

STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL
TECHNICAL SUPPORT DOCUMENT FOR
PREVENTION OF SIGNIFICANT DETERIORATION
AND NOTICE OF CONSTRUCTION APPROVAL PERMIT
NO. EFSEC/2001-02, Amendment 1
Sumas Energy 2 Generation Facility Project
Sumas, Washington

September 17, 2004

1. INTRODUCTION

1.1 THE PERMIT PROCESS

The Prevention of Significant Deterioration (PSD) procedure is established in Title 40, Code of Federal Regulations (CFR), 40 CFR Part 52.21. Federal rules require PSD review of all new or modified air pollution sources that meet certain criteria. The objective of the PSD program is to prevent serious adverse environmental impact from emissions into the atmosphere by a proposed new source. The program limits degradation of air quality to that which is not considered "significant" as defined by the Federal Regulations listed above. It also sets up a mechanism for evaluating the effect that the proposed emissions might have on environmentally related areas for such parameters as visibility, soils, and vegetation. PSD rules also require the use of the most effective air pollution control equipment and procedures, after considering environmental, economic, and energy factors.

The Notice of Construction (NOC) approval procedure for EFSEC projects is established in chapter 463-39 WAC which adopts WAC 173-400-110 and chapter 173-460 WAC by reference. The objective of these rules is to prevent serious adverse environmental impact from emissions into the atmosphere by a proposed new source from pollutants that are not subject to PSD permitting.

The Washington State Energy Facility Site Evaluation Council (EFSEC) is the PSD permitting and NOC approval authority for energy facilities greater than 350 MW sited in the state of Washington per Chapter 463-39 of the Washington Administrative Code (WAC).

1.2 THE PROJECT

In August 2002 the Governor of Washington State approved the construction and operation of the Sumas Energy 2 Generation Facility (SE2GF), an electrical generating facility located in Sumas, Washington. Power produced at the SE2GF would be sold to the open market. The SE2GF would be constructed within the City of Sumas, in Whatcom County, Washington. The project site is located in an industrial zone in the City of Sumas, about one-half mile south of the international border. The approximately 37-acre property, which includes the site, consists of a 26-acre open field used for agriculture and a 10.6 acre forested wetland, which would be preserved as an element of site planning.

1.2.1 General Description

The SE2GF would be a combined-cycle facility using natural gas as the only fuel source for the combustion turbines¹. The facility design includes two separate but identical combustion turbines, one steam turbine, two generators and two heat recovery steam generators (HRSG). Each HRSG would include a duct burner. Each combustion turbine would discharge hot exhaust gases to the HRSG, which produces reheat steam flows to high, intermediate and low pressure sections of the steam turbines. The nominal capacity of each combustion and steam turbine set would be 334.5 MW yielding a total nominal plant capacity of 669 MW.

1.2.2 Project Status

The NOC/PSD permit for this project became effective on April 17, 2003. Under Condition 22 of the permit, Sumas Energy 2, Inc., (SE2) must initiate construction of the project within eighteen months of the final and effective date of the permit. SE2 indicates that it will not commence construction of SE2GF until after acquiring approval from the Canadian National Energy Board (NEB) to construct a transmission line that will connect SE2GF to the BC Hydro Clayburn substation in Abbotsford, BC. The NEB denied SE2's application to build the transmission line in March 2004. The Canadian Federal Court of Appeal is currently reviewing NEB's decision.

Given these recent developments, SE2 believes it is unlikely that NEB approval will be obtained prior to the construction-initiation deadline of this PSD permit. Consequently, SE2 is requesting amendment to PSD/NOC Permit No. EFSEC/2001-02 allowing an eighteen month extension of the construction-initiation deadline (to April 17, 2006). SE2 has not requested modifications to substantive requirements of the permit.

2.0 EXTENSION POLICY AND PROCEDURE

Federal regulation 40 CFR 52.21(r)(2) authorizes EFSEC to grant PSD permit extensions. EFSEC has used criteria advocated by the U.S. Environmental Protection Agency (EPA) in reviewing the extension request². Relative to SE2GF, the relevant issues are:

1. The extension request must be received by the permitting agency prior to expiration of the permit.
2. The Best Available Control Technology (BACT) analysis and determination must be updated to current standards.
3. PSD increment consumption and air quality impacts must be reassessed to assure that interim source growth would not materially alter the conclusions made relative to the original permit decision.
4. The decision to extend the permit must be subjected to the same public review and comment procedures as applicable to the original permit.

¹ Diesel-powered internal combustion engines for an emergency generator and for driving fire-suppression water pumps are included in the permit. Very low sulfur content oil is required as fuel.

² EPA Region IX Policy on PSD Permit Extensions, Wayne Blanchard (Chief, New Source Section) to Region IX States and Districts (September 8, 1988);
<http://www.epa.gov/Region7/programs/artd/air/nsr/nsrmemos/extnsion.pdf>

2.1 EXTENSION REQUEST TIMELINESS

SE2 submitted an application for extension of PSD/NOC Permit No. EFSEC/2001-02 on June 1, 2004 with an explanation of the reason why an extension was being requested (as described in Section 1.2.2 above). EFSEC finds that this is a timely request for PSD permit extension, and the basis for the request is justifiable.

2.2 BACT DETERMINATION

The BACT determination that is the basis of the terms and conditions of PSD/NOC Permit No. EFSEC/2001-02 is described in detail in the "Fact Sheet for Prevention of Significant Deterioration Sumas Energy 2 Generation Facility Project Sumas, Washington" (September 28, 2001), attached. That BACT determination is summarized in Table 1, below:

Table 1: BACT Determination for PSD/NOC Permit No. EFSEC/2001-02

Pollutant	Emission Limit	Averaging Period	Associated Control Technology
Nitrogen Oxides (NO _x)	2.0 ppmdv (corrected to 15% oxygen)	3 hour	Selective Catalytic Reduction (SCR)
Carbon Monoxide (CO)	2.0 ppmdv (corrected to 15% oxygen)	1 hour	Catalytic Oxidation
Sulfur Oxides (SO ₂)	1.0 ppmdv (corrected to 15% oxygen)	1 hour	Burn only natural gas in the turbines
Particulate matter (PM) all assumed to be less than 10 microns in diameter (PM ₁₀)	Filterable	194 pounds per day (lb/day) per turbine	Good Combustion Practice
	Condensable	377 lb/day per turbine	
Volatile Organic Compounds (VOCs)	420 lb/day per turbine	Daily	Good Combustion Practice and Catalytic Oxidation
Sulfuric Acid Mist	39 lb/day per turbine	Daily	Burn only natural gas in the turbines
Ammonia	5 ppmdv (corrected to 15% oxygen)	1 hour	Selective Catalytic Reduction (SCR)

Review of Recent BACT Determinations

EFSEC's permit writer searched EPA's RACT/BACT/LAER Clearinghouse³ to determine whether more effective pollutant control technologies had been imposed in permits subsequent to the final and effective date of PSD/NOC Permit No. EFSEC/2001-02. The search results indicated the same control technologies are being applied as shown in Table 1 for SE2GF. No federal BACT emission limit specified in permits is more stringent than PSD/NOC Permit No. EFSEC/2001-02 for NO_x, CO, or SO₂. Several new permits show more restrictive limits for total PM₁₀ and VOCs while using the same

³ TTN Web - Technology Transfer Network, Clean Air Technology Center, RACT/BACT/LAER Clearinghouse, <http://cfpub1.epa.gov/rblc/cfm/basicsearch.cfm>

control technologies as SE2GF.

BACT for PM₁₀

SE2GF's limit in PSD/NOC Permit No. EFSEC/2001-02 was derived directly from the turbine vendor's (Westinghouse) performance specifications. Under "good combustion practice," PM₁₀ emissions can vary with turbine design and natural gas quality. Turbine design is not a consideration under PSD review, and natural gas quality is determined by the natural gas source used for supply. Consequently, EFSEC believes the SE2GF PM₁₀ emission limit has been specified using the best information available. The installation of post-combustion control equipment to reduce PM₁₀ emissions from a natural gas-fired combustion turbine remains economically infeasible.

BACT for VOC

As discussed in Section 2.2.2.3 of the fact sheet for PSD/NOC Permit No. EFSEC/2001-02 (ibid.), EFSEC determined that addition of catalyst to the proposed catalytic oxidation system for the purpose of VOC reduction is not economically justifiable. For the proposed catalytic oxidation system, reducing VOC and CO emissions is a matter of tradeoff. Given a specified size for the catalyst system, lower VOC emissions can be achieved at the expense of higher CO emissions by selection of the location of the catalyst block in the exhaust system. For example, there have been twenty-two (22) combined cycle, natural gas-fired power turbines with duct burners permitted since the beginning of 2003. All but two of them have been permitted with the same or higher CO and VOC limits than SE2GF or with lower VOC limits and correspondingly higher CO limits. In one of the other two cases, the difference between the VOC limit and SE2GF's VOC limit is marginal. None of these facilities is as-yet in operation.

Each permitting agency has the discretion of requiring the balance between CO and VOC reduction that it believes best addresses local pollutant concerns. Along with NO_x, VOCs participate in ozone-formation. VOCs are considered a pollutant of concern in urban areas where industrial sources are the primary source of VOCs contributing to smog. By minimizing industrial VOC emissions in such areas, ozone formation is also minimized because atmospheric NO_x is less likely to find the necessary co-reactant (VOC) with which to form ozone.

By contrast, the region surrounding Sumas is more rural in nature. Within the Lower Fraser Valley, industrial VOC emissions account for 10 percent or less of all sources, with the remainder of emissions resulting from area and mobile sources⁴. High-VOC summer concentrations are primarily due to arboreal respiration amplified by VOC emissions from cars and trucks. During the summer months there are sufficient VOCs in the ambient air to react with any available NO_x. The relatively small reduction in atmospheric VOC concentrations that might be achieved if SE2GF VOC emissions were reduced would have a negligible effect on regional ozone formation.

The September 11, 2000, report from Canadian environmental agencies⁵ appears to confirm that SE2GF's potential contribution to regional ozone is very limited. It concluded, "... close to S2GF (sic) the ozone concentrations ... more likely will be less than 2 parts per billion higher under (ozone) episode conditions. Beyond 5 kilometers from the facility, the increases drop off rapidly to values less than 0.5 parts per billion higher. The duration of ozone episodes does not increase. ... It is unlikely that the S2GF emissions will result in exceedances of the new ozone CWS ..." Consequently, EFSEC targeted maximum CO reduction in the PSD/NOC Permit No. EFSEC/2001-02. No reduction of

⁴ "Forecast and Backcast of the 2000 Emission Inventory for the Lower Fraser Valley Airshed, 1985 - 2025," GVRD and FVRD (July, 2003).

⁵ "Sumas Energy 2 Generation Facility Air Quality Issue Summary," prepared by technical staff from the BC Ministry of Environment, Lands, and Parks, Environment Canada - Pacific and Yukon Region, and the Greater Vancouver Regional District, pages 16 and 17 (September 11, 2000).

VOC emissions, other than reduction of formaldehyde, was claimed for the catalytic oxidation system even though some effect may be justifiably expected.

BACT Determination

EFSEC concludes that the BACT determination and related permit terms and conditions under the original PSD/NOC Permit No. EFSEC/2001-02 remain valid.

2.3 AIR QUALITY IMPACTS

Consideration of Air Quality Impacts

Air quality impacts related to the maximum allowed emissions from SE2GF are shown in Table 2, below, and are compared to significance thresholds, allowable increment consumption levels, National Ambient Air Quality Standards (NAAQS), and Canada Wide Standards or Objectives (CWS or NAAQO).

As shown in Table 2, air quality impacts for all pollutants for which EPA has established allowable increment consumption and/or NAAQS are predicted to be below the "modeling significance level". EPA judges such impacts to have an insignificant effect upon the airshed, and thus consideration of emissions of nearby sources is unnecessary. Air quality impacts for all regulated pollutants are also well below the Canadian Standards or Objectives.

NAAQS have been established for PM_{2.5}. However, analysis of monitoring results aimed at determining NAAQS attainment status across the U.S., is still in progress for this pollutant. Emission inventory and modeling methodologies are also still in development for PM_{2.5}, and, significant ambient impact levels (SILs) have not been specified in regulation. To determine if SE2GF emissions will result in a violation of the 24-hour or annual PM_{2.5} NAAQS, EPA guidance⁶ recommends that PM₁₀ be utilized as a surrogate. Air quality concentrations projected under the assumption that all PM is PM_{2.5} indicate the impact will not threaten the PM_{2.5} NAAQS. As of February 2004, the Governor of the State of Washington has recommended to EPA Region 10 that Whatcom County be classified as "in attainment/unclassifiable" for PM_{2.5}.

⁶ "Interim Implementation of New Source Review Requirements for PM_{2.5}", John S. Seitz, Director Office of Air Quality Planning & Standards (MD-10), US EPA (1997).

Table 2: Modeled Ambient Air Impacts for SE2GF as permitted in PSD/NOC Permit No. EFSEC/2001-02

Pollutant	Modeling Results, micrograms per cubic meter (mgrams/m ³)		Modeling Significance Level mgrams/m ³		Class I area Allowable Increment Consumption mgrams/m ³	Class II area Allowable Increment Consumption mgrams/m ³	Monitoring Requirement Threshold mgrams/m ³	NAAQS ⁷	CWS or NAAQO
	Class I area	Class II area	Class I area ⁸	Class II area				mgrams/m ³	
NO ₂ , annual average	0.017 All NO _x as NO ₂	0.272	0.1	1.0	2.5	25	14	100	60
		31 Including background	N/A	2,000	N/A	N/A	None	35E3	15E3
CO, 1 hour average	Not applicable	8.8	N/A	2,000	N/A	N/A	None	35E3	15E3
CO, 8 hour average	N/A	4.6	N/A	500	N/A	N/A	575	10E3	6,000
SO ₂ , 3 hour average	0.39	5.3	1.0	25	25	512	None	1,300	375 (BC)
SO ₂ , 24 hour average	0.092	1.4	0.2	5	5	91	13	365	150
SO ₂ , annual average	0.008	0.13	0.1	1	2	20	None	80	30
PM ₁₀ , 24 hour average	0.28	4.2	0.3	5	8	37	10	150	50
PM ₁₀ , annual average	0.024	0.39	0.2	1	4	19	None	50	30
PM _{2.5} , 24 hour average	N/A	4.2	N/A	N/A	N/A	N/A	None	65	30
PM _{2.5} , annual average	N/A	0.39	N/A	N/A	N/A	N/A	None	15	N/A

⁷ These are both the primary and secondary NAAQS except for CO which has no secondary NAAQS.

⁸ Proposed by EPA: Federal Register Volume 61 No. 142 page 38292 (7/23/96).

Consideration of Regional Growth

EFSEC's permit writer consulted the Northwest Air Pollution Agency, the Greater Vancouver Regional District, the Ministry of Water, Land, and Air Protection, the Fraser Valley Regional District, and the City of Abbotsford regarding regional growth that may have occurred in the vicinity of the SE2GF since issuance of the PSD/NOC permit. All indicated no significant industrial projects have been installed in the vicinity of SE2GF⁹ since the original PSD permit finalization date. Peter Andzans of the City of Abbotsford Development Services Department said he believed Abbotsford has experienced significant recent growth, and that this should be considered in any decision to grant SE2 an extension of time to initiate construction under PSD Permit EFSEC/2001-02¹⁰.

Automobile registration¹¹ and Canadian census data clearly indicate that the Abbotsford area has experienced a population growth rate averaging about 3% per year over the last ten years. The population growth rate has slowed to about 2% per year over the last five years, and is now about the same as the British Columbia province as a whole (although still a significantly faster population growth rate than Canada as a whole). Based on construction permit issuance data for Abbotsford¹², commercial, industrial, agricultural, and institutional growth has been flat to negative from 2001 into 2004. There has been a burst of residential construction since 2002 which may reflect recent trends in low interest rates.

In light of the relatively high population growth rate in the Abbotsford area, air quality improvement programs implemented by the Lower Fraser Valley agencies have been successful and according to GVRD monitoring data, air quality in the Lower Fraser Valley has been improving on a continuing basis. GVRD monitors indicate Abbotsford air quality is in the best quality category¹³ over 96% of the time, and never "poor."¹⁴ Over 85% of the "fair" ratings are due to relatively high PM₁₀ concentrations, and during the ozone season, less than 2% of the time the Air Quality Index is rated "fair" due to relatively high ozone concentrations. Annual emissions in the Lower Fraser Valley for each pollutant subject to review under PSD/NOC Permit No. EFSEC/2001-02 declined up to 9% between 2000 and 2003 or remained unchanged¹⁵.

EFSEC concludes that any interim emission source growth that may have occurred in the Lower Fraser Valley area would not materially alter the conclusions regarding the environmental impact of permitted SE2GF pollutant emissions as determined during the development of the original PSD/NOC Permit No. EFSEC/2001-02.

⁹ Electronic mail messages and telephone communication from Dan Mahar (NWAPA), Nancy Knight (GVRD), Hu Wallis (MWLAP), and John Baumhoff (FVRD) to Bernard Brady (Ecology), June 30, 2004.

¹⁰ Telephone communication between Peter Andzans and Bernard Brady (July 7, 2004) and electronic message from Peter Andzans to Bernard Brady (July 12, 2004).

¹¹ Faxed by Peter Andzans to Bernard Brady (July 14, 2004).

¹² *ibid.*

¹³ Canadian Air Quality Index of "good" is the best category, followed by "fair" and "poor."

¹⁴ Air Quality Index Information available from the Greater Vancouver Regional District.

¹⁵ "Forecast and Backcast of the 2000 Emission Inventory for the Lower Fraser Valley Airshed, 1985 - 2025," GVRD and FVRD (July, 2003).

3.0 DETERMINATION

EFSEC concludes that subject to consideration of public comment on review of this permit extension request,

1. All requirements are fulfilled to approve the extension request,
2. No changes are required to the original terms and conditions of PSD/NOC Permit No. EFSEC/2001-02, and
3. The construction-initiation deadline for PSD/NOC Permit No. EFSEC/2001-02 will be extended to April 17, 2006.

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