



DEPARTMENT OF
ECOLOGY
State of Washington

**TECHNICAL SUPPORT DOCUMENT
FOR PREVENTION OF SIGNIFICANT
DETERIORATION (PSD) PERMIT**

**PERMIT NO: PSD 11-05
Amendment 1**

**Puget Sound Energy
Fredonia Power Generating Station**

Prepared by

**Air Quality Program
Washington State Department of Ecology
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EXECUTIVE SUMMARY

Puget Sound Energy (PSE) was issued a Prevention of Significant Deterioration (PSD) permit on October 24, 2013, to expand the Fredonia Generating Station (FGS). FGS is located at 13085 Ball Road near Mt. Vernon, Washington. The expansion project will provide up to approximately 181–207 megawatts (MW) of additional generating capacity to meet future PSE system needs. The new simple cycle combustion turbines will fire natural gas as the primary fuel. The limited backup fuel is ultra-low sulfur diesel (ULSD) fuel oil.

The PSD permit amendment application for an 18-month time extension was received by Ecology on March 2, 2015. The amendment fee was paid on April 2, 2015. The application was determined to be complete on April 10, 2015.

The time extension amendment will have no significant adverse impact on air quality. PSE has satisfied all requirements for an 18-month extension to the issued PSD permit for the Fredonia Expansion Project.

The emissions of other air pollutants not subjected to PSD review is covered in the Northwest Clean Air Agency (NWCAA) Notice of Construction (NOC) approval for this project.

1. INTRODUCTION

1.1. The Permitting Process

1.1.1. The PSD Process

PSD permitting requirements in Washington State are established in Title 40, Code of Federal Regulations (CFR) §52.21; Washington Administrative Code (WAC) 173-400-700 through 750; and the agreement for the delegation of the federal PSD regulations by the United States Environmental Protection Agency (EPA) to Ecology, dated December 10, 2013.

1.2. Site and Project Description

1.2.1. Site Description

The FGS facility is located at 13085 Ball Road near Mount Vernon, Skagit County, Washington (see Figure 1). The site is on the south side of Ovenell Road, southwest of the Skagit Regional Bayview Airport, approximately 2.5 miles inland of Padilla Bay. The proposed project is not expected to increase the current footprint acreage of the site, which is approximately 40 acres.

The terrain surrounding the facility is essentially flat. The elevation of the facility is approximately 50 feet above mean sea level (MSL).

The FGS facility is located in a Class II area that is designated as “attainment or unclassifiable” for the purpose of PSD permitting for all pollutants.

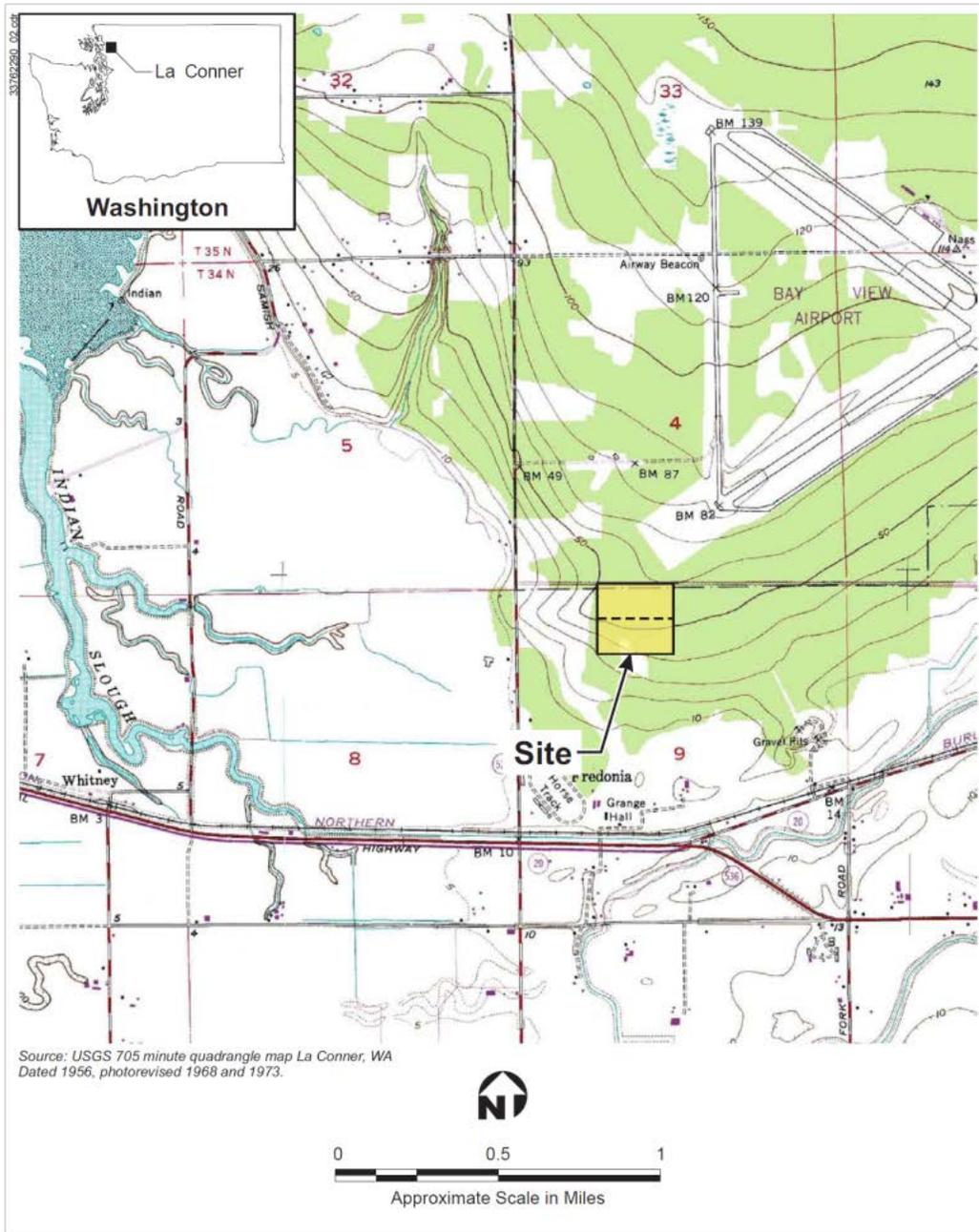


Figure 1. The FGS facility location map

(Source: PSE's PSD application 2nd revision, received July 7, 2011)

1.2.2. Amendment Description

Prevention of Significant Deterioration (PSD) permit number 11-05 was officially issued and effective on October 24, 2013. PSE requested this time extension because the company will need to pick one of the options listed in the PSD permit before they proceed with construction. In the amendment application, PSE explained that the company prepares a biennial Integrated Resource Plan (IRP). The IRP examines PSE's electric and gas resource needs for the next 20 years, analyzes the mix of conservation and supply resources that might best meet them, and identifies a strategic direction to achieve a diversified, balanced portfolio that meets customer needs, results in reasonable energy supply costs and mitigates market risks. The IRP helps guide PSE's resource acquisition decisions and is part of the ratemaking decisions with PSE's regulators. The next IRP is due to be filed in September 2015. PSE wants to use the IRP analysis before pursuing either construction on the Fredonia facility or another resource alternative.

Ecology finds that an extension of the deadline for commencement of construction is justified.

2. STATE ENVIRONMENTAL POLICY ACT (SEPA)

Ecology had concluded that the applicant had adequately demonstrated compliance with SEPA requirements prior to the issuance of the permit. SEPA requirements are still considered complete for this project. The amendment only is an extension of the deadline for commencement of construction. Skagit County was the lead agency for SEPA for this project.

3. BEST AVAILABLE CONTROL TECHNOLOGY (BACT) DETERMINATIONS

The BACT evaluation of EPA's RACT/BACT/LAER Clearinghouse was reviewed to refresh the BACT analysis that was done for the PSD permit for the proposed project. The original permit application used information that was accessed from the RBLC on May 31, 2011. The permit amendment application included the facilities that have more recent BACT determinations in the RBLC after May 31, 2011. From 20 separate permits BACT/LAER or other "case-by-case" determinations searched for large simple-cycle industrial gas turbines, the determinations made for individual pollutants are discussed below.

1. Nitrogen oxides (NO_x): The review found the highest level of control for NO_x is 2.5 parts per million (ppm) @ 15 percent O₂, 1-hour average. Three facilities listed this emission level as BACT, with the use of selective catalytic reduction (SCR) plus water injection. One facility uses this same technology combination for a 2.5 ppm, 3-hour "other" case-by-case determination. However, this facility's permit (the Howard Down Station) is not clear from the RBLC whether this limit applies during the ultra-low sulfur distillate oil (ULSD) firing. One other facility also lists a 2.5 ppm emission level using SCR and Wet Low-Emission (WLE) combustors (5 ppm when firing ULSD) and LAER applies to this facility for NO_x. One other facility uses SCR and clean burning fuel (natural gas) for a 2.5 ppm limit on a 3-hour rolling average.

The rest of the permitted NO_x levels listed in the RBLC range from 5 ppm (using SCR plus water injection, and using SCR alone) to 30 ppm (using Dry Low NO_x burners). For distillate firing, the lowest limit is 3.8 ppm on a 3-hour rolling average (Troutdale Energy Center). Other limits for distillate firing are between 5 ppm (one facility) and 9 ppm (two facilities).

Based on the updated RBLC review, it is logical to maintain the NO_x ACT limits of 2.5 ppm (1-hour average) for natural gas and 5.0 ppm (1-hour average) for distillate oil. The 5.0 ppm 1-hour limit for fuel oil is similar in stringency to the two 2.5 and 3.8 3-hour emission limits mentioned above. A unit could easily experience an hour of 5 ppm emissions and still meet a 2.5 or 3.8 ppm 3-hour limit.

2. Carbon monoxide (CO): In reviewing the RBLC, the highest level of control shown for CO is 4 ppm @ 15 percent O₂ (no average period provided). Only one facility lists this emission level as BACT with the use of Good Combustion Practices. Several facilities have limits of 5 ppm and 6 ppm using an oxidation catalyst. The highest limit identified in the RBLC is 58.4 ppm. All of these values are within the range of PSE's original BACT analysis (2 ppm to 63 ppm). Therefore, no change to the CO BACT limits (4 ppm for the three Frame turbines and 5.21 ppm for the LMS100, all using an oxidation catalyst).
3. Volatile organic compounds (VOCs): The RBLC review found the highest level of control shown for VOC is 2 ppm @ 15 percent O₂, 1-hour average. Two facilities listed this emission level as BACT with the use of an oxidation catalyst. The other facilities show VOC BACT limits between 2.5 ppm and 4 ppm using oxidation catalysts. All of these values are within the range of or higher than the original BACT analysis (i.e., 1 ppm to 1.4 ppm). Therefore, the VOC BACT limits of 1.0 to 1.4 ppm for the three Frame turbines, and 2.6 ppm for the LMS100 using an oxidation catalyst will remain the same.
4. Particulate matter, sulfur dioxide (SO₂), and sulfuric acid mist (H₂SO₄): The RBLC review of the current BACT limits for these pollutants utilize pipeline natural gas or ULSD. The updated RBLC database shows no other control technologies. Therefore, there are no changes to the particulate matter, SO₂, or H₂SO₄ BACT limits.
5. Ammonia (NH₃): There is only one facility with an NH₃ limit listed in the updated RBLC. The limit of 10 ppm is the same as the current PSE Fredonia limit for NH₃. Therefore, there are no changes to the NH₃ limit.
6. Greenhouse gases (GHGs): Of the six GHG BACT determinations documented in the RBLC for large simple-cycle industrial gas turbines, the proposed Fredonia combustion turbine options limits for carbon dioxide equivalents (CO₂e) (which range from 1,138 and 1,310 lb/MW-hr) are more stringent. The limits for CO₂e, the emergency generators, and circuit breakers are still appropriate and no changes are required. Effective January 1, 2014, the updated Global Warming Potentials (GWPs) became effective. The GWP is

multiplied by the compound's concentration to produce an equivalent amount of CO₂ written as CO_{2e}. The changes resulted in some GWPs increasing slightly, and some GWPs decreasing slightly. For example, methane (CH₄) went from 21 to 25, nitrous oxide (N₂O) went from 310 to 298, and sulfur hexafluoride (SF₆) went from 23,900 to 22,800. The effect in CO_{2e} is not significant for this project, and did not require further action in the permit amendment.

4. AIR MODELING

A review of the validity of the air quality impact and consumption modeling used in the original application was conducted by the applicant. Proposed equipment, stack parameters, and emissions for the FGS Expansion Project have not changed since the PSD permit was issued. In addition, there has not been any significant change in the existing air quality conditions in the project vicinity. Therefore, the air quality impact modeling for the original PSD permit remains valid for the requested permit extension.

5. PUBLIC COMMENT PERIOD

This permit amendment will be given a 30-day public comment period. The public comment period will be public noticed in the local newspaper. Ecology requests comments are sent to the agency contact listed below.

6. AGENCY CONTACT

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ACRONYMS AND ABBREVIATIONS

BACT	best available control technology
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂ e	carbon dioxide equivalents
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
FGS	Fredonia Generating Station
GHG	greenhouse gas
H ₂ SO ₄	sulfuric acid mist
HAPs	hazardous air pollutants
MSL	mean sea level
MW	megawatts
NOC	Notice of Construction
NO _x	nitrogen oxides
NWCAA	Northwest Clean Air Agency
ppm	parts per million
PM	particulate matter
PSD	Prevention of Significant Deterioration
PSE	Puget Sound Energy
RBLC	RACT/BACT/LAER Clearinghouse
SCR	selective catalytic reduction
SEPA	State Environmental Policy Act
SO ₂	sulfur dioxide
ULSD	ultra-low sulfur diesel
VOC	volatile organic compound
WAC	Washington Administrative Code
WLE	Wet Low-Emission