Responses to Comments in Letter 3 from Shirley Harten and others, Abbotsford Residents

Note: The responses listed below are numbered to correspond to the numbers shown in the right-hand margin of the preceding comment letter.

1. **Cumulative Air Quality Impact Assessment**

The cumulative air quality impacts of the proposed facility were evaluated as part of a detailed air quality impact analysis prepared for the project. The air quality impact analysis was prepared in conjunction with staff from the Washington Department of Ecology; scientists from the University of Washington; the applicant's air quality consultant; a Canadian interagency technical committee consisting of staff from the Ministry of the Environment, Land and Parks; Greater Vancouver Regional District; and Environment Canada – Pacific and Yukon Regions (Volume 1, Appendix K, page 1).

Air quality impacts were analyzed by first determining the existing air quality in the vicinity of the project site. As discussed in Section 3.1.3 of the EIS (Existing Air Quality), the Northwest Air Pollution Authority (NWAPA) and the Greater Vancouver Regional District (GVRD) maintain air quality monitoring stations throughout the region as a means of tracking air quality conditions over time. In general, these monitoring stations are located in areas where there may be existing air quality problems. Within NWAPA's jurisdiction, air quality monitoring stations are located in Bellingham, Anacortes, and near March Point. The GVRD maintains monitoring stations throughout the Lower Fraser Valley, including a station in Abbotsford, B.C., approximately 5 miles north of the project site. Because of the proximity of the Abbotsford monitoring station to the proposed project site, data from the Abbotsford monitoring station were considered more representative of existing air quality near the proposed facility than the NWAPA stations in Bellingham or Anacortes.

The air quality studies were conducted throughout 1999. As a result, monitoring data collected from the Abbotsford station from 1996 through 1998 were used to characterize existing air quality conditions in the vicinity of the project site. Table 3.1-2 in the EIS provides a summary of the air quality data from the Abbotsford station.

Following publication of the Draft EIS in March 2000, additional monitoring data for the Abbotsford station became available. The applicant's air quality consultant obtained the 1999 data and confirmed that significant changes in existing air quality had not occurred in the intervening year (memo dated October 16, 2000 from David E. Weeks, Paralegal to Mr. Allen J. Fiksdal, "Sumas Energy 2 – PSD Hearing Bench Request). The 1999 air quality data for the Abbotsford monitoring station have been added to Table 3.1-2 of the Final EIS. The data in Table 3.1-2 of the Draft EIS reflected ambient air quality conditions without operation of the proposed S2GF facility.

To assess the incremental air quality impact of the proposed project, estimated air emissions associated with the S2GF facility were added to the ambient air quality and compared to the applicable regulatory standards governing air emissions in both Canada and the United States (see Table 3.1-7 of the EIS). The incremental impact of the proposed S2GF emissions, when added to existing and potential sources of emissions, results in the overall or cumulative impact of the proposed project.

Operational emissions associated with the proposed facility are shown in Tables 3.1-3, 3.1-4, 3.1-5, and 3.1-6 of the Draft EIS. Table 3.1-7 of the Draft EIS compares estimated pollutants attributable to the S2GF facility with the National Ambient Air Quality Standards (NAAQS), the Washington State Ambient Air Quality Standards, and the most stringent of the Canadian Air Quality Objectives. As shown in Table 3.1-7, when the maximum predicted concentrations resulting from the proposed project are added to the highest monitored values from the Abbotsford monitoring station, the total pollutant concentrations (i.e, the cumulative impacts associated with the proposed facility) are less than the applicable regulatory standards that would apply to the facility.

Air Quality Standards and Human Health Considerations

With respect to the human health implications of emissions from the proposed project, it is generally acknowledged that all chemicals and agents may pose a human health hazard if the level of exposure is sufficiently great. The uncertainty associated with establishing health-based regulatory standards is in determining with a high degree of scientific certainty precisely what level of exposure results in a health impact.

In the face of this scientific uncertainty, the U.S. Environmental Protection Agency takes a conservative, health-based approach to setting regulatory standards for air emissions. EPA's standards are developed based on a rigorous review of existing scientific studies using state-of-the-art assessment methodologies. In addition, independent committees of non-EPA technical experts peer review EPA's work and provide advice and recommendations regarding the scientific adequacy of EPA's analyses. Finally, federal regulations require that the standards be reevaluated periodically to ensure that they remain protective of human health. Regulatory standards are then revised, if appropriate, based on new data, studies, or information.

2. A detailed air quality impact assessment was prepared for the proposed project, including a thorough evaluation of air quality impacts in Canada (Exhibit 25, page 1ff). The initial air quality assessment used a "standard" air quality model (ISCST3), combined with worst-case emissions from the proposed facility and five years of hourly meteorological data from the Abbotsford Airport.

Using this approach, air quality emissions of criteria and toxic air pollutants were estimated at more than 500 locations. Modeling indicated that the proposed facility would comply with applicable regulatory standards for criteria and toxic pollutants, as well as Prevention of Significant (PSD) increments. Because of the conservative nature of the model, however, there was concern about potential impacts to "air quality related values" in Class I areas.

At the request of EFSEC, a more detailed air quality analysis was conducted using the CALMET/CALPUFF modeling systems. For this effort, additional expertise was provided by scientists from the University of Washington, the Washington Department of Ecology, and the applicant's air quality consultant. The CALMET/CALPUFF assessment evaluated more than 4,000 receptor locations in a region extending from approximately Olympia, Washington, to Whistler Mountain (north of Vancouver, British Columbia) and from the Pacific Ocean to east of the Cascade Mountains. Meteorological data from more than 90 weather stations throughout the Pacific Northwest was used for this modeling effort. As with the ISCT3 modeling, the more detailed CALMET/CALPUFF assessment demonstrated that the proposed project would meet all applicable air quality regulatory requirements.

Finally, in response to concerns raised by Canadian air quality staff, additional detailed CALMET/CALPUFF modeling was performed to evaluate the potential impact of the proposed project on air quality in the Lower Fraser Valley. This modeling involved extensive coordination with technical staff from the British Columbia Ministry of the Environment, Land and Parks (MELP) to ensure that the modeling protocols and methodologies met their needs. In September 2000, MELP issued a separate report detailing the air quality impacts of the proposed facility (Volume 1, Appendix K). Air quality modeling confirmed that air emissions from the proposed facility would not significantly cause the most stringent Canadian air quality objectives or standards to be exceeded (Volume 1, Appendix K, page vi). Results of the study on Lower Fraser Valley air quality are summarized below.

Regulated Pollutants and Air Toxics. As noted in the Canadian report, sulfur dioxide (SO2,) carbon monoxide (CO), oxides of nitrogen (NOx), and a variety of residual air toxics emitted from the proposed facility would not be expected to increase the frequency for exceeding British Columbia or Washington State air quality objectives or standards (Volume 1, Appendix K, page vii).

NOx. The proposed project would employ selective catalytic reduction (SCR) to limit NOx emissions to 2 parts per million (ppm) when fired by natural gas and 6 ppm when fired by fuel oil (diesel) which is much less than the New Source Performance Standards for these types of turbines (159 ppm) and lower than the most stringent limit imposed on similarly sized facilities in Washington State (Exhibit 25, page 8). Air quality modeling (based on an original proposal to limit NOx emissions to 3 ppm during gas firing and 12 ppm when fired by fuel oil) indicated that NOx emissions attributable to the proposed project would be less than 1 percent of the annual NOx standard. As a result, annual NOx emissions based on a revised emission limit of 2ppm would be even less.

Assuming a maximum background NOx concentration of 33 micrograms per cubic meter (μg/m3), derived by averaging the maximum annual concentrations recorded at the Abbotsford monitoring station between 1996 and 1998, total concentration of NOx would be approximately 34 percent of the 100 μg/m3 ambient air quality standard (Exhibit 25, page 9). The Canadian MELP also concluded that annual NOx emissions from the proposed facility would account for approximately 0.33 percent of all Lower Fraser

Valley emission sources including Washington State with a NOx emission limit of 3 ppm (Volume 1, Appendix K, page 3).

In the Lower Fraser Valley, CALPUFF/CALMET modeling indicated that the maximum predicted NOx concentrations attributable to the proposed facility would be 13 percent, 5 percent, and 1 percent of the Canadian 1-hour, 24-hour, and annual average air quality objectives, respectively. The total NOx concentrations (with background NOx concentrations included) were 42 percent, 36 percent, and 55 percent of the Canadian 1-hour, 24-hour, and annual objectives, respectively. Air quality technical staff from the Canadian MELP concluded that NOx emissions from the proposed facility would not be expected to result in exceedances of the most stringent British Columbia NOx objectives (Volume 1, Appendix K, page 13).

SO2. The proposed facility will rely on natural gas or low-sulfur diesel fuel to limit SO2 emissions to 1 ppm when fired by natural gas and 10 ppm when fired by fuel oil (Exhibit 25, page 9). Modeling indicated that ambient concentrations of SO2 attributable to the proposed project would be 7 percent (maximum) of the applicable NAAQS. When maximum background concentrations are included the analysis, the total SO2 concentration would be 10 percent or less of the NAAQS. The MELP concluded that annual SO2 emissions from the proposed facility would account for approximately 0.29 percent of all Lower Fraser Valley emission sources including Washington state (Volume 1, Appendix K, page 3).

For the Lower Fraser Valley CALPUFF/CALMET modeling, the maximum estimated SO2 concentrations attributable to the proposed project were less than 13 percent of the Canadian 1-hour, 3-hour, 24-hour, and annual average air quality objectives. When background concentrations are included in the analysis, total SO2 concentrations were less than 21 percent of the Canadian objectives for the 1-hour, 3-hour, 24-hour, and annual averaging periods (Volume 1, Appendix K, page 11). The Canadian MELP concluded that SO2 emissions from the proposed facility would not be expected to result in exceedances of the most stringent British Columbia air quality objectives (Volume 1, Appendix K, page 13).

CO. The proposed project would use catalytic oxidation to limit CO emissions to 2 ppm when fired by natural gas and 12 ppm when fired by fuel oil. Air quality modeling indicated that CO emissions attributable to the proposed facility would be less than 1 percent of the applicable NAAQS. When existing background concentrations are included, the total, or cumulative, concentration of CO would be less than 34 percent of the NAAQS.

In the Lower Fraser Valley, the maximum predicted CO concentrations attributable to the proposed facility were estimated to be 0.2 percent of both the 1-hour and 8-hour Canadian air quality objectives. When background concentrations are included, the cumulative concentration of CO would be 62 percent of the 8-hour Canadian objectives. The Canadian MELP concluded that CO emissions from the proposed facility would not be expected to result in exceedances of the most stringent British Columbia air quality objectives (Volume 1, Appendix K, page 13). The MELP also concluded that annual NOx emissions from the proposed facility would account for approximately 0.03 percent of all Lower Fraser Valley emission sources including Washington state (Volume 1, Appendix K, page 3).

PM10. The proposed facility would use natural gas and efficient operation to limit PM10 emissions to 24 pounds per hour when fired by natural gas and 64 pounds per hour when fired by fuel oil. (Exhibit 25, page 11). Modeling indicated that PM10 concentrations attributable to the proposed project would be less than 7 percent of the 24-hour NAAQS and less than 1 percent of the annual standard. With background concentrations added, the total concentration of PM10 would be approximately 44 percent of the 150 μg/m3 24-hour standard and 32 percent of the annual standard at the worst-case locations. The MELP concluded that annual PM10 emissions from the proposed facility would account for approximately 1.483 percent of all Lower Fraser Valley (including Washington State) emission sources, not including reentrained road dust (Volume 1, Appendix K, page 3).

In the Lower Fraser Valley, the maximum predicted PM10 concentrations attributable to the proposed project were estimated to be 1 percent of the Canadian annual air quality objective. With assumed background concentrations, the cumulative annual concentration would be 53 percent of the 30 μg/m3 Canadian objective. The MELP concluded that based on historical PM10 measurements and modeled estimates for the same period, the addition of PM10 emissions from the proposed facility would not cause an increase in the exceedance frequency of the PM10 objective. During exceedance events the PM10 contribution attributable to the proposed facility would not be more than 1 percent (Volume 1, Appendix K, page 25).

The MELP concluded that ambient PM10 concentrations in the Abbotsford area may already contribute up to 6 additional deaths per million per year. For an exposed population of 100,000, this would mean 0.6 deaths/year. As is the case for ozone, potential impacts related to less severe health outcomes would be orders of magnitude higher. The predicted risk from the proposed facility would be less than 1 additional death per million population per year on Sumas Mountain, and considerably less than this in Abbotsford. In percentage terms, this would correspond to a 10 percent increase in risk on Sumas Mountain, and a 1-2 percent increase in risk in Abbotsford, where maximum impacts are predicted to occur.

Ozone. The proposed facility would not emit ozone, however Canadian officials raised concerns about the potential impacts on ozone episodes attributable to emissions of NOx and volatile organic compounds (VOCs) from the proposed facility. In response to a request from the Lower Fraser Valley Air Quality Coordinating Committee, Environment Canada evaluated the potential impacts of project-related emissions on ozone concentrations in the Lower Fraser Valley (Exhibit 25, page 13).

Environment Canada modeled ozone impacts against two objectives: (1) the current maximum desirable objective (1-hour average) level of 51 parts per billion (ppb), and (2) a proposed Canada Wide Standard of 65 ppb (daily 8-hour maximum, based on the fourth highest annual measurement, averaged over three consecutive years) (Volume 1, Appendix K, page 16).

Environment Canada modeled the Lower Fraser Valley for a select set of meteorological conditions that are considered to be associated with a typical summertime ozone episode. The modeled results indicate that near the proposed facility ozone concentrations might be up to 5 ppb higher, but more likely will be less than 2 ppb higher under episode conditions. Beyond approximately 3 miles (5 km) from the facility, increases drop off rapidly to values less than 0.5 ppb higher. The duration or intensity of ozone episodes did not increase as a result of emissions attributable to the proposed facility. (Volume 1, Appendix K, page 15).

For the Canada Wide Standard, Environment Canada concluded that since there are no existing ozone exceedances in Abbotsford, and the estimated ozone increase attributable to the proposed facility is small and limited in time and space, it is unlikely that emissions from the proposed facility will result in exceedances of the new ozone standard in either Abbotsford or Chilliwack (Volume 1, Appendix K, page 16).

The MELP concluded that ambient ozone concentrations above 40 ppb in Abbotsford may already contribute 4 extra deaths per million population per year. For an exposed population of 100,000, this would mean 0.4 deaths/year. Potential impacts related to exacerbation of illnesses such as asthma and other respiratory conditions are orders of magnitude higher. An estimate of the incremental ozone-related health risk associated with S2GF emissions was not possible due to current limitations of ozone modeling.

Visibility. Visibility is a measure of how air emissions may affect the maximum distance from which an object can be perceived against a background sky. In the United States, 24-hour average extinction coefficients are used as a measure of regional haze. Increased extinction causes reduced visual range. A 5 percent change in extinction is used in assessments of Class I areas to indicate a “just perceptible” change to a visual landscape. (Exhibit 25, page 15).

Under conditions of gas firing, predicted changes in extinction coefficients in Class I areas are less than the 5 percent criterion, indicating that visual conditions would not be perceptibly impaired when the proposed facility was gas fired. However, the model predicted that oil-fired emissions combined with unfavorable meteorology could result in perceptible regional haze in Olympic National Park and North Cascades National Park. However, the meteorological conditions that resulted in the predicted visibility impacts in the parks are not the same as those that would trigger oil firing at the facility (i.e., very low temperatures resulting in gas shortages). Because the probability of a gas shortage is low when temperatures are not extreme, it is unlikely the adverse visibility impacts would actually occur. (Exhibit 25, page 15)

It should also be noted that for the analysis it was assumed that 70 percent of the mass of emitted PM was elemental carbon (soot). Soot is extremely efficient at absorbing light and has a major effect on visibility when present as an aerosol. Since publication of the

Draft EIS, additional data indicate that soot comprises a much smaller fraction of the PM emitted than was assumed in the visibility analysis (23 to 40 percent). As a result, the visibility impacts are likely to be overestimated (Exhibit PSD-17, page 1).

No formal visibility standards have been adopted for the Lower Fraser Valley. Based on one year of model predictions, worst-case estimates (the upper bound of a range of estimates) indicate that a slight reduction in visibility could be expected for up to 14 days per year due to emissions from the proposed facility. The view from Abbotsford to Sumas Mountain is expected to be the most affected. Oil-firing during the winter is expected to result in the greatest visibility impacts. If oil-firing occurs, a slight reduction in visibility could occur for every oil-firing day, up to a maximum of 15 days. However, the likelihood that winds would carry emissions northward into Canada decreases as the overall temperature decreases. Therefore, under cold conditions that would warrant oil-firing, winds would likely be from the north. Visibility impacts are expected to be infrequent. (Exhibit 154.5, page 29). The MELP concluded that the estimates were worst-case and likely overestimate the actual impacts because they assume consistently good baseline visibility conditions. (Volume 1, Appendix K).

3. See General Response D, which addresses concerns about impacts of this project to the availability of water resources for other groundwater users.

4. **Health Effects of Transmission Lines**

We are all exposed to varying levels of EMF. Concern regarding the possible health effects of exposure to EMF has led to extensive research. The human health research on EMF over the years has been primarily focused on whether or not a cause-and-effect association can be made between EMF and cancer, and whether there exists a biological mechanism by which EMF exposure can cause cancer. None of the proposed biological mechanisms has held up under additional testing, and the laboratory studies in living animals do not show that EMF can cause cancer. Following their evaluation of the body of scientific literature available through 1998, the National Institute of Environmental Health Sciences (NIEHS) concluded that the majority of the animal studies provide evidence that EMF fields do not cause cancer, or the promotion of cancer in exposed animals, and provide no basis to conclude that EMF affects cancer (NIEHS 1998).

The question of power lines and cancer arose because some epidemiology studies (that is, studies of disease occurrence in people) had reported a link with some kinds of cancer. This link is a statistical association, which in some studies indicated that more of the children who had cancer had lived closer to certain types of power lines, or were exposed to higher estimated magnetic fields (Savitz et al. 1988. Wertheimer et al. 1979, Feychting and Ahlbom 1993). However, because the meaning of these results was not clear, additional studies were undertaken. These studies did not show convincing evidence of links between EMF and childhood cancer (e.g., Linet et al. 1997, Preston Martin et al. 1996a, 1996b, Gurney et al. 1996, McBride et al. 1999, Kleinerman et al. 2000, UK Childhood Study Investigators 1999, Green et al. 1999a, 1999b). Studies of higher exposures that occur at workplaces have not found links with cancer overall, and have not shown strong, convincing links with any specific type of cancer (e.g., NIEHS 1998).

In recent years, the U.S. Government has focused its efforts on the EMF Research and Public Information Dissemination (RAPID) program, which has included a number of whole-animal research studies, and the 1998-1999 NIEHS evaluation of scientific research noted above. The NIEHS reviewed both epidemiologic and laboratory research related to cancer, as well as non-cancer endpoints. Both epidemiology and laboratory studies are relevant for assessing possible effects of exposure on human health. Laboratory studies of animals conducted as part of the NIEHS program and those published after the NIEHS report provide no basis to conclude that EMF affects cancer; animals exposed for long periods of time did not develop any more cancer than unexposed animals.

Using the approach of the National Toxicology Program, the NIEHS opinion is that EMF exposure at power frequencies would not be listed as a human carcinogen.

Undoubtedly, this subject will continue to be controversial because it is a recognized limitation of science that it is very difficult to prove the negative, that is, to prove that something is not there.

Additional sources of information on this topic have been added to the reference list for the health and safety section of the EIS (see Volume 1, Chapter 4).

Economic Effects of Transmission Lines

Please see General Response B for discussion of potential economic effects of the transmission line in Canada.

5. See General Response I, which addresses the quantity and quality of wastewater discharge from the project. Letter 3, Responses to Comments 1 and 2 address air quality.

6. Thank you for your comments.