General Response to Comments on Major Issues

A. Potential Benefits and Costs of the Proposed Project

Issue Summary:

Some commentors pointed out that the EIS discussed the benefits of the project but did not address the potential costs of the project.

Response:

The primary benefits of the project discussed in the EIS include $30.6 million in payroll, fringe benefits, and other labor overhead expenditures. It is anticipated that approximately $11 million would be spent in Whatcom County. Other economic benefits include local spending on goods and services estimated at $22 million. Finally, millions of dollars in taxes would be paid to local and state governments.

Potential costs of the proposed project would result from several factors, such as availability of housing, public services, and utilities. An inadequate supply of housing (especially during the construction period) could increase rental rates and reduce the amount of affordable housing. The project area is well equipped to serve the needs of the temporary workers. There are nearly 3,000 motel rooms and RV sites within 30 minutes driving time of the job site, including sites in Abbotsford, B.C. The projected peak number of non-local transient construction workers requiring accommodations in the vicinity of the project is approximately 140. This represents less than five percent of capacity. This would not be enough demand to affect housing prices. Also, it is not expected that the 23 permanent employees needed for project operation would affect housing prices.

Non-quantifiable environmental costs can come in several forms. For example, air emissions that may affect air quality may lead to longer-term incidences of adverse health impacts or damage to vegetation. Water discharges may adversely affect water quality and impact fish habitat. A community's quality of life may also be affected. Many such impacts can be mitigated to avoid or decrease adverse effects to the environment. However, they may add to cumulative impacts from existing or future projects. It is impossible to affix a financial cost in the immediate term to such longer-term cumulative impacts.

Public services and utilities in the area include fire protection, police, emergency medical services, schools, parks and recreation facilities, streets, telephone service, water, solid waste disposal, electricity, and stormwater and sewage collection and treatment facilities.

In order to minimize or avoid impacts to these services, SE2 has entered into an agreement with the City of Sumas (see Stipulation Agreement Between City of Sumas

and Sumas Energy 2 in Volume 1, Appendix G of this Final EIS). This agreement provides that SE2 will:

- provide for the facilities necessary to reliably supply the plant with nonpotable water;
- pay the City $25,000 per year of operation for the sole purpose of aquifer protection, research, and analysis to support future water rights applications;
- pay for repairs to roads damaged from SE2 construction-related traffic;
- repave the portion of Bob Mitchell Avenue extending north from Front Street to the Burlington Northern grade crossing;
- pay for reconductoring the City's underground electric line adjacent to the project site to prevent compromising the City's ability to provide power to its other users while providing power to SE2 during construction; and
- pay for a nitrate removal system for the City's potable water supply so that the City can comply with applicable water standards in the event that the standards are exceeded.

B. Visual and Socioeconomic Impacts of the Transmission Line in Canada

Issue Summary:

Several commentors raised concerns regarding the potential impact of the proposed transmission line in Canada. Specifically, various commentors expressed concern that the line would result in socioeconomic impacts, including decreasing property values, obstructing views, and resulting in economic loss to the City of Abbotsford and downtown businesses.

Response:

Electrical lines supported by wood power poles already exist along the proposed transmission line route. The route along the CP Rail and SRBC has existing wood poles on both sides of the railway section between the international border and Highway 1. (Norecol Dames & Moore, 1999). The existing power lines continue along the SRBC rail line north of Highway 1 and continue until the CP Rail line heads to the northwest, as the existing power lines follow the SRBC line to the southeast. A portion of the proposed line would be visible from residential areas and from the downtown core of the City of Abbotsford.

For most of its length, the proposed line would not be visible from adjacent residential or commercial areas due to local topography, vegetation, and structures that tend to block views. In some locations, where there are currently no power lines along the ROW, native trees could be planted to screen views. In the downtown core of Abbotsford, the applicant has indicated a willingness to bury the line to minimize impact. (Adjudicative Hearing Transcript, testimony by Charles Martin, page 3243.)

Residential areas with views of the northern part of the proposed alignment presently have views of the BC Hydro lines coming into and out of the Clayburn Substation. Addition of the proposed 230 kV power line on single poles is not expected to appreciably degrade those views.

Commentors' concerns regarding socioeconomic impacts appeared to be driven by the potential visual impacts, EMF-related health impacts, and safety issues regarding the presence of high voltage lines. As discussed above, the visual impacts of the line are expected to be minimal and, therefore, are not likely to result in socioeconomic impacts.

C. Wetland Impacts and Mitigation

Issue Summary:

Several commentors stated that the EIS did not adequately describe the impacts on wetlands. The Washington Department of Ecology commented that the EIS did not consider prior converted cropland as wetlands, which Ecology believes should be regulated by the state of Washington (through the Department of Ecology). Comments also included requests for additional mitigation to compensate for the loss of the prior converted croplands and for wetland functions that would be lost from construction of the proposed plant. Commentors stated that important wetland functions that need to be replaced include wildlife habitat and hydrologic benefits.

Response:

The Final EIS text in Volume 1 includes information from the agreements reached between the Washington Department of Fish and Wildlife (WDFW), Department of Ecology, and SE2 during the EFSEC adjudicative hearing process. Mitigation presented in the EIS is taken from Exhibit JW-4 of the July 17, 2000 Supplemental Settlement Agreement Between the Washington Department of Fish and Wildlife and Sumas Energy 2. This exhibit is a Wetland Delineation and Mitigation Report prepared by Bexar Environmental Consulting Ltd. (June 26, 2000). Appendix G in Volume 1 includes the wetland report.

The existing wetland acreage reported in Exhibit JW-4 for the proposed plant site, and mitigation area to the west of the plant site, includes 2.77 acres of farmed wetlands and 1.55 acres of wetland. An additional 8.8 acres of forested and scrub-shrub wetland occurs in the northwest corner of the 37-acre project site but would not be directly affected by the proposed action. This acreage of farmed wetland and other wetlands on the proposed project site has been confirmed by the U.S. Army Corps of Engineers and Natural Resources Conservation Service (NRCS). Therefore, the consultant who prepared the Wetland Delineation and Mitigation Report, Bexar Environmental, deemed the 4.32 acres as the appropriate wetland acreage. The wetland impact acreage from the proposed plant site, as reported by the consultant in Exhibit JW-4, is 2.81 acres. This acreage excludes impacts on prior converted croplands because the Corps does not consider prior converted croplands as jurisdictional wetlands under the Clean Water Act.

In response to Ecology's comments that prior converted croplands should be considered wetlands, Bexar Environmental conducted additional studies. Bexar reviewed previous wetland delineations (David Evans Associates 1995) and conducted site visits in May 2000 to determine potential wetland acreage discounting the prior converted designation. Bexar Environmental identified 12.69 acres of wetland on the project site (excluding the 8.8 forested and scrub-shrub wetland in the northwest corner of the 37-acre site) when the prior converted cropland designation is discounted (see Exhibit JW-4 in Volume 1, Appendix G). Using this wetland study, Bexar determined a total of 8.76 acres of farmed wetland pasture and other wetlands would be filled, excavated, or culverted at the proposed plant site.

The Final EIS identifies the 2.81 acres of impact as the appropriate acreage because (1) the question of the total acreage of prior converted croplands to be included in the wetland impact acreage had not yet been resolved as the Final EIS was being prepared; (2) the Corps and the NRCS have confirmed the wetland acreage as discussed above; (3) through a stipulation with the applicant (Volume 1, Appendix G), Ecology agreed that the area confirmed by the Corps and NRCS is a wetland (and the prior converted area is additional wetland area regulated by the state); and (4) Exhibit JW-4 (the Bexar report), reporting the 2.81 acres of impact, has been accepted by WDFW and Ecology as part of agreements reached with SE2.

The 2.81 acres is greater than the 1.9 acres of impact previously reported in Section 3.4.3 of the Draft EIS because of a redesigned stormwater detention system that is shown in Exhibit JW-4. The total mitigation acreage presented in Exhibit JW-4, 10.01 acres, when combined with 9.44 acres of preserved wetlands, is also greater than the mitigation acreage presented in the Draft EIS (11.87 acres). The larger wetland mitigation acreage was developed at the original mitigation site west of the proposed plant site plus a new mitigation area east of the plant site.

As stated above, the mitigation strategy identified in Exhibit JW-4 is also used in the Final EIS. The total 19.41 acres of mitigation and preservation identified in Exhibit JW-4 includes 5.99 acres of wetland enhancement, 3.17 acres of wetland creation, 0.81 acres of wetland buffer, and 9.44 acres of wetland preservation. The mitigation was developed to compensate for the loss of wetland functions associated with construction and operation of the proposed project. The agreements also identify additional mitigation measures to avoid and minimize impacts related to construction and operational procedures, specific construction procedures for pipelines and the 230 kV electrical transmission line, guidelines regarding staging and access areas, creek crossing methods, restoration and revegetation guidelines, ROW maintenance activities, and upland habitat mitigation requirements.

Although the Final EIS uses the wetland delineation and mitigation acreage presented in the agreements between WDFW, Ecology, and SE2, the agreements acknowledge that SE2 would comply with any conditions in any future agreement with either WDFW or Ecology that sets more stringent standards regarding wetlands and water quality, relative to EFSEC's adjudicative hearing proceedings, as well as any additional conditions required by the Council itself. Furthermore, the Ecology agreement should not be interpreted as representing Ecology's position in any proceeding other than the EFSEC adjudicative hearing. Therefore, if additional wetland acreage or mitigation is a condition of other settlement agreements, such agreements or additional requirements may identify wetland acreage or mitigation that is different that that reported in this EIS.

D. Depletion of Groundwater Resources

Issue Summary:

Numerous commentors expressed concern that the groundwater extraction proposed to meet S2GF cooling water requirements would result in depletion of the groundwater resource in the Sumas aquifer. Two primary concerns were raised: (1) would the increased pumping result in a loss or reduction of groundwater in nearby private wells (in both Washington and Canada), and (2) would increased pumping result in long-term mining of the aquifer, thereby causing widespread lowering of the water table and baseflow in streams?

Response:

Since the Draft EIS was published, SE2 has revised the proposed groundwater maximum water intake from the City from 849 gallons per minute to approximately 760 gallons per minute (based on Adjudicative Hearing Transcript prefiled direct testimony of Mr. Burt Clothier, Exhibit 23, page 4, revised June 20, 2000). This change would result in a reduction of the yearly allocation from 1,053 acre-feet to 1,025 acre-feet. This would be accomplished by adding a reverse osmosis system to recycle cooling tower blowdown water. The Final EIS reflects this change.

With respect to the concern about effects on private wells, Robinson & Noble (2000) performed a hydrogeologic evaluation of pumping test data from the May Road and municipal well fields to define a theoretical radius of influence for each of the City of Sumas well fields (see Volume 1, Appendix J of this EIS). Using hydrologic parameters determined from three well tests, they calculated the theoretical distance at which one foot of interference drawdown would occur as a result of production of the full allocated water right at each well field. Based on their analysis, Robinson & Noble calculated a theoretical one-foot drawdown at a distance of approximately one mile from the Sumas municipal well field. Greater drawdown would be expected closer to the well field, whereas less than a foot of drawdown would be expected farther from the pumping wells.

This information cannot be relied on to determine precise drawdown at any given location because actual conditions are strongly influenced by local hydrologic conditions and interference from other pumping wells. Nevertheless, it does provide an indication of the size of the area that is likely to be impacted by drawdown during pumping. As described in the EIS, there are five known residential wells and one water right within this one-mile radius in Washington; several additional wells are expected to fall within this radius on the Canadian side of the border. However, the locations of the Canadian wells were not determined as part of the evaluation.

Based on the above evaluation, it is likely that the increased pumping could impact water levels in wells located within about a mile of the municipal well field. However, whether the use of these wells would be impaired would depend on the depth and condition of each well and how they have been used historically. Based on testimony on behalf of the applicant by Ms. McGaffey (Adjudicative Hearing Transcript, pages 906 to 910), the

applicant would be willing to mitigate any of these six wells identified within one mile of the municipal well field in the event that they were impaired as a result of the increased pumping. Ms. McGaffey did not confirm or preclude whether the applicant would also be willing to provide mitigation for other impaired wells that were subsequently identified within the one-mile radius.

The EIS has been revised to more fully discuss the potential for drawdown to impact nearby wells, and to describe the mitigation measure that the applicant has offered for impaired wells. In addition, the EIS recommends that this mitigation measure be extended to any existing well that can be demonstrated to have been impaired by the increased pumping. It is recommended that this be implemented by performing a more complete survey of nearby wells, to include establishing well depths, pump configurations, and historical water uses, before the startup of the project. Periodic water level monitoring should then be performed from these wells for at least a year in advance of project startup and should continue until the extent of any impairment could be established.

It should be noted that the City of Abbotsford has recently decided to reduce its reliance on groundwater and will be greatly reducing pumping from its two well fields, the closest of which is at Farmer Road, about one-half mile north of the Sumas municipal well field (see public testimony by Mr. David Davidson, Volume 1, Appendix J). Since these well fields have historically been pumped at several times the rate that would be required to supply the S2GF project, it is likely that some wells, especially in Canada, could actually experience a net rise in water level.

With respect to concerns that the groundwater extraction for this project could result in long-term depletion or mining of the Sumas aquifer, it is necessary to rely on more regional studies that consider overall water use and regional recharge and discharge. In concept, any use of groundwater from the Sumas aquifer contributes toward long-term depletion of the water resource. However, such extraction would only impact the regional groundwater system when the cumulative use results in removing more water from the aquifer than is replaced by precipitation and irrigation.

Studies by the British Columbia Ministry of the Environment (Kohut 1987) and the U.S. Geological Survey (1999) suggest that groundwater extraction from the Sumas aquifer has not yet reached the point where it is being depleted. The USGS (1999) did not identify any trends in water levels in Washington that would indicate depletion is occurring, but referenced work by Kohut that showed a decline in water levels in the Sumas-Abbotsford area. However, Kohut (1987) attributed a localized lowering of the aquifer over several years in the Sumas-Abbotsford area to well interference between several high-capacity pumping centers. The water balances for the aquifer calculated by Kohut indicated that recharge was substantially greater than groundwater extraction (Kohut 1987).

Based on these limited regional studies, there is sufficient evidence to conclude that the water consumption by the S2GF plant would not perceptibly reduce groundwater resources that are available to rural groundwater users in the area. However, as

groundwater extraction from the aquifer increases over time, this facility would contribute a small, incremental percentage to a cumulative lowering of the water level in the aquifer.

E. Potential Deterioration of Groundwater Quality as a Result of Increased Extraction

Issue Summary:

Several commentors expressed concern that the increased groundwater required for the S2GF project would result over time in increased nitrate levels in the City wells. Some commentors noted that nitrate is already present in the wells, and that it would be prudent to assume that an increase in pumping would result in drawing more nitrates to the wells. Others felt that investigations should be conducted to evaluate the potential for future contamination of the City wells. Still others wanted to know how the applicant planned to mitigate the loss of potable water should that occur.

Response:

The presence of nitrates in the Sumas aquifer is the result of historic and ongoing land use practices on the rural lands overlying the aquifer. As such, there is no point source for the nitrate contamination, and practices leading to contamination will likely continue for some time into the future. These factors, combined with the hydrologic and geochemical complexity of the aquifer, make it highly unlikely that even a very detailed investigation could reliably predict movement of the contamination in response to increased pumping.

Nevertheless, nitrates are currently present in both of the City's well fields, and it is prudent to assume that increased pumping could result in increases in nitrate concentrations. In the case of the municipal well field, an increase in nitrate concentrations could result in exceedances of the federal drinking water standard of 10 milligrams of nitrogen per liter of water. Whereas this possibility has always been a concern, the substantially greater use of water that would be required once the S2GF project is online could make it considerably more difficult for the City to adjust its use of wells to control the problem. Depending on how many of the wells in this well field were impacted, this could adversely affect the City's ability to provide uncontaminated drinking water to its customers.

In order to protect the water supply in the event of future nitrate contamination, an agreement has been reached between the City of Sumas and SE2. SE2 has agreed to reimburse the City for a water treatment system to remove nitrates if nitrate levels in the potable water supply ever exceed applicable federal, state, or local water quality standards subsequent to the project's start of operation. The full agreement is provided in the Partial Stipulation Agreement Between City of Sumas and Sumas Energy 2 (Volume 1, Appendix G). SE2 has also agreed to pay the City $25,000 for each year of operation solely for the purpose of aquifer protection, research, and analysis to support future water rights applications.

The City currently monitors for nitrates in each of its wells on a monthly basis. This monitoring should be continued to provide enough lead time to install a treatment system in the event nitrate levels begin to increase in the municipal well field.

F. Water Supply Characterization and Allocation Impacts

Issue Summary:

Several commentors felt that a more comprehensive, detailed, and project-specific hydrogeologic investigation and assessment should be completed to adequately evaluate aquifer characteristics and potential impacts that could result from the proposed increase in pumping from the City well fields. Some commentors felt the EIS should include a project-specific detailed study of the impacts to adjacent water rights, Canadian users, and private and agricultural properties, using more current data.

Response:

Based on the discussion presented in General Response D, we believe that additional studies to better characterize potential impacts to the aquifer and to specific wells and water rights are not needed if mitigation measures are implemented to address impairment to near-field wells. In our opinion, regional studies to address the larger issue of whether there would be long-term impacts to the aquifer would not yield useful results without years of data collection. Considering the small contribution that the S2GF project would make to potential long-term depletion of the groundwater, such studies are not recommended in the Final EIS. The Final EIS does recommend, however, that a baseline study be conducted of wells near the plant (in the United States and Canada) for use in evaluating potential impairment that could result from drawdown interference. Also, a groundwater monitoring program is recommended as a means of determining the extent of drawdown impact in the area surrounding the municipal well field (again, including Canada). This monitoring program should be initiated at least two years before project startup and continued until the extent and distribution of drawdown impact are determined, including any seasonal variations. This information could then be used to assess claims of well impairment.

G. Impacts to Stream Baseflow

Issue Summary:

Several commentors expressed concern that baseflow to area streams would be reduced as a result of this project. These comments raised two primary questions: (1) how much of a reduction in baseflow would occur in Johnson Creek due to loss of infiltration at the site, and (2) would there be a long-term reduction in baseflow to streams in general as a consequence of extracting a large volume of water from the aquifer?

With respect to the first issue, some commentors felt that a site-specific water balance should be prepared that describes the expected change in baseflow contributions from the site, to include changes in drain tiles. With respect to the second issue, some commentors felt that the long-term effect of groundwater drawdown on baseflow should be analyzed, especially with regard to impact on salmon streams.

Response:

Baseflow to Johnson Creek results either when shallow perched groundwater discharges to the streambed, or when the potentiometric surface of the semi-confined Sumas aquifer is high enough to intersect the streambed where the soil column is sufficiently permeable to allow upward leakage. Based on our current understanding of the hydrologic setting of the project site and nearby reaches of the creek, these circumstances only occur during the wet season, when streamflow is already high from surface runoff.

The near-surface site soils, because of their low permeability, do not have the capacity to store much water. Rather, most of the water from precipitation ponds on the surface, runs off, or is captured by shallow drain tiles that were installed to provide drainage for farming. As a result, it is likely that the site in its current condition contains very little perched groundwater in the dry season to support baseflow. Consequently, although construction of the S2GF project would reduce infiltration, and to a small extent could also reduce baseflow from shallow perched groundwater, it would not likely have any perceptible effect on baseflow to the creek during the dry season, when flows are most important to sustain the stream ecology.

The project would also effectively eliminate onsite infiltration to the Sumas aquifer within the plant's footprint. However, this site would cover about 20 acres, whereas the Sumas aquifer underlies about 150 square miles. Given this low fraction of a percent of the aquifer recharge area, combined with the low permeability of the site soils and the drain tiles that capture most infiltrating water onsite, it appears the amount of site-specific recharge from infiltration does not contribute perceptibly to the volume of water in the aquifer.

Even if the amount of infiltration through site soils was considerable, it would not contribute substantially to baseflow in Johnson Creek. Based on the seasonal fluctuations reported for the potentiometric surface of the aquifer, discharge to Johnson Creek from the aquifer would only occur during the wet months when the potentiometric surface is

high enough to intersect the creek bed. At that time of the year, the added component of streamflow resulting from baseflow is likely to be insignificant, considering the large amount of concurrent surface water runoff to the creek. Consequently, any added lowering of the aquifer and resultant reduction in baseflow in the wet season would not likely have an appreciable effect on streamflow. Lowering of the aquifer during the dry season would have essentially no impact on streamflow since the groundwater would already be too low to provide baseflow.

With respect to the question about a general reduction in stream baseflow, the long-term pumping that would be required for operation of the S2GF plant would result in an incremental reduction of the amount of groundwater that is available for discharge to area streams. This reduction would begin to impact baseflow in the future when the cumulative groundwater extraction rates of all water users in the area have increased enough to begin to deplete the aquifer (see General Response D for further discussion of this potential).

H. Environmental Risks Posed by the 2.5-Million-Gallon[1] Diesel Fuel Storage Tank

Issue Summary:

Some commentors felt that either stringent conditions should be imposed on the project to ensure public and environmental safety from potential catastrophe and contamination, or alternatively the need for diesel fuel as a backup to natural gas firing of the plant should be eliminated from the project.

Whereas some commentors were not explicit about the basis for their concerns, others felt that the environmental risks of groundwater contamination and/or surface water contamination were unacceptable. Several commentors were concerned that a catastrophic earthquake or flood would destroy the tank. One commentor advocated additional safety/mitigation measures and contingency planning for the diesel fuel tank to include a protection bond, full-time monitoring, shutdown in the event of a leak until remediated, and an agreement to provide potable water in the event of contamination.

Response:

The EIS and Application for Site Certification describe a variety of measures that are being proposed to provide for the integrity of the proposed diesel fuel tank and to minimize the potential of a release of fuel to the environment:

- Prior to construction, a geotechnical investigation of the site would be conducted to characterize ground conditions for design of a foundation that would withstand the design earthquake.
- Measures would be taken to prepare the ground and foundation such that the largest expected earthquake would not result in liquefaction or lateral spreading.
- The tank setting would be above the 100-year flood level and would be situated within an impervious bermed area that has sufficient capacity to contain substantially more volume than the tank itself.
- The tank would be of steel construction and designed and constructed in accordance with all applicable safety standards.
- Monitoring and inspections would be performed on a regular basis to detect any leaks or conditions that could affect the integrity of the tank.
- Spill response protocol would be in place to clean up any releases immediately and to identify and remedy the source of leaks.

[1] In its final briefing to the Energy Facility Site Evaluation Council (September 5, 2000), the applicant proposed to reduce the diesel storage tank size to 1.5 million gallons. The environmental impact of this proposed design modification has not been analyzed in this FEIS.

Assuming all of the above precautions are taken, it is highly unlikely that a release would occur that could not be contained and cleaned up before there was any appreciable threat to the environment.

In the very unlikely event a major release did occur, it would pose a serious risk to downstream surface water. Diesel fuel would likely migrate across the impervious site surface to drainage features. For anything less than a total failure of the containment system, it is likely that the fuel could be captured before reaching offsite streams.

With regard to risks to groundwater, the pavement, fill pad, and low-permeability soils underlying the plant and surrounding area would provide substantial protection of the Sumas aquifer. There would be sufficient time for cleanup before much if any of the fuel could infiltrate to the relatively deep aquifer. In addition to the low-permeability soils, the upward gradient of the aquifer and the tendency for fuels to float on water would further impede downward migration of the diesel to the aquifer. If the aquifer became contaminated, the City's water supply wells would not be affected since they are all located on substantially higher ground and are hydraulically upgradient of the proposed plant. However, there would be a potential for contaminant migration to downgradient wells that draw water from the Sumas aquifer.

Although the potential for a risk to water resources is considered to be very low, the consequences of a major release would be substantial, particularly with respect to surface water impairment. Because of this potential risk, the Final EIS recommends that, in addition to the proposed mitigation, EFSEC consider requiring a protection bond from the applicant, and that an alarm system be installed to provide an early alert to any leakage of the tank.

I. Wastewater Disposal in Abbotsford

Issue Summary:

Numerous commentors were opposed to disposal of a large volume of wastewater from the S2GF project at the JAMES Treatment Plant in Abbotsford. Several pointed out that the City of Abbotsford was not willing to accept any more wastewater than had already been agreed to in a contract between the City of Sumas and the City of Abbotsford. Several commentors raised concerns about possible contaminants in the wastewater, and the fact that the wastewater would ultimately be released to the Fraser River.

Response:

Since the submittal of the Draft EIS, the City of Abbotsford and the Fraser Valley Regional District have indicated that they will not augment an existing sewage service agreement in place with the City of Sumas in an amount sufficient to accommodate the new flow originally planned from S2GF. Because of this, the City of Sumas has notified SE2 that the only discharge capacity available to them would be through the existing contract with SCCLP (a sister company) that allows for daily discharge of 80,000 gallons per day. Consequently, the two plants would need to have a combined discharge capacity that is equivalent to what is currently allowed for the SCCLP, provided that the wastewater quality meets all applicable codes.

In order to accommodate this reduced discharge volume, SE2 has modified the project's cooling tower design to recycle cooling tower blowdown water using reverse osmosis. This proposed change would reduce the plant's maximum wastewater discharge from approximately 368,640 gallons per day to approximately 39,000 gallons per day, or a maximum of approximately 27 gallons per minute (gpm). Section 2.2.2.6 of the Final EIS reflects this change in the design and amount of wastewater discharge that would be generated.

With respect to concerns about the quality of the wastewater, the great majority of the wastewater from this facility would be blowdown water, with only a very small amount of boiler water makeup and sewage from onsite restrooms. At a maximum discharge rate of 27 gpm, it would be greatly diluted by a much larger quantity of waste from elsewhere in the Sumas sewer district. The wastewater leaving the site would be treated to meet all applicable discharge codes, and it would be treated further at the JAMES Treatment Plant before discharge to the Fraser River. Ultimately, its discharge to the Fraser River would be regulated by Canadian environmental regulations.

J. Impact of the Proposed Plant on Flooding

Issue Summary:

Several commentors expressed concern that the fill pad that would be installed to raise the S2GF plant above the 100-year flood elevation would result in potential increased flood damage to surrounding areas. Commentors requested that the floodplain modeling for the project be verified and the hydraulic model be run for both pre-fill and post-fill conditions at the plant site. They suggested that the unsteady-state flow model being developed by Whatcom County could be used in conjunction with a steady-state model to evaluate both floodplain conveyance and storage losses associated with the project.

Response:

The EIS includes a two-dimensional, steady-state flood model for the City of Sumas that was performed by KCM in 1997 to evaluate the 100-year flood in Sumas. The purpose of that model was to predict the areal extent, depth, and velocity of water throughout the City during a 100-year flood event. The study included an assessment of the effect of filling the entire industrial-zoned area of the city. The modeling determined that such filling would result in a maximum increase in flood water depth of up to 10 inches, in localized areas. This model overestimates the impact of the S2GF construction alone, because it assumes that an area about eight times larger than the 22 acres associated with this project would be completely filled.

According to Mr. David Davidson, a 1996 flood study performed by David Evans & Associates predicted a 2-inch rise in the 100-year flood would result from filling of a somewhat smaller property immediately north of the S2GF site.

Experts differ in their opinions as to the adequacy of the flood modeling that was performed for the City of Sumas. In his prefiled rebuttal testimony (Adjudicative Hearing Rebuttal Testimony, page 3), Mr. David Carlton of KCM/Tetratech testified that the modeling done for the City meets federal, state, and local standards for floodplain modeling, and is actually considered more precise than about 95 percent of the modeling that is currently done for FEMA.

In contrast, Ms. Paula Cooper of Whatcom County Public Works testified that use of a relatively new unsteady flow model would allow for a better assessment of whether adverse offsite impacts would be expected. She suggested that the unsteady flow method would provide a better means of evaluating whether measures such as compensatory storage should be considered to mitigate negative impacts.

Considering the potential significance of flooding in the project area, and the fact that project-specific flood modeling has not been performed, it is recommended in the Final EIS that the unsteady-state model be run to evaluate the 100-year flood. If this modeling identifies unacceptable impacts to nearby properties, compensatory measures should then be designed specifically to mitigate these impacts.

K. Cumulative Air Quality Impact Assessment

Issue Summary:

Several commentors were concerned that the Draft EIS did not adequately address the contribution of the proposed S2GF to the cumulative air quality impacts - including visibility and human health considerations - in the surrounding airshed, and especially in Canada.

Response:

1. Evaluating Impacts to Existing Air Quality

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.

2. Modeling Impacts to Canada

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 2 ppm 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).

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).

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. 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.

4. Assessment of Potential Health Impacts in Canada

The Canadian report (Appendix K) included an assessment of potential health impacts in the Fraser Valley due to PM10 and ozone emissions, concluding as follows:

- 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.

- 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.

L. Health Effects of Transmission Lines

Issue Summary:

Some commentors felt that the discussion of electromagnetic field (EMF) effects in the Draft EIS was inadequate. Other commentors expressed concern that available information on EMF human health effects does not rule out negative human impacts.

Response:

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).

M. Best Available Control Technology Analysis

Issue Summary:

Some commentors questioned the reliability of Best Availability Control Technology (BACT) for this project. Other commentors felt that economic considerations should not be the prime motivator when choosing BACT.

Response:

The federal and state Clean Air Acts require that BACT be applied to control significant pollutants from new or modified major sources. BACT is defined as an emissions limitation based on the maximum degree of reduction for each pollutant subject to regulation, emitted from any proposed major stationary source, on a case-by-case basis, taking into account cost-effectiveness, economic, energy, environmental, and other considerations (Exhibit 170.2, page 6). The BACT analysis prepared for the proposed project is consistent with the "top-down" BACT guidance required by the EPA (EPA 1990a) and EFSEC for BACT determinations. Contrary to the comment, economic considerations are not the prime factors in a BACT determination.

The "top-down" BACT process considers the most stringent form of emissions reduction technology possible, then tries to establish that it is technically infeasible or not economically justifiable. If proven infeasible or unjustifiable, then the next less stringent level of reduction is considered. When an emission reduction technology cannot be defeated, then it is determined to be BACT. The ultimate decision on what constitutes BACT for any particular project is made by the permitting authorities, not the applicant.

A "top-down" BACT analysis starts by identifying all "available" control options. Available control options are those pollution control technologies with a practical potential for application to the emissions unit and the regulated pollutant under evaluation. Air pollution control technologies include the application of production processes or available methods, systems, and techniques for control of the affected pollutant.

In the second step of the BACT analysis, the technical feasibility of each control option identified is evaluated with respect to source-specific factors. A demonstration of technical infeasibility must show, based on physical, chemical, and engineering principles, that technical difficulties would preclude the successful use of the control option on the emissions unit under review. Technically infeasible control options are then eliminated from further consideration in the analysis.

In the third step, all remaining control alternatives not eliminated in the second step are ranked and then listed in order of overall control effectiveness for the pollutant under review, from most to least effective control alternative.

After the identification of available and technically feasible control technology options,

additional impacts (energy, environmental, and economic) are considered to arrive at the final level of control for a specific project. In the event that the top-level control technology is shown to be inappropriate due to energy, environmental, or economic impacts, then the next most stringent alternative in the listing becomes the new control candidate and is similarly evaluated. The most effective control option not eliminated is proposed as BACT for the pollutant and emission unit under review.

The economic impact analysis involves assessing the costs associated with installation and operation of each BACT alternative. Examples of costs included are: (1) capital and interest charges, (2) engineering and installation costs, (3) operating and maintenance costs, (4) energy costs, (5) waste disposal costs, and (6) lost revenue due to equipment downtime. For the proposed project, the BACT analysis resulted in equivalent or lower emission limits than those determined to be BACT for similar and recent permitting actions in Washington State and Canada. (Application for Site Certification, Volume 2, Appendix B-3, page 1)