BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

IN RE APPLICATION NO. 99-1

SUMAS ENERGY 2 GENERATION FACILITY

EXHIBIT _____ (EH-T)

APPLICANT'S PREFILED TESTIMONY

ERIC HANSEN

Q. Please reintroduce yourself to the Council.

A. My name is Eric Hansen. I am a senior consultant with MFG, Inc. and I have 23 years of experience consulting on air quality and permitting issues. My background and experience is described in greater detail in my resume, which was admitted into evidence as Exhibit 25.1. MFG prepared the air quality and noise sections for Sumas Energy 2's First Revised Application submitted in January 2000 and for the Second Revised Application submitted in June 2001. Half a dozen other professionals in our office assisted me with this project.

Q. What subjects does your prefiled testimony address?

PERKINS COIE LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888

A. My testimony discusses changes in the proposed project that relate to air emissions and the implications of those changes on air quality.

Q. What work have you done since the conclusion of EFSEC's hearings in September 2000 that pertains to the air quality impacts of the SE2 project?

A. I assisted SE2 in identifying modifications to the project that would address the concerns mentioned in the Council's February Order. Based on the changes SE2 committed to, we recalculated the project's emissions and repeated extensive air quality modeling to determine the impact of the project changes on ambient air quality. We also compared proposed S2GF emission rates against recent BACT determinations for combined cycle power plants to ensure that S2GF emission rates were at least as low as those of other plants.

During the past year, we at MFG have also been very involved in air quality analysis and permitting concerning several other electrical generating facilities. In part due to the very sophisticated and unprecedented level of modeling we performed in connection with the SE2 project, the developers of several other power projects (e.g. Cherry Point, Goldendale, Rathdrum, Satsop, Wallula) as well as the Bonneville Power Administration have retained us to perform air quality analyses. I think it is fair to say that we are the leading consultants in the region when it comes to the CALPUFF model and the analysis of air quality impacts associated with power projects. Although all of this work was not directly related to the SE2 project, it provides me with a broader perspective from which to address the air quality implications of the S2GF.

PERKINS COIE LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888

Air Quality

Q. Please summarize the changes in the SE2 Project contained in the Second Revised Application that relate to air quality.

A. The Second Revised Application contains several changes that have implications for air quality:

1. SE2 eliminated back-up oil firing.

2. SE2 committed to NOx emission limits of 2 ppm, instead of the 3 ppm found in the January 2000 Application.

3. SE2 committed to ammonia emissions limits of 5 ppm, instead of the 10 ppm found in the January 2000 Application.

4. SE2 increased the height of the exhaust stacks from 150 feet to 180 feet.

5. SE2 volunteered to try to implement 100% offsets of its NOx and particulate matter (PM) emissions in the airshed, or if that is not possible, to provide $1.5 million in funding for air quality improvements in the airshed.

Q. Let's talk about each of these changes in turn. First, how does the elimination of back-up oil firing affect the emissions from the project?

A. Maximum short-term emissions from the project decrease significantly when oil firing is eliminated. Compared with the emission rates evaluated in the January 2000 application, the decision to eliminate oil firing together with the decision to enhance NOx control has reduced the maximum short term emissions from S2GF as follows:

- A 79% reduction in NOx emissions (from 79.3 lb/hr to 16.5 lb/hr)
- A 79% reduction in CO emissions (from 48.3 lb/hr to 10 lb/hr)

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1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888

- A 91% reduction in SO2 emissions (from 90.2 lb/hr to 7.9 lb/hr)
- A 29% reduction in VOC emissions (from 24.7 lb/hr to 17.5 lb/hr)
- A 63% reduction in PM10/PM2.5 emissions (from 63.6 lb/hr to 23.8 lb/hr)

Overall, the maximum hourly or daily pollutant emissions from the plant are reduced by more than 70% when oil firing is eliminated.

Q. SE2 had only been asking permission to use oil for a maximum 15 days a year. Will eliminating back up oil firing make much difference with respect to air quality?

A. It depends upon whether you are primarily concerned about annual emissions or daily emissions. As you may recall, there was not much concern about annual emissions or annual average impacts during the first round of hearings. Predicted annual average ambient concentrations of the original SE2 proposal were all less than EPA's Significant Impact Levels. The elimination of oil firing, which previously could have occurred 4% of the time, provides some reduction in annual emissions and, as a result, further reduces the annual average ambient concentrations that result from the project emissions. There was little concern about these annual impacts before and there should be even less now.

Let's consider PM10 concentrations, for example, and I pick PM10 because much of the concern raised in the previous hearings focused on PM10 concentrations. Our analysis indicates that elimination of oil firing reduces annual ambient concentrations, but that the predicted concentrations attributable to both the original and current S2GF are well below U.S. and Canadian ambient air quality criteria. When we

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1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888

modeled the ambient air quality impacts of the reduced emissions associated with the modified project, the annual average concentration at the worst location in the United States decreased from 0.48 to 0.39 ug/m3, a 19% reduction from the levels predicted for the original SE2 proposal. These predicted concentrations are less than 0.8% of EPA's an annual ambient air quality standard for PM10, which is 50 ug/m3.

In Canada, the annual average concentration at the worst case location decreased from 0.42 to 0.38 ug/m3, a 10 percent reduction from the levels predicted for the original SE2 proposal. This maximum predicted concentration is only 1.3% of the GVRD's Acceptable Objective of 30 ug/m3. Even if we assume that the particulate matter emitted by S2GF is all very small and can be considered PM2.5, even the maximum predicted concentrations are less than 3% of the 15 ug/m3 standard that was initially established by EPA.

With that said, the primary air quality concerns expressed during the first round of hearings related to maximum daily emissions, not annual averages. The elimination of oil firing results in a much more dramatic reduction in maximum daily emissions, and therefore, in the maximum daily impacts. As I testified above, the maximum short-term emissions of criteria pollutants are reduced by 79% (NOx), 79% (CO), 91% (SO2), 29% (VOCs) and 63% (PM). Because oil could have been burned as much as 15 days in a row, the elimination of oil firing results in a significant reduction in short term emissions and short-term impacts to ambient air quality.

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Again, I will use PM10 to illustrate this point. The reduction in emissions results in a 58% reduction in the maximum impact on ambient PM10 concentrations in the United States (from 10.1 ug/m3 to 4.2 ug/m3). This maximum predicted concentration is less than 3% of the U.S. 24-hour PM10 standard, which is 150 ug/m3. Likewise, the reduction in emissions results in a 50% reduction in the 24-hour average concentration at the worst case location in Canada (from 7.4 ug/m3 to 3.7 ug/m3). The predicted concentration is less than 8% of the GVRD's Acceptable Objective of 50 ug/m3. When one considers that these very low predicted concentrations represent the worst case locations in Canada and the United States, and that they represent the worst impact day over a five year period, it is clear that the revised SE2 proposal would have a minimal effect on local particulate matter concentrations.

Finally, I think it is worth pointing out that if this were not an EFSEC project and the permitting process for the project were instead dictated solely by EPA procedures for the PSD process, SE2 would never have been required to consider existing air quality (for any of the pollutants) because predicted concentrations with gas firing are less than EPA's Significant Impact Levels.

Q. The second change you mentioned was a higher level of NOx emission control. What effect will that have on air quality?

A. For combustion turbine projects, evaluations of Best Available Control Technology (BACT) usually focus on oxides of nitrogen (NOx). The degree of NOx control is

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1201 Third Avenue, Suite 4800
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often a key indicator of the level of control a proponent is willing to accept, and often is the best indicator of whether a plant is relatively clean or relatively dirty.

The January 2000 Application proposed a NOx emission rate of 3 ppm. That emission rate was as low as any project proposed in Washington, and far below the permitted levels for existing plants. When we learned that incremental improvements in Selective Catalytic Reduction (SCR) technology would enable SE2 to obtain a guarantee of a 2 ppm emission rate from the equipment supplier, SE2 immediately agreed to pay the additional cost to obtain the lower emission rate. This resulted in a 33 percent reduction in NOx emissions, and reduced NOx emissions by more than 75 tons annually.

The predicted ambient concentrations of NOx attributable to SE2 were half a percent of the U.S. ambient air quality standard and about 1 percent of the Canadian NOx objectives when the emission rate was 3 ppm. The reduction in NOx emissions further reduces an already low impact on ambient NOx concentrations. It also reduces the degree of secondary aerosol formation, a process in which NOx emissions are converted in the atmosphere to fine particulate matter.

It should also be noted that the analysis conducted by Environment Canada on the potential impact of S2GF emissions on ozone episodes in the Fraser Valley was based on the 3 ppm emission rate. Environment Canada concluded that a small increase in ozone episode intensity and no increase in ozone episode duration could be attributed to S2GF. The Canadian Joint Technical Report regarding the S2GF determined that

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1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888

"Given the limited magnitude and area of the predicted ground level ozone impact due to S2GF emissions, it is unlikely that S2GF will result in an exceedance of the new C[anada] W[ide] S[tandard]." (BC MELP et.al, 2000). Because ozone formation involves a chemical reaction of NOx, volatile organic compounds and other species in the presence of sunlight, the 33 percent reduction in NOx emissions would be expected to further reduce S2GF's small predicted effect on ozone.

Q. How does the 2 ppm NOx limit compare with other similar projects permitted in Washington state?

A. I am not aware of any Washington project currently proposed at 2 ppm except the Goldendale Energy Project, which was originally developed by an affiliate of SE2. The following table compares the SE2 limit to other power facilities recently permitted or proposed in the Northwest.

Project	NOx Limit
SE2	2.0 ppm
Chehalis	3 /14 ppm (gas/oil)
River Road	4 /9 ppm (gas/oil)
Mint Farm	3 ppm
Everett Delta II	3.5 /42 ppm (gas/oil)
Fredrickson	3 /13 ppm (gas/oil)
Satsop	2.5 ppm
Goldendale	2.0 ppm

Q. How does it compare to other similar projects permitting in Canada?

A. We can compare SE2 emissions with three other plants. The Burrard Thermal generating plant is located just east of downtown Vancouver. It has a generating capacity of about 960 MW, which is about 45% greater than S2GF. Now that the

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boilers have been retrofitted with SCR , they emit NOx at a rate of about 9 ppm. On a pound of NOx per megawatt hour basis, the Burrard Thermal plant (with SCR) is permitted to emit more than four times as much NOx as S2GF.

The Island Cogeneration Project is a combined cycle project near Campbell River on Vancouver Island that began operation last year. That 248 MW project was permitted at 25 ppm NOx (SCR was not required). As a result, its permitted NOx emission rate is more than 13 times that of S2GF.

Based on its application, a proposed combined cycle project at Port Alberni (Vancouver Island) would emit NOx at a rate of 3.5 ppm. That is considerably better than the other generating projects in British Columbia. However, it would still emit 74 percent more NOx than S2GF for each megawatt of electricity produced.

Q. The third change you mentioned was a reduction in ammonia emissions. What effect does that have on air quality?

A. Environment Canada studies suggest ammonia emissions play a major role in the white haze often observed in the eastern Lower Fraser Valley. Currently, ammonia emissions in the area come primarily from animal waste, particularly the poultry, swine and dairy farming in the Fraser Valley. Over the last decade, government agencies have been working with farmers to reduce water pollution from animal husbandry but this has led to increased land application and spraying of animal waste, which adversely affects air quality and visibility. The Pacific Agri-Food Research Centre (PARC) estimates that about 8,000 tons of ammonia are attributable to

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(206) 583-8888

agricultural practices each year in the Lower Fraser Valley. GVRD's estimates of agriculture's contribution are higher, at about 14,000 tons per year. That accounts for about 84% of the total 16,674 tons of ammonia emitted in the Canadian part of the valley each year.

Because a fraction of the ammonia injected in the SCR would "slip" unreacted from the stack, S2GF would be an additional source of ammonia. In its January 2000 application, SE2 proposed a 10 ppm ammonia slip, which is still the "industry standard" ammonia slip estimate. With recent incremental improvements in SCR technology, some SCR vendors can now guarantee a NOx emission limit of 5 ppm. Consequently, SE2 has committed to this lower emission rate. As a result, maximum potential annual emissions of ammonia will be reduced from 276 tons per year to about half that. Actual emissions will be much lower, however, because ammonia slip is very low when the SCR catalyst is new. The impact of the project's ammonia emissions will be negligible compared to that of the existing Lower Fraser Valley emissions.

In response to questions from Canadian regulatory staff, MFG modeled the potential impacts from S2GF's ammonia emissions. At 10 ppm, S2GF emissions would result in maximum 24-hour and annual ammonia concentrations of 6 $\mu g/m^3$ and 0.6 $\mu g/m^3$, respectively. The maximum 24-hour predicted ammonia concentration is much less than the 100 $\mu g/m^3$ screening criterion Washington applies to protect public health. At the reduced 5 ppm ammonia slip rate in the Second Revised Application,

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1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888

concentrations attributable to S2GF would be about 3% of the screening criteria at the worst case location under the worst case meteorological conditions.

In 1996, Environment Canada conducted a monitoring program in which ammonia concentrations were measured at Abbotsford. The measured annual ammonia concentration was 16.4 $\mu g/m^3$ during this period. At 5 ppm ammonia slip, the maximum predicted annual concentration attributable to SE2 at the worst case location is 0.3 $\mu g/m^3$ or about 2% of the monitored background value. This indicates that the reduced S2GF ammonia emissions would not significantly contribute to annual ammonia concentrations in the Lower Fraser Valley.

Environment Canada also collected data on other airborne nitrogen compounds during 1996, and estimated the annual nitrogen deposition flux in Abbotsford to be 8.6 kg/ha/yr. MFG's CALPUFF analysis of a 10 ppm ammonia slip estimated the maximum annual nitrogen deposition flux attributable to S2GF to be 0.05 kg/ha/yr - a small fraction of existing nitrogen deposition in the Lower Fraser Valley. At the reduced 5 ppm emission rate, the S2GF contribution would be only about half the contribution estimated with 10 ppm ammonia slip. In my professional opinion, ammonia emissions from S2GF should not be a concern.

Q. The fourth change you mentioned was an increase in the height of the exhaust stack from 150 feet to 180 feet. What effect will that have on air quality?

A. Raising the stacks improves dilution because it reduces the "downwash" effects of other structures and releases emissions higher, where wind speeds are greater. As a result of this change, the modeling we've performed indicates that maximum ambient

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Seattle, Washington 98101-3099
(206) 583-8888

concentrations will be reduced by approximately 10 percent . This improvement is independent of and in addition to the benefits achieved by better NOx and ammonia emission controls and by the elimination of oil firing.

Q. The last change in the project you mentioned was the offer to offset emissions. How will this offer affect air quality?

A. Chuck Martin's testimony addresses SE2's specific proposal regarding offsets. Under the proposal, SE2 would continue to attempt to identify and implement a project or projects that would reduce NOx and PM emissions sufficiently to offset the emissions from the SE2 project. If SE2 were able to implement such a project(s), the net effect of the SE2 project would be no change in the total emission of NOx and PM emissions and no overall impact on air quality with respect to these pollutants. On the other hand, if SE2 is not able to implement an offset project, SE2 would provide $1.5 million dollars in funding that the Washington Department of Ecology and the B.C. Ministry of Water, Land, and Air Protection could use to address air quality issues in the Fraser Valley Airshed.

Q. Is this offset proposal unusual?

A. Yes. Washington law does not require electrical generating facilities to offset emissions unless the project is located in an area that exceeds air quality standards. Under the Clean Air Act and state regulations, the air quality in this airshed is considered to be good and no offsets are required. Furthermore, the modeling indicates that emission controls proposed for S2GF are sufficient to protect the air

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shed from significant air quality impacts. SE2's efforts to obtain offsets are not required, and are unnecessary, and unprecedented.

The only similar offer I know of was made by SE2's affiliate for the Goldendale Energy Project. Recognizing that the Columbia River Gorge National Scenic Area is an area with special protection, Goldendale Energy proposed the most stringent emission controls yet seen in the state and offered to provide funding for air quality improvements. BPA suggested air quality offset funding at a rate of $1000 per ton of annual NOx and PM10 emissions, which resulted in a total fund of $175,600 from Goldendale Energy. By comparison, SE2 proposes to provide more than 4 times that much funding ($4,243 per ton).

Q. Are there any other changes in the Second Revised Application?

A. The Second Revised Application does not identify any other changes to the way air emissions are controlled by the project. In revising the application, however, we also updated the discussion of existing air quality by adding the most recent available monitoring data. We also used the latest version of the CALPUFF and updated an assumption regarding the chemistry of the particulate matter emitted by combustion turbines.

Q. Now that you've explained the changes in the project and the revisions made in the application, can you summarize your overall conclusions regarding the impact of the revised project on air quality?

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Seattle, Washington 98101-3099
(206) 583-8888

A. My general conclusion is that the revised project's emissions would not have a discernable adverse impact on air quality - even if SE2 were not planning on implementing or funding any offset projects.

The concerns expressed by some during the last hearings focused on existing concentrations of particulate matter and ozone, and the potential for even small increases in emissions to exacerbate occasional periods of relatively higher concentrations of ozone or particulate matter. So even though our analysis (Sections 3.2 and 6.1 of the Application) evaluates all of the criteria and toxic pollutants from the plant, the primary focus seems to have been particulate matter (PM10 and/or PM2.5) and, to a lesser extent, ozone. I'd like to provide my perspective on those two concerns. As I do so, please keep in mind I am not taking into account SE2's commitment to implement offset projects or fund air quality improvement programs.

Initially, ozone. Ozone episodes can occur several days a year in the Fraser Valley. These periods of relatively higher ozone concentrations typically occur during periods of stagnant, warm, sunny weather. Some years experience more of this weather than others, so some years have more ozone episodes. Some, but not all years, experience occasions when peak ozone concentrations exceed the "Acceptable Objective." GVRD's 1999 air quality report indicates that ozone concentrations have met Canada's "Desirable Objective" 99% of the time every year for the last ten years. Even the maximum measured ozone concentrations in the last ten years have met the United States air quality standard for ozone. GVRD reports indicate there has been little or no change in peak ozone concentrations over the last ten years.

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(206) 583-8888

It is my professional opinion that S2GF emissions will have a very small effect on ozone episodes primarily because the ozone-related emissions from S2GF are minimal in comparison with other sources of ozone precursors in the airshed. My qualitative belief is supported by Environment Canada's photochemical modeling study, which indicates emissions from S2GF would have a very small effect. The Canadian Joint Technical Report regarding S2GF emissions also concludes that S2GF emissions would not have a significant effect on compliance with the Canada Wide Standards for ozone. Specifically, they concluded:

> "Since there are no present ozone CWS exceedances in Abbotsford, and the predicted ozone increase due to S2GF is small and limited in time and space, it is unlikely that the S2GF emissions will result in exceedances of the new ozone CWS in either Abbotsford or Chilliwack."

I should also note that the Washington Department of Ecology and Puget Sound Clean Air Agency have been researching causes of ozone episodes in the Puget Sound area. They have concluded that Puget Sound ozone formation is dominated by naturally occurring hydrocarbons emitted by vegetation. PSCAA does not believe additional controls on NOx emissions from industrial sources will be effective in reducing peak ozone concentrations. Instead, PSCAA intends to focus on the formulation of motor vehicle fuel to minimize the contribution evaporative emissions have on ozone.

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(206) 583-8888

Q. You also mentioned Particulate Matter. Can you summarize your conclusions about the impact of the revised project's particulate matter emissions on air quality?

A. The air pollution community used to measure particulate matter as "Total Suspended Particulate Matter" or TSP. That included virtually any size particle that was suspended in the air. The late 1980s, standards were revised to reflect particles with a diameter of approximately 10 millionths of a meter (10 microns) or smaller – we refer to that as PM10. Because this size range is more readily inhaled than larger particles, PM10 is also referred to as "inhalable particulate matter." In 1997, EPA promulgated standards for particles with a diameter of approximately 2.5 microns or less, which we refer to as PM2.5 or fine particulate matter. As a result of a lawsuit challenging EPA's criteria for the PM2.5 standard, EPA rescinded the standard and is working on a new PM2.5 standard. At present, the U.S. air quality standards refer only to PM10. In 2000, the federal government in Canada established a Canada Wide Standard for PM2.5 of 30 ug/m3. This limit applies to the average (over 3 years) of the 98th percentile measured 24-hour PM2.5 concentrations. The PM2.5 standard initially established by EPA followed the same format. Focusing on the 98th percentile concentrations rather than the maximum concentrations directs attention to more frequently occurring levels (i.e., 2 % of the time) rather than extreme events. In our analysis, we have conservatively assumed that all of the particulate matter coming from S2GF is PM2.5, though some of it may be larger than 2.5 microns.

Although current short-term maximum measured PM10 concentrations are far below the U.S. ambient air quality standard of 150 ug/m3, measured concentrations in the

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(206) 583-8888

east end of the Lower Fraser Valley do occasionally exceed the GVRD's Acceptable Objective of 50 ug/m3. GVRD's 1999 air quality report indicates that:

> "Variations in the maximum 24-hour [PM10] values are brought on by very specific meteorological conditions. In 1994, 1995, and 1996, these conditions were cold, very windy conditions which created dust storms localized in the eastern LFV [Lower Fraser Valley]. During 1998, the conditions were more regional in nature and were brought on by unseasonably hot, dry , stagnant conditions over a four day period at the end of April."

There were no exceedances of the 24-hour PM10 objective in 1999. My review of PM10 data indicates that, by U.S. standards, the Fraser Valley air quality is very good. But even by the more stringent Canadian standards, PM10 concentrations are rarely a problem. On those rare occasions when there are problems, the problem is usually attributable to wind blown dust – not industrial sources. Of course, on those windy days, industrial emissions are quickly dispersed and their contribution is minimal.

The Canada Wide Standards are more directly comparable to the U.S. ambient air quality standards. GVRD monitoring data for Chilliwack, the location nearest Sumas and Abbotsford, indicate existing PM2.5 concentrations meet the Canada Wide Standard.

Maximum predicted daily PM2.5 and PM10 concentrations attributable to the S2GF project occur on Sumas Mountain in Washington, a few miles south of the site. The highest daily PM2.5 and PM10 concentrations attributable to S2GF in Canada also occur on Sumas Mountain – the Canadian version situated a few miles east of Abbotsford. While the concentration on the American side is slightly higher, the 24-

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(206) 583-8888

hour concentrations predicted by the ISC model are both a little less than 4 ug/m3. Predictions based on the CALPUFF model are a little higher, at 6 ug/m3, because that model considers secondary aerosol formation (the additional particulate matter formed in the atmosphere after the exhaust leaves the stack). These concentrations attributable to S2GF are a small fraction of the Canadian reference level of 25 ug/m3, the GVRD Acceptable Objective of 50 ug/m3, the Canada Wide (PM2.5) Standard of 30 ug/m3, and the U.S. ambient air quality standard of 150 ug/m3. Furthermore, predicted PM2.5/PM10 concentrations in the lowlands (i.e., not on the elevated locations on Sumas Mountains), are closer to 1 ug/m3.

In addition to reporting maximum concentrations in our application, we at MFG assessed particulate matter concentrations in the Fraser Valley in a number of different ways requested by Canadian air quality agencies. After reviewing our work, the Canadian Joint Technical Report concluded

> "As such, the impacts of S2GF on the exceedance frequencies and magnitude of PM10 concentrations are expected to be minimal for the City of Abbotsford."
>
> "Hence, it is unlikely that emissions from S2GF would result in the exceedance of the PM2.5 CWS, provided that current ambient PM2.5 concentrations remain similar to estimated historical levels."

Thus, our work, and the review of our work by Canadian and U.S. air quality staff, indicates that emissions from S2GF will not significantly affect compliance with either the U.S. or Canadian air quality criteria.

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(206) 583-8888

Q. In the last round of hearings, there was a lot of discussion about "Canadian reference levels" or "health reference levels." When you say that none of the Canadian ambient air quality standards will be exceeded, are you taking those reference levels into account?

A. No. I am referring to the Canada Wide Standards and to air quality objectives. The health reference levels were not intended to be used in air permitting decisions for specific industrial sources. They may have been taken into account in setting Canada Wide Standards – much in the same way that medical studies and "lowest effect thresholds" are taken into account when EPA sets its NAAQS. But the health reference levels are not themselves used to judge whether a facility may be built or not.

Our review of air quality data in British Columbia indicates reference levels for ozone are frequently exceeded in large geographic areas, even in relatively “pristine” locations. One might argue that such levels are attributable to man made air pollution, but ozone data from Olympic National Park, which represents a very clean location, reveal that ozone concentrations exceed reference levels 30-50 percent of the time. Finally, my graduate studies focused on the “background” air quality data taken by NOAA at Mauna Loa Observatory on the island of Hawaii. When I reviewed those data recently, I found that ozone concentrations exceeded the reference level in 11 of the 12 months of data I evaluated. It should be no surprise that ozone concentrations in the Fraser Valley also occasionally exceed the ozone reference level. Ozone concentrations above the reference levels are clearly not an indicator of bad air quality.

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(206) 583-8888

Q. Just for the sake of discussion, how do your modeled results compare to the health reference levels for PM or ozone?

A. Let me talk about ozone first. When Environment Canada evaluated the effect S2GF emissions would have on a typical ozone episode, the predicted impact was within the uncertainty or "noise" level of the model. Therefore, the theoretical impact of the plant emissions could only be determined by subtracting the “no S2GF” scenario from the “with S2GF” scenario. Environment Canada derived changes in ozone concentration ranging from 0.7 to 3.8 ppb over a five-day period, with the greatest change in the immediate vicinity of the plant. Changes in ozone concentration in Custer and Abbotsford rarely exceeded 0.2 ppb. These changes are small with respect to the 20 ppb ozone reference level and tiny with respect to the Canada Wide Standard and the U.S ozone ambient air quality standard.

With respect to particulate matter, as I've explained, the maximum predicted PM2.5 and PM10 concentrations attributable to the S2GF project are only about 20% of the Canadian reference level of 25 ug/m3 These concentrations are well below the reference levels. It is true that existing concentrations sometimes exceed the reference levels, but as I explained before, high particulate matter levels in the Fraser Valley are usually attributable to wind-blown dust, not industrial sources. On these windy days, the emissions from S2GF are likely to be quickly dispersed and are unlikely to have a discernable impact on ambient concentrations in the Fraser Valley. Moreover, our detailed examination of the Lower Fraser Valley led the Canadian Joint Technical Report to conclude that particulate matter emissions from S2GF are

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1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888

not likely to affect the frequency or severity of exceedences of local air quality objectives nor cause exceedances of the Canada Wide Standard.

Q. How will the project, as modified in the Second Revised Application, affect visibility?

A. Our analysis of the potential visibility impacts in Class I areas and in the immediate vicinity of the project site indicated that the worst impacts occurred with oil firing. Consequently, SE2's elimination of oil firing will reduce the predicted visibility impacts. In fact, our June 2001 application indicates emissions from S2GF will not cause perceptible changes in visibility at any Class I area. While we did not repeat the local analysis, we would expect a similar reduction in impacts locally.

Q. In issuing Order No. 754, the Council concluded that "because of the nature of the air shed into which the pollutants would be emitted, this is not an appropriate location for a power facility with these levels of emissions." In your expert opinion and in light of the changes to the project contained in the Second Revised Application, do you believe Sumas is an appropriate location for the proposed facility?

A. I believe Sumas is an appropriate location for this plant. The air quality in this area is comparable to air quality throughout the Puget Sound area. The area meets U.S. ambient air quality standards by a wide margin, meets the more stringent Canada Wide Standards, and rarely exceeds the much more stringent "Objectives." This plant is as clean as any combined cycle generating plant now being proposed, and far cleaner than many of them. Predicted air quality impacts based on EPA modeling

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procedures are insignificant, so the relatively good air quality that currently exists will not be significantly degraded. Finally, the proponents have volunteered to try to obtain offsets for the pollutants of greatest concern, and to adopt a curtailment policy similar to that which governs B.C. Hydro's Burrard Thermal plant during adverse air quality conditions.

END OF TESTIMONY

PERKINS COIE LLP
1201 Third Avenue, Suite 4800
Seattle, Washington 98101-3099
(206) 583-8888