the back-up diesel generators, and why they think that cutting the number of hours those generators run will keep the cancers to a predictable number that is acceptable (to them. Remember, they live in Spokane, not Quincy.)

Ecology Response:
The Health Impacts Assessment does not predict the number of cancers that will be caused by operation of the backup diesel generators. Risk assessment can't predict rates of a certain disease in an exposed community. However, it is a good tool for estimating potential risk based on current knowledge and many assumptions. Many of the assumptions used to assess risk overestimate risk because we want to be sure our regulatory decisions help protect human health. The U.S. Environmental Protection Agency has determined that what is commonly referred to as "acceptable" health risk can range up to 100 additional cancers in one million people exposed to a cancer-causing chemical.

Comment 57, Gloria Ogoshi:
Are those predictable cancers the only effects of running unshielded generators in Quincy? (The generators in Olympia are shielded. There are only 5 of them. Olympia has a different set of Ecology people.)

Ecology Response:
Ecology takes very seriously the potential health threat to the public that proposed industrial projects might cause. The new diesel engines that Yahoo! is installing have an

emission rate that meets federal standards. The federal standards are set to be protective of human health. Yahoo!'s cutback in maximum potential use of the backup generators actually decreases the modeled health risks from diesel exhaust. The DIS data centers in Olympia were permitted by the Olympic Clean Air Authority, not the Department of Ecology. Because each city has its unique airshed characteristics, it is not reasonable to compare conditions in Olympia to those in Quincy, or to try to use such comparisons to draw conclusions about equitability of permitting processes. Ecology is the permitting Air Authority for Grant County, and our methodology and processes for making decisions about permits within our jurisdiction are consistent.

In regards to the concern about best available technology, by law, Ecology has no basis to require that Yahoo! install additional protective controls. State law requires that we also consider the "energy, environmental, and economic impacts and other costs" of a technology before we determine what types of emission-limiting technology should be used. The term we use to describe emission-limiting technology is "Best Available Control Technology" or BACT. This is a little bit confusing because BACT is all about whether emissions are kept low enough to represent the effectiveness of the control technology selected.

While we can require the use of certain technology to meet the emission limit, we cannot require that an industry use technology that goes beyond the limit that has been demonstrated to be achievable in practice by similar operating emissions units.

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

In the case of Yahoo!'s project, only the new engines proposed for the expansion are subject to BACT requirements at this time. The existing, older engines underwent a BACT evaluation before they were installed. Under Ecology's permit restrictions, new diesel engines, to be installed for expansion, will emit less than one-half ton of diesel particles per year. We found this emission rate to be too low to make any commercially-available add-on control technology feasible. We estimated that it would cost Yahoo! more than $200,000 to reduce each ton of diesel particulate using diesel particulate filters. Using diesel oxidation catalysts to reduce diesel particulate would cost more than $400,000 for each ton of diesel PM removed. No other regulatory agency, to our knowledge, has made a BACT determination that requires the installation of a control technology that would cost anywhere close to these values.

Comment 58, Gloria Ogoshi:
When each of those generators at the server farms are tested, run for testing, practice and maintenance, they all produce environmental contaminants. They are run at least once a month, but we have been noticing a lot more run-time than that. Each time they are run, they produce noise pollution, air pollution (the very small and therefore more damaging diesel particulates), heat pollution, and use up a large amount of water and power.

Ecology Response:
The fact that the diesel-powered backup generators produce toxic air pollutants when operated is the primary reason that Ecology is involved in permitting data center expansion. Our review and analysis of potential pollution that occurs when the engines run was conducted to determine the risk to human health and the environment. Issues of water, power and noise are not the venue of the air pollution review. Those issues should be addressed as part of the State Environmental policy Act (SEPA) review for the project.

The conditions of Yahoo!'s permit specify the maximum number of hours per year the generators can run and the amount of fuel they are allowed to use. The permit also requires that **"**Any air quality complaints resulting from operation of the proposed emissions units or activities shall be promptly assessed and addressed. A record shall be maintained of Yahoo!'s action to investigate the validity of the complaint and what, if any, corrective action was taken in response to the complaint. Ecology shall be notified within three (3) days of receipt of any such complaint."

Comment 59, Gloria Ogoshi:
Ecology says little about anything but the cancer risk because that can be shown by them to be relatively small. But the total picture of how these pollutants fits into our lives in Quincy should be part of Ecology's assessment on our behalf, and it is not.

Ecology Response:
The Department of Ecology's review also looked at non-cancer health effects from specific air pollutants subject to review. Non-air quality issues are reviewed within the purview of the project's SEPA review, for which the City of Quincy was the lead agency. Please direct any non-air quality questions regarding the proposed project to the City of Quincy.

Comment 60, Gloria Ogoshi:
What about all the other sources of pollution that combine to produce the environment you and your families live in, here in Quincy? Shouldn't they be considered when Ecology decides what is "acceptable" for our surroundings?

Ecology Response:

The technical support document for the third tier review describes how Ecology estimated background levels of diesel particulates in Quincy. "Background" refers to the sources of pollution in Quincy that currently exist. Ecology's toxicologists looked at the potential health effects of diesel engine exhaust particles taking into account the following sources:

- Yahoo!'s 10 new generators
- Yahoo!'s existing 13 generators
- Other sources of diesel engine exhaust particles in the area, such as trucks on highways and trains
- Large diesel generators at the Microsoft and Intuit data centers in Quincy

Comment 61, Gloria Ogoshi:

It isn't just about the small number of cancers, and Ecology knows that. Every chronically, catastrophically ill person and the people who surround them knows the ghastly economic and social tolls of ill health. Chronic illness can mean "just" asthma. Just heart problems. Just neurological disorders like Parkinson's, Alzheimers, Multiple Sclerosis, Lupus-every illness made worse by more pollutants. They just aren't mentioning these other things to us.

Ecology Response:

We estimate the risk to human health of any type of disease, whether chronic or acute, to be low because the level of toxic air pollutants emitted by the backup generators are estimated to be less than reference concentrations (RfCs) established by the U.S. Environmental Protection Agency (U.S. EPA). An RfC is defined by the U.S. EPA 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…"*

Under Chapter 173-460 of the Washington Administrative Code (WAC), only those toxic air pollutant emissions that are predicted to exceed an acceptable source impact level (ASIL) are evaluated in the Health Impact Assessment (HIA) for a proposed project. Therefore, only the emissions from Yahoo!'s proposed 10 new engines were compared to the ASIL. In this case, diesel engine exhaust particles and nitrogen dioxide were the only toxic air pollutants evaluated in the HIA.

In the technical support document for the third tier review, Ecology evaluated the non-cancer hazards associated with long-term exposure to diesel engine exhaust particulate and nitrogen dioxide from all known sources in Quincy. Ecology acknowledges that there is a growing body of epidemiological evidence showing an association between diesel particulate matter and cardiovascular and cardiopulmonary effects even at lower concentrations. The U.S. EPA is currently reviewing these epidemiological studies (and other information) in their review of the fine particulate matter NAAQS to determine if a revision to the NAAQS is appropriate.

III. Summary of public involvement opportunities

A. Summary of public involvement opportunities for this permit:

1. A legal ad was placed on February 14 in the Columbia Basin Herald (the largest daily newspaper in Grant County, where the project is located). In selecting the newspaper, we took into account the extent of readership throughout the city, county and region to maximize contact with the people who might have an interest in this project. The ad stated where the project documents were available to review and when/where the public hearing would be held. The ad further stated how to submit public comment and that all comments were required to be postmarked no later than March 21, 2011.

2. On February 14, 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 March 3, March 10, and March 17, 2011, and in the Columbia Basin Herald on February 14, February 21 and February 28, 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 March 3 and March 10, 2011.

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

5. Flyers advertising the hearing in Spanish were posted at several locations in the community on March 7, 2011. The flyers were posted by Ecology staff at the following locations:

- La Michoacana Paleteria Y Heladeria, 6 D St, Quincy
- Princess Fashions, 317 Central Ave, Quincy
- Tacos Mi Pueblo, 800 1st Ave, Quincy

6. On Tuesday, March 15, 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

7. The February 14 news release generated an article in the Wenatchee World, on Feb. 15, and another in the Empire Press, on Feb. 24, 2011. The Quincy Valley Post Register published articles about the public hearing on February 17 and March 17, 2011.

IV. 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	1-36
2	Leonard Bauhs	37
3	Joe Wichmann	38
4	Russell Schwaberow	39
5	Patricia Anne Martin	40-54
6	Gloria Ogoshi	55-61
7	Terry Brewer	
8	Susan Riley	

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 March 21, 2011, 4:31 PM.
2. Leonard Bauhs, IT Specialist, DSHS, Economic Service Administration, Operations Support Division, IT Solutions-IT Field Operations. Comments received in e-mail dated February 14, 2011 at 10:34 PM.
3. Joe Wichmann, 4268 Wilcox Road, Northport, WA 99157. Written comments received in e-mail dated February 15, 2011 at 9:04 AM.
4. Russell Schwaberow, no address. Comment received in e-mail dated February 15, 2011 at 9:05 AM.
5. Patricia Anne Martin, 617 H Street SW, Quincy, WA 98848. Oral comments given as testimony, written comments submitted in e-mail dated March 21, 2011, 4:58 PM and 7:42 PM.
6. Gloria Ogoshi, 219 C Street SE, Quincy, WA 98848. Oral comments given by Danna Del Porto as testimony, written comments submitted during the hearing on March 17, 2011.
7. Terry Brewer, Grant County Economic Development Council, 6594 Patton Blvd., NE, Moses Lake, WA. Oral comments given as testimony during the hearing on March 17, 2011.
8. Susan Riley, President, Columbia Basin Environmental Council, P.O. Box 1285, Soap Lake, WA 98851-1285. Written comment received on March 1, 2011.

Appendix C
Copies of All Written Comments

1. I am requesting that this written document be used as my statement regarding the Yahoo expansion instead of what I put on the tape recording at the public meeting in Quincy, March 17, 2011. I was surprised by the fact that my speaking would be limited to 5 minutes. Is a 5-minute limit for public testimony standard practice or was it imposed because of Ecology's failure to control the meeting? If 5 minutes is the typical limit on testimony I will summarize my comments in advance for future public meetings and follow up, as I am now, with written comments.

My thanks to the Department of Ecology for hosting this Public Hearing so that citizens of Quincy can learn about the data centers that will be surrounding our town. At some point in time the "movers and shakers" met and decided our community would have lots and lots of data centers. The Grant Public Utility District (GCPUD) has installed two electrical grids to service these facilities and one by one they are going to come here. The Grant County Public Utility District map developed by Will Coe clearly shows that the land around our town has already been dedicated to data centers. These land use decisions were made without public input or, in most cases, public knowledge. How land is developed is a function of zoning and an individual property owner's decision but when large numbers of industrial companies congregate in a very small area, surrounding a rural town, I believe the public should have been part of that process. The Mayor Quincy and the City Administrator were part of the planning but, as far as I know, they did not share their knowledge with very many people. Since our elected officials did not inform residents, it is our job as citizens is to make every effort to ensure that the computer industry is a good neighbor and we must do the very best job to protect our air, our water and our way of life. The responsibility of the Department of Ecology should be to ensure that our community is protected. Let's see how this progresses.

As of Friday, March 18, 2011, I read in the newspaper that a legislative effort is being made to extend the data center tax breaks until 2023. If that passes, I feel our community is doomed because no one, none of our elected officials or governmental agencies is taking any steps to protect the health and safety of persons living around these data centers and their diesel generators. I really do think it is criminal that regulations have been altered, numbers manipulated and facts twisted to allow the construction of these data centers without any emission controls. I am frustrated because I feel so helpless and yet I am so sad that this is happening, all in the name of economic development. The lack of personal responsibility and conscience on the part of individuals involved with this series of projects is terribly disappointing.

I would like to have an objection noted on the official record that the Department of Ecology has been provided (in public records) a copy of the Quincy City Ordinance No. 183, 1950, that names the Quincy Valley Post Register as the newspaper of legal record for the City of Quincy. At this public hearing tonight I have listened to the DOE Spokane official list the ways in which the public was notified of this meeting and DOE is still using the Moses Lake paper, the

Columbia Basin Herald, as the newspaper for public notice. I think continuing to use that newspaper is disrespectful and I resent the fact that our local paper is not the primary method of notification for citizens. Whatever is placed in any newspaper must be printed in English and Spanish. Apparently, DOE printed a notice in El Mundo (a Spanish language newspaper) and that might be useful for notification for the 64% of residents who are Hispanic except that newspaper is not delivered to residents but is available in a box at one grocery store in Quincy. I looked in the El Mundo newspaper of March 17, 2011, and there was no article about the DOE Yahoo Public Hearing of March 17, 2011. I have not received and answer to my question to El Mundo about an article from DOE that might have appeared in an earlier edition of the weekly newspaper. I reserve the right to enter information in my statement regarding this posting for the meeting past the March 21, 20100. Also, I want to enter a complaint about the timing and dates of the DOE Public Hearings. When DOE has a hearing on a Thursday night and requires the public to respond by the following Monday by 5 pm, there is no way to acquire information from other individuals or agencies. Under these limitations, the DOE hearing is designed to fail. As a member of the public, this artificially limited time to prepare a concise and informed statement is unfair to citizens and does not serve the law as a requirement for dialogue about public health and safety. I think the efforts made by DOE Spokane look good on paper but are not useful to notify citizens. I am requesting a copy of the postings that were placed in town. I want the dates the notices were posted, the locations of the postings and the name of the individual who posted the notices.

I appreciate Yahoo for their early and steady commitment to being a good neighbor. From the beginning of their time in Quincy, Yahoo has participated with the citizens of Quincy by joining in community events and sharing their time and energy to help local residents. Yahoo's efforts to be good neighbors have been noticed. I appreciate that Lisa Karstetter is a Yahoo employee because she knows this town and she cares what happens here. Recent Yahoo news is a herd of weed eating goats visited the Yahoo weed patch to eat the weeds rather than use chemical controls. That was a brilliant idea and a great example of environmental stewardship. Good job Lisa, Kathy Keifer and Yahoo. I came to this meeting tonight prepared to be hostile and grumpy. However, I have met and listened Scott, the Yahoo spokesman, and I am impressed. Yahoo has been extremely innovative and has made significant steps to reduce the negative environmental footprint of their data center. I still have concerns but my attitude is greatly softened by learning how much Yahoo has reduced their diesel generator run time. I am altering my written statement somewhat over what I spoke in public because of what I heard at the hearing. Yahoo has solved the issue of lengthy generator idle-run-time for storm avoidance. With the installation of block heaters, the generators can be started at once in the event of electricity loss in a storm. This act alone cuts out some potentially dangerous emissions that are the focus of my concerns. I want to also mention that the Yahoo permit application is a work of art. The permit is easy to read, the information is clear and concise for an average, non-scientific reader.

At this point I have some questions and I look forward to hearing the responses from the Department of Ecology regarding my inquiries. I would appreciate that the answers to each

question be printed immediately after the question, regardless of how many times the question may be asked by me or others who comment.

The Columbia Basin has electrical storms and these storms frequently follow the landforms, such as Monument Hill behind the town of Quincy. Since Spokane weather was introduced in this permit as relevant data, I will use Spokane's number of electrical storms to represent Quincy's storm pattern. This data is provided by John Livingston of the National Oceanic and Atmospheric Administration and is the "Mean Monthly and Annual Number of Thunderstorms" dated 10/28/2010. Spokane has an average of 11 electrical storms annually. Yahoo has been in place a number of years so there must be an established procedure to prepare for an electrical storm. I would like a detailed accounting of storm preparation for 11 electrical storms per year.

My questions are:

I did ask these questions in the hearing. I am leaving these as written questions in my comments as I did talk to the Yahoo spokesman and have a partial answer. Please, provide written answers to these questions.

1. How is Yahoo notified of an impending electrical storm? Do you subscribe to one of the weather diagnostic services? What is the procedure followed by the Yahoo team for storm avoidance? What do you use as a storm alert…the National Weather Service?

2. How far in advance of a storm do you start the diesel generators? How long do they run after the storm passes? Some storms are very rapid and pass through quickly and some storms just sit in one spot and brood, casting lightening all around. Is the procedure to keep the engines running and prepared until the storm is a certain umber of miles distant? How is it determined that it is safe to turn the generators off?

3. What is the average number of generators you start in storm avoidance preparation and what is the percentage of "load" that the engines run at to be in idle? Is the "load" the same in all instances for storm avoidance?

4. Have you modeled the emissions from your generators at the idle load? What are the emissions numbers for all toxic emissions created during storm avoidance, running the engines in idle, from the Yahoo generators? I would like the number of hours that Yahoo ran their engines in 2008, 2009 for storm avoidance.

5. Do you run the engines at idle for windstorms, dust storms, snowstorms or any other natural event that could interrupt the electrical supply?

Another question I have is the number of hours Yahoo has been permitted to run the generators. As the data center is not a new construction model in the world of industry, how can it be that the 400 hours in the first permit was so far above the necessary hours to adequately run the facility? Certainly Yahoo, or any other data center, would have a pretty good idea of operational details and the number of generator hours should be right up there in

the decision making process. If you can cut the number of hours in half and still have enough time for proper use of the generators, why were you so far off the mark in the first permit? I would like you to explain to me the reasons for the incorrect estimate of necessary hours because, to me, it looks as if the hours could have been exaggerated in the first permit and that would allow a reduction in hours to look like a savings for the facility and create a reason to grant the operating permit without requiring mechanical mitigation. Forgive me for being suspicious but that question has been discussed in the community and I would like an explanation for this confusing series of numbers.

I have been puzzled over some other details. This permit application is very nice and easy to follow and I thank you for preparing this document so a regular citizen could follow the steps. The most interesting steps were the tBACT, BACT and LEAR listing for devices to control emissions. My question is this: In refusing some of the control options, the price was quoted per ton of material removed. The price seems quite high but what about the extended life of the facility? I assume these data centers are being built to be around for a long time. Actually, answer for me the life expectancy of the Yahoo facility. How long is it expected to operate? I guess at least 25, 35, 50, ? Years, more or less. If Yahoo extended the cost of the "filters" over the life of the facility what would the cost per ton be at that point? I would like to know how many tons of DPM would be generated over Quincy in 25 years. And how would be cost of the filters be amortized over that same time frame? And if the "filter" is removing XXX tons per year, think how much nicer and safer our community would be without all of the tons of toxic materials spreading over the hills and through the dales. I have a hard time seeing that the cost per ton spread over the life of the facility can be more than the human and environmental cost for the City of Quincy. Putting "filters" on these generator stacks is the right thing to do and I believe everyone in this room knows this fact.

Has Yahoo or the Department of Ecology investigated the impact of the emission materials on adjacent farmland? Has the toxic affect of the emissions altered or impacted adjacent crops? How do emission particles affect hay, corn or fruit crops like apples or pears? How do you know the impacts? What studies have been done on the effect of emissions on agriculture and who did them? What are the effects of the emissions on agricultural livestock? Beef cattle, dairy cattle, sheep or chickens? How about health impacts to pleasure animals such as horses, dogs or cats? Or effects to wild game: pheasants, ducks or quail. Does the emission material collect in water forms like lakes or irrigation canals and could that emission material travel to other farms on the Columbia Basin Project?

I would like to know the total cost of ammonia scrubbers for the additional 10 engines. And, since this is a comment period to which Yahoo must also respond, I want to know how much Yahoo saved through the tax exemption passed by the Legislature in 2010. How much did Yahoo save?

What is the cost of air pollution caused by DPM in lost work, hospitalizations from heart attacks and strokes? I have been told that DPM is the greate4st health hazard in Washington State and is a number one priority of the government to decrease and control. I submit that the Spokane

office of DOE is not decreasing DPM in Quincy. How does the Yahoo center air quality permit conform to the statewide effort to decrease DPM?

I would like an answer to this question. At the hearing I hear that Yahoo was raising the stacks on the first part of the development. It is my understanding that if there are physical changes to an existing facility then the existing facilities triggers a new source review. If changes are made to that facility I believe the operating permit becomes invalid and the permit must go through the public hearing over again. Does Yahoo have to have another public hearing if they alter the facility that has already been permitted? Also, what is the reason for the change in the stack height? The information at the hearing did not answer a question about nitrate emissions, NOx and NO2. Actually, the public hearing did not present any health information and DOE needs to consider this as a complaint about those missing health facts that the public should have been able to consider. I would like to see the emission rates for nitrates from both the first part of the facility plus the expansion added to the emission rates from Celite. Celite is located close enough to Yahoo that Celite emissions cannot just be lumped into the background numbers. I believe they have to be modeled separately. I want to see a chart of these different emissions: first generators, expansion generators and Celite emissions. I would like a chart showing the number of pounds/tons of DPM, and all other toxins released from the two parts of the Yahoo facility.

The Department of Ecology on February 9, 2011, levied a $10,000 fine against REC Silicon of Moses Lake for emitting triple the amount of nitrogen oxide as allowed in their permit. Karen Wood, manager of DOE's Air Quality Program in Spokane is quoted as saying, "It is extremely important to control pollutants from industrial sites as well as cars and trucks. Nitrogen Oxides can damage people's health if they are exposed long enough"…. I am wondering how the emissions of nitrogen oxides, DPM, acrolein, formaldehyde and all of the other goodies from the data centers around Quincy will accumulate in people's lungs over the length of time they are running. How are the nitrogen oxide emissions from the REC Silicon plant in Moses Lake different than the nitrogen oxide emissions from the emission sources in Quincy? How many pounds/tons are permitted for REC silicon, Celite, Microsoft and Yahoo? These data centers are not mobile like a truck. They will sit still and emit for the length of their lives and local residents will receive all of these toxins each and every time the storms brew and the electric grid is threatened. How did Ecology know that REC Silicon had violated its permit for nitrogen oxides?

This question is for the Department of Ecology. I would like a description of how the laws are written and put into code for the Department of Ecology. Does the Legislature participate in the writing of these laws? Is there an advisory board to consult? How does the Director of the Department of Ecology function in the creation of laws? How does the Governor of the State of Washington function in the creation of these laws? How can a law be changed or altered? Is there any coordination with the Environmental Protection agency? Can some laws be specific to Washington State and, if laws are not the same at the state and national level, which law takes precedent?

I want to know, were any state laws altered or changed in the last ten years that have allowed the sitting of these data centers in Quincy? How about the dropping of the NO emission standard? Were any other changes made to the laws to drop emissions or change the standards that might have been beneficial to industry?

Speaking of residents, were notices of this meeting posted at Lazy Acres? Lazy Acres is the closest concentration of residential housing to Yahoo and those families are primarily Hispanic and low income. To construct potentially dangerous industrial facilities in minority communities is a violation of the principle of Environmental Justice, Presidential Executive Order #12898 of 1994. I believe our low median local income and 64% Hispanic population makes the concentration of potentially hazardous data centers in one small community a violation of this principle. I suspect that the lack of "filters" or mechanical devices makes the sitting of these data centers even more irresponsible on the part of the Department of Ecology. Has the DOE taken into account the principle of Environmental Justice in the sitting of these data centers in Quincy? If not, why not?

I consider the initial Yahoo facility built next to the expansion as one emission source. Are all the Yahoo generators added together considered one emission source? If not, why not? Are there any numbers that add the generator emissions together? What is the aggregate of the generator emissions at Yahoo? I want the emissions added together for discussion of this permit. I do not see the logic and the legality of separating the emission sources because the total numbers of generators are on the same piece of property and within a short distance from one another. All parts of the facility are operated by the same engineers and receive their electrical power from the same feeder line. If any significant distance separated these structures, I could, possibly, see separating the emissions but these generators act as one unit. They are turned on, as a group, when necessary and therefore they must be considered one emissions source.

When I drive past the Yahoo facility, the construction has been buzzing along. Is the structure I see the expansion? If so, I was under the impression that construction was not to start until the permit was issued. This construction has been ongoing for several months. Is this building being done within the laws and guidelines for data center construction and permitting?

Yahoo is receiving tax benefits from the State of Washington. The Washington Legislature allowed those benefits to data centers because data centers would create jobs in this difficult economy. How many permanent jobs will be dedicated to the Yahoo expansion? Does Yahoo meet the various criteria to qualify for the Washington State tax break? Describe, in detail, how Yahoo meets the guidelines for the tax advantage

For my records, I want a copy of the DOE "community wide" review guidelines as well as the supporting legislation/law that established this measuring tool. The community wide model has been discussed as the tool that allows this concentration of data centers in Quincy and the ceiling on cancer deaths to rise to 100 per million. I have never seen the guidelines. When did this measuring tool begin to be used in Washington State? Has the "community wide" model

been approved by the Legislature? Has the "community wide" model been approved by the EPA?

My biggest "issue" with all data center operation is that as a resident of Quincy I have no method to determine if the data centers are following the criteria of their permit. How can I know if Yahoo is operating within permitting guidelines? On one part of the paperwork the generators are running %100 and yet there are times some generators run %10 and then some run %40. Why are the run times/run rates changed when utilizing the generators? I have learned enough to ask this question: Is Yahoo changing the % of run or the run amount of the generators in order to be in compliance with emissions standards? I want an answer to this question. And, how am I to know as a resident that Yahoo is following the guidelines of their permit? To be able to verify compliance with the permit is the heart of my dissatisfaction with the air quality permits issued by DOE Spokane. At least with the Microsoft permit there were specific hours of the day that Microsoft was to operate their generators. With only limits on the total hours of operation, how can I access those Yahoo operating records? I have been denied access to the Microsoft operating information so I cannot know, with certainty, that the permit is being honored. Also, I cannot know that Yahoo is following the permit. The only way to have some certainty about generator operational safety is to insist that control devices must be installed on the generator stacks. These DOE data center permits look like a three-legged mule with one eye. This animal might be a mule but it can never get the job done. My Grandpa told me not to believe that three-legged mule with one eye would ever get better. I suspect that, without some security, I will never trust the data center emissions because the operating permits will not get the job done: community health and safety are not protected.

Thank you for taking your time to read my comments,

Danna Dal Porto
16651 Road 3 NW
Quincy, WA

2. Gregory - Was reading the attached email from DOE a bit chagrinned. There are hydrogen fuel cell back-up generators that are tested, proven and selling commercially. Ballard Power Systems in Seattle could help take the green thing one step further by keeping the purchase local. I've been tracking another company, Plug Power, for some years, too. It has a similar product that has also sold around the world. No reason to burn diesel!

Thanks – Leonard

Leonard Bauhs
State of Washington
Department of Social and Health Services
IT Specialist, Economic Service Administration
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3. I believe that the proposed new generator capacity for the Yahoo site should be propane or natural gas fueled rather than diesel. Propane and natural gas fueled generators are quieter and cleaner than diesel.
While propane and natural gas are marginally more expensive, these are backup generators and as such are not expected to be used extensively in any year. Yearly operating fuel costs are expected to be low regardless of the fuel.

Sincerely,

Joe Wichmann, PhD
jwichmann@wildblue.net
4268 WIlcox Rd
Northport, WA 99157
509.732.8846

4. Hello,
There seems to be concern about the diesel generators being used on occasion by the data centers and causing pollution problems for residents in Quincy. In a blog I read, there are a lot of trains that go through Quincy, some running through and some idling for hours. Where stands the foundation of complains against these generators that will be rarely used compared to the trains diesel engines and has a study been done about the pollution that Quincy receives from the trains? I suggest they throw out the complaint with the bath water. Thanks and have a great day.....Russell Schwaberow

5. I would like to thank Yahoo for being an engaged and active member of our community, but I must object to their expansion project under what I believe to be violations of the Washington State Clean Air Act, Federal Clean Air Act, as well as, discriminatory actions taken by the State Department of Ecology on behalf of data centers locating in Quincy, including Yahoo.
My objections to actions taken by the state and Yahoo include the following:

1. Establishing a "goal" of 100 cancers per million is a standard that is less stringent than used elsewhere in the state and is an environmental injustice, and I believe a violation of Title VI of the Civil Rights Act of 1964. Quincy being predominantly low-income and Hispanic is being disproportionately burdened with these toxic polluters, and what laws should protect us have been impermissibly amended, manipulated, or simply not enforced. In any case, Yahoo and Ecology cannot escape their responsibilities under the law.

The standard of 100 cancers per million has arbitrarily been established for Quincy and is not supported by state law. If it were supported under state law, the Department of Ecology would be able to cite the statute. They have not done that because they cannot. (See Gary Palcisko statement).
Additionally, Ecology's decision to lower the standard is not consistent with Washington Legislature Policy:
The Legislature further recognizes that air emissions from thousands of small individual sources are major contributors to air pollution in many regions of the state. As the population of a

region grows, small sources may contribute an increasing proportion of that region's total air emissions. It is declared to be the policy of the state to achieve significant reductions in emissions from those small sources whose aggregate emissions constitute a significant contribution to air pollution in a particular region.

2. Amending Washington's clean air regulations WAC 173-460 and WAC 173-400 in 2009 to facilitate the placement of multiple data centers in Quincy, and again in 2011 in what appears to be an attempt to undermine MYTAPN's appeal before the PCHB. (see attached "2009 changes to air quality regulations; "2011 clean air changes" and "Chart – changes to WA air standards"). Had these provisions been properly enforced, including those federal requirements removed in 2009, I believe that emissions controls would have been required on all data centers currently located in Quincy and their expansions where appropriate. Additionally, I believe that without these amendments/repeals/insertions that multiple data centers would not have met the clean air requirements when locating in Quincy, and indeed, may not be meeting them now.
3. Yahoo is claiming an emission reduction, but state law requires emission reductions must be based on "actual emissions[1]" and "shall equal the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during a two-year period which precedes the particular date and is representative of normal source operation." WAC 173-400-030(1)

The fuel and hour reductions are "potential" emissions, not "actual". I want it noted for the record that I specifically asked Yahoo's vice-president Scott Notebloom how much diesel exhaust Yahoo emitted last year, and specifically how much more was going to be emitted by the additional 10 generators. His response was that he did not know. So I asked Greg Flibbert, who also did not know and gestured to Karen Wood, Grant Pfiefer and other Ecology representatives who also were unable, or unwilling, to answer this question.

I am requesting an answer to my question in tons per year. I want to know how much diesel exhaust was emitted by Yahoo in 2010 and how much will be emitted from the new engines in tons per year. This is the very basic information upon which Ecology would have based their risk assessment, and upon which the community was denied access during a Public Hearing on the risks of the new emissions. This does not appear to have been an oversight, but a concerted effort to deny information to the public.

4. The Clean Air Act, Washington State statute and clean air regulations apply LAER (lowest achievable emission rate) to "any source", and require that:

"The maximum degree of reduction in emissions that is deemed achievable for new sources in a category or subcategory shall not be less stringent than the emissions control that is achieved in practice by the best controlled similar source..." 42 USC 7412(d)(3)

Washington State's Clean Air statute RCW 70.94.030(14) and air pollution regulations (WAC 173-400-030(43)) mirror the application of LAER to all sources, not just major sources. Recent regulations finalized March 1, 2011 (see attached "2011 clean air changes") attempt to limit LAER's applicability to major sources only by repositioning the definition under a new section of WAC 173-400 dealing with major facilities. Not only was this amendment to the regulation not part of the rule put out for public comment, but we believe this action is not statutorily supported and may have been exercised to undermine our legal challenge in the PCHB. Whatever the reason, it does not absolve Yahoo from the requirement to maximally reduce

their emissions by using “the emissions control that is achieved in practice by the best controlled similar source”.
1 WAC 173-400-030(1) "Actual emissions" means the actual rate of emissions of a pollutant from an emission unit, as determined in accordance with (a) through (c) of this subsection.
(a) In general, actual emissions as of a particular date shall equal the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during a two-year period which precedes the particular date and which is representative of normal source operation.”

5. Yahoo is extending their stacks 5 feet which may constitute an impermissible dispersion technique[2] for purposes of the Act, and as a modification may subject the existing facility to the requirements of 42 USC 7411, i.e., standards of performance for new stationary sources, including LAER. Although Ecology has removed this provision under the 2011 changes, Washington regulations cannot be less stringent than federal law.
6. Ecology has an obligation under the Federal Clean Air Act to enforce compliance with NAAQS. Part of this obligation is modeling required under 40 CFR 51 Appendix W Section 8.2.3 (a) which requires that, “In multi-source areas, two components of background should be determined: contributions from nearby sources and contributions from other sources.” The regulation then goes on to state regarding “nearby sources”, that “All sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled.”

Even though Ecology has attempted to remove this obligation under the 2009 rule changes (see attached “2009 changes to clean air regulations” page 19 of 51) – the state cannot be less stringent than federal requirements. Despite Greg Flibbert’s assertion at the Public Hearing on March 17, 2011 that Ecology is not required to use 40 CFR 51 Appendix W, that is patently not true. Ecology must enforce the provisions of the Federal Clean Air Act, and the agency’s failure to do so does not absolve Yahoo from compliance with the law.
Appendix W requires Yahoo to explicitly model, not only the new emissions, but emissions from “nearby sources” including from Yahoo’s existing generators, Celite and any other source that is expected to “cause a significant concentration gradient in the vicinity of the source”. I have attached Celite’s permit to include with my comments. Celite’s emissions cannot simply be included in background as Ecology has done, but must be modeled together with Yahoo’s emissions (existing and new) for compliance with NAAQS as required under Appendix W for NO2, carbon monoxide, particulate matter and VOCs. Formaldehyde, NO2, VOCs and particulate matter are definitely of concern in the area around Yahoo and Celite.

7. Yahoo’s diesel generators do not qualify as “Emergency stationary internal combustion engine” under 40 CFR 60.4219 because they are used for purposes other than power outages and required testing and maintenance, e.g., electrical bypass. Because Yahoo’s engines are not for “emergency” purposes as defined under federal regulation, Yahoo must use diesel generators that comply with federal regulations effective January 1, 2011, i.e., Tier IV. Only those diesel engines meeting the definition of “emergency” may continue to use Tier II engines.
8. I suspect that Ecology is exempting the “utility feed swap” and generator “initialization” from compliance with NAAQS. As Ecology is aware, startup operations cannot be exempted. I will also assume that this action has already taken place since that is Ecology’s modus operandi.2 5 1. 100(hh)(1) Dispersion technique means any technique which attempts to

affect the concentration of a pollutant in the ambient air by: (i) Using that portion of a stack which exceeds good engineering practice stack height (as defined under 42 USC 7423(c))Yahoo was originally permitted to generate emergency power for the Grant County PUD, but as we learned at the Public Hearing on March 17, 2011 has never been wired to do so. Washington's clean air regulations state that failing to construct the facility -- in this case to configure the facility as permitted to provide backup generation to the PUD -- within the 18 month time limit allowed under WAC 173-400-110(9)[3] invalidates that portion of the permit.

In addition to our claim that Yahoo is not reducing "actual emissions", we also assert that Yahoo is no longer entitled to the excessive hours or fuel allocation allowed under the permit issued in 2007, specifically, that allocated to emergency backup power for the Grant County PUD.

9. Yahoo intends to run the additional 10 generators at low-load in what appears to be a circumvention of 1-hr NO2 NAAQS compliance. Higher-load operation of diesel generators produces more NOx, and therefore NO2. In light of the significant amount of NOx emitted by Celite's 24/7 operation 322 days/year, it must be nearly impossible for Yahoo to comply with the 1-hr NO2 NAAQS without manipulating the operation of the generators. We believe this constitutes a violation under 40 CFR 60.12.4

Finally, there are real health implications from Yahoo's pollution in our community that have not been addressed by Ecology because of regulation changes in 2009 that removed requirements to assess the impact on sensitive populations, environmental fate of emissions and exposure to mixtures of toxic air pollutants. Ecology has an obligation under the Federal Clean Air Act to use the appropriate guidance tools to assess the consequences of air pollution on our community and has not done so.

Changing the regulations, does not change the responsibility.

Quincy should not have to live with decisions made by people 150 miles away. I will look forward to your response to my comments.

Patricia Martin
Former Mayor
MYTAPN

6. The following is my statement for the hearing with Department of Ecology on March 17, 2011. I am sorry I will not be there to present it for the record but I am too ill to attend this meeting. I am sure you will all appreciate my not being present to sneeze and cough my way through this hearing. This apparently viral cold reportedly lasts 4-6 weeks and is full of coughing, sneezing, elevated temperatures and sinus infections. Most people agree that, due to its viral nature, antibiotics do not measurably shorten its length.

My statement is, unfortunately, the draft form of what I had intended to present. My computer locks up every time I try to modify this document. I hope it is still clear enough to get my points across. I know that DOE may use references to statutes and regulations to bolster the fact that they have ignored many factors in urging the approval of the latest round of unmodified polluting generators. However, there are two aspects to any law. The general rule

is that when the actual statutes and regulations mitigate the intent of the law, or even go against the intent of the law, they are held to be invalid. The environmental laws are meant to protect the health and welfare of the populace-not to impose "acceptable" health risks upon them. Those health risks are to be plainly discovered to the people upon whom they are to be imposed, explained in such a way that all of the real risks are in fact plain to everyone. To that end, explanations by the agency, here, Washington State Department Of Ecology, Spokane branch, must be fulsome, clear, and fully made.

To do otherwise means that the people upon whom the risks are to be imposed cannot give their informed consent, and without that fully informed consent, the entire process of public hearings, questions and answers, is without meaning: null and void.

Many people have said they feel uncomfortable making judgement on these facts without the proper training and background. I have in my remarks attempted to lay out a means to cut through this difficulty. We are often called upon to make judgements without full knowledge and experience in an area, but we must make our best attempt to discover the facts fully, and then, to sort them out until we have some idea what they may portend. There are many roads to the heart of a matter, and where one peters out, we may make our way towards a resolution by other roads. Rarely is there only way to resolve an issue. Rarely do we have total ignorance in an area. We can be very cautious and yet, it behooves us to try every way we can to get to a point from which we may pry out some workable pattern that will show what we can expect from a course of action we have chosen and devise a suitable answer to questions we may have about a matter.

Is this important enough to go to all this trouble? Think what you will pay over the years in healthcare costs, both for yourself and as taxpayers. Think about the hidden costs of depreciation to homes and buildings locally. Think about your children and the effect the totality of polluted water and air will most likely have upon them. Is it?

Very truly yours,

Gloria Ogoshi

Analyzing Something When You Are Stumped

So you are not a doctor or a scientist. You know nothing about motors and environmental pollutants. Do you give up? Okay; but then somebody else will gladly step in to make your decisions for you. If the result turns out badly for you, you will already have lost your right to complain because you turned it all over to someone else.

At least give it a try.

First, remember this: SCIENCE is not a religion. Science is not a belief system, like Christianity or being a Muslim. Science is a PROOF system. Science is a way to see whether something has predictable results. You already use this proof system every day in hundreds of ways. $1 +$1 = $2. One gallon of gas in my car takes me a predictable number of miles. The number of miles is affected by how fast I go and whether the wind is toward me or behind me. Speed and wind direction are factors, or parameters, that affect the number of miles per gallon I get.

So maybe you are a scientist. But when there are a lot of parts to a problem, many of which you do not understand, many of which you can't even put a name to, and you don't exactly understand how it all works together, can you just give up? You don't have to. There is usually at least one thing you already know. Start from there and see whether you can figure out what the other parts are and how they fit with each other. Pause. Think about it. What are the MAIN parts? Does this system make sense? If not, why not? You have to ask yourself questions.

You are actually using two systems at the same time. You are trying to figure out how the unknown system works and you are doing that by using systems and things you already know and asking yourself questions about the unknown system by referring to the ones you know.

Why does this work? Because everything has a system it fits into. It is usually a question of deciding which system the new system most looks like. There are always differences between systems, some small difference and some large, but in general, if the main parts of a system are similar and they work on each other in the same general way, the results of what that system will produce will be predictable. Example: taxes. You pay taxes to the State and Federal governments. The money joins together with other taxpayers' payments and becomes large enough to keep the nation's transportation, communication, safety net, security, and foreign projects going in a relatively smooth way, when the system is allowed to work as it was meant to. An example in miniature of this bigger system would be road taxes: You pay a tax when you buy gas, it goes into the Federal/State's funds and comes back as dollars dedicated to keeping the transportation system up and running. Similarity in systems.

A system has predictable results; after we use it for a while, we can assign these predictable results a number that says how probable it is that the predictable will happen. (Like winning the Power Ball with a ticket from Safeway!) We can say that so many times out of a hundred times, a certain thing will most likely happen. That is why Ecology says we will have a predictable number of cancers from the operation of the back-up diesel generators, and why they think that cutting the number of hours those generators run will keep the cancers to a predictable number that is acceptable (to them. Remember, they live in Spokane, not Quincy.)

We should look at the system again, though. Are those Predictable cancers the only effects of running unshielded generators in Quincy? (The generators in Olympia are shielded. There are only 5 of them. Olympia has a different set of Ecology people.) Industry produces large environmental changes because industry is usually a mass producer. When each of those generators at the server farms are tested, run for testing, practice and maintenance, they all

produce environmental contaminants. They are run at least once a month, but we have been noticing a lot more run-time than that. Each time they are run, they produce noise pollution, air pollution (the very small and therefore more damaging diesel particulates), heat pollution, and use up
a large amount of water and power.

Ecology says little about anything but the cancer risk because that can be shown by them to be relatively small. But the total picture of how these pollutants fits into our lives in Quincy should be part of Ecology's assessment on our behalf, and it is not.

Pollutants and their effects are cumulative. That means your body doesn't ignore all the pollutants except the one Ecology wants you to consider. While you are listening to Ecology's limiting analysis, your ears are throbbing to the beat of Microsoft's 37 generators, your sinuses are being irritated by those tiny, tiny little black diesel particles, your lungs are struggling to get those things out of your body as soon as possible, your heart is beating harder to get enough oxygen to your brain, and when you go to wet your dry mouth and throat, you are drinking water that is increasingly contaminated because of the drawdown of local water resources by the greedy, overheated server farms. And that is just the server farm pollutants.

What about all the other sources of pollution that combine to produce the environment you and your families live in, here in Quincy? Shouldn't they be considered when Ecology decides what is "acceptable" for our surroundings? There is, of course another factor: the economic one. Yes; there are jobs. But consider that, where tax breaks, usage breaks, and other considerations are given to these mass users and abusers of the environment, nobody gives Quincy residents tax breaks for the damage our heating/cooling equipment sustains, the toll to our buildings, our health insurance and increased medical costs, the decrease in our general quality of life. It isn't just about the small number of cancers, and Ecology knows that. Every chronically, catastrophically ill person and the people who surround them knows the ghastly economic and social tolls of ill health. Chronic illness can mean "just" asthma. Just heart problems. Just neurological disorders like Parkinson's, Alzheimers, Multiple Sclerosis, Lupus- every illness made worse by more pollutants.

They just aren't mentioning these other things to us.

Systems work together. Here, the economic system is interacting with the environmental system and the political one. It's depressing to have to deal with this, but the alternative is to let Ecology decide how much risk is acceptable for us to take on their behalf.

PS: There are also systems in place to deal with publicly elected politicians and their appointed bureaucrats who fail to observe the public good in their representations to and for us. However, it is much easier to take the trouble here, at the public hearing stage, than to try to un-do what has been already done. That is why the *"fait accompli"* (already did it) tactic is so effective. However, for those who think that "fait accompli" means *"carte blanche"* (free pass to do whatever I want) I have two cautionary tales: Bell, CA, where certain once-elected

officials are currently being investigated for criminal prosecution, and a legal concept: *ultra vires.* Basically, if your job description says you are supposed to protect the electorate but you did not, then it must have been your personal idea, not your employers. If you are prosecuted, you will stand alone.

Gloria Ogoshi
219 C Street SE
Quincy, WA 98848
509-787-3366

7. My name is Terry Brewer. I work at Grant County Economic Development Council in Moses Lake, WA. My home address is 1997 Soap Lake, WA.

I thank the Department of Ecology and all the personnel that are here this evening for this public hearing. I appreciate the comment period where we had presenters both from the company and their consulting environmental firm as well as persons from Ecology speaking to the issues and the permit process before this hearing. I very much appreciate the work that Department of Ecology and staff do on behalf of the citizens in the state of Washington.

My job is economic development. That's about growing business in our community, all of Grant County, so that there are jobs available in income levels that can support families in our community.

I've worked with Yahoo since 2005. When I started working with them I believed that they were a very good corporate citizen. It was evident of that from their practices in other communities where they were established, and I was pretty enthused when they decided to come to Grant County Washington and build a facility like this.

I think they've proven themselves to be a good corporate citizen in our state and within this community. I very much appreciate their efforts and concerns with the environment and evidenced by their voluntary commitment to reduce fuel usage over what was previously permitted in the 2007 permit.

Again, I appreciate the work that Department of Ecology, and I've heard from many consultants we've worked with on behalf of other clients, other projects that sometimes had developed in Grant County, sometimes they have not, but we generally hear that the State Department of Ecology is as tough as any place they've worked, and all I can say is that means to me as a person that you're doing your job on behalf of the citizens in the State of Washington to see that things are done right so that we have a healthy and clean environment for our future.

I can't think of many things we can do as citizens that don't involve some risk. I'm at risk when I walk down that stairway tonight because I'm a little bit clumsy. Probably see me use the hand rail in case I trip. I'm really at risk when I get on the highway to drive home or to drive to work in the morning. There are far more people killed on our roads in Grant County than should be,

far more than what this cancer risk would be from this operation that's proposed by Yahoo or any of the others all added up in our community, but we accept that we can't walk everywhere we need to be so we get in the car and drive at some risk, and I think what is proposed here you've gone to the ultimate standard it looks to me like to prove or to ensure that people are going to be protected within all that's reasonable, and I appreciate that and thank you for your time.

Terry Brewer
6594 Patton Blvd. NE
Moses Lake, WA
Grant County EDC

8. Dear Sir/Madam,

This letter is in support of the additional l0 Back-up diesel electrical generators for the Yahoo facility at Quincy, Washington.

Our members have visited the aforementioned site at the city of Quincy, WA and were unable to detect any odors, visible obscurity of air quality, noise above the background level, or any impact upon air quality. We visited numerous industrial sites within the city and made the same observations.

As we evaluated the electrical provider for Grant County we determined it has an outstanding record for reliability of service. In those instances where electrical service is disrupted, it is caused by an Act of God, or involves a vehicle accident. Response from the utility in restoring power, accounts for its 99.8% real time service.
Modem diesel engines are equipped with electronic controls using advanced computer systems. Federal laws now permit only ultra low sulfur diesel fuel to be sold.
With the use of catalytic converters and urea in the exhaust, harmful emissions are reduced.

With the use of appropriately mixed biodiesel fuels, emissions can be further reduced. In France, 77% of the motor vehicles are high efficient hi-mileage modem diesel engines.

In conclusion, we reached the opinion of supporting the use of diesels at Yahoo because of their negligible frequency of use, and the high efficiency of modem diesel engines using low sulfur and biodiesel fuel. CBEC appreciates the opportunity to comment.

Sincerely,
Susan Riley, President
Columbia Basin Environmental Council
POB 1285 Soap Lake, Washington 98851-1285
A registered Non-profit Washington Corporation

Appendix D
Hearing Transcript and Oral Comments

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

Formal Comment

Date:	March 17, 2011
Location:	Quincy, Washington
Transcribed by:	Brenda Cavan, Dept. of Ecology Air Quality/ ERO, March 23, 2011

Kendra-Robinson Harding:

Okay, so we are recording, and this part I read pretty much verbatim so I apologize that I won't be talking directly to you, but this is information that is required that we state. So when I call your name please come to the front of the room. I've also got a sheet here to remind you when you come up and comment that these are the things we'd like you to say for the state when you're commenting.

Let the record show that it is 8:06 p.m. on March 17, 2011, and this hearing is being held at Quincy City Hall in Quincy, Washington. This hearing is on proposed expansion to Yahoo's Data Center in Quincy, Washington.

Legal notice of the hearing was published in the Columbia Basin Herald newspaper on February 14, 2011. In addition, display ads were published in the Quincy Valley Post Register on March 3, March 10, and March 17, 2011, and in the Columbia Basin Herald on February 14, February 21, and February 28, 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 March 3 and March 10, 2011.

A press release including information for public broadcast was distributed to radio, TV, and newspapers on February 14, 2011. A copy of this news release can be seen over here, and it includes information on this hearing plus the public comment period which closes Monday March 21, 2011.

Information about the hearing was placed on the Department of Ecology's on-line public calendar. Flyers advertising the hearing in Spanish were posted at public locations around Quincy on March 7, 2011.

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 the 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 Greg Flibbert at the Department of Ecology by midnight on March 21, 2011. They can also be faxed to (509) 329-3529 or e-mailed to Greg at gfli461@ecy.wa.gov. And again, all that contact information is in here so if you would like to comment and you don't do so verbally tonight, you have until Monday at midnight to make sure we receive those.

Formal Comment Period

Kendra: It is now the formal comment period for anyone who'd like to come up and comment. Please remember that only one person should speak at this time, and I'll call you up in number order according to your card. So I have 4 people that have indicated they would like to comment.

So now I would like to propose a time limit on testimonies, and this is so that we can make sure that everyone that wants to comment can. We typically give a time limit of 5 minutes. Does that seem like enough time, or would you like more, or less? Okay, so we'll leave it at 5 minutes, and be respectful of everyone's time. I do have a timer, and I will notify those speaking that you have 30 seconds or less remaining.

Okay, so when you come up just remember to state your name, city, state of residence, and organization you're representing.

We cannot answer questions for the testimonies, but they may be asked for the record.

Alright are there any further questions on what I just stated. Alright, could I ask Danna Dal Porto to please come up for comment. And she has told me ahead of time that she actually has someone's written statement that she is going to read also so she'll have her own 5 minutes and then she'll have 5 minutes for the other person's statement.

1. Danna Dal Porto
16651 Road 3 NW
Quincy, WA 98848

I am requesting that this written document be used as my statement regarding the Yahoo expansion instead of what I put on the tape recording at the public meeting in Quincy, March 17, 2011. I was surprised by the fact that my speaking would be limited to 5 minutes. Is a 5-minute limit for public testimony standard practice or was it imposed because of Ecology's failure to control the meeting? If 5 minutes is the typical limit on testimony I will summarize my comments in advance for future public meetings and follow up, as I am now, with written comments.

My thanks to the Department of Ecology for hosting this Public Hearing so that citizens of Quincy can learn about the data centers that will be surrounding our town. At some point in time the "movers and shakers" met and decided our community would have lots and lots of data centers. The Grant Public Utility District (GCPUD) has installed two electrical grids to service these facilities and one by one they are going to come here. The Grant Count Public Utility District map developed by Will Coe clearly shows that the land around our town has already been dedicated to data centers. These land use decisions were made without public input or, in most cases, public knowledge. How land is developed is a function of zoning and an individual property owner's decision but when large numbers of industrial companies congregate in a very small area, surrounding a rural town, I believe the public should have been part of that process. The Mayor Quincy and the City Administrator were part of the planning but, as far as I know, they did not share their knowledge with very many people. Since our elected officials did not inform residents, it is our job as citizens is to make every effort to ensure that the computer industry is a good neighbor and we must do the very best job to protect our air, our water and our way of life. The responsibility of the Department of Ecology should be to ensure that our community is protected. Let's see how this progresses.

As of Friday, March 18, 2011, I read in the newspaper that a legislative effort is being made to extend the data center tax breaks until 2023. If that passes, I feel our community is doomed because no one, none of our elected officials or governmental agencies is taking any steps to protect the health and safety of persons living around these data centers and their diesel generators. I really do think it is criminal that regulations have been altered, numbers manipulated and facts twisted to allow the construction of these data centers without any emission controls. I am frustrated because I feel so helpless and yet I am so sad that this is happening, all in the name of economic development. The lack of personal responsibility and conscience on the part of individuals involved with this series of projects is terribly disappointing.

I would like to have an objection noted on the official record that the Department of Ecology has been provided (in public records) a copy of the Quincy City Ordinance No. 183, 1950, that names the Quincy Valley Post Register as the newspaper of legal record for the City of Quincy. At this public hearing tonight I have listened to the DOE Spokane official list the ways in which the public was notified of this meeting and DOE is still using the Moses Lake paper, the Columbia Basin Herald, as the newspaper for public notice. I think continuing to use that newspaper is disrespectful and I resent the fact that our local paper is not the primary method of notification for citizens. Whatever is placed in any newspaper must be printed in English and Spanish. Apparently, DOE printed a notice in El Mundo (a Spanish language newspaper) and that might be useful for notification for the 64% of residents who are Hispanic except that newspaper is not delivered to residents but is available in a box at one grocery store in Quincy. I looked in the El Mundo newspaper of March 17, 2011, and there was no article about the DOE Yahoo Public Hearing of March 17, 2011. I have not received and answer to my question to El Mundo about an article from DOE that might have appeared in an earlier edition of the weekly newspaper. I reserve the right to enter information in my statement regarding this posting for the meeting past the March 21, 20100. Also, I want to enter a complaint about the timing and

dates of the DOE Public Hearings. When DOE has a hearing on a Thursday night and requires the public to respond by the following Monday by 5 pm, there is no way to acquire information from other individuals or agencies. Under these limitations, the DOE hearing is designed to fail. As a member of the public, this artificially limited time to prepare a concise and informed statement is unfair to citizens and does not serve the law as a requirement for dialogue about public health and safety. I think the efforts made by DOE Spokane look good on paper but are not useful to notify citizens. I am requesting a copy of the postings that were placed in town. I want the dates the notices were posted, the locations of the postings and the name of the individual who posted the notices.

I appreciate Yahoo for their early and steady commitment to being a good neighbor. From the beginning of their time in Quincy, Yahoo has participated with the citizens of Quincy by joining in community events and sharing their time and energy to help local residents. Yahoo's efforts to be good neighbors have been noticed. I appreciate that Lisa Karstetter is a Yahoo employee because she knows this town and she cares what happens here. Recent Yahoo news is a herd of weed eating goats visited the Yahoo weed patch to eat the weeds rather than use chemical controls. That was a brilliant idea and a great example of environmental stewardship. Good job Lisa, Kathy Keifer and Yahoo. I came to this meeting tonight prepared to be hostile and grumpy. However, I have met and listened Scott, the Yahoo spokesman, and I am impressed. Yahoo has been extremely innovative and has made significant steps to reduce the negative environmental footprint of their data center. I still have concerns but my attitude is greatly softened by learning how much Yahoo has reduced their diesel generator run time. I am altering my written statement somewhat over what I spoke in public because of what I heard at the hearing. Yahoo has solved the issue of lengthy generator idle-run-time for storm avoidance. With the installation of block heaters, the generators can be started at once in the event of electricity loss in a storm. This act alone cuts out some potentially dangerous emissions that are the focus of my concerns. I want to also mention that the Yahoo permit application is a work of art. The permit is easy to read, the information is clear and concise for an average, non-scientific reader.

At this point I have some questions and I look forward to hearing the responses from the Department of Ecology regarding my inquiries. I would appreciate that the answers to each question be printed immediately after the question, regardless of how many times the question may be asked by me or others who comment.

The Columbia Basin has electrical storms and these storms frequently follow the landforms, such as Monument Hill behind the town of Quincy. Since Spokane weather was introduced in this permit as relevant data, I will use Spokane's number of electrical storms to represent Quincy's storm pattern. This data is provided by John Livingston of the National Oceanic and Atmospheric Administration and is the "Mean Monthly and Annual Number of Thunderstorms" dated 10/28/2010. Spokane has an average of 11 electrical storms annually. Yahoo has been in place a number of years so there must be an established procedure to prepare for an electrical storm. I would like a detailed accounting of storm preparation for 11 electrical storms per year.

My questions are:
I did ask these questions in the hearing. I am leaving these as written questions in my comments as I did talk to the Yahoo spokesman and have a partial answer. Please, provide written answers to these questions.

1. How is Yahoo notified of an impending electrical storm? Do you subscribe to one of the weather diagnostic services? What is the procedure followed by the Yahoo team for storm avoidance? What do you use as a storm alert…the National Weather Service?

2. How far in advance of a storm do you start the diesel generators? How long do they run after the storm passes? Some storms are very rapid and pass through quickly and some storms just sit in one spot and brood, casting lightening all around. Is the procedure to keep the engines running and prepared until the storm is a certain umber of miles distant? How is it determined that it is safe to turn the generators off?
3. What is the average number of generators you start in storm avoidance preparation and what is the percentage of "load" that the engines run at to be in idle? Is the "load" the same in all instances for storm avoidance?

4. Have you modeled the emissions from your generators at the idle load? What are the emissions numbers for all toxic emissions created during storm avoidance, running the engines in idle, from the Yahoo generators? I would like the number of hours that Yahoo ran their engines in 2008, 2009 for storm avoidance.

5. Do you run the engines at idle for windstorms, dust storms, snowstorms or any other natural event that could interrupt the electrical supply?

Another question I have is the number of hours Yahoo has been permitted to run the generators. As the data center is not a new construction model in the world of industry, how can it be that the 400 hours in the first permit was so far above the necessary hours to adequately run the facility? Certainly Yahoo, or any other data center, would have a pretty good idea of operational details and the number of generator hours should be right up there in the decision making process. If you can cut the number of hours in half and still have enough time for proper use of the generators, why were you so far off the mark in the first permit? I would like you to explain to me the reasons for the incorrect estimate of necessary hours because, to me, it looks as if the hours could have been exaggerated in the first permit and that would allow a reduction in hours to look like a savings for the facility and create a reason to grant the operating permit without requiring mechanical mitigation. Forgive me for being suspicious but that question has been discussed in the community and I would like an explanation for this confusing series of numbers.

I have been puzzled over some other details. This permit application is very nice and easy to follow and I thank you for preparing this document so a regular citizen could follow the steps. The most interesting steps were the tBACT, BACT and LEAR listing for devices to control emissions. My question is this: In refusing some of the control options, the price was quoted

per ton of material removed. The price seems quite high but what about the extended life of the facility? I assume these data centers are being built to be around for a long time. Actually, answer for me the life expectancy of the Yahoo facility. How long is it expected to operate? I guess at least 25, 35, 50, ? Years, more or less. If Yahoo extended the cost of the "filters" over the life of the facility what would the cost per ton be at that point? I would like to know how many tons of DPM would be generated over Quincy in 25 years. And how would be cost of the filters be amortized over that same time frame? And if the "filter" is removing XXX tons per year, think how much nicer and safer our community would be without all of the tons of toxic materials spreading over the hills and through the dales. I have a hard time seeing that the cost per ton spread over the life of the facility can be more than the human and environmental cost for the City of Quincy. Putting "filters" on these generator stacks is the right thing to do and I believe everyone in this room knows this fact.

Has Yahoo or the Department of Ecology investigated the impact of the emission materials on adjacent farmland? Has the toxic affect of the emissions altered or impacted adjacent crops? How do emission particles affect hay, corn or fruit crops like apples or pears? How do you know the impacts? What studies have been done on the effect of emissions on agriculture and who did them? What are the effects of the emissions on agricultural livestock? Beef cattle, dairy cattle, sheep or chickens? How about health impacts to pleasure animals such as horses, dogs or cats? Or effects to wild game: pheasants, ducks or quail. Does the emission material collect in water forms like lakes or irrigation canals and could that emission material travel to other farms on the Columbia Basin Project?

I would like to know the total cost of ammonia scrubbers for the additional 10 engines. And, since this is a comment period to which Yahoo must also respond, I want to know how much Yahoo saved through the tax exemption passed by the Legislature in 2010. How much did Yahoo save?

What is the cost of air pollution caused by DPM in lost work, hospitalizations from heart attacks and strokes? I have been told that DPM is the greate4st health hazard in Washington State and is a number one priority of the government to decrease and control. I submit that the Spokane office of DOE is not decreasing DPM in Quincy. How does the Yahoo center air quality permit conform to the statewide effort to decrease DPM?

I would like an answer to this question. At the hearing I hear that Yahoo was raising the stacks on the first part of the development. It is my understanding that if there are physical changes to an existing facility then the existing facilities triggers a new source review. If changes are made to that facility I believe the operating permit becomes invalid and the permit must go through the public hearing over again. Does Yahoo have to have another public hearing if they alter the facility that has already been permitted? Also, what is the reason for the change in the stack height? The information at the hearing did not answer a question about nitrate emissions, NOx and NO2. Actually, the public hearing did not present any health information and DOE needs to consider this as a complaint about those missing health facts that the public should have been able to consider. I would like to see the emission rates for nitrates from both

the first part of the facility plus the expansion added to the emission rates from Celite. Celite is located close enough to Yahoo that Celite emissions cannot just be lumped into the background numbers. I believe they have to be modeled separately. I want to see a chart of these different emissions: first generators, expansion generators and Celite emissions. I would like a chart showing the number of pounds/tons of DPM, and all other toxins released from the two parts of the Yahoo facility.

The Department of Ecology on February 9, 2011, levied a $10,000 fine against REC Silicon of Moses Lake for emitting triple the amount of nitrogen oxide as allowed in their permit. Karen Wood, manager of DOE's Air Quality Program in Spokane is quoted as saying, "It is extremely important to control pollutants from industrial sites as well as cars and trucks. Nitrogen Oxides can damage people's health if they are exposed long enough"…. I am wondering how the emissions of nitrogen oxides, DPM, acrolein, formaldehyde and all of the other goodies from the data centers around Quincy will accumulate in people's lungs over the length of time they are running. How are the nitrogen oxide emissions from the REC Silicon plant in Moses Lake different than the nitrogen oxide emissions from the emission sources in Quincy? How many pounds/tons are permitted for REC silicon, Celite, Microsoft and Yahoo? These data centers are not mobile like a truck. They will sit still and emit for the length of their lives and local residents will receive all of these toxins each and every time the storms brew and the electric grid is threatened. How did Ecology know that REC Silicon had violated its permit for nitrogen oxides?

This question is for the Department of Ecology. I would like a description of how the laws are written and put into code for the Department of Ecology. Does the Legislature participate in the writing of these laws? Is there an advisory board to consult? How does the Director of the Department of Ecology function in the creation of laws? How does the Governor of the State of Washington function in the creation of these laws? How can a law be changed or altered? Is there any coordination with the Environmental Protection agency? Can some laws be specific to Washington State and, if laws are not the same at the state and national level, which law takes precedent?

I want to know, were any state laws altered or changed in the last ten years that have allowed the sitting of these data centers in Quincy? How about the dropping of the NO emission standard? Were any other changes made to the laws to drop emissions or change the standards that might have been beneficial to industry?

Speaking of residents, were notices of this meeting posted at Lazy Acres? Lazy Acres is the closest concentration of residential housing to Yahoo and those families are primarily Hispanic and low income. To construct potentially dangerous industrial facilities in minority communities is a violation of the principle of Environmental Justice, Presidential Executive Order #12898 of 1994. I believe our low median local income and 64% Hispanic population makes the concentration of potentially hazardous data centers in one small community a violation of this principle. I suspect that the lack of "filters" or mechanical devices makes the sitting of these data centers even more irresponsible on the part of the Department of Ecology.

Has the DOE taken into account the principle of Environmental Justice in the siting of these data centers in Quincy? If not, why not?

I consider the initial Yahoo facility built next to the expansion as one emission source. Are all the Yahoo generators added together considered one emission source? If not, why not? Are there any numbers that add the generator emissions together? What is the aggregate of the generator emissions at Yahoo? I want the emissions added together for discussion of this permit. I do not see the logic and the legality of separating the emission sources because the total numbers of generators are on the same piece of property and within a short distance from one another. All parts of the facility are operated by the same engineers and receive their electrical power from the same feeder line. If any significant distance separated these structures, I could, possibly, see separating the emissions but these generators act as one unit. They are turned on, as a group, when necessary and therefore they must be considered one emissions source.

When I drive past the Yahoo facility, the construction has been buzzing along. Is the structure I see the expansion? If so, I was under the impression that construction was not to start until the permit was issued. This construction has been ongoing for several months. Is this building being done within the laws and guidelines for data center construction and permitting? Yahoo is receiving tax benefits from the State of Washington. The Washington Legislature allowed those benefits to data centers because data centers would create jobs in this difficult economy. How many permanent jobs will be dedicated to the Yahoo expansion? Does Yahoo meet the various criteria to qualify for the Washington State tax break? Describe, in detail, how Yahoo meets the guidelines for the tax advantage

For my records, I want a copy of the DOE "community wide" review guidelines as well as the supporting legislation/law that established this measuring tool. The community wide model has been discussed as the tool that allows this concentration of data centers in Quincy and the ceiling on cancer deaths to rise to 100 per million. I have never seen the guidelines. When did this measuring tool begin to be used in Washington State? Has the "community wide" model been approved by the Legislature? Has the "community wide" model been approved by the EPA?

My biggest "issue" with all data center operation is that as a resident of Quincy I have no method to determine if the data centers are following the criteria of their permit. How can I know if Yahoo is operating within permitting guidelines? On one part of the paperwork the generators are running %100 and yet there are times some generators run %10 and then some run %40. Why are the run times/run rates changed when utilizing the generators? I have learned enough to ask this question: Is Yahoo changing the % of run or the run amount of the generators in order to be in compliance with emissions standards? I want an answer to this question. And, how am I to know as a resident that Yahoo is following the guidelines of their permit? To be able to verify compliance with the permit is the heart of my dissatisfaction with the air quality permits issued by DOE Spokane. At least with the Microsoft permit there were specific hours of the day that Microsoft was to operate their generators. With only limits on

the total hours of operation, how can I access those Yahoo operating records? I have been denied access to the Microsoft operating information so I cannot know, with certainty, that the permit is being honored. Also, I cannot know that Yahoo is following the permit. The only way to have some certainty about generator operational safety is to insist that control devices must be installed on the generator stacks. These DOE data center permits look like a three-legged mule with one eye. This animal might be a mule but it can never get the job done. My Grandpa told me not to believe that three-legged mule with one eye would ever get better. I suspect that, without some security, I will never trust the data center emissions because the operating permits will not get the job done: community health and safety are not protected.

Thank you for taking your time to read my comments,

Danna Dal Porto

Thank you. I'm reading for Gloria.

2. Gloria Ogoshi
219 C Street SE
Quincy, WA 98848
509-787-3366

The following is my statement for the hearing with Department of Ecology on March 17, 2011. I am sorry I will not be there to present it for the record but I am too ill to attend this meeting. I am sure you will all appreciate my not being present to sneeze and cough my way through this hearing. This apparently viral cold reportedly lasts 4-6 weeks and is full of coughing, sneezing, elevated temperatures and sinus infections. Most people agree that, due to its viral nature, antibiotics do not measurably shorten its length.

My statement is, unfortunately, the draft form of what I had intended to present. My computer locks up every time I try to modify this document. I hope it is still clear enough to get my points across. I know that DOE may use references to statutes and regulations to bolster the fact that they have ignored many factors in urging the approval of the latest round of unmodified polluting generators. However, there are two aspects to any law. The general rule is that when the actual statutes and regulations mitigate the intent of the law, or even go against the intent of the law, they are held to be invalid. The environmental laws are meant to protect the health and welfare of the populace-not to impose "acceptable" health risks upon them. Those health risks are to be plainly discovered to the people upon whom they are to be imposed, explained in such a way that all of the real risks are in fact plain to everyone. To that end, explanations by the agency, here, Washington State Department Of Ecology, Spokane branch, must be fulsome, clear, and fully made.

To do otherwise means that the people upon whom the risks are to be imposed cannot give their informed consent, and without that fully informed consent, the entire process of public hearings, questions and answers, is without meaning: null and void.

Many people have said they feel uncomfortable making judgement on these facts without the proper training and background. I have in my remarks attempted to lay out a means to cut through this difficulty. We are often called upon to make judgements without full knowledge and experience in an area, but we must make our best attempt to discover the facts fully, and then, to sort them out until we have some idea what they may portend. There are many roads to the heart of a matter, and where one peters out, we may make our way towards a resolution by other roads. Rarely is there only way to resolve an issue. Rarely do we have total ignorance in an area. We can be very cautious and yet, it behooves us to try every way we can to get to a point from which we may pry out some workable pattern that will show what we can expect from a course of action we have chosen and devise a suitable answer to questions we may have about a matter.

Is this important enough to go to all this trouble? Think what you will pay over the years in healthcare costs, both for yourself and as taxpayers. Think about the hidden costs of depreciation to homes and buildings locally. Think about your children and the effect the totality of polluted water and air will most likely have upon them. Is it?

Very truly yours,

Gloria Ogoshi

Analyzing Something When You Are Stumped

So you are not a doctor or a scientist. You know nothing about motors and environmental pollutants. Do you give up? Okay; but then somebody else will gladly step in to make your decisions for you. If the result turns out badly for you, you will already have lost your right to complain because you turned it all over to someone else.

At least give it a try.

First, remember this: SCIENCE is not a religion. Science is not a belief system, like Christianity or being a Muslim. Science is a PROOF system. Science is a way to see whether something has predictable results. You already use this proof system every day in hundreds of ways. $1 +$1 = $2. One gallon of gas in my car takes me a predictable number of miles. The number of miles is affected by how fast I go and whether the wind is toward me or behind me. Speed and wind direction are factors, or parameters, that affect the number of miles per gallon I get.

So maybe you are a scientist. But when there are a lot of parts to a problem, many of which you do not understand, many of which you can't even put a name to, and you don't exactly understand how it all works together, can you just give up? You don't have to. There is usually at least one thing you already know. Start from there and see whether you can figure out what the other parts are and how they fit with each other. Pause. Think about it. What are the

MAIN parts? Does this system make sense? If not, why not? You have to ask yourself questions.

You are actually using two systems at the same time. You are trying to figure out how the unknown system works and you are doing that by using systems and things you already know and asking yourself questions about the unknown system by referring to the ones you know.

Why does this work? Because everything has a system it fits into. It is usually a question of deciding which system the new system most looks like. There are always differences between systems, some small difference and some large, but in general, if the main parts of a system are similar and they work on each other in the same general way, the results of what that system will produce will be predictable. Example: taxes. You pay taxes to the State and Federal governments. The money joins together with other taxpayers' payments and becomes large enough to keep the nation's transportation, communication, safety net, security, and foreign projects going in a relatively smooth way, when the system is allowed to work as it was meant to. An example in miniature of this bigger system would be road taxes: You pay a tax when you buy gas, it goes into the Federal/State's funds and comes back as dollars dedicated to keeping the transportation system up and running. Similarity in systems.

A system has predictable results; after we use it for a while, we can assign these predictable results a number that says how probable it is that the predictable will happen. (Like winning the Power Ball with a ticket from Safeway!) We can say that so many times out of a hundred times, a certain thing will most likely happen. That is why Ecology says we will have a predictable number of cancers from the operation of the back-up diesel generators, and why they think that cutting the number of hours those generators run will keep the cancers to a predictable number that is acceptable (to them. Remember, they live in Spokane, not Quincy.)

We should look at the system again, though. Are those Predictable cancers the only effects of running unshielded generators in Quincy? (The generators in Olympia are shielded. There are only 5 of them. Olympia has a different set of Ecology people.) Industry produces large environmental changes because industry is usually a mass producer. When each of those generators at the server farms are tested, run for testing, practice and maintenance, they all produce environmental contaminants. They are run at least once a month, but we have been noticing a lot more run-time than that. Each time they are run, they produce noise pollution, air pollution (the very small and therefore more damaging diesel particulates), heat pollution, and use up
a large amount of water and power.

Ecology says little about anything but the cancer risk because that can be shown by them to be relatively small. But the total picture of how these pollutants fits into our lives in Quincy should be part of Ecology's assessment on our behalf, and it is not.

Pollutants and their effects are cumulative. That means your body doesn't ignore all the pollutants except the one Ecology wants you to consider. While you are listening to Ecology's

limiting analysis, your ears are throbbing to the beat of Microsoft's 37 generators, your sinuses are being irritated by those tiny, tiny little black diesel particles, your lungs are struggling to get those things out of your body as soon as possible, your heart is beating harder to get enough oxygen to your brain, and when you go to wet your dry mouth and throat, you are drinking water that is increasingly contaminated because of the drawdown of local water resources by the greedy, overheated server farms. And that is just the server farm pollutants.

What about all the other sources of pollution that combine to produce the environment you and your families live in, here in Quincy? Shouldn't they be considered when Ecology decides what is "acceptable" for our surroundings? There is, of course another factor: the economic one. Yes; there are jobs. But consider that, where tax breaks, usage breaks, and other considerations are given to these mass users and abusers of the environment, nobody gives Quincy residents tax breaks for the damage our heating/cooling equipment sustains, the toll to our buildings, our health insurance and increased medical costs, the decrease in our general quality of life. It isn't just about the small number of cancers, and Ecology knows that. Every chronically, catastrophically ill person and the people who surround them knows the ghastly economic and social tolls of ill health. Chronic illness can mean "just" asthma. Just heart problems. Just neurological disorders like Parkinson's, Alzheimers, Multiple Sclerosis, Lupus- every illness made worse by more pollutants.

They just aren't mentioning these other things to us.

Systems work together. Here, the economic system is interacting with the environmental system and the political one. It's depressing to have to deal with this, but the alternative is to let Ecology decide how much risk is acceptable for us to take on their behalf.

PS: There are also systems in place to deal with publicly elected politicians and their appointed bureaucrats who fail to observe the public good in their representations to and for us. However, it is much easier to take the trouble here, at the public hearing stage, than to try to un-do what has been already done. That is why the *"fait accompli"* (already did it) tactic is so effective. However, for those who think that "fait accompli" means *"carte blanche"* (free pass to do whatever I want) I have two cautionary tales: Bell, CA, where certain once-elected officials are currently being investigated for criminal prosecution, and a legal concept: *ultra vires.* Basically, if your job description says you are supposed to protect the electorate but you did not, then it must have been your personal idea, not your employers. If you are prosecuted, you will stand alone.

3. Patricia Martin
617 H Street
Quincy, WA 98848

My name is Patricia Martin and I too am a member of MYTAPN Microsoft Yes and Toxic Toxic air pollution No. While I have written some comments, I'm going to selectively read portions of it. I've already expressed my objection to the goal 100 cancers in a million. I believe that was

arbitrarily and capriciously assigned to Quincy, and unfortunately I forgot to bring Gary Palcisko's statement in which he asserts that he indeed came up with that 100 cancers in a million. The uppermost levels of cancers in the state of Washington is presently set at 10 cancers per million, and it's not something that's up to a decision of Ecology. States have the prerogative to be more stringent than the federal standards and whether or not EPA has accepted a risk of 100 cancers in a million or not is irrelevant. Washington State has not. The Legislature of Washington has declared it to be the policy of the state to achieve significant reductions in emissions from low small sources whose aggregate emissions constitute a significant contribution to air pollution in a particular region. They don't care whether its, you know, one source or multiple. They want the ultimate in reductions in emissions in a given area, and certainly it's not the Legislature's desire for Ecology to establish a goal that undermines their directive. I also talked about the emission reduction, and believe that Ecology's operating outside the law. That actual emissions need to equal the average in tons per year of emissions that are actually emitted by a pollutant and not those that are proposed or potentially emitted, or I mean if they were not emitted they cannot be reduced, and so there is no trade off there. And the citizens of Quincy are getting nothing in return in having more pollutants emitted to the environment. The Clean Air Act and the Washington State statute and the regulation apply a term known as LAER, the lowest achievable emission rate to any source and require that the maximum degree of reduction in emissions that's deemed achievable for a new source in the category or subcategory shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source. In that case to the best of my knowledge that similar source are the five diesel generators that have been required to use diesel oxidation catalysts in Olympia. There, oh, I'll go ahead and read this next part.

Washington State's Clean Air statute RCW 70.94.030(14) and air pollution control regulation WAC 173-400-030(43) mirror the application of LAER to all sources, not just major. Recent regulations finalized March 1, 2011 attempt to limit LAER's applicability to major sources only by repositioning, to major sources only by repositioning under a new section of WAC 173-400 that deal solely with major facilities. Not only was this amendment to the regulation not put out for public comment, but we believe this action is not statutorily supported and may have been exercised to undermine our legal challenge that is currently before the Pollution Controls Hearings Board. Whatever the reason, it does not absolve Yahoo from their requirement to employ the most stringent technology that has been put in place for a similar source. Ecology's goal is inconsistent with legislative policy, and both Yahoo and Ecology have an obligation under the law to abide by its intent, not Ecology's interpretation.

Finally, there are real health implications in our community that are not being addressed through Ecology's required health assessment including the impact on sensitive populations including children and people with heart and lung problems. Yahoo's impact should not be at the expense of even one community member's health not one.

I have a 2009 edition of the WAC 173-460-100 which is called a request for a risk management decision which limits, again, the Tier 2's limit to 10 cancers per million, and this, anything over

and above 10 throws you into a Tier 3, and as I mentioned before and this is consistent with what I just said about LAER, is that all known and available technologies must be put in place before you can allow any cancers to exceed 10. The goal of the Clean Air Act is to keep the air clean. (Timer signals 30 seconds remaining.) And then finally, am I done? Kendra replied yes.

I just want to insert some concerns over the NO2 modeling, the PM_{10}, and I was going to ask some questions about when they plan to do their utility fees flop, and then I 'm also inserting some changes to the acceptable levels for exposure to, for example, formaldehyde and acrolein and showing that the EPA's standard on them for nasal cancer and nasal lesions are the regulations that Ecology had before they changed them. Okay?

Kendra Robinson-Harding:

If there is anything extra, just submit them and we'll make sure that we get the answers to you.

Alright. Next I have Cliff Bates. (Pause) Uh oh. Maybe Cliff had to leave. Okay, so if he comes back we can add him in.
After him was Terry Brewer.

4. Terry Brewer
6594 Patton Blvd. NE
Moses Lake, WA
Grant County EDC

My name is Terry Brewer. I work at Grant County Economic Development Council in Moses Lake, WA. My home address is 1997 Soap Lake, WA.

I thank the Department of Ecology and all the personnel that are here this evening for this public hearing. I appreciate the comment period where we had presenters both from the company and their consulting environmental firm as well as persons from Ecology speaking to the issues and the permit process before this hearing. I very much appreciate the work that Department of Ecology and staff do on behalf of the citizens in the state of Washington.

My job is economic development. That's about growing business in our community, all of Grant County, so that there are jobs available in income levels that can support families in our community.

I've worked with Yahoo since 2005. When I started working with them I believed that they were a very good corporate citizen. It was evident of that from their practices in other communities where they were established, and I was pretty enthused when they decided to come to Grant County Washington and build a facility like this.

I think they've proven themselves to be a good corporate citizen in our state and within this community. I very much appreciate their efforts and concerns with the environment and

evidenced by their voluntary commitment to reduce fuel usage over what was previously permitted in the 2007 permit.

Again, I appreciate the work that Department of Ecology, and I've heard from many consultants we've worked with on behalf of other clients, other projects that sometimes had developed in Grant County, sometimes they have not, but we generally hear that the State Department of Ecology is as tough as any place they've worked, and all I can say is that means to me as a person that you're doing your job on behalf of the citizens in the State of Washington to see that things are done right so that we have a healthy and clean environment for our future.

I can't think of many things we can do as citizens that don't involve some risk. I'm at risk when I walk down that stairway tonight because I'm a little bit clumsy. Probably see me use the hand rail in case I trip. I'm really at risk when I get on the highway to drive home or to drive to work in the morning. There are far more people killed on our roads in Grant County than should be, far more than what this cancer risk would be from this operation that's proposed by Yahoo or any of the others all added up in our community, but we accept that we can't walk everywhere we need to be so we get in the car and drive at some risk, and I think what is proposed here you've gone to the ultimate standard it looks to me like to prove or to ensure that people are going to be protected within all that's reasonable, and I appreciate that and thank you for your time.

Kendra-Robinson Harding:

Did Cliff Bates return to the room? Okay. Are there any further comments - people that would like to comment for the record?

Okay, well I would like to thank everyone for coming tonight. We were here for quite a while, and I'm a big fan of public involvement. I really appreciate you coming here tonight. It takes time out of your day. You're missing meals and time with your family this evening, and thank you for caring enough to come and talk on the subject with us because we really do welcome feedback, and we want to make sure that you're all answered. And like I said earlier that responsiveness summary will address everything that's been said during the formal portion and any written comments that we received. Thank you very much, and let the record show that the hearing was adjourned at 8:30 p.m.

Kendra-Robinson Harding
Regional Air Quality Program
Department of Ecology
March 17, 2011

Appendix E
Public Notices

1. **News release:**

DEPARTMENT OF ECOLOGY
State of Washington

News Release

FOR IMMEDIATE RELEASE – September 2, 2010
10-224

Public invited to comment on draft permit for Yahoo! Data Center expansion

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

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

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

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

Considered by itself, the Yahoo! expansion would not necessitate the third-tier review. But due to the interest expressed by other data companies to expand or build in the Quincy area, Ecology was concerned that the cumulative effect of diesel engine emissions should be assessed. This approach elevated Ecology's review of Yahoo!'s permit request to the director's level.

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

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

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

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

###

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

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

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

###

Broadcast version

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

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

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

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,
& THIRD TIER PETITION APPROVAL RECOMMENDATION

The State of Washington Department of Ecology (Ecology) has received application to modify an existing air pollution source. Yahoo! Inc. has proposed installation of ten new 2.28 megawatt electrical generators powered by diesel engines at the Yahoo! Data Center located at 1010 Yahoo! Way, Quincy in Grant County. The Yahoo! Data Center had previously been approved to install and operate thirteen 2.28 megawatt electrical generators for a total of 29.64 megawatts of emergency backup electrical power. The current project will add 22.8 megawatts of emergency backup electrical power to the facility. The increase in diesel engine exhaust particulate and nitrogen dioxide from the diesel engines was reviewed under a Third 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 completed Third Tier Health Impact Assessment, Ecology concluded that the potential health risks to the community were acceptable and the proposed project will conform to all requirements as specified in Chapter 173-460 WAC. Copies of the Notice of Construction Preliminary Determination, the Third 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 5:30 PM on March 17, 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 Yahoo! Inc. on the proposed project, the air quality regulatory requirements, and the results of our analysis. Public comment will be taken starting at 7:00 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 March 21, 2011 to Gregory Flibbert at the above Spokane address.

3. Display ad, English

You Are Invited to a

Public Hearing

on the

Yahoo! Data Center

Proposed Expansion Permit

Thursday, March 17th, 2011

- **Meet and Greet at 5:30pm**
- **Presentations at 6:15pm**
- **Formal Hearing at 7:00pm**

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 March 21st, 2011

To comment or for more information:

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

Email: gregory.flibbert@ecy.wa.gov / Phone: 509-329-3452

DEPARTMENT OF ECOLOGY
State of Washington

4. Display ad, Spanish

Le invitamos a una

Audiencia Pública

sobre el propuesto permiso para la expansión del

Yahoo! Data Center

Jueves, el 17 de marzo de 2011

- **Reunir a las 5:30 p.m.**
- **Presentaciones a las 6:15 p.m.**
- **Audiencia Oficial a las 7:00 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 21 de marzo de 2011.

Para entregar sus comentarios o obtener más información:

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

E-mail: gregory.flibbert@ecy.wa.gov / Teléfono: 509-329-3452

DEPARTMENT OF ECOLOGY
State of Washington

Appendix F
Technical Support Document

Technical Support Document for Third Tier Review

Yahoo! Data Center
Phase 5 Expansion Project
Quincy, Washington

February 8, 2011

Reviewed By:

David Ogulei, Project Manager:	(360) 407-6803
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Ranil Dhammapala, Modeler:	(360) 407-6807
Clint Bowman, Modeler:	(360) 407-6815
Jeff Johnston, Risk Manager:	(360) 407-6115

Approved By:

Ted Sturdevant, Director/Risk Manager:	(360) 407-7001

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

Yahoo!, Inc. (Yahoo!) proposes to expand their data center located in Quincy, Grant County, Washington. The expansion project, or the Phase 5 development, will consist of five buildings to house server equipment and 10 diesel-powered backup engine-generator sets each rated at 2,280 mechanical kilowatts (kWm). The engines will be housed in separate enclosures.

Potential emissions of diesel engine exhaust particulate matter (DEEP) and nitrogen dioxide (NO_2) from the proposed backup engines exceeded regulatory trigger levels called Acceptable Source Impact Levels (ASILs). Under typical situations, Yahoo! would be required to submit a second tier petition per Chapter 173-460 Washington Administrative Code (WAC). However, in the case of Yahoo!'s Phase 5 project, the Washington State Department of Ecology (Ecology) required Yahoo! to submit a third tier review petition under WAC 173-460-100. A third tier review involves a more rigorous health impacts evaluation than a second tier review.

Additionally, 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 considers the cumulative impacts of DEEP and NO_2 from existing permitted data centers and other nearby sources of diesel engine emissions.

1.2. Health Impacts Evaluation

Yahoo! retained Landau Associates (Landau) to prepare a Health Impact Assessment (HIA) to evaluate the potential health risks attributable to operation of the diesel-powered generators from the Phase 5 expansion project. The HIA demonstrated that emissions of DEEP from the proposed Phase 5 expansion alone could result in an increased cancer risk of up to 4 in one million (4×10^{-6}) at the maximally impacted residential location, which is an undeveloped residentially zoned property located to the west of Yahoo!. Because the increase in cancer risks attributable to the expansion alone is less than 10 in one million, the project could be approvable under WAC 173-460-090.

The HIA also demonstrated that power outage emissions of NO_2 from the 10 proposed engines (Phase 5) could infrequently result in hazard quotients greater than one at a few non-residential off-site locations near Yahoo!'s southeast boundary. A hazard quotient greater than one means that the estimated short-term (one-hour average) NO_2 levels exceed a reference exposure level (REL) of 470 micrograms per cubic meter (g/m^3). At or above this level, some sensitive asthmatics could experience symptoms.

1.3. Health Risks Attributable to Nearby Sources

Landau and Ecology also evaluated emissions from other nearby emission sources to determine the cumulative long-term and short-term health impacts associated with DEEP and NO_2. Ecology evaluated cumulative acute exposure to NO_2 assuming simultaneous power outage

emissions from all existing and proposed data centers in Quincy. Ecology found that acute hazard quotients could infrequently exceed one at some locations in Quincy if worst-case meteorological conditions occurred coincidentally with unplanned power outages. As mentioned above, a hazard quotient equal to or greater than one could cause some sensitive asthmatics to experience symptoms. The concentrations responsible for these hazards are not expected to occur frequently or be sustained for long periods of time. Therefore, Ecology determined that the potential acute hazard due to the project is acceptable.

After the expansion, Ecology estimates the potential cumulative cancer risk posed by DEEP emitted from Yahoo! and other nearby sources to be 25 in one million at an existing residence to the north of the Yahoo! facility, and 21 in one million at an undeveloped residential parcel to the west of Yahoo!. The existing residence is more impacted by allowable emissions from the existing Intuit data center than by emissions from Yahoo!. While there are other residential locations in Quincy that may experience higher DEEP related risks, we found that Yahoo!'s individual contribution to cancer risk at those locations is typically less than one in one million.

Ecology determines that this potential post-expansion cumulative cancer risk is acceptable because it falls within available risk management guidelines.

1.4. Environmental Benefits

In order to assure that the expansion will result in a greater environmental benefit to the state of Washington, as required by WAC 173-460-100(3)(c), Yahoo! has volunteered to extend exhaust stacks and reduce annual fuel usage limits and allowable hours of operation for their existing data center engines in Quincy. The existing data center currently has 13 engines each rated at 2,280 kWe.

Yahoo!'s proposal will result in an overall 37% reduction in potential DEEP emissions and enhanced pollutant dispersion. Potential cancer risk from cumulative exposure to DEEP decreases from a pre-expansion risk of 52 in one million to a post-expansion risk of 21 in one million at the maximally impacted residential parcel located to the west of Yahoo!. Therefore, Ecology concludes that the proposed reduction in maximum annual facility-wide fuel usage will result in a greater environmental benefit to the state of Washington.

1.5. Recommendation

Ecology recommends approval of the proposed project. However, because acute exposure to cumulative NO_2 emissions could infrequently reach levels of concern for some sensitive individuals, Ecology recommends that Yahoo! be required to:

> Communicate health risks posed by Yahoo!'s emissions to potential new homeowners at undeveloped parcels adjacent to Yahoo! or to the local regulatory agency responsible for zoning and development in the affected area;
>
> Routinely report to Ecology all unplanned power failures occurring at their facility; and

Immediately report situations where combined duration of power outages exceeds eight hours in any given year. This notification would allow Ecology to reconsider additional measures designed to protect sensitive individuals.

Under a third tier petition, Yahoo! must hold a public hearing in which Yahoo! and Ecology will present the results of the HIA, the proposed emission controls, pollution prevention methods, additional proposed measures, and any remaining risks posed by the project. Yahoo! must participate in discussions and answer the public's questions at the public hearing.

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

2. YAHOO! QUINCY DATA CENTER

2.1. Yahoo!'s Existing Data Center (Phases 1 through 3)

Yahoo! submitted a Notice of Construction (NOC) application on January 24, 2007, for the installation of the Yahoo! Data Center (Phases 1 through 3) at 1115 Industrial Loop Road, Quincy, in Grant County. Ecology approved the NOC application through Order No. 07AQ-E241 issued on November 13, 2007 (Ecology, 2010a). Construction of Phases 1-3 on a 45+-acre parcel located in the northeastern portion of the Quincy UGA (Figure 1) was completed in 2007-2008.

Yahoo! requires uninterrupted electrical power supply for computer servers inside the data center buildings. While the main power supply to the facility is generally reliable, other sources of electrical power, such as backup diesel engines, are needed in the event of a power interruption.

Phases 1-3 consist of thirteen (13) MTU Detroit Diesel, Inc. Model 16V4000 G83 B3 diesel engines that power Newage AvK Model DSG 86 L1-4s generators with a combined 100% standby rating of 32.5 electric megawatts (MWe). Each engine is permitted to operate for up to 400 hours per year on average, and the total facility diesel fuel usage is limited to 821,600 gallons per year and 49,296 gallons per day of ultra-low sulfur diesel fuel. The data center also uses six Evapco Model AT 212-636 two cell evaporative cooling units (Ecology, 2010a). The Yahoo! Data Center is supported by associated equipment such as fuel tanks, cooling water storage and treatment, and electrical systems.

2.2. Yahoo! Data Center Proposed Expansion Project (Phase 5)

Yahoo! proposes to expand their existing data center complex in Quincy, Washington. The proposed Phase 5 expansion project is located adjacent to the south end of the existing building in Quincy, WA (Figure 2). Phase 5 will include five buildings to house server equipment and ten (10) 2.280 megawatt (MWm) MTU Detroit Diesel, Inc. Model 16V4000 G83 diesel engines to power emergency generators (Landau, 2010).

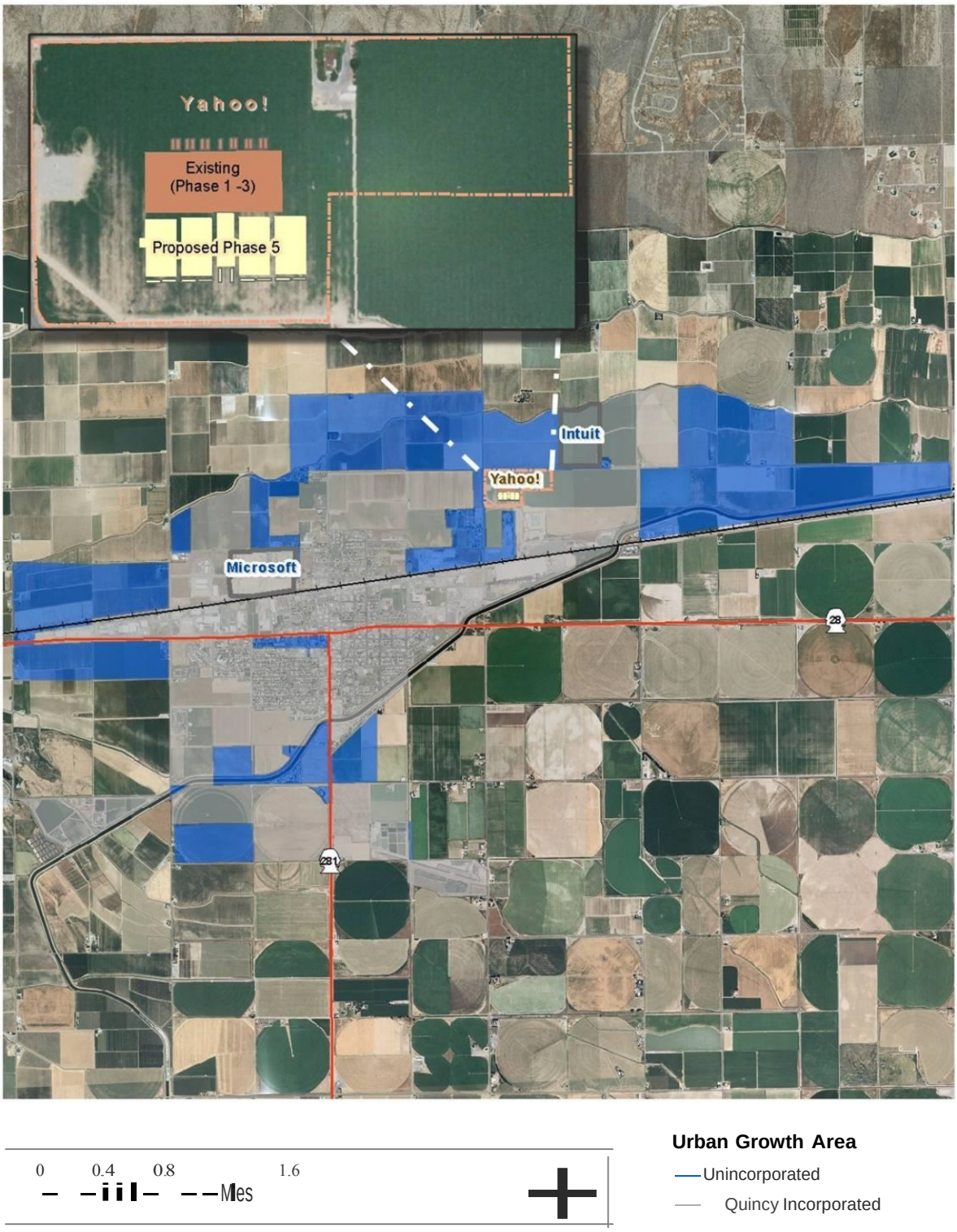

Figure 1. Yahoo! Data Center location within Quincy, WA's Urban Growth Area

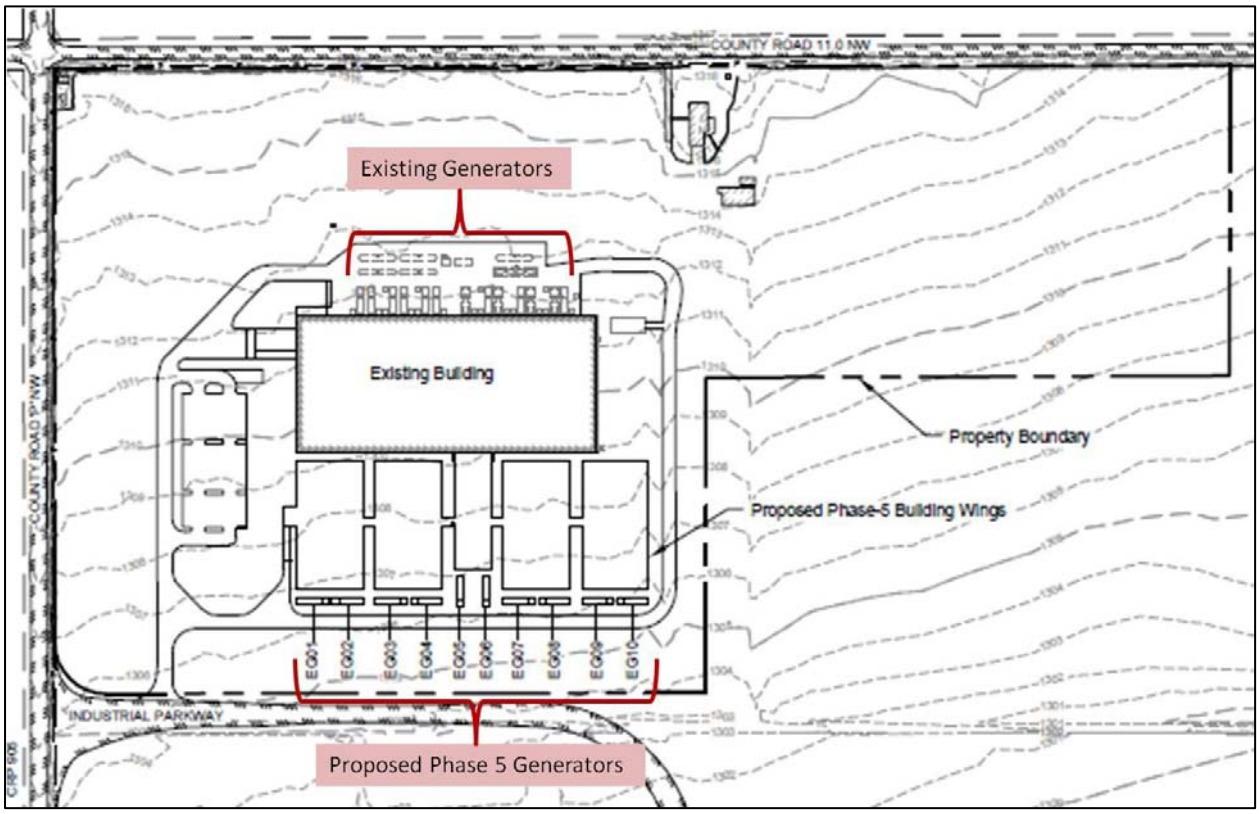

Figure 2. Site plan drawing showing general location of air emission units (Adapted from Landau, 2010)

Yahoo! plans to install four of the 10 engines in 2011. The final six engines will be installed at an undetermined date. The engines will be located in separate generator enclosures to the south of the proposed facility (Figure 2). Exhaust from each engine will be routed through a vertical exhaust stack that extends through the roof of the generator enclosure 30 feet above grade.

In order to minimize air quality impacts from the proposed project, Yahoo! agrees to limit the duration of engine testing, maintenance and other usage. Operation of each of the ten (10) MTU Detroit Diesel engines will be limited to 100 hours per year. Each engine will undergo monthly testing for one hour per test and annual load testing for four hours. Yahoo! also requests 36 hours of electrical bypass and 48 hours of outage operation for each engine. In total, Yahoo! estimates that a fuel usage limit of up to 103,551 gallons per year of ultra-low sulfur (less than 0.0015 wt %), EPA on-road specification No. 2 distillate diesel oil will provide enough fuel for operating durations shown in Table 1.

Table 1. Operating Time Limits for Yahoo!'s Proposed Phase 5 Data Center Expansion Diesel Engines

Event	Frequency	# Engines Concurrently Operating	Hours/Event	Engine Load (%)	Total Maximum Hours/Year
Monthly testing	Each engine 1 x per month	1	1	Idle [a]	12
Annual load testing	Each engine 1 x per year	1	4		4
Electrical bypass/maintenance	As needed	1 or 2	b	1 engine @ 80% or 2 engines @ 40%	36
Outage	As needed	10	c	8 engines @ 90% 2 engines @ 10%	48
Combined testing, maintenance + outage					100

a. Engines are not place under load during monthly testing, but Yahoo! assumed 10% load for the purpose of estimating emissions.
b. Yahoo! reports that electrical bypass events generally require fewer than four hours of engine operation in any single day.
c. Outages are not expected to occur for the full allotment of time during any given year.

2.3. Land Use

Although Yahoo!'s property is located among relatively undeveloped land, several nearby parcels are zoned residential, and several others contain commercial/industrial land uses. Table 2 describes general land uses in properties surrounding the Yahoo! facility (Ecology, 2010b; Grant County, 2011). Figure 3 shows general land use designations for parcels near Yahoo!.

Table 2. Land Use Designations Near Yahoo! Data Center in Quincy, WA

Direction From Yahoo!	Land Use	Notable Development
North	Agriculture	Farm buildings/home approximately 1/2 mile
Northeast	Agriculture Communications, transportation, utilities	Intuit Data Center
East Southeast	Communications, transportation, utilities	Industrial park buildings
South	Commercial/industrial Wholesale, retail, trade	Property owned by Quincy Foods LLC
Southwest	Mobile home park Residential Manufacturing	Mobile homes Celite Corporation
West	Residential	Not currently developed
Northwest	Agriculture	None

Figure 3. Land use in parcels near Yahoo!

2.4. Reductions of Emissions From the Existing Yahoo! Data Center Phases 1–3 Emission Units

During the NOC permit review process for Yahoo!'s Phase 5 expansion project, Yahoo! offered to reduce the allowable emissions from Phases 1-3's thirteen (13) MTU Detroit Diesel, Inc. Model 16V4000 G83 B3 diesel engines. These diesel engines were originally permitted to operate at full standby for up to 400 hours per year per engine on average, and a facility-wide diesel fuel consumption limit of 821,600 gallons per year (Table 3). As part of the Phase 5 expansion project proposal, Yahoo! proposes to reduce their existing data center's (Phases 1-3) maximum annual diesel fuel consumption from 821,600 gallons per year to 410,800 gallons per year. Yahoo! also proposed to extend the permitted height of each exhaust stack by five feet.

Table 3 shows that with the 10 additional engines in the proposed Phase 5 expansion, Yahoo!'s net allowable facility-wide fuel consumption will decrease from 821,600 gallons per year to 514,351 gallons per year. This reduction in allowable fuel consumption roughly translates into a 37% net decrease in the amount of DEEP emissions allowed from the facility.

Table 3. Yahoo!'s Maximum Annual Fuel Usage

Project	Historical Allowed Fuel Usage (gallons per year)	Proposed Allowed Fuel Usage (gallons per year)	Percent Reduction (total)
Phases 1-3	821,600	410,800	50%
Phase 5	-	103,551	
Total	821,600	514,351	37.4%

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 Notice of Construction application for a new or modified emissions unit emitting TAPs in excess of the de minimis levels: (1) first tier (toxic

[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.

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 impact 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 non-carcinogen 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 non-carcinogen 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 non-carcinogens, 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.

Yahoo!'s proposed Phase 5 data center expansion required a third tier petition to Ecology because the cumulative health impact from the proposed data center and other existing sources of DEEP necessitated a third tier risk management decision in accordance with WAC 173-460-100.

3.2. tBACT for the Yahoo! Phase 5 Data Center Expansion Project

Table 4 shows Ecology's preliminary tBACT determination for TAPs emitted by Yahoo!'s engines.

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

Toxic Air Pollutant(s)	tBACT Determination
Acetaldehyde, acrolein, benzene, benzo(a)pyrene, 1,3-butadiene, carbon monoxide, diesel engine exhaust particulate, formaldehyde, naphthalene, propylene, toluene, total PAHs, xylenes	Restricted operation of EPA Tier-2 certified engines, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Nitrogen dioxide	Good combustion practices; an engine design that incorporates fuel injection timing retard, turbocharger, and a low-temperature after-cooler; EPA Tier-2 certified engines; and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Sulfur dioxide	Use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

Ecology has also proposed the following emission limits:

> The total amount of PM emissions from operating all 10 expansion project engines during each year shall not exceed 0.35 tons/yr, based on load specific emission factors supplied by the engine manufacturer.
>
> Nitrogen dioxide (NO_2) emissions from the 10 expansion project engines shall not exceed the following emission rates based on emission factors derived from source testing:
> - 3.5 lb/hr during annual load testing (one engine at a time)
> - 2.5 lb/hr during start-up testing (one engine at a time)
> - 2.3 lb/hr during electrical bypass (one engine @ 80% or two engines @ 40%)
> - 0.34 lb/hr during monthly maintenance (one engine at a time)
> - 23.9 lb/hr during power outages (eight engines @ 90% load and two @ 10% load)

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

3.3. First Tier Review Toxics Screening for the Yahoo! Phase 5 Data Center Expansion Project

Yahoo!'s consultant, Landau, used a combination of EPA emission factors, and EPA Tier-2 engine emission limits to estimate emission rates of TAPs from Yahoo!'s diesel-powered generators (Landau, 2010). 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.

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	0.36	71	No
Acrolein	lb/24-hr	0.029	0.00789	**Yes**
Benzene	lb/yr	11	6.62	**Yes**
Benzo(a)pyrene (TEQ)	lb/yr	0.013	0.174	No
Benz(a)anthracene	lb/yr	0.009	1.74	No
Benzo(a)pyrene	lb/yr	0.004	0.174	No
Benzo(b)fluoranthene	lb/yr	0.016	1.74	No
Benzo(k)fluoranthene	lb/yr	0.003	1.74	No
Chrysene	lb/yr	0.022	17.4	No
Dibenz(a,h)anthracene	lb/yr	0.005	0.16	No
Indeno(1,2,3-cd)pyrene	lb/yr	0.006	1.74	No
1,3-Butadiene	lb/yr	0.56	1.13	No
Carbon Monoxide	lb/hr	130	50.4	**Yes**
DEEP	lb/yr	699	0.639	**Yes**
Formaldehyde	lb/yr	1.1	32	No
Naphthalene	lb/yr	1.8	5.64	No
Nitrogen Dioxide	lb/hr	23.4	1.03	**Yes**
Propylene	lb/24-hr	10.1	394	No
Sulfur dioxide	lb/hr	0.23	1.45	No
Toluene	lb/24-hr	1.0	657	No
Xylenes	lb/24-hr	0.70	29	No

TEQ – toxic equivalent (sum of relative toxicity of several polycyclic aromatic hydrocarbons similar to benzo(a)pyrene)

Landau 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. DEEP and NO_2 exceeded ASILs, therefore, Yahoo! was required to prepare a HIA.

3.4. Third Tier Review of Yahoo!'s Phase 5 Data Center Expansion Project

As stated above, potential DEEP and NO_2 impacts from the proposed expansion exceeded their respective ASILs. As a result, Yahoo! prepared and submitted to Ecology a HIA. Under typical situations, Ecology would evaluate the HIA under second tier review, but Ecology required a higher level of review for Yahoo!'s proposed Phase 5 project. Section 3.5 below explains Ecology's rationale for evaluating Yahoo!'s HIA under third tier review in accordance with WAC 173-460-100. A third tier review petition involves a detailed assessment of proposed emissions controls and environmental benefits of the project, as well as disclosure of expected health risks from the project at a public hearing.

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

Pollutant	CAS#	Averaging Time	Highest Modeled Off-Site Concentration (µg/m^3)	ASIL (µg/m^3)	Exceeds ASIL
Acrolein	107-02-8	24-hr	0.005	0.06	No
Benzene	71-43-2	Annual	0.001	0.0345	No
Carbon monoxide	630-08-0	1-hr	1,403	23,000	No
DEEP	--	Annual	0.07	0.00333	**Yes**
Nitrogen dioxide	10102-44-0	1-hr	755	470	**Yes**

Note: Applicant also provided maximum 1-hr acrolein concentration at Ecology's request. The resulting value, 0.013 µg/m3, is much lower than the acute reference exposure level (2.5 µg/m^3), so Ecology did not require an evaluation of short-term acrolein impacts.

3.5. The Third Tier Review and 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 MW electrical generating capacity or higher. Microsoft's recent permit to expand will increase total permitted diesel-powered emergency engines at Quincy area data centers to 59.

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 µg/m^3, annual average, above which predicted ambient concentrations of DEEP are subject to second tier review. Primarily because DEEP was not previously regulated, the existing data center permits allowed 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 legislature to promote the development of additional data centers in rural Washington. 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, Sabey Corporation, Dell Marketing, LP, and Yahoo!, Inc.

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, 2010c). Therefore, a third tier review will be used by Ecology to consider the approval of Yahoo! and each subsequent company's proposal to construct data centers in the Quincy UGA.

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.

For the Yahoo! project, Ecology also considered cumulative short-term impacts of NO_2 assuming a system-wide outage in Quincy. Section 4 of this document summarizes Ecology's review of Yahoo!'s HIA and present results of our evaluation of cumulative DEEP and NO_2 concentrations in Quincy.

3.6. Third Tier Review Processing Requirements

In order for Ecology to review the third tier petition, each of the following regulatory requirements under Chapter 173-460-090 and Chapter 173-460-100 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.

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

(c) The applicant has developed a health impact assessment protocol that has been approved by Ecology.

(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.

(e) The third tier review petition contains a health impact assessment conducted in accordance with the approved health impact assessment protocol.

Ecology approved the HIA protocol (item (c)) on October 21, 2010, and Ecology received the HIA (item (e)) on December 22, 2010. The project review team found the refined modeling conducted by Yahoo! acceptable.

Acting as the "permitting authority" for this project, Ecology's Eastern Regional Office (ERO) satisfied items (a) and (b) above on February 1, 2011. The applicant has therefore satisfied all of the five requirements above.

3.6.1. Third Tier Review Approval Criteria

Ecology's director approves all third tier petitions. As specified in WAC 173-460-100(3), Ecology's director must find that the following conditions are met before approving a third tier petition:

(a) Proposed emission controls represent at least tBACT.

(b) A health impact assessment (HIA) has been completed as described in WAC 173-460-090(3).

(c) Approval of the project will result in a greater environmental benefit to the state of Washington.

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 and NO_2 emissions from Yahoo!'s proposed diesel-powered emergency generators and existing sources of DEEP and NO_2 in Quincy, WA. Yahoo!'s consultant (Landau) prepared the HIA.

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 Yahoo!-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 Yahoo!'s project-related and community-wide DEEP impacts are acceptable, Ecology quantifies and presents non-cancer hazards and cancer risks in the remaining sections of this document.

4.1.2. Overview of NO_2 Toxicity

NO_2 is a red-brown gas that is present in diesel exhaust. It forms when nitrogen, present in diesel fuel and as a major component of air, combines with oxygen to produce oxides of nitrogen.

NO_2 and other oxides of nitrogen are of concern for ambient air quality because they are part of a complex chain of reactions responsible for the formation of ground-level ozone. Additionally, exposure to NO_2 can cause both long-term (chronic) and short-term (acute) health effects.

Long-term exposure to NO_2 can lead to chronic respiratory illness such as bronchitis and increase the frequency of respiratory illness due to respiratory infections.

Short-term exposure to extremely high concentrations (> 180,000 g/m^3) of NO_2 may result in serious effects including death (NAC AEGL Committee, 2008). Moderate levels (~ 30,000 g/m^3) may severely irritate the eyes, nose, throat, and respiratory tract, and cause shortness of breath and extreme discomfort. Lower level NO_2 exposure (< 1,000 g/m^3), such as that experienced near major roadways, or perhaps downwind from stationary sources of NO_2, may cause increased bronchial reactivity in some asthmatics, decreased lung function in patients with chronic obstructive pulmonary disease, and increased risk of respiratory infections, especially in young children (CalEPA, 2008). For this project, the maximum short-term ambient NO_2 concentration has been estimated to be 755 g/m^3, 1-hour average.

Power outage emissions present the greatest potential for producing high enough short-term concentrations of NO_2 to be of concern for susceptible individuals, such as people with asthma. Ecology calculates and presents numerical estimates of exposure and hazard later in 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-term 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 is 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 Yahoo!. However, given the very low amounts of PAHs and other multi-exposure route type TAPs that will be emitted from Yahoo, 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 Yahoo!'s emergency generators, Ecology will evaluate only inhalation exposure to DEEP and NO_2.

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

Yahoo!'s DEEP and NO_2 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, and the 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 Yahoo!'s generators, Landau conducted air dispersion modeling. Air dispersion modeling incorporates emissions, meteorological, geographical, and terrain information to estimate pollutant concentrations downwind from a source.

Each of Yahoo!'s Phase 5 generators were modeled as individual discharge points. Landau used the following model inputs to estimate ambient impacts:

American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD, Version 09292) with Plume Rise Model Enhancements (PRIME) algorithm for building downwash.

Five years sequential hourly meteorological data from Moses Lake Airport (2001-2005).

Twice-daily upper air data from Spokane (2001-2005) 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 30 feet above local ground level and a stack inside diameter of 18 inches (0.457 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 300 meters from each facility boundary. A grid spacing of 25 to 50 meters was used for distances more than 300 meters from the boundary.

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% NO_2 and 90% nitric oxide (NO) by mass.

Landau modeled both short-term and long-term impacts to demonstrate compliance with NAAQS and derive NO_2 and DEEP concentrations for the HIA. Because Yahoo!'s emissions are intermittent, several operating scenarios were assumed when estimating ambient impacts (Table 8).

Table 8. Operating Scenarios Used for Estimating Ambient Impacts

Operating Scenario Modeled	# Engines	Load	Modeled to Determine	Rationale
Full-time scenario[4]	10	8 @ 90% 2 @ 10%	All short-term NAAQS except 24-hr $PM_{2.5}$ and 1-hr NO_2	Conservative estimate of maximum short-term impact
Electrical bypass	1	80%	Three-year average of eighth highest $PM_{2.5}$ for 24-hr NAAQS Three-year average of eighth highest maximum daily 1-hr NO_2 for NAAQS	First and second highest would occur under power outage scenarios. Third through seventh would occur during annual load testing.
Power outage	10	8 @ 90% 2 @ 10%	NO_2 maximum 1-hr concentrations for HIA	Worst-case acute exposures would occur during power outage scenarios
Sum of all allowable operating scenarios and operating hours	10	Various loads for total operating time of 100 hr/yr	Annual average DPM concentration for HIA	Chronic exposures are averaged over a long period of time.

4.2.3. Identifying Potentially Exposed Receptors

As described in Section 2.3, the proposed Yahoo! facility is located among commercial/industrial-zoned properties, but several different land uses are located within the vicinity of Yahoo!'s property. Landau 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, Landau identified these locations and the most impacted schools.[5] The most impacted schools are Quincy High and Quincy Junior High schools located to the southwest of Yahoo!.

4.2.3.1. Receptors Maximally Exposed to DEEP

Table 9 shows maximally exposed receptors of different types and the direction and distance from Yahoo!'s proposed expansion. These receptors represent locations of various land uses that are most impacted by Yahoo! Phase 5 DEEP emissions. This table also shows the estimated average exposure concentration at each maximally exposed receptor.

[4] According to Yahoo!, this modeling scenario assumes that all engines are running 24 hours per day, 7 days per week.

[5] Exposure concentrations for these receptors reported in this document may differ slightly from those reported in the HIA. This is because Ecology relied on modeled concentration values at the nearest grid point instead of interpolating between points. The difference in reported values is minimal.

Table 9. 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]	NE	250	76	0.074
Maximum Impacted Residence (existing)	NNE	3,400	1,036	0.0030
Maximum Impacted Residential Land Use (currently undeveloped)	NW	850	259	0.014
Maximum Impacted Business/Office	S	550	168	0.016
Maximum Impacted School [b]	SW	3,800	1,158	0.0006

a. Occurs at property fence line.
b. Location identified by Ecology as the maximum impacted school differs slightly from that identified by in the HIA. Landau chose a receptor location at the school property boundary near an open field. Ecology identified the receptor location at a building. For long-term exposure to DEEP, people are more likely to be in or near the building than at the property line.

Figure 4 shows a color-coded map of estimated average DEEP concentrations attributable to Yahoo!'s Phase 5 DEEP emissions. This figure represents the ambient impacts of Yahoo!'s Phase 5 expansion project and each of the maximally exposed receptors representing different land uses. Areas outside the shaded area in Figure 4 are those with an estimated impact below the ASIL. Ecology estimates that Yahoo!'s Phase 5 DEEP emissions impact one residentially zoned parcel at a level exceeding the ASIL. This 10-acre parcel is zoned residential but is currently undeveloped.

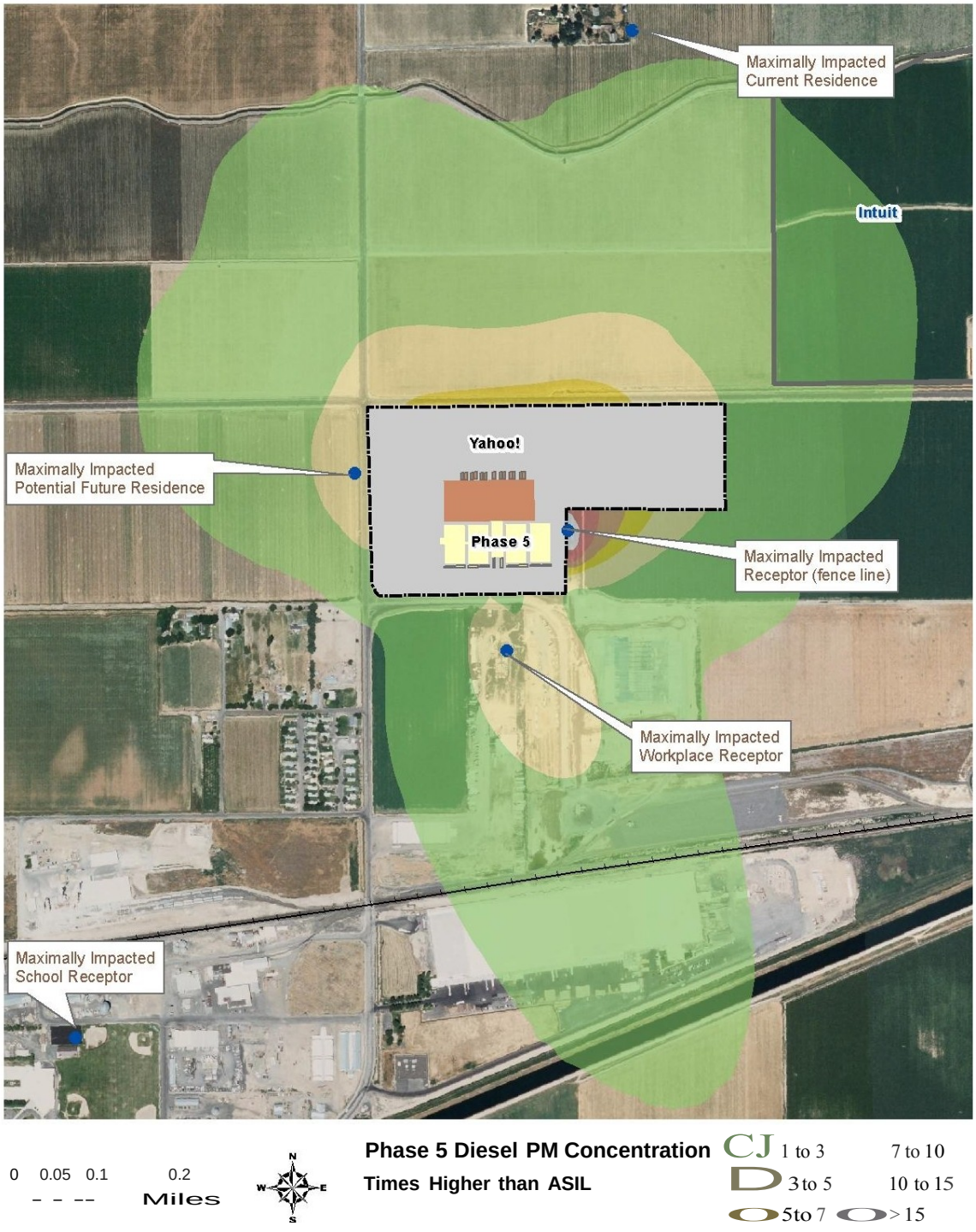

Figure 4. Estimated annual average off-site DEEP concentrations attributable to proposed Yahoo! emissions (Phase 5 expansion project only)

4.2.3.2. Receptors Maximally Exposed to NO_2

Figure 5 shows the areas near Yahoo! where Phase 5 related emissions result in concentrations greater than the ASIL. The areas within the small area of shaded contours exceed the NO_2 ASIL. Phase 5 NO_2 impacts are below the ASIL for most of the modeling domain except for a small area along the southeast corner of Yahoo!'s property. Table 10 shows 1-hr NO_2 concentrations attributable to Phase 5 emergency outage emissions at each maximally impacted receptor type.

Table 10. Maximally Exposed Receptors–Maximum 1-Hour NO_2

Receptor Type	Direction From Nearest Project-Specific NO_2 Emission Source	Estimated Distance From Nearest Project-Specific NO_2 Emission Source		Estimated 1-Hour Project-Related Increase in Maximum NO_2 Concentration at Receptor Location
		Feet	Meters	
Point of Maximum Impact	SE	190	58	755
Maximum Impacted Residence (existing)	SW	920	280	200
Maximum Impacted Residential Land Use (currently undeveloped)	WNW	600	183	353
Maximum Impacted Business/ Office	SE	330	101	521
Maximum Impacted School	SW	4,800	1,463	130

4.2.4. Exposure Frequency and Duration

The likelihood that someone is exposed to DEEP and NO_2 from Yahoo!'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 and NO_2 concentrations in the vicinity of the proposed Yahoo! expansion.

Ecology considers the land use surrounding the Yahoo! 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 Yahoo!-related emissions during the hours that they spend working near the facility.

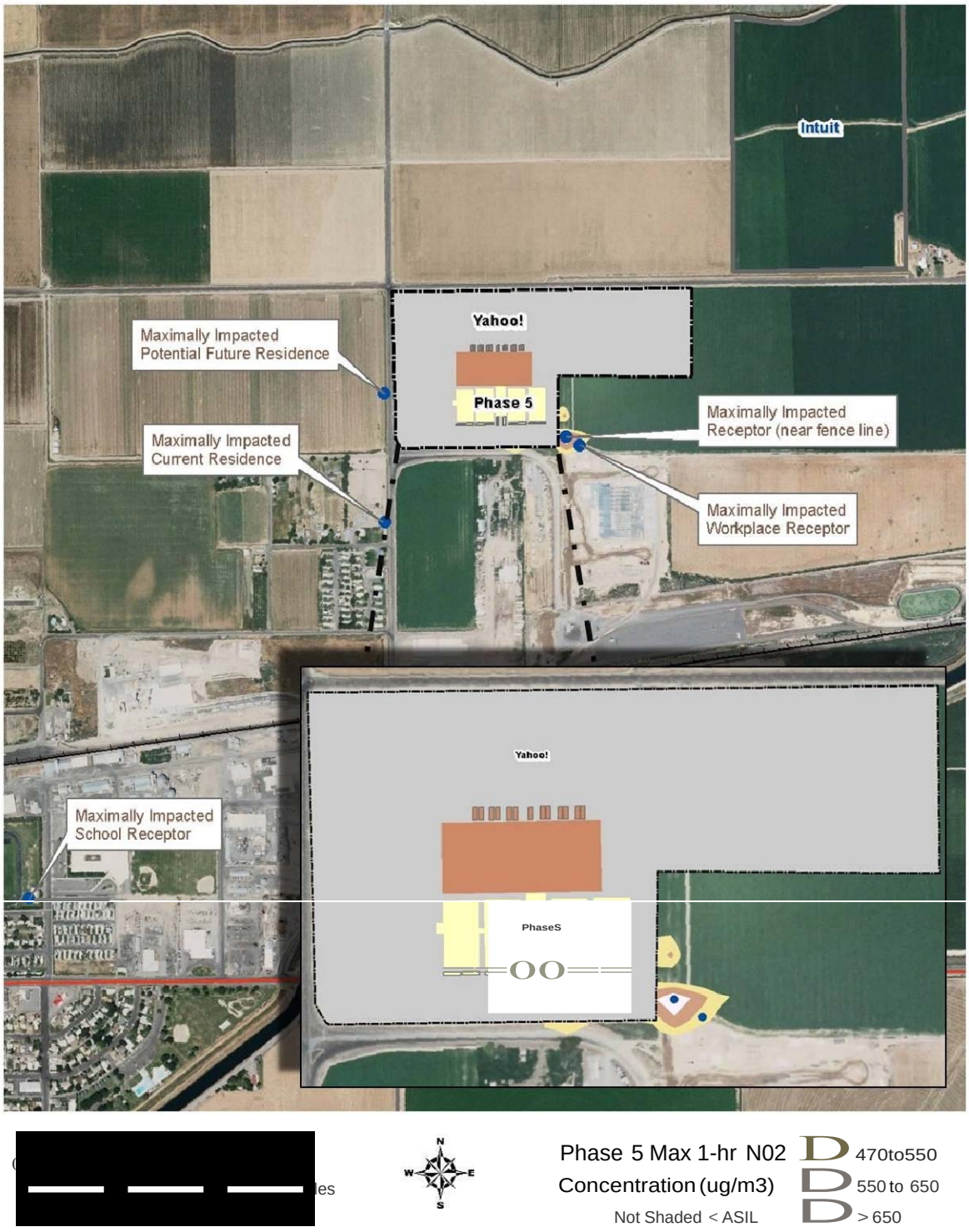

Figure 5. Estimated maximum 1-hr off-site NO_2 concentrations attributable to proposed Yahoo! emissions during a sustained power outage (Phase 5 expansion project only)

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 non-residential 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

Chapter 173-460-090 WAC states, "background concentrations of TAPs will be considered as part of a second tier review."[6] 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 high interest in building data centers within the Quincy UGA, Ecology determined that the cumulative risk of all sources of diesel engine exhaust (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! Phases 1-3, Microsoft, and Intuit. Data center emissions and descriptions were obtained from input files provided by Landau as part of their analysis accompanying the current Yahoo! application. Data center emissions were derived from existing permits from Microsoft (2010), Yahoo! (2007), and Intuit (2007). We also included allowable emissions proposed by Dell Marketing, LP (Dell) and Sabey Corporation (Sabey) for their planned data centers in Quincy. The rail and highway emissions were taken from 2005 emissions inventories.

Ecology's analysis estimated prevailing DEEP concentrations to be about 100 times the DEEP ASIL (0.00333 $\mu g/m^3$) near Yahoo! and Intuit. 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 prevailing DEEP exposure concentrations.

Ecology also modeled allowable DEEP emissions from Yahoo! after the Phase 5 expansion, extension of Yahoo! Phases 1-3 exhaust stacks, and reduction in allowable fuel use from Phases

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

1-3 engines. The modeled pre- and post- project DEEP concentrations (g/m^3) at maximally exposed receptors near Yahoo! are shown in Table 11.

Table 11. Maximally Exposed Receptors–Cumulative Annual DEEP

Attributable to:	Annual DEEP Concentration (µg/m³) at Various Receptor Locations				
	Fence line Receptor [a, c]	Current Residence [b]	Possible Future Residence [b]	Workplace [b]	Students–Quincy Jr. High [b]
Prevailing (pre-project)	0.81589	0.086	0.17451	0.524	0.0534
Yahoo! Phases 1-3	0.78247	0.01818	0.15389	0.5079	0.00395
Intuit	0.01051	0.05684	0.00393	0.01039	0.0017
Microsoft	0.00219	0.00198	0.00272	0.00212	0.00328
BNSF	0.02059	0.00704	0.01383	0.02327	0.04425
Highways	0.00013	0.00011	0.00014	0.00013	0.00022
Cumulative (post-project)	0.10094	0.082	0.06902	0.0897	0.05196
Yahoo! Phases 1-3	0.06014	0.01181	0.03442	0.04079	0.00193
Yahoo! Phase 5	0.00738	0.003	0.014	0.016	0.00058
Intuit	0.01051	0.05684	0.00393	0.01039	0.0017
Microsoft	0.00219	0.00198	0.00272	0.00212	0.00328
BNSF	0.02059	0.00704	0.01383	0.02327	0.04425
Highways	0.00013	0.00011	0.00014	0.00013	0.00022

a. The maximally impacted fence line receptor exposed to prevailing (pre-project) DEEP occurs at a different location than that most impacted by Phase 5 emissions (Table 9).
b. Locations of maximally exposed receptors are roughly the same for both pre- and post-project scenarios.
c. This is also the point of maximum impact.

Figure 6 shows the calculated prevailing concentrations (presented as the number of times greater than the ASIL of 0.0033 $\mu g/m^3$) near Yahoo! based on allowable emissions from all existing permits, rail and highway emissions (panel a), and estimated prevailing concentrations after installation of the proposed project, extension of Yahoo! Phases 1-3 exhaust stacks, and reduction in allowable fuel use from Phases 1-3 engines (panel b). Maximum cumulative DEEP concentrations near the Yahoo! property decrease considerably after accounting for fuel usage reduction and exhaust stack extension. Estimated impacts near the northern and southern boundaries of Yahoo!'s property show the largest decline of more than 50% in some places.

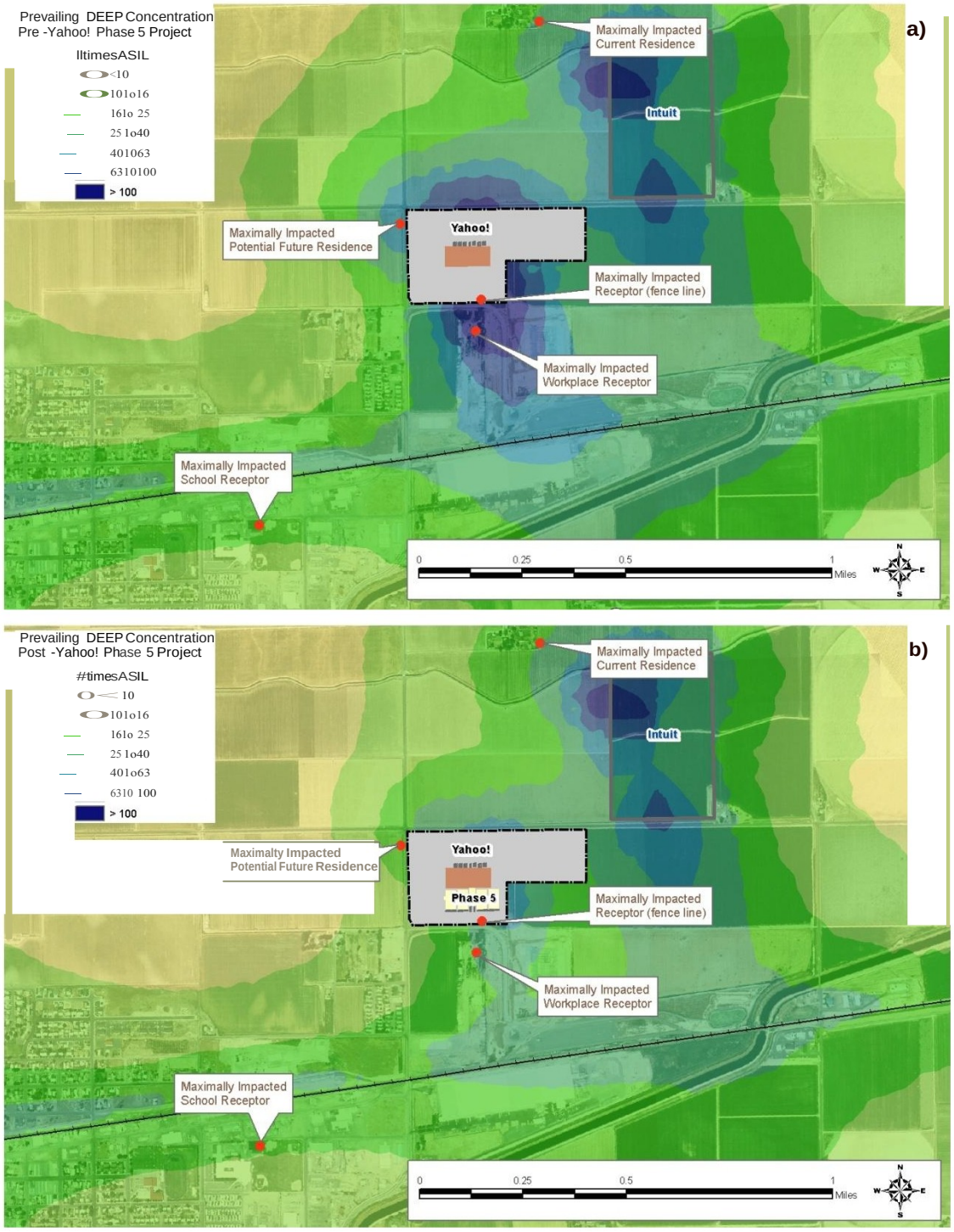

Figure 6. a) Prevailing allowable DEEP concentrations near Yahoo! prior to Yahoo! Phase 5 expansion. b) Prevailing allowable DEEP concentrations near Yahoo! after Phase 5 expansion, reducing allowable fuel use for the existing engines and raising exhaust stacks.

4.2.5.2. Cumulative Exposure to NO_2 in Quincy

Ecology used a similar methodology as described in Section 4.2.5.1 above to estimate the cumulative short-term NO_2 impact assuming a system-wide power outage. The purpose of this effort was to identify worst-case exposure scenarios in the event of system-wide power outage in Quincy.

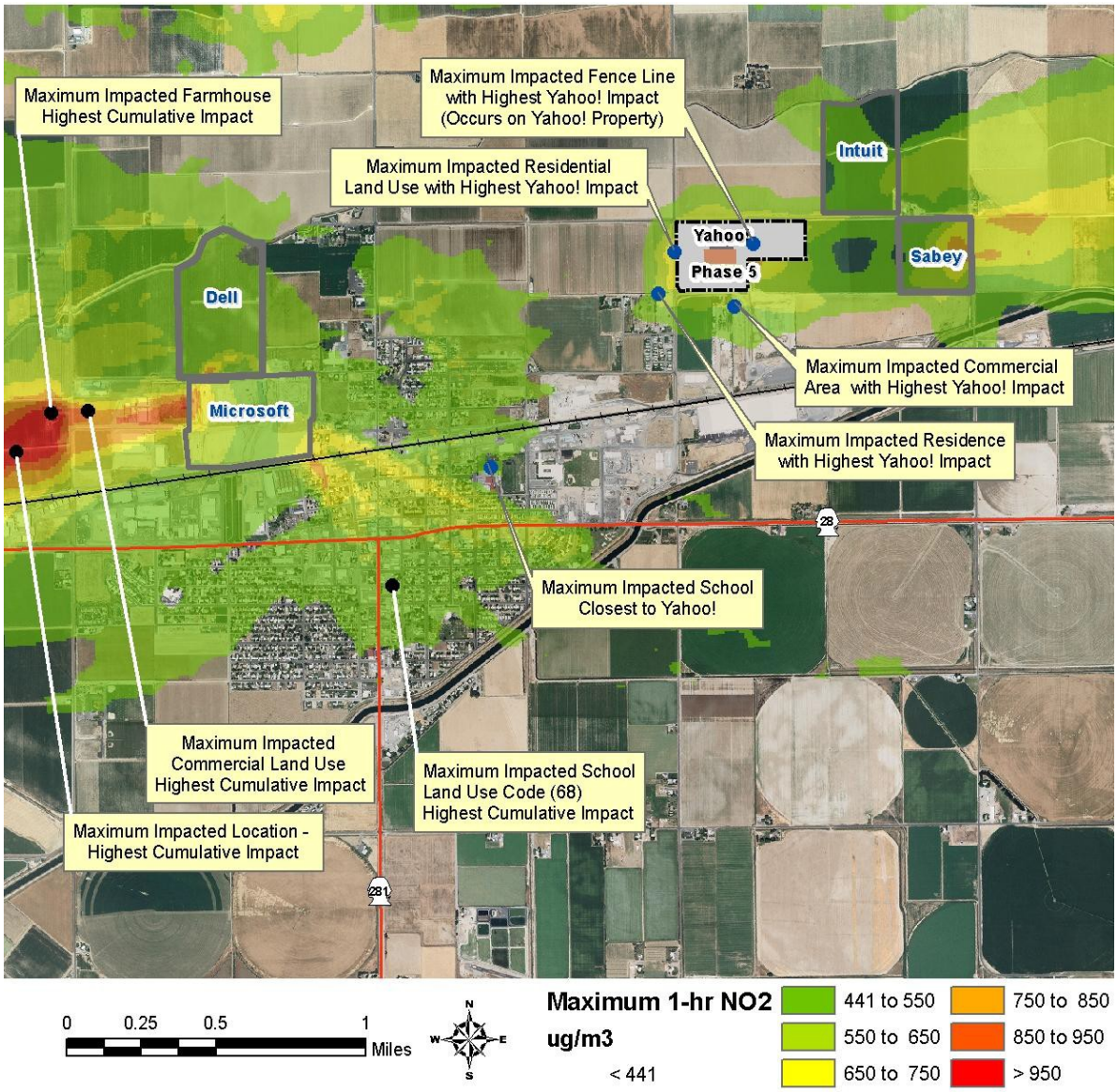

Figure 7. Cumulative 1-hour maximum NO_2 concentrations in Quincy, assuming power outage emissions from all existing and proposed Quincy data centers and emissions from Celite Corporation

Ecology modeled NO_2 emissions during simultaneous power outage from nearby existing data centers (i.e., Microsoft and Intuit) and proposed data centers (i.e., Yahoo! Phase 5 and proposed changes to Phases 1-3, Dell, and Sabey). This model assumed:

Continuous simultaneous outage emissions for all data center engines for all of 2005.

Each engine operates at loads specified in permits (for existing data centers) or permit applications (for those data centers not yet permitted).

The model also included potential emissions from nearby Celite Corporation.

Table 12. Maximally Exposed Receptors–Cumulative Annual NO_2

Attributable to:	Maximum 1-Hour NO_2 Concentration (µg/m^3) at Various Receptor Locations				
	Fence Line Receptor	**Current Residence**	**Possible Future Residence**	**Workplace**	**Students– Quincy Jr. High**
Phase 5 Only	755	200	353	521	130
Cumulative– [c] Highest Yahoo! Impacts	1,006	632	826	610	498 [a]
Attributable to:	**Point of Maximum Impact**	**Apparent Farmhouse [b]**		**Commercial (Land Use Code 20 to 70, not 68)**	**School District Properties (Land Use Code 68)**
Cumulative– [c] Highest Overall Impact	1,174	1,059		1,034	521

Note: Assumed background of 29 µg/m^3 not added.

a. Although this school is the most impacted by Yahoo!'s emissions, Yahoo! contributes only a negligible amount of NO_2 to the maximum 1-hr concentration.
b. Appears to be farm buildings from aerial image. According to parcel information, the property is owned by Port District #1.
c. "Cumulative" includes simultaneous power outage emissions from Microsoft, Intuit, Yahoo!, proposed Sabey, and proposed Dell. Emissions from Celite Corporation are also included.

Figure 7 and Table 12 show the maximum 1-hour NO_2 concentrations that could occur in Quincy if all data centers operated simultaneously under emergency conditions. Although the NO_2 level of interest is 470 g/m^3, the figure shows only those concentrations that exceed 441 g/m^3 because Ecology assumes that a prevailing NO_2 concentration of 29 g/m^3 exists in Quincy at any given time. It is important to note that the maximum 1-hour concentrations shown in this figure do not all occur at the same time. The figure displays the worst-case concentration at each location in Quincy.

The highest maximum 1-hour concentration (1,174 g/m^3) appears to occur at a location to the west of Microsoft's property. At the time of this maximum occurrence, this area appears to be

impacted by primary emissions from Microsoft (55%), and secondary[7] emissions from Sabey (22%), Yahoo! (19%), and Intuit (4%).
Table 12 shows the maximum 1-hour NO_2 concentrations at various receptors attributable to Phase 5 emissions and cumulative emissions from all sources. Worst-case scenarios could result in concentrations above the NO_2 ASIL at locations near Yahoo! and other data centers in Quincy. The frequency with which these impacts could occur is further discussed in Section 4.4.1.4.

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 non-cancer health effects are not expected and a metric by which to quantify increased risk from exposure to a carcinogen. Table 13 shows DEEP non-cancer 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 non-cancer health effects.

National Ambient Air Quality Standards (NAAQS) and other regulatory toxicological values for short-term 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% or a population cancer risk of 300 excess cancer cases per million people exposed.

[7] Secondary emissions refer to the conversion of nitric oxide to nitrogen dioxide over time.

4.3.2. Dose Response Assessment–NO_2

OEHHA developed an acute reference exposure level for NO_2 based on inhalation studies of asthmatics exposed to NO_2. These studies found that some asthmatics exposed to about 0.25 ppm (i.e., 470 g/m^3) experienced increased airway reactivity following inhalation exposure to NO_2 (CalEPA, 2008). Not all asthmatic subjects experienced an effect.

The acute REL derived for NO_2 does not contain any uncertainty factor adjustment, and therefore does not provide any additional buffer between the derived value and the exposure concentration at which effects have been observed in sensitive populations. This implies that exposure to NO_2 at levels equivalent to the acute REL (which is also the same as Ecology's ASIL) could result in increased airway reactivity in a subset of asthmatics. People without asthma or other respiratory disease are not likely to experience effects at NO_2 levels at or below the REL.

Table 13. Toxicity Values Used to Assess and Quantify Non-Cancer Hazard and Cancer Risk

Pollutant	Agency	Non-Cancer	Cancer
DEEP	U.S. Environmental Protection Agency	RfC = 5 µg/m3	NA [a]
	California EPA – Office of Environmental Health Hazard Assessment	Chronic REL = 5 µg/m3	URF = 0.0003 per µg/m3
NO_2	California EPA – Office of Environmental Health Hazard Assessment	Acute (1-hr) REL = 470 µg/m3	N/A

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 health impact assessment 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 Non-Cancer Hazards

In order to evaluate the potential for non-cancer adverse health effects that may result from exposure to air pollutants, exposure concentrations at each receptor location are compared to relevant non-cancer 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:

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

A HQ of one or less indicates that the exposure to a substance is not likely to result in adverse non-cancer 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:

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

Hazard quotients 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, CA OEHHA does not employ this practice. For the purpose of this evaluation, Ecology determined the RfC or REL (5 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 14 shows chronic HQs at the maximally exposed receptors near Yahoo! attributable to DEEP exposure from all sources. HQs are much lower than one for all receptors' cumulative exposure to DEEP indicating adverse non-cancer effects are not likely to result from chronic exposure to DEEP emitted from Yahoo! and other local sources.

Table 14. Chronic Non-Cancer Hazards for Residential and Occupational Scenarios

Attributable to:	Chronic Hazard Quotient at Various Receptor Locations–DEEP Exposure				
	Fence Line Receptor	Current Residence	Possible Future Residence	Workplace	Students–Quincy Jr. High
Phase 5 only	0.0148	0.001	0.003	0.003	<0.001
Prevailing (pre-project)	0.163	0.017	0.035	0.105	0.011
Yahoo! Phases 1-3	0.156	0.004	0.031	0.102	0.001
Intuit	0.002	0.011	0.001	0.002	<0.001
Microsoft	<0.001	<0.001	0.001	<0.001	0.001
BNSF	0.004	0.001	0.003	0.005	0.009
Highways	<0.001	<0.001	<0.001	<0.001	<0.001
Cumulative (post-project)	0.020	0.016	0.014	0.018	0.010

Attributable to:	Chronic Hazard Quotient at Various Receptor Locations–DEEP Exposure				
	Fence Line Receptor	Current Residence	Possible Future Residence	Workplace	Students–Quincy Jr. High
Yahoo! Phases 1-3	0.012	0.002	0.007	0.008	<0.001
Yahoo! Phase 5	0.001	0.001	0.003	0.003	<0.001
Intuit	0.002	0.011	0.001	0.002	<0.001
Microsoft	<0.001	<0.001	0.001	<0.001	0.001
BNSF	0.004	0.001	0.003	0.005	0.009
Highways	<0.001	<0.001	<0.001	<0.001	<0.001

4.4.1.2. Hazard Quotient–NO_2

To evaluate possible non-cancer effects from exposure to NO_2, modeled concentrations at receptor locations were compared to its respective non-cancer toxicological values. In this case, maximum-modeled 1-hour NO_2 concentrations are compared to the acute REL (470 g/m^3). The acute HQ for NO_2 exposure is calculated using the following equation:

$$\text{Acute HQ} = \frac{\text{maximum 1-hr } NO_2 \text{ concentration}}{470 \ g/m^3}$$

Table 15 shows acute hazard quotients at the maximally exposed receptors most impacted by Yahoo!'s Phase 5 NO_2 emissions. Hazard quotients exceed one at the fence line and workplace receptors.

Table 15. Acute Non-Cancer Hazards for Residential and Occupational Scenarios

Attributable to:	Acute Hazard Quotient at Various Receptor Locations–NO_2 Exposure				
	Fence Line Receptor [a]	Current Residence	Possible Future Residence	Workplace	Students–Quincy Jr. High
Phase 5 Only	**1.6**	0.4	0.8	**1.1**	0.3
Cumulative–[c] Highest Yahoo! Impacts	2.1	1.3	1.8	1.3	1.1 [b]
Attributable to:	**Point of Maximum Impact**	**Apparent Farmhouse [d]**		**Commercial (Land Use Code 20 to 70, not 68)**	**Land Use Code 68**
Cumulative–[c] Highest Overall Impact	2.5 [a]	2.3 [a]		2.2 [a]	1.1 [a]

a. Yahoo! contributes less than 20% of the NO_2 hazard at these locations. These locations were not further evaluated in this document.
b. Yahoo! contributes negligible NO_2 to this location during maximum cumulative impact days.
c. "Cumulative" includes simultaneous power outage emissions from Microsoft, Intuit, Yahoo!, proposed Sabey, and proposed Dell. Emissions from Celite Corporation are also included.
d. Appears to be farm buildings from aerial image. According to parcel information, the property is owned by Port District #1.

Ecology also calculated HQs for receptors cumulatively impacted by simultaneous data center emissions in Quincy. HQs for each of the maximally exposed receptors near Yahoo! exceed one.

Given that the acute REL for NO_2 does not provide any additional buffer between the derived value and the exposure concentration at which effects have been observed in sensitive populations, someone with asthma or other respiratory illness present at these locations when both meteorological conditions and engine use during a power outage occurred could experience increased airway reactivity and respiratory symptoms.

4.4.1.3. Discussion of Acute Hazard Quotients Greater Than One

NO_2 HQs may exceed one at certain times when unfavorable air dispersion conditions coincide with electrical grid transmission failure at Yahoo! and other Quincy data centers. If the HQ is less than one, then the risk is generally considered acceptable. The more the HQ increases above one, the more likely it is that adverse health effects will occur by some undefined amount (due in part, to how the risk-based concentration is derived).

As mentioned in Section 4.3.2, OEHHA developed an acute reference exposure level for NO_2 based on inhalation studies of people with asthma. These studies found that some subjects exposed to about 0.25 ppm (470 $\mu g/m^3$) experienced increased airway reactivity following exposure (CalEPA, 2008). Not all subjects experienced apparent effects. Like NO_2, DEEP may interact with airways in the respiratory tract. Simultaneous exposure to NO_2 and DEEP components of Yahoo!'s diesel engine exhausts probably results in a higher risk of adverse respiratory effects than exposure to the NO_2 component alone.

4.4.1.4. Probability Analysis of NO_2 ASIL Exceedances

Ecology also analyzed the frequency (# of hours) meteorological conditions could result in a NO_2 concentration greater than 441 $\mu g/m^3$ across the Quincy modeling domain. Figure 8 displays these results graphically. This figure shows the number of hours per year that a cumulative NO_2 concentration could exceed 441 $\mu g/m^3$ assuming data center engines operate continuously throughout the year. In reality, these data centers are only permitted to operate for up to 48 hours per year under emergency outage conditions. According to Grant County Public Utilities District (PUD), the average total outage time for customers that experience an outage throughout PUD's service area is only about 143 minutes per year.

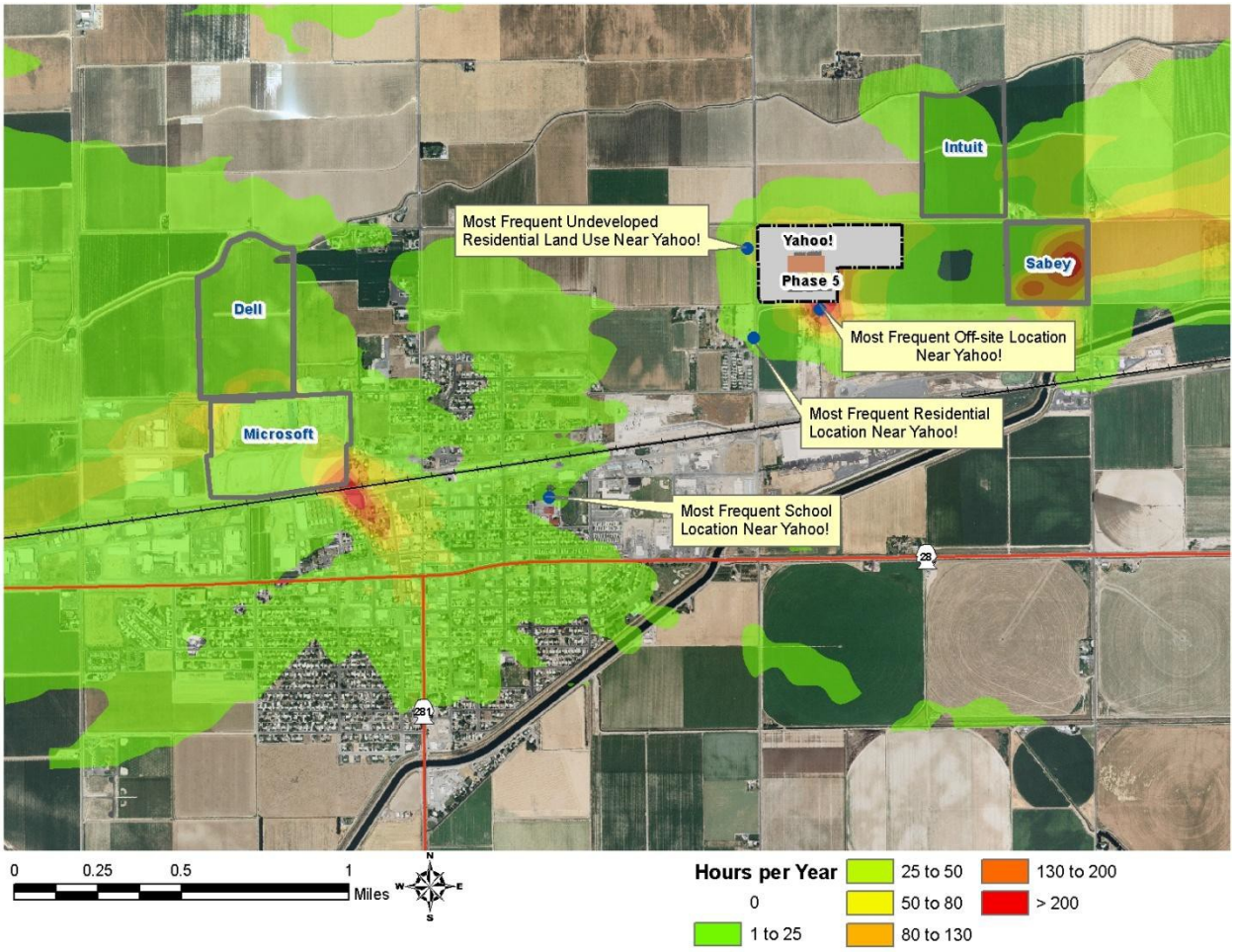

Figure 8. Frequency that cumulative 1-hour NO_2 concentrations could exceed 441 µg/m^3 assuming continuous power outage emissions from all existing and proposed Quincy data centers and emissions from Celite Corporation

To account for infrequent intermittent emergency outages, Ecology further evaluated the modeling data to determine the probability of meteorological conditions necessary to result in ambient NO_2 concentrations in excess of the ASIL, combined with estimates of the probability that a system-wide outage requires simultaneous emergency engine operation. The results of this analysis are summarized in Table 16. Generally, the likelihood that a power outage will coincide with unfavorable meteorological conditions is extremely low. The combined probability of these worst-case scenarios is further described in Section 4.4.1.5.

Table 16. Frequency (hours per year) With Which NO_2 Concentrations Could Exceed 441 µg/m^3 Assuming Continuous Operation of all Data Centers' Engines in Quincy

	Most Frequent Locations That NO_2 Concentrations Could Exceed 441 µg/m^3 (hours per year)				
	Fence Line Receptor	**Current Residence**	**Possible Future Residence**	**Workplace**	**Students– Quincy Jr. High**
Cumulative– Highest Yahoo! Impacts	376	5	36	187	2

4.4.1.5. Joint Probability Analysis

As stated above, Ecology identified conditions that would cause the 1-hour NO_2 concentration to reach or exceed 470 µg/m^3 (441 µg/m^3 from the data center + 29 µg/m^3 from background sources). Ecology has not determined if these times in the 2005 period were at times more (or less) likely to occur simultaneously with power outages. If they occurred at times when outages were no more or less likely than average to take place, the probability of generator operation would be independent of the probability of atmospheric conditions that would lead to high NO_2 concentrations at these locations. A combination of independent probabilities allows evaluation of the joint probability that conditions could occur simultaneously. The joint probability can be estimated as:

$$P(X \cap Y) = P(X) \cdot P(Y)$$

Where:

P(X) = The number of unfavorable atmospheric condition hours that occurred in the 2005 period[8] divided by the total number of hours in the same period, i.e., 8760 hours.

P(Y) = The number of hours during which unplanned outage generator operation takes place divided by the total number of hours considered. Ecology estimated P(Y) by examining possible scenarios under the maximum frequency of outage-caused generator operation to be permitted, i.e., 48 hours per year.

$P(X \cap Y)$ = The hourly probability that the concentration at a given receptor will exceed 441 µg/m^3.

Based on this joint probability, the estimated frequency of times per year that an ambient NO_2 concentration of 441 µg/m^3 would probably occur given full use of the allowance for up to 48 hours of emergency outage operation, is:

Frequency (hours per year) = $P(X \cap Y) \cdot 8760$ hr/yr

[8] The number of times the NO_2 concentration exceeded 441 µg/m^3 in the AERMOD simulation.

The long-term recurrence intervals between hours that an ambient NO_2 concentration of 441 $\mu g/m^3$ would probably occur given full use of the allowance for up to 48 hours of emergency outage operation, is:

Recurrence (years) = 1/Frequency (hr/yr)

Table 17 shows combined probability that an ambient NO_2 concentration of 441 $\mu g/m^3$ would probably occur given full use of the allowance for up to 48 hours of emergency outage operation for all data centers in Quincy, and recurrence intervals between occurrences at five various receptor types most frequently impacted near Yahoo!. Based on this analysis, the NO_2 levels could reach or exceed 470 $\mu g/m^3$ about once every ½ year at Yahoo!'s fence line and once every 91 years at Quincy Junior High School.

Table 17. Combined Probability and Recurrence Intervals With Which NO_2 Concentrations Could Exceed 441 $\mu g/m^3$ Assuming 48 Hours Per Year of All Quincy Data Centers' Engines Operating Simultaneously

	Receptors With Highest Yahoo! Impact				
	Fence Line Receptor	**Current Residence**	**Possible Future Residence**	**Workplace**	**Students– Quincy Jr. High**
Frequency (hr/yr)	376	5	36	187	2
P(X)	4.3E-02	5.7E-04	4.1E-03	2.1E-02	2.3E-04
P(Y) 48 hours outage per year	5.5E-03	5.5E-03	5.5E-03	5.5E-03	5.5E-03
P(X ∩ Y)	2.4E-04	3.1E-06	2.3E-05	1.2E-04	1.3E-06
Hours per year	2.1	0.03	0.2	1.0	0.01
Recurrence interval (years)	0.5	36.5	5.1	1.0	91.3

While Yahoo! has requested 48 hours of power outage operation for their permit, the actual frequency and total duration of unplanned operation of the generators is likely to be much less. According to Grant County Public Utilities District (PUD), the average total outage time for customers that experience an outage throughout PUD's service area is only about 143 minutes per year. Some customers experience longer outages and others experience shorter outages. Because data centers may or may not experience similar outages as other Grant County PUD customers, Ecology obtained a report of recent unplanned generator usage at the Ask.com data center in Moses Lake, the Yahoo! Data Center in Quincy,[9] and the Microsoft Columbia Data Center (Quincy).[10]

[9] Lael Allen to Lisa Karstetter, Gerald Allen, Ty Sween, and Mark Johnson, "PUD outages since Dec. 2007," e-mail message, January 03, 2011, 10:17 AM
[10] Jim Wilder to Jack Eaton and David Ogulei, "Unplanned generator usage at MSFT Columbia Data Center," e-mail message, December 08, 2010, 5:04 PM

Since 2007, Yahoo! reported only three instances when emergency engines were operated under emergency outage conditions for a total of three hours. Similarly, Microsoft reported four events, although the durations of these events are not reported. Ask.com in Moses Lake (but part of the Grant County PUD system), experienced three events for a total outage of about 10 minutes and 18 seconds.

Based on the available records of power failures at data center substations in Grant County, the possibility that Yahoo! will experience the highest permitted duration of power failure of a combined 48 hours per year appears unlikely.

A similar joint probability analysis as described above substituting three hours of power outage per year for the 48 permitted hours per year yields occurrences that are more infrequent. Based on this more likely scenario, the NO_2 levels could reach or exceed 470 $\mu g/m^3$ about once every eight years at Yahoo!'s fence line and once every 1,460 years at Quincy Junior High School (Table 18).

Table 18. Combined Probability and Recurrence Intervals With Which NO_2 Concentrations Could Exceed 441 $\mu g/m^3$ Assuming 3 Hours Per Year of all Quincy Data Centers' Engines Operating Simultaneously

	Receptors With Highest Yahoo! Impact				
	Fence Line Receptor	**Current Residence**	**Possible Future Residence**	**Workplace**	**Students– Quincy Jr. High**
Frequency (hr/yr)	376	5	36	187	2
P(X)	4.3E-02	5.7E-04	4.1E-03	2.1E-02	2.3E-04
P(Y) 3 hours outage per year	3.4E-04	3.4E-04	3.4E-04	3.4E-04	3.4E-04
$P(X \cap Y)$	1.5E-05	2.0E-07	1.4E-06	7.3E-06	7.8E-08
Hours per year	0.129	0.002	0.012	0.064	0.001
Recurrence interval (years)	7.8	584	81.1	15.6	1,460

Ecology's analysis concluded that coincidental worst-case meteorological and power outage conditions are extremely unlikely to occur. Although extremely improbable, we cannot completely rule out the possibility of having such a scenario. If such an event were to occur, people with asthma who might be cumulatively exposed to NO_2 and DEEP from Yahoo! and other sources may experience respiratory symptoms such as wheezing, shortness of breath, and reduced pulmonary function with airway constriction.

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 unit risk factor (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:

$$\text{Risk} = \frac{\text{CAir x URF x EF x ED}}{\text{AT}}$$

Where:

CAir = Concentration in air at the receptor ($\mu g/m^3$)
URF = Unit Risk Factor $(\mu g/m^3)^{-1}$
EF1 = Exposure Frequency (days per year)
EF2 = Exposure Frequency (hours per day)
ED = Exposure Duration (years)
AT = Averaging Time (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/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.

Table 19 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 Yahoo! facility. As shown in Table 19, cancer risks attributable to the Phase 5 data center expansion project (rows shaded purple) are less than one in one hundred thousand (1×10^{-5}). The highest risk occurs at residential parcels to the west of the Yahoo! facility (4.2×10^{-6}). This area is currently undeveloped so the estimated risks would apply if this parcel was 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}). Cumulative risk for the maximally exposed residence near Yahoo!'s property, however, exceeds one in one hundred thousand (Table 19).

For the purpose of third tier petitions in the Quincy UGA, Ecology established a cumulative risk management goal of 100 excess cancer cases in one million people exposed (1×10^{-4}). Ecology has defined this goal to represent the cumulative level of concern for Quincy residents (also called an "ample margin of safety")[11] 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 19, the maximum cumulative cancer risk for the maximally impacted current residential receptor near Yahoo! after Phase 5 development (rows shaded blue) is 25 in one million. This risk occurs at the existing residence to the north of the Yahoo! facility. This residence is more impacted by allowable emissions from the existing Intuit Data Center than by emissions from Yahoo!. In the event residential parcels to the west of Yahoo! are developed, maximum cumulative risks approach 21 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 Yahoo!'s expansion project are permissible pending public comment. It is important to note that approval of the project and reduction in allowable emissions from the existing data center would result in a decline in the future residential receptor's maximum estimated "prevailing" risk (from 52 per million to 21 per million). A lower risk reduction (from 26 per million to 25 per million) was observed at the existing residence located about ½ mile north of Yahoo!. This residence receives about 80% of its potential DEEP exposure from other nearby sources.

[11] "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.

Table 19. Estimated Increased Cancer Risk for Residential, Occupational, Student, and Scenarios

Location/ Scenario	Scope	Annual DEEP Concentration ($\mu g/m^3$)	EF1 (days/yr)	EF2 (hr/24 hr)	ED (yr)	AT (days)	Individual Increased Cancer Risk	Risk/Million
Maximally Exposed Current Residence	"Prevailing" pre-project	0.086	365	24/24	70	25550	2.6×10^{-5}	26
	Yahoo! Phases 1-3	0.01818					5.5×10^{-6}	6
	Intuit	0.05684					1.7×10^{-5}	17
	Microsoft	0.00198					6×10^{-7}	~1
	BNSF	0.00704					2.1×10^{-6}	2
	Highways	0.00011					3.3×10^{-8}	<1
	"Prevailing" post-project	0.082					2.5×10^{-5}	25
	Yahoo! Phases 1-3	0.01181					3.5×10^{-6}	4
	Yahoo! Phase 5	**0.003**					**9.0×10^{-7}**	**~1**
	Intuit	0.05684					1.7×10^{-5}	17
	Microsoft	0.00198					6×10^{-7}	~1
	BNSF	0.00704					2.1×10^{-6}	2
	Highways	0.00011					3.3×10^{-8}	<1
Maximally Exposed Potential Future Residence	"Prevailing" pre-project	0.17451	365	24/24	70	25550	5.2×10^{-5}	52
	Yahoo! Phases 1-3	0.15389					$4.6. \times 10^{-5}$	46
	Intuit	0.00393					1.2×10^{-6}	1
	Microsoft	0.00272					8.0×10^{-7}	~1
	BNSF	0.01383					4.1×10^{-6}	4
	Highways	0.00014					4.2×10^{-8}	<1
	"Prevailing" post-project	0.06902					2.1×10^{-5}	21
	Yahoo! Phases 1-3	0.03442					1.0×10^{-5}	10
	Yahoo! Phase 5	**0.014**					**4.2×10^{-6}**	**4**
	Intuit	0.00393					1.2×10^{-6}	1
	Microsoft	0.00272					8.0×10^{-7}	~1
	BNSF	0.01383					4.1×10^{-6}	4
	Highways	0.00014					4.2×10^{-8}	<1

Table 19 (cont'd). Estimated Increased Cancer Risk for Residential, Occupational, Student, and Scenarios

Location/ Scenario	Scope	Annual DEEP Concentration ($\mu g/m^3$)	EF1 (days/yr)	EF2 (hr/24 hr)	ED (yr)	AT (days)	Individual Increased Cancer Risk	Risk/ Million
Maximally Impacted Off-Site Workplace	"Prevailing" pre-project	0.524	250	8/24	40	25550	2.1×10^{-5}	21
	Yahoo! Phases 1-3	0.5079					2.0×10^{-5}	20
	Intuit	0.01039					4×10^{-7}	<1
	Microsoft	0.00212					1.0×10^{-7}	<1
	BNSF	0.02327					9×10^{-7}	~1
	Highways	0.00013					5.1×10^{-9}	<1
	"Prevailing" post-project	0.0897					3.5×10^{-6}	4
	Yahoo! Phases 1-3	0.04079					1.6×10^{-6}	2
	Yahoo! Phase 5	**0.016**					**6.0×10^{-7}**	**~1**
	Intuit	0.01039					4×10^{-7}	<1
	Microsoft	0.00212					1.0×10^{-7}	<1
	BNSF	0.02327					9×10^{-7}	~1
	Highways	0.00013					5.1×10^{-9}	<1
Maximally Impacted School– Teacher	"Prevailing" pre-project	0.0534	200	8/24	40	25550	1.7×10^{-6}	2
	Yahoo! Phases 1-3	0.00395					1.2×10^{-7}	<1
	Intuit	0.0017					5.3×10^{-8}	<1
	Microsoft	0.00328					1.0×10^{-7}	<1
	BNSF	0.04425					1.4×10^{-6}	1.4
	Highways	0.00022					6.9×10^{-9}	<1
	"Prevailing" post-project	0.05196					1.6×10^{-6}	2
	Yahoo! Phases 1-3	0.00193					6.0×10^{-8}	<1
	Yahoo! Phase 5	**0.00058**					**1.8×10^{-8}**	<1
	Intuit	0.0017					5.3×10^{-8}	<1
	Microsoft	0.00328					1.0×10^{-7}	<1
	BNSF	0.04425					1.4×10^{-6}	1.4
	Highways	0.00022					6.9×10^{-9}	<1

Table 19 (cont'd). Estimated Increased Cancer Risk for Residential, Occupational, Student, and Scenarios

Location/ Scenario	Scope	Annual DEEP Concentration ($\mu g/m^3$)	EF1 (days/yr)	EF2 (hr/24 hr)	ED (yr)	AT (days)	Individual Increased Cancer Risk	Risk/ Million
Maximally Impacted School– Student	"Prevailing" pre-project	0.0534					1.1×10^{-7}	<1
	Yahoo! Phases 1-3	0.00395					8.3×10^{-9}	<1
	Intuit	0.0017					3.6×10^{-9}	<1
	Microsoft	0.00328					6.9×10^{-9}	<1
	BNSF	0.04425					9.4×10^{-8}	<1
	Highways	0.00022					4.6×10^{-10}	<1
	"Prevailing" post-project	0.05196					1.1×10^{-7}	<1
	Yahoo! Phases 1-3	0.00193					4.1×10^{-9}	<1
	Yahoo! Phase 5	**0.00058**					**1.2×10^{-9}**	<1
	Intuit	0.0017					3.6×10^{-9}	<1
	Microsoft	0.00328					6.9×10^{-9}	<1
	BNSF	0.04425					9.4×10^{-8}	<1
	Highways	0.00022					4.6×10^{-10}	<1
Maximally Impacted Fence Line Receptor	"Prevailing" pre-project	0.81589	250	2/24	40	25550	8.0×10^{-6}	8
	Yahoo! Phases 1-3	0.78247					7.7×10^{-6}	7.7
	Intuit	0.01051					1.0×10^{-7}	<1
	Microsoft	0.00219					2.1×10^{-8}	<1
	BNSF	0.02059					2.0×10^{-7}	<1
	Highways	0.00013					1.3×10^{-9}	<1
	"Prevailing" post-project	0.10094					9.9×10^{-7}	1
	Yahoo! Phases 1-3	0.06014					5.9×10^{-7}	<1
	Yahoo! Phase 5	**0.00738**					**7.2×10^{-8}**	<1
	Intuit	0.01051					1.0×10^{-7}	<1
	Microsoft	0.00219					2.1×10^{-8}	<1
	BNSF	0.02059					2.0×10^{-7}	<1
	Highways	0.00013					1.3×10^{-9}	<1

Note: **Pre-project** refers to Yahoo!'s allowable annual fuel consumption limit from existing (Phases 1 through 3) engines at 821,600 gallons per year. **Post-project** refers to Yahoo!'s voluntary reduction in allowable annual fuel consumption from existing (Phases 1 through 3) engines from 821,600 to 410,800 gallons per year.

5. UNCERTAINTY CHARACTERIZATION

Many factors of the health impact assessment 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 Yahoo!'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 health impact assessment.

5.1. Exposure Uncertainty

It is difficult to characterize the amount of time that people can be exposed to Yahoo!'s DEEP emissions. For simplicity, Yahoo! 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. Yahoo! estimates that they will use the generators during emergency outages for no more than 48 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, Yahoo! cannot predict future outages with any degree of certainty. Yahoo! accepted a limit of emergency operation for 48 hours per year and estimated that this limit should be more than sufficient to meet their emergency demands.

For the purposes of evaluating cumulative exposure to NO_2 during power outages, Ecology assumed that all data centers lose power at the same time. Grant County PUD reports that this circumstance is extremely unlikely because there are two separate feeder lines that supply power to the east and west portions of Quincy (Coe, 2010). Therefore, an outage along either of those lines would only affect Microsoft and Dell (west) or Yahoo!, Intuit, and Sabey (east). A simultaneous outage along both feeder lines is much less likely, and therefore, Ecology's estimate of the cumulative impacts of NO_2 during power outages represents an unlikely worst-case scenario.

5.2. Emissions Uncertainty

The exact amount of DEEP and NO_X emitted from Yahoo!'s diesel-powered generators is uncertain. Yahoo! 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.

The ratio of NO_2 to NO_X emitted from Yahoo!'s diesel engines is also uncertain. In accordance with guidance from Ecology, Landau assumed that 10% of NO_X emitted from diesel engines is in the form of NO_2. This represents a conservative estimate of primary NO_2 emissions from diesel engines.

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 Yahoo! 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 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 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 1×10^{-5} to 1×10^{-3} per $\mu g/m^3$. OEHHA's DEEP URF (3×10^{-4} per $\mu g/m^3$) 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 20 presents a summary of how the uncertainty affects the quantitative estimate of risks or hazards.

Table 20. 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 non-cancer 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 $PM_{2.5}$.

Relevant to Yahoo!'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 Yahoo! adequately demonstrated compliance with the $PM_{2.5}$ NAAQS. Therefore, short-term impacts from DEEP exposure were considered and found to be acceptable.

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

7.1. Project Summary

Yahoo! proposes to expand their data center located in Quincy, Grant County, Washington. The expansion project, or the Phase 5 development, will consist of five buildings to house server equipment and 10 diesel-powered backup engine-generator sets each rated at 2,280 kWm. The engines will be housed in separate enclosures.

Potential emissions of DEEP and NO_2 from the proposed backup engines exceeded regulatory trigger levels called ASILs. The proponent was therefore 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. In the case of Yahoo!'s third tier petition, Ecology also considered short-term (acute) NO_2 impacts in the community during outage scenarios.

Because Ecology chose to take a community-wide approach to permitting data centers in Quincy under a third tier review, Ecology is required to make a third tier risk management decision in accordance with WAC 173-460-100. The third tier review process allows Ecology to consider Yahoo!'s request to extend exhaust stacks and reduce allowable DEEP emissions from their existing data center in Quincy, thereby reducing the overall potential risk from exposure to DEEP emitted by Yahoo!'s data center operations in Quincy.

7.2. Potential Health Risks

Yahoo! retained Landau Associates (Landau) to prepare a HIA to evaluate the potential health risks attributable to operation of the diesel-powered generators from the Phase 5 expansion project. The HIA demonstrated that emissions of DEEP from the proposed expansion alone could result in an increased cancer risk of up to 4 in one million (4×10^{-6}) at an undeveloped residentially zoned property located to the west of Yahoo!.

The HIA also demonstrated that power outage emissions of NO_2 from the 10 proposed engines (Phase 5) could infrequently result in hazard quotients greater than one at a few non-residential off-site locations near Yahoo!'s southeast boundary. A hazard quotient greater than one means that the estimated short–term (one-hour average) NO_2 levels exceed a reference exposure level of 470 g/m^3. At or above this level, some sensitive asthmatics could experience symptoms.

While Yahoo!'s proposed Phase 5 expansion 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 on-road, non-road, and existing data center emissions of DEEP, and

Short-term NO_2 power outage emissions from all existing and proposed data centers and NO_2 emissions from Celite Corporation added to an assumed background level of 29 g/m^3.

The maximum prevailing cumulative cancer risk prior to Yahoo!'s Phase 5 proposal is 26 in one million (2.6×10^{-5}) at an existing residence most impacted by Yahoo!. It is important to note that because Yahoo! is located in a relatively non-residential area, the existing residence maximally exposed to DEEP is located more than ½ mile north of Yahoo!. This particular residence is theoretically more impacted by emissions from the nearby Intuit Data Center than by Yahoo! Data Center. A potentially higher risk of 52 in one million (5.2×10^{-5}) occurs at an undeveloped residential property located to the west of Yahoo!.

Ecology also evaluated the cumulative short-term NO_2 impact assuming all data centers (existing and proposed) lost power at the same time. This cumulative assessment of NO_2 aimed to identify the worst-case short-term impacts in Quincy during emergency outage conditions. Ecology found that NO_2 levels could rise above a level of concern for sensitive individuals during certain meteorological conditions.

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. The worst-case scenario would mean that Yahoo! (and other Quincy data centers) experience a full 48 hours of simultaneous power outage per year as allowed by permit. Short-term NO_2 levels could reach or exceed 470 $\mu g/m^3$ about once every ½ year at Yahoo!'s fence line. Workers at commercial sites directly south of Yahoo! could be impacted once a year, and future residents in the area could be impacted about once every five years (at an undeveloped residentially zoned parcel). Existing residences near Yahoo! could be impacted once every 36 years, and the nearest school could be impacted once every 91 years assuming 48 hours of unplanned simultaneous outage per year in Quincy.

Given that two separate feeder lines are reported to supply power to Quincy, it is unlikely that data centers on the east side (Yahoo!, Intuit, and proposed Sabey) will experience an outage at the same time as those on the west side (Microsoft and proposed Dell). Furthermore, it is also unlikely that Yahoo! or any other data center will use their full permitted limit of emergency outage hours on an annual basis (i.e., 48 hours per year). Ecology evaluated an alternate scenario where data centers experience three hours of unplanned outage per year. This length of time is more in line with average system-wide outage times reported by Grant County PUD. Under this scenario, NO_2 levels could reach or exceed 470 $\mu g/m^3$ about once every eight years at Yahoo!'s fence line. Workers at commercial sites directly south of Yahoo! could be impacted about once

every 16 years, and future residents in the area could be impacted about once every 81 years (at an undeveloped residentially zoned parcel adjacent to Yahoo!). Existing residences near Yahoo! could be impacted about once every 584 years, and the nearest school could be impacted about once every 1,460 years. This analysis demonstrates that individual receptors are not likely to be frequently and repeatedly exposed to short-term NO_2 levels above 470-$\mu g/m^3$.

7.3. Third Tier Review Criteria

Section 3.6 lists the minimum approval criteria for a third tier review. The criteria are restated below followed by a brief summary of how Yahoo! satisfied each approval criterion for a third tier review:

(a) Proposed emission controls represent at least BACT.

Ecology's Eastern Regional Office 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) A health impact assessment (HIA) has been completed as described in WAC 173-460-090(3).

Yahoo! submitted a complete HIA to Ecology. Section 4 above summarizes Ecology's review and interpretation of Yahoo!'s HIA.

(c) Approval of the project will result in a greater environmental benefit to the state of Washington.

Section 2.3 describes Yahoo!'s proposal to increase exhaust stack heights to enhance dispersion and to reduce the total facility-wide (existing and proposed data center) allowable fuel consumption from 821,600 gallons per year to 514,351 gallons per year. This enforceable reduction in capacity to use diesel fuel in its diesel engines includes a 50% reduction in fuel use from existing engines, which translates into 37% reduction in Yahoo!'s maximum allowable DEEP emissions. Potential cumulative pre-expansion project risk will decrease from 5.2×10^{-5} (52 in one million) to 2.1×10^{-5} (21 in one million) at a residentially zoned parcel to the west of Yahoo!.

Without this proposed project, such allowable emission reductions would likely not be realized. Ecology views the requested enforceable limit as an environmental benefit to the state of Washington because Yahoo!'s potential long-term facility-wide air quality impact will be reduced.

7.4. Conclusions and Recommendation

Assuming that Yahoo! 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 are within a range considered by Ecology to reflect an "ample margin of safety."

Although Yahoo!'s emissions are unlikely to result in excessive cancer risk, they may on certain infrequent occasions contribute to adverse airway reaction symptoms among people with NO_2-sensitive asthma. Given the low lifetime risk of severe asthma symptoms from NO_2 emissions and the evidently infrequent recurrence of high NO_2 exposure situations, Ecology concludes that risks from the proposed engines are acceptable under WAC 173-460 provided implementation of the following recommendations.

Ecology concludes that Yahoo! has satisfied the requirements for approval of the third tier review petition, subject to the following recommendations:

1) Yahoo! communicate health risks posed by Yahoo! to potential new homeowners at undeveloped residential parcels adjacent to Yahoo! or to the local regulatory agency responsible for zoning and development in the affected area; and

2) Yahoo! routinely reports to Ecology all unplanned power failures occurring at their facility.

Ecology will use routine reports of unplanned power failures from Yahoo! and other data centers in Quincy to determine the appropriateness of assumptions in this analysis. The reports shall include the date, time, and duration of each power outage and the length of time that each engine operates as a result of the outage. Ecology may also use the power outage records to verify compliance with the 48 hours/year limit on emergency operations.

The project review team recommends that the director approve Yahoo!'s third tier petition subject to implementation of the above recommendations. As required by state rules, Yahoo! must hold a public hearing in which Yahoo! and Ecology will present the results of the health impact analysis, the proposed emission controls, pollution prevention methods, additional proposed measures, and any remaining risks posed by the project. Yahoo! must participate in discussions and answer the public's questions at the public hearing.

8. LIST OF ACRONYMS AND ABBREVIATIONS

AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AQP	Air Quality Program
ASIL	Acceptable Source Impact Level
AT	Averaging Time (days)
BNSF	Burlington Northern Santa Fe
CAir	Concentration in air
CalEPA	California Environmental Protection Agency
CAS #	Chemical Abstracts Service Number
DEEP	Diesel Engine Exhaust, Particulate
DEM	Digital Elevation Model
Ecology	Washington State Department of Ecology, Headquarters Office
ED	Exposure Duration (years)
EF	Exposure Frequency
EF1	Exposure Frequency (days per year)
EF2	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 Analysis
HQ	Hazard Quotient
hr	Hour
ICF	ICF International
kWm	kilowatt, mechanical
Landau	Landau Associates
g/m^3	Micrograms per Cubic Meter
m	Micron or micrometer
MWe	Megawatt, electrical
NAAQS	National Ambient Air Quality Standards
NAC AEGL	The National Advisory Committee for the Development of Acute Exposure Guideline Levels
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
Phases 1-3	Yahoo! Data Center Phases 1 through 3 (already built)
Phase 5	Yahoo! Data Center Phase 5 (proposed to be built)
$PM_{2.5}$	Particulate Matter less than 2.5 micrometers in diameter
ppb	parts per billion

ppm	parts per million
PRIME	Plume Rise Model Enhancements
PUD	Public Utilities District
PVMRM	Plume Volume Molar Ratio Method
REL	OEHHA Reference Exposure Level
RfC	Reference Concentration
SQER	Small Quaintly 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
Yahoo!	Yahoo! Inc.

9. REFERENCES

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Appendix G
Final Permit

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A ~~NEW~~	)	~~PRELIMINARY DETERMINATION~~
AIR CONTAMINANT SOURCE FOR	)	11AQ-E399
YAHOO! INC.	)	
YAHOO! DATA CENTER	)	

TO:

Mozan Totani, Project Manager
Yahoo! Inc.
701 First Avenue
Sunnyvale, CA 94089

Mark Johnson, Facilities Manager
Yahoo! Data Center
1010 Yahoo! Way
Quincy, WA 98848

1. EQUIPMENT

The following table contains a list of equipment that was evaluated for this order of approval. Existing MTU Detroit Diesel emergency generator unit identification numbers R through 12 were approved in Notice of Construction (NOC) approval Order No. 07AQ-E241 issued on November 13, 2007. New unit identification numbers 13 through 22 were proposed in the NOC application for the Phase 5 Expansion for the Yahoo! Data Center located in Quincy, and submitted to Ecology on September 20, 2010.

Table 1.1: 2.5 eMW Engine & Generator Serial Numbers

Phase	Unit ID	Engine SN	Generator SN	Manuf. date
1	R	527103530	81 28288 A505	12/14/06
	1	527103852	81 28288 A205	2/16/07
	2	527103897	81 28288 A305	2/19/07
	3	527103898	81 28288 A105	2/19/07
	4	527104004	81 28288 A405	3/1/07
2	5	527104645	81 28976 A404	9/12/07
	6	527104646	81 28597 A405	9/12/07
	7	527105840	81 28597 A101	8/8/08
	8	527104665	81 28597 A105	9/12/07
3	9	527105203	81 28597 A505	2/1/08
	10	527105204	81 28976 A104	2/1/08
	11	527105205	81 28976 A204	2/1/08
	12	527105206	81 28976 A304	2/1/08
5	13	527107949	WA-527124	9/16/10
	14	527107950	WA-575140	9/16/10
	15	527107951	WA-575127	9/16/10
	16	527107948	WA-575180	9/16/10
	17			
	18			
	19			
	20			
	21			
	22			

Table 1.2: Cooling Towers installed under NOC 07AQ-E241			
Total Units	Manufacturer & Model	# Cooling Towers Per Unit	Total # Cooling Towers
6	Evapco Model AT 212-636	2	12

2. PROJECT SUMMARY

2.1 Original Project: Phases 1-3

Yahoo! Inc. submitted a Notice of Construction (NOC) application on January 24, 2007, for the installation of the Yahoo! Data Center at 1010 Yahoo! Way, Quincy, in Grant County. The Yahoo! Data Center will be used as an electronic data storage and data access facility. The primary air contaminant sources at the facility consist of thirteen (13) MTU Detroit Diesel, Inc. Model 16V4000 G83 B3 diesel engines that power Newage AvK Model DSG 86 L1-4s generators. The servers at the Yahoo! Data Center are cooled by six Evapco Model AT 212-636 two cell evaporative cooling units. The Yahoo! Data Center is supported by associated equipment such as fuel tanks, cooling water storage and treatment, and electrical systems. The MTU Detroit Diesel engines are used to power emergency backup electrical generators in case of a failure of the Grant County PUD hydroelectric power grid.

Notice of Construction Approval Order No. 07AQ-E241 was issued on November 13, 2007. The Order limited operation of each generator to 400 hours per year for combined break-in, maintenance, and emergency backup electrical generation. The diesel engines were restricted to 49,296 gallons/day and 821,600 gallons/year of low sulfur (less than 0.0015 wt %), EPA on-road specification No. 2 distillate diesel oil.

2.2 Expansion Project: Phase 5

Yahoo! Inc. submitted a NOC application on September 20, 2010, to expand the Yahoo! Data Center. The expansion project will increase the size of the facility by approximately 151,000 square feet, and will include ten (10) 2.28 MWm MTU Detroit Diesel, Inc. Model 16V4000 G83 diesel engines that power Newage AvK Model DSG 86 L1-4s generators. The additional servers at the Yahoo! Data Center expansion will not use evaporative cooling systems. Operation of the ten (10) MTU Detroit Diesel engines will be limited to 100 hours per year each, and will be restricted to no more than 103,551 gallons per year of low sulfur (less than 0.0015 wt %), EPA on-road specification No. 2 distillate diesel oil.

Yahoo! has proposed to reduce allowed operation of the existing 13 generators from 400 hours per year to 200 hours per year for combined break-in, maintenance, and emergency backup electrical generation. Yahoo! also proposes to reduce allowed diesel fuel for the existing generators from 821,600 gallons/year to 410,800 gallons per year of low sulfur (less than 0.0015 wt %), EPA on-road specification No. 2 distillate diesel oil. Engine exhaust stack heights will be raised from 15 feet to 20 feet above ground level.

The operating reductions being proposed in the 2010 Yahoo! Expansion project will result in an annual total decrease in potential engine combustion ~~potential~~ emissions from the Yahoo!

Data Center, and will reduce most potential ambient impacts. Annual permitted facility fuel allocation will decrease from 821,600 gallons as allowed in NOC Approval Order No. 07AQ-E241 to 514,351 gallons under the expansion project approval order.

Table 2.1: Potential to Emit for the Yahoo! Data Center Generators			
Pollutant	**Existing Units R thru 12 Potential To Emit**	**Expansion Units 13 thru 22 Potential To Emit**	**Total Facility Potential to Emit**
Criteria Pollutant	**tons/yr**	**tons/yr**	**tons/yr**
2.1.1 NO_x	35	11	46
2.1.2 CO	13	6.1	19.1
2.1.3 SO_2	80 lb/yr	22 lb/yr	102 lb/yr
2.1.4 $PM_{2.5}$	1.2	0.35	1.6
2.1.5 VOC	80 lb/yr	349 lb/yr	429 lb/yr
Toxic Air Pollutants (TAPs)			
2.1.6 Primary NO_2*	3.5	1.1	4.6
2.1.7 DEEP**	1.2	0.35	1.6
2.1.8 Carbon monoxide	13	6.1	19.1
2.1.9 Sulfur dioxide	4.0E-02	1.0E-02	5.1E-02
Carbon based TAPs			
2.1.10 Acrolein	2.1E-04	5.59E-05	2.7E-04
2.1.11 Benzene	2.1E-02	5.5E-03	2.6E-02
2.1.12 Propylene	7.47E-02	1.98E-02	9.4E-02
2.1.13 Toluene	7.5E-03	1.99E-03	9.5E-03
2.1.14 Xylenes	5.2E-03	1.37E-03	6.5E-03
2.1.15 Formaldehyde	2.1E-03	5.6E-04	2.7E-03
2.1.16 Acetaldehyde	6.7E-04	1.79E-04	8.5E-04
Poly Aromatic Hydrocarbons			
2.1.17 Naphthalene	3.5E-03	9.22E-04	4.4E-03
2.1.18 Benz(a)anthracene	1.7E-05	4.41E-06	2.1E-05
2.1.19 Chrysene	4.1E-05	1.1E-05	5.2E-05
2.1.20 Benzo(b)fluoranthene	3.0E-05	7.9E-06	3.8E-05
2.1.21 Benzo(k)fluoranthene	5.8E-06	1.55E-06	7.4E-06
2.1.22 Benzo(a)Pyrene	6.9E-06	1.82E-06	8.7E-06
2.1.23 Indeno(1,2,3-cd)pyrene	1.1E-05	2.94E-06	1.4E-05
2.1.24 Dibenz(a,h)anthracene	9.2E-06	2.45E-06	1.2E-05

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

2.3 There are no small emergency engines to power fire water pumps or cooling water pre-treatment facility. Washington Administrative Code (WAC) 173-400-110(4)(h)(xxxix), as adopted on the date of this Order, exempts all emergency engines below 500 bhp.

2.4 The Yahoo! Data Center was constructed with 6 Evapco Model USS 212-636 cooling units to dissipate heat from the electronic servers. Each Model USS 212-636 unit has two cooling towers and two fans. Each individual cooling tower has a design recirculation rate of **3150** gallons per minute.

Table 2.2: Cooling Towers Emission Limits

Pollutant	**Max loading conc. ~~M~~gmg/l**	**Emission rate Total Lbs/yr**
2.4.1 Arsenic	0.002	0.00263
2.4.2 Barium	0.013	0.0171
2.4.3 Cadmium	0.003	0.00395
2.4.4 Chromium III	0.0047	0.00618
2.4.5 Copper	0.0032	0.00421
2.4.6 Iron	0.0665	0.0875
2.4.7 Lead	0.0005	0.000658
2.4.8 Manganese	0.002	0.00263
2.4.9 Mercury	0.0003	0.000395
2.4.10 Particulate[1]	~~4210~~3200	~~0.00421~~ 4210
[1] All particulate is considered to be 10 microns or less in diameter		

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~~3.~~

3. DETERMINATIONS

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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:

3.1 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.

3.2. The proposed project, if constructed and operated as herein required, will utilize best available control technology (BACT) as defined below:

Pollutant(s)	**BACT Determination**
Particulate matter (PM), carbon monoxide and volatile organic compounds	Restricted operation of EPA Tier-2 certified engines, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Nitrogen oxides (NOx)	Good combustion practices; an engine design that incorporates fuel injection timing retard, turbocharger and a low-temperature after-cooler; EPA Tier-2 certified engines; and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Sulfur dioxide	Use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

3.3 The proposed project, if constructed and operated as herein required, will utilize best available control technology for toxic air pollutants (tBACT) as defined below:

Toxic Air Pollutant(s)	tBACT Determination
Acetaldehyde, carbon monoxide, acrolein, benzene, benzo(a)pyrene, 1,3-butadiene, diesel engine exhaust particulate, formaldehyde, toluene, total PAHs, propylene, xylenes	Restricted operation of EPA Tier-2 certified engines, and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Nitrogen dioxide	Good combustion practices; an engine design that incorporates fuel injection timing retard, turbocharger and a low-temperature after-cooler; EPA Tier-2 certified engines; and compliance with the operation and maintenance restrictions of 40 CFR Part 60, Subpart IIII.
Sulfur dioxide	Use of ultra-low sulfur diesel fuel containing no more than 15 parts per million by weight of sulfur.

4. HEALTH IMPACT ANALYSIS

Ecology has evaluated the cumulative health risks associated with diesel engine exhaust particulate and nitrogen dioxide emissions from the proposed project, in accordance with WAC 173-460-100. Ecology has concluded that the cumulative health risks from the project are acceptable. ~~, and that~~ A~~a~~pproval of the project will result in a greater environmental benefit to the state of Washington based on emissions reductions~~.~~ The Third Tier Petition was approved on February 10, 2011. ~~*Note: Draft language dependent on final health risk assessment.*~~ The T~~t~~echnical ~~analysis~~Support Document for the Third Tier Review dated February 8, 2011 ~~supporting~~ that contains the analysis for the~~is~~ Third Tier approval determination is hereby incorporated into this Notice of Construction Approval Order.

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

APPROVAL CONDITIONS

1. **ADMINISTRATIVE CONDITION**

1.1 Notice of Construction Approval Order No. 07AQ-E241 issued on November 13, 2007 is hereby rescinded and replaced entirely by this Order.

1.2 Yahoo! shall schedule a meeting with Quincy School District officials by no later than ~~February~~ April 15, 2011. The meeting will include administrators from any elementary or secondary school at the discretion of the Quincy School District officials. The purpose of the meeting will be to both communicate, and better understand, any potential concerns or complaints that local schools may have regarding emergency generator maintenance testing and operation. In addition, Yahoo! will provide school administrators and District Officials with a direct

telephone contact to one or more of the Yahoo! Data Center managers. The school administrators and District Officials shall also be provided a maintenance testing schedule as contained in this Order, and will update the school whenever Ecology-approved changes occur in the maintenance testing schedule. As decided by the school administrators, District Officials, and Yahoo!, an ongoing relationship between the school and Yahoo! shall be established.

2. **EQUIPMENT RESTRICTIONS**

2.1. The twenty-three (23) MTU Detroit Diesel, Inc. Model 16V4000 G83 B3 diesel engines or equivalents that power the 2.28 MWm (2.0 eMW) Newage AvK Model DSG 86 L1-4s generators shall be certified by the manufacturer to meet 40 CFR 89 Tier II emission levels ~~if manufactured before January 1, 2011. Any generator engine manufactured after January 1, 2011 shall meet 40 CFR 89 Tier IV Transitional emission levels~~ or other specifications as required by the EPA at the time the engines are installed.

2.2. The only engines and electrical generating units approved for operation at the Yahoo! Data Center are those listed in Table 1.1 above.

2.3. Manufacture and installation of the first 4 of 10 engine/generator sets proposed for the Phase 5 expansion project shall occur by July 1, 2011. The manufacture and installation of the last 6 of 10 engine/generator sets proposed for the expansion project shall occur by July 1, 2013. If the manufacture and installation of these engines has not completed within the above schedule, a NOC application may be required prior to installation.

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

2.5. The 13 existing 2.28 MWm engine-generator exhaust stack heights shall be increased from 15 feet to greater than or equal to 20 feet above ground level.

~~2.5.~~2.6. The 10 expansion 2.28 MWm engine-generators exhaust stack heights shall be greater than or equal to 30 feet above ground level.

3. **OPERATING LIMITATIONS**

3.1. The fuel consumption at the Yahoo! Data Center facility shall be limited to a total of 514,351 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. The 13 existing ~~generators~~ engines shall be limited to 410,800 gallons per year of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil (less than 0.0015 weight percent sulfur) and not operate more than 200 hours per year per engine. Total annual fuel consumption by the 13 ~~generators~~ engines may be averaged over a three (3) year period using monthly rolling totals.

3.3. The 10 expansion project ~~generators~~ engines shall be limited to 103,551 gallons per year of diesel fuel equivalent to on-road specification No. 2 distillate fuel oil (less than 0.0015 weight percent sulfur) and not operate more than 100 hours per year per engine. Total annual fuel consumption by the 10 ~~generators~~ engines may be averaged over a three (3) year period using monthly rolling totals.

3.4. The 23 Yahoo! Data Center engines are limited to the following hours of operation, fuel limits, and number of engines operating concurrently. Except as provided in Condition 3.11, the 13 existing engines are limited as follows in Table 3.4a, and the 10 expansion engines are limited as follows in Table 3.4b:

Table 3.4a: 13 Existing Engines Operating Restrictions

Operating Activity	Hours/year per generator	Operating Load (%)	Diesel Fuel Gallons/year	# Operating Concurrently
Maintenance Testing	12	100	24,648	1
Load Testing	4	100	8216	1
Electrical Bypass	36	100	73,944	2
Power Outage	148	100	303,992	13
Total	200		410,800	

Table 3.4b: 10 Expansion Engines Operating Restrictions

Operating Activity	Hours/year per generator	Operating Load (%)	Diesel Fuel Gallons/year	# Operating Concurrently
Maintenance Testing	12	0%	1896	1
Load Bank Testing	4	100	5892	1
Electrical Bypass	36	2 at 40, or 1 at 80	43,020	2
Power Outage	48	8 at 90, 2 at 10	52743	10
Total	100		103,551	

3.5. Operation of the 23 Yahoo! Data Center generators for required monthly maintenance testing shall be limited to approximately one hour per month per engine for a total of 12 hours per year. The 13 existing engines are limited to an average electric load of 100% of the standby rating during testing. The 10 expansion engines will be maintenance tested at 0% electric load. Only one generator shall be operated at a time during monthly maintenance testing.

3.6. Operation of the 23 Yahoo! Data Center generators for required annual load testing shall be limited to approximately 4 hours per year per engine at an average electric load of 100% of the standby rating. The 10 expansion engines are limited to one engine operating concurrently at an average load of 100% of the standby rating.

3.7. Operation of the 23 Yahoo! Data Center generators for electrical bypass shall be limited to approximately 36 hours per year per engine. The 13 existing engines are limited to two engines operating concurrently at an average load of 100% of the standby rating. The 10 expansion engines are limited to two engines operating

concurrently for electrical bypass maintenance at an average load of 40% of the standby rating, and 4 hours of total engine runtime per day.

3.8. The 13 existing generators operating for emergency power generation shall be limited to approximately 148 hours per year per engine at an average electrical load of 100% of the standby rating. The 10 expansion generators operating for emergency power generation shall be limited to approximately 48 hours per year per engine at an average electrical load of 74% of the standby rating. No more than eight (8) expansion engines shall operate at greater than 90% load during any power outage.

3.9. The twenty-three (23) Yahoo! Data Center generator engines require maintenance testing each month. To mitigate engine emission impacts, Yahoo! will perform all maintenance testing during daylight hours, and at least 80% of all maintenance testing within a contiguous two week period each month. Engine maintenance and testing may take place outside of these time restrictions upon coordination by Yahoo! with the other data centers in northeast Quincy to minimize engine emission impacts to the community. Yahoo! shall maintain records of the coordination communications with the other data centers, and those communications shall be available for review by Ecology. Approved days for testing can be re-negotiated at any time as approved in writing by Ecology, and will not trigger revision or amendment of this Order.

3.10. The 6 evaporative cooling units with a total of 2 cooling towers per unit shall each have a mist eliminator that will maintain the maximum drift rate to no more than 0.001 percent of the circulating water rate.

3.11. Start-up testing of the 10 expansion generators is restricted as follows:

3.11.1 Prior to beginning normal operation of the new engines, each generator engine may operate for no more than 16 hours for startup testing at an average load of 83%.

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

3.11.3 During a site integration test, up to six generator engines may operate concurrently for up to four hours at a time at a load of 100%.

3.11.4 Combined engine runtime during startup testing shall not exceed sixteen hours over two days.

3.11.5 All startup testing shall be conducted during ~~daylight hours from during~~ daylight hours.

3.11.6 Fuel use limits and emission limits contained in Approval Conditions 3.4 and 5, respectively, remain in effect during start-up testing.

4. **GENERAL TESTING AND MAINTENANCE REQUIREMENTS**

4.1. Yahoo! will follow engine-manufacturer's recommended diagnostic testing and maintenance procedures to ensure that each of the twenty-three (23) 2.28 MWm 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, Yahoo! shall measure concentrations of nitric oxide (NO), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2) 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 5.3.1, 5.3.2, 5.3.3, 5.13.1, 5.13.2 and 5.13.3, and as an indicator of proper operation of the engines. Additional periodic testing shall be conducted according to Approval Condition 4.4.

4.3. The following procedure shall be used for each test for the 10 expansion engines required by Approval Condition 4.2 unless an alternate method is proposed by Yahoo! and approved in writing by Ecology prior to the test.

4.3.1 Initial emissions testing shall be combined with start-up testing and subsequent emissions testing shall be combined with pre-scheduled monthly maintenance and annual load bank engine testing. Additional operation of the engines for the purpose of emissions testing beyond the operating hours allowed in this Order is not allowed.

4.3.2 A portable emissions instrument analyzer may be used. The analyzer model must be approved in writing by Ecology prior to the first required test. 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. Alternate calibration procedures may be approved in advance by Ecology.

4.3.3 Three test runs shall be conducted for each engine. Each run must last at least 15 minutes. Analyzer data shall be recorded at least once every 5 minutes during the test. Engine electrical power output shall be recorded during testing.

4.3.4 Emissions measurement shall be conducted at each of the proposed average engine loads of 0%, 80%, and 100% that correspond to scheduled engine testing scenarios in Approval Condition 3.4 and Table 3.4b. Monthly testing emission rates were evaluated at 10% load due to the lack of manufacture emissions data at 0% load. Actual monthly testing will occur at 0% load. Emissions measurements need not be conducted at 90% load because a power outage is not scheduled operation.

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

data, as measured according to Approval Condition 4.6, shall be included in the test report, along with the emissions calculations.

4.4. At the conclusion of the manufacturer's warranty term for each engine, or 60 months from engine delivery date, or 3,000 hours of operation, whichever occurs first, Yahoo! shall pursue one of the following options to verify compliance with federal emissions standards and the emission limits in this Order:

4.4.1 Emission testing of each engine for DEEP, NO_2, CO, total nitrogen oxides, and non-methane hydrocarbon (NMHC) emission rates to determine continuing compliance with the 40 CFR 89 Tier II emission standards (the applicant may replace the dynamometer requirement in Subpart E of 40 CFR 89 with corresponding measurement of gen-set electrical output). The testing of each engine shall be repeated every 60 months after its first test. The engine testing may be staged to test 5 engines in each 12 month period.

4.4.2 Re-evaluating BACT and tBACT and health risks of the facility's operations based on the previous 5 years of actual operations and actual power reliability data.

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

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

4.4.5 This requirement is in addition to any testing required by Approval Condition 4.2 above.

4.5 All engines shall be equipped with a properly installed and maintained non-resettable meter that records total operating hours.

4.6 Each of the 10 new expansion engines 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 period of operation.

4.7 Ecology may require additional testing as allowed in WAC-173-400-105(4) at its discretion.

5 EMISSION LIMITS

The twenty-three 2.28 MWm engine-generators shall meet the following emission limits. If required to demonstrate compliance with the g/kW-hr average emission limits through emissions testing, Yahoo! 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 existing engine shall not exceed NO_x emissions of 5.4 g/kW-hr.

5.2 Each expansion project engine shall not exceed NO_x emissions of 6.3 g/kW-hr if built before January 1, 2011. The NO_x emission factor for engines built after

January 1, 2011 shall comply with 40 CFR Part 60, Subpart IIII, or any other applicable EPA requirement, in effect at the time the engines are installed.

5.3 Nitrogen dioxide (NO_2) emissions from each of the 10 expansion project engines shall not exceed the following emission rates at the stated loads, based on emission factors derived from source testing:

	Operating Scenario	Operating Load	Emissions Limit (lb/hr) per engine
5.3.1	Annual Load Testing	100%	3.5
5.3.2	Startup Testing	80%	2.3
5.3.3	Monthly Maintenance	10%	0.34
5.3.4	Electrical Bypass/Maintenance	80%	2.3
5.3.5	Power Outages	90%	2.9

5.4 Each existing engine shall not exceed VOC emissions of 0.2 g/kW-hr.

5.5 Each expansion engine shall not exceed VOC emissions of 0.1 g/kW-hr.

5.6 Each existing engine shall not exceed CO emissions of 2.0 g/kW-hr.

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

5.8 Each existing engine shall not exceed PM emissions of 0.19 g/kW-hr.

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

5.10 The total amount of PM emissions from operating all 10 expansion project engines during each year shall not exceed 0.35 tons/yr, based on load specific emission factors supplied by the engine manufacturer.

5.11 The total amount of PM emissions from operating all 23 engines during each year shall not exceed 1.6 tons/yr, based on load specific emission factors supplied by the engine manufacturer. All PM emissions shall be considered diesel engine exhaust particulate (DEEP) emissions and all DEEP emissions shall be considered $PM_{2.5}$ emissions.

5.12 Visual emissions from each diesel engine exhaust stack shall be no more than 5 percent, with the exception of a ten (10) minute period after unit start-up. Visual emissions shall be measured by using the procedures contained in 40 CFR 60, Appendix A, Method 9.

5.13 SO_2 emissions from each diesel engine exhaust stack shall not exceed 0.03 lbs/hr, based on emission factors derived from source testing.

	Operating Scenario	Operating Load	Emissions Limit (lb/hr) per engine
5.13.1	Annual Load Testing	100%	0.031
5.13.2	Startup Testing	80%	0.025
5.13.3	Monthly Maintenance	0% (eval at 10%)	0.0033
5.13.4	Electrical Bypass/Maintenance	80%	0.025
5.13.5	Power Outages	90%	0.028

6 OPERATION AND MAINTENANCE MANUALS

A site-specific O&M manual for the Yahoo! Data Center facility equipment shall be developed and followed. Manufacturers' operating instructions and design specifications for the engines, generators, cooling towers, and associated equipment shall be included in the manual. The O&M manual shall be updated to reflect any modifications of the equipment or its operating procedures. Emissions that result from failure to follow the operating procedures contained in the O&M manual or manufacturer's operating instructions may be considered proof that the equipment was not properly installed, operated, and/or maintained. The O&M manual for the diesel engines and associated equipment shall at a minimum include:

6.1 Manufacturer's testing and maintenance procedures that will ensure that each individual engine will conform to the EPA Tiered Emission Standards appropriate for that engine throughout the life of the engine.
6.2 Normal operating parameters and design specifications.
6.3 Operating maintenance schedule.

7 SUBMITTALS

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

Washington State Department of Ecology
Air Quality Program
4601 N. Monroe Street
Spokane, WA 99205-1295

8 RECORDKEEPING

All records, Operations and Maintenance Manual, and procedures developed under this Order shall be organized in a readily accessible manner and cover a minimum of the most recent 60-month period. The following records are required to be collected and maintained.

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

8.2 Total annual hours of operation for each diesel engine.

8.3 Operational ~~purpose~~ mode and duration for each start-up of each diesel engine.

8.4 Annual gross power generated by facility-wide operation of the ~~emergency~~ backup electrical generators.

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

8.6 Recordkeeping required by Title 40 CFR Part 60 Subpart IIII.

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

9 REPORTING

9.1 Within 10 business days after entering into a binding agreement to purchase the engine/generator sets identified in Equipment Table 1.1 above, Yahoo! shall notify Ecology in writing. The serial number of the engine and the generator, and the engine build date will be submitted prior to installation of each engine.

9.2 The following information will be submitted to the AQP at the address in Condition 7 above by January 31 of each calendar year.

9.2.1 Monthly rolling annual total summary of air contaminant emissions, monthly rolling hours of operation with annual total, and monthly rolling gross power generation with annual total, and a listing of each start-up of each diesel engine that shows the ~~purpose~~ mode and duration of each type of operation.

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

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

~~9.3~~9.4 Yahoo! shall notify Ecology by e-mail or in writing within 24 hours of any ~~emergency~~ engine operation of greater than 60 minutes if such engine~~that~~ operation occurs as the result of a power outage ~~that lasts for greater than 60 minutes~~. This notification does not alleviate Yahoo! from annual reporting of operations contained in any section of Approval Condition 9.

10 STACK TESTING

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

10.1.1 As soon as possible in advance of such testing, the Permittee shall submit a testing protocol for Ecology approval that includes the following information:

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

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

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

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

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

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

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

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

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

10.1.2.4 A summary of control system or equipment operating conditions.

10.1.2.5 A summary of production related parameters.

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

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

10.1.2.8 Copies of field data and example calculations.

10.1.2.9 Chain of custody information.

10.1.2.10 Calibration documentation.

10.1.2.11 Discussion of any abnormalities associated with the results.

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

11 GENERAL CONDITIONS

11.1 **Commencing/Discontinuing Construction and/or Operations:** This approval shall become void if operation of the Yahoo! Data Center backup emergency diesel electric generators is discontinued at the facility for a period of eighteen (18) months, unless prior written notification is received by Ecology at the address in Condition 7 above.

11.2 **Compliance Assurance Access:** Access to the source by representatives of Ecology or the EPA shall be permitted upon request. Failure to allow such access is grounds for enforcement action under the federal Clean Air Act or the Washington State Clean Air Act, and may result in revocation of this Approval Order.

11.3 **Availability of Order and O&M Manual:** Legible copies of this Order and the O&M manual shall be available to employees in direct operation of the emergency diesel electric generators, and be available for review upon request by Ecology.

11.4 **Equipment Operation:** Operation of the engine/generator sets and related equipment shall be conducted in compliance with all data and specifications submitted as part of the NOC application and in accordance with the O&M manual, unless otherwise approved in writing by Ecology.

11.5 **Modifications:** Any modification to the generators, engines, or cooling towers and their related equipment's operating or maintenance procedures, contrary to information in the NOC application, shall be reported to Ecology at least 60 days

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

11.6 **Activities Inconsistent with the NOC Application and this Approval Order:** Any activity undertaken by the permittee or others, in a manner that is inconsistent with the NOC application and this determination, shall be subject to Ecology enforcement under applicable regulations.

11.7 **Obligations under Other Laws or Regulations:** Nothing in this Approval Order shall be construed to relieve the permittee of its obligations under any local, state or federal laws or regulations.

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

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

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

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

b. Obtaining this authorization by misrepresentation or failure to disclose fully all relevant fact.

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

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

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

Be sure to do the following:

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

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

Mail appeal to:		Deliver your appeal in person to:
The Pollution Control Hearings Board PO Box 40903 Olympia WA 98504-0903	OR	The Pollution Control Hearings Board 4224 – 6th Ave SE Rowe Six, Bldg 2 Lacey, WA 98503

2. To serve your appeal on the Department of Ecology

Mail appeal to:		Deliver your appeal in person to:
The Department of Ecology Appeals Coordinator P.O. Box 47608 Olympia, WA 98504-7608	OR	The Department of Ecology Appeals Coordinator 300 Desmond Dr SE Lacey, WA 98503

3. And send a copy of your appeal to:

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

For additional information visit the Environmental Hearings Office Website:
http://www.eho.wa.gov
To find laws and agency rules visit the Washington State Legislature Website:
http://www1.leg.wa.gov/CodeReviser

DATED this 2489th day of ~~February~~March, 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