Serving Island, San Juan, Skagit and Whatcom Counties

Statement of Basis for AOP 004R5—Draft

Puget Sound Energy
Encogen Generating Station

Bellingham, Washington

June 5, 2026

PERMIT INFORMATION

Puget Sound Energy - Encogen Generating Station
915 Cornwall Avenue, Bellingham, WA 98225

SIC: 4911
NAICS: 221
EPA AFS: 53-073-00032

NWCAA ID: 1638-V-W

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Expires: August 31, 2031

Renewal Application Due: August 31, 2030

TABLE OF CONTENTS

TABLES

FIGURES

1 INTRODUCTION

The Puget Sound Energy - Encogen Generating Station (PSE Encogen), located in Bellingham, Washington, is required to obtain an air operating permit because it has the potential to emit 100 tons or more of each of the following pollutants: oxides of nitrogen (NO_X), sulfur dioxide (SO_2), and carbon monoxide (CO). These pollutants are emitted during the burning of liquid and gaseous fossil fuels in the three GE Frame 6 combustion turbines at PSE Encogen that produce electric power for the Puget Sound Energy (PSE) grid. The primary sources of emissions are the three combustion turbines and the transfer and storage of fuel oil[1]. Furthermore, PSE Encogen is subject to the acid rain program (Title IV of the Clean Air Act), which also triggers the requirement to obtain an air operating permit.

The purpose of this Statement of Basis is to set forth the legal and factual basis for the conditions of the PSE Encogen Air Operating Permit (AOP) No. 004R5 in accordance with WAC 173-401-700(8). This document also provides background information to facilitate review of the permit by interested parties. The Statement of Basis is not a legally enforceable document.

1.1 Permit Changes in the Fifth Renewal

The Northwest Clean Air Agency (NWCAA) received an application for the fifth renewal of the PSE Encogen AOP on August 14, 2025.

The following changes have been made to the AOP during the fifth renewal:

- Regulatory citations in the permit were revised to reflect new or modified regulations and updated revision/promulgation dates.
- Formatting throughout the entire permit has been updated to current NWCAA standards.
- Contact names and information for PSE and the NWCAA were updated as appropriate. In addition, the Permit Information page reflects the updated permit number and dates for the permit application and renewal.
- AOP Section 2 (Standard Terms and Conditions) has been replaced with the latest NWCAA standard version, containing any new or modified regulations and updated reference dates.
- AOP Section 3 (Standard Terms and Conditions for NSPS) has been replaced with the latest NWCAA standard version of applicable requirements, containing any new or modified regulations and updated reference dates.
- AOP Section 4 (Generally Applicable Requirements) were reviewed and updated. Section 4 primarily lists NWCAA and Washington Administrative Code (WAC) regulations, which often lack specific methods for compliance determination and require that additional monitoring, recordkeeping and recording provisions be added to the AOP for the purpose of compliance determination. This aspect of Air Operating Permits, known as gap-filling and sufficiency monitoring, is discussed further in Section 4.4. Gap-filled and sufficiency monitoring requirements in the

[1] The terms "fuel oil", "No. 2 distillate", "diesel fuel", "diesel oil", "No. 2 diesel", and "oil" all are synonymous with the term "on-road spec oil" within the context of the PSE Encogen Air Operating Permit and Statement of Basis. "On-road spec oil" means "on-road specification No. 2 diesel fuel" containing no more than 0.05 percent sulfur by weight, as specified in 40 CFR 80.29, as amended through January 18, 2001.

AOP Section 4 were modified for this renewal to be consistent with NWCAA's new format for this section.

- The Acid Rain Permit and Certificate of Representation for Units 1, 2, and 3 at the PSE Encogen facility are included in AOP Section 6. The permit has been updated since the last AOP renewal.
- The Statement of Basis content and layout were revised to standardize the documents issued for the Puget Sound Energy facilities within NWCAA jurisdiction. Factual information was revised to correct for current operation and some text has been rephrased to add clarification.

2 FACILITY DESCRIPTION

2.1 General Facility Description

The PSE Encogen facility is located on approximately 5 acres in the 900 block of Cornwall Avenue in Bellingham, Washington. The plant is approximately 1,000 feet east of Bellingham Bay. The surrounding area is predominantly industrial or commercial; however, there is a residential area on the hillside east of the plant. Puget Sound Energy assumed complete ownership of the facility in November 1999. The plant was originally constructed and operated by the Enserch Development Corporation.

The PSE Encogen facility consists of three combustion gas turbine generator systems and associated heat recovery steam generators (HRSGs) and exhaust gas treatment, a steam turbine-generator system, fuel oil storage, an electrical switchyard, and equipment for feed water treatment. A facility plot plan is shown in Figure 2-1.

PSE Encogen is a combined cycle facility that produces electric power from the combustion of fossil fuels. The electric power generated by the combustion and steam turbines is transferred to the distribution system operated by Puget Sound Energy. Prior to December 2007, PSE Encogen was considered a combined cycle cogeneration facility since steam and hot water were transferred to the adjacent Georgia-Pacific (GP) tissue plant for use in their manufacturing process. However, with the shutdown of the GP plant in December 2007, PSE Encogen is no longer a cogeneration facility and is now classified simply as a combined cycle facility. A process flow diagram is shown in Figure 2-2.

In early 2006, a 93 MMBtu/hr (million British thermal units per hour) natural gas-fired Nebraska auxiliary boiler was added to the facility to provide steam to the GP plant during times when the turbines were not in operation. On December 21, 2007 and concurrent with the shut-down of the GP plant, the auxiliary boiler was disconnected from service and designated as inactive. On April 1, 2013, the boiler was sold and removed from site.

The combined cycle turbines use natural gas as the primary fuel source, but distillate fuel oil is available as a backup fuel to facilitate continued generation of power in the event of a natural gas curtailment[2]. A small amount of fuel oil is used for periodic readiness testing of the turbines. This testing typically consumes less than 100,000 gallons of distillate fuel per year. The backup fuel is maintained in two 470,000-gallon tanks. A third 470,000-gallon tank exists on-site, but it is not used nor is it connected to the fuel delivery system. Fuel oil is delivered to the PSE Encogen site by tanker truck from various suppliers.

Natural gas is provided to the facility via pipeline from Canada and is consumed at a maximum nominal rate of 1,320 MMBtu/hr. Electrical output to PSE at full nominal rating is 172 megawatts (MWe). This is an increase from 160 MWe full nominal rating for the PSE Encogen plant due to the closure of the GP plant; steam that used to go to GP, about 140,000 pounds per hour, is now routed through the steam turbine, which generates more power. Therefore, the increased power output does not result in increased emissions.

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[2] *Period of natural gas curtailment or supply interruption* means a period of time during which the supply of natural gas to an affected facility is halted for reasons beyond the control of the facility. An increase in the cost or unit price of natural gas does not constitute a period of natural gas curtailment or supply interruption. (Reference: 40 CFR 63.7575).

Prior to the shutdown of the GP plant, PSE Encogen supplied steam and hot water to GP for use in their process, and GP received and treated wastewater from PSE Encogen. Since the shutdown of GP, process water and wastewater exchange no longer occurs. Excess heat from PSE Encogen's electrical generation operations is dissipated through the cooling towers, and process wastewater is now treated onsite to adjust pH and discharged to the City of Bellingham sewer system.

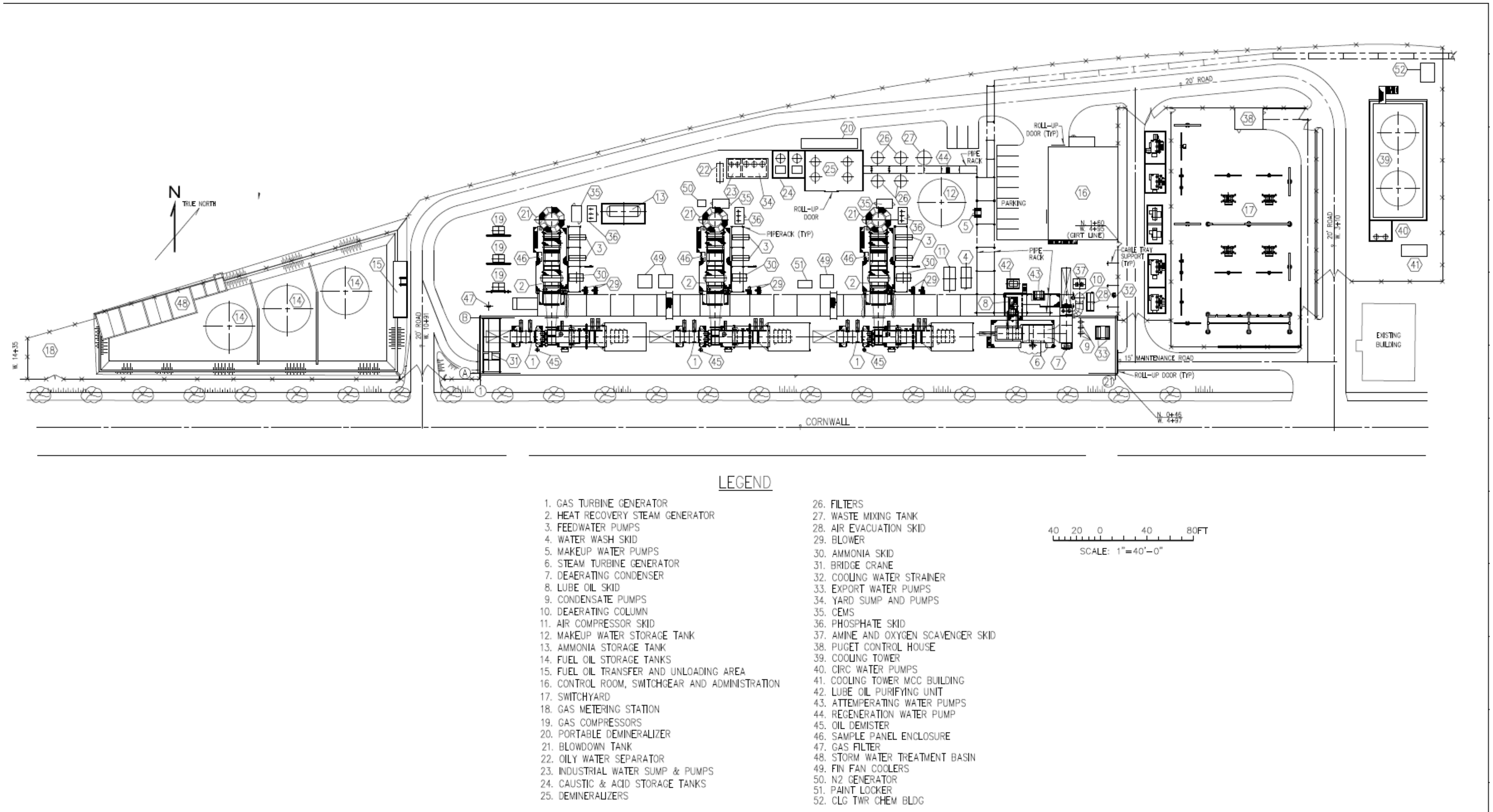

Figure 2-1 PSE Encogen Plot Plan

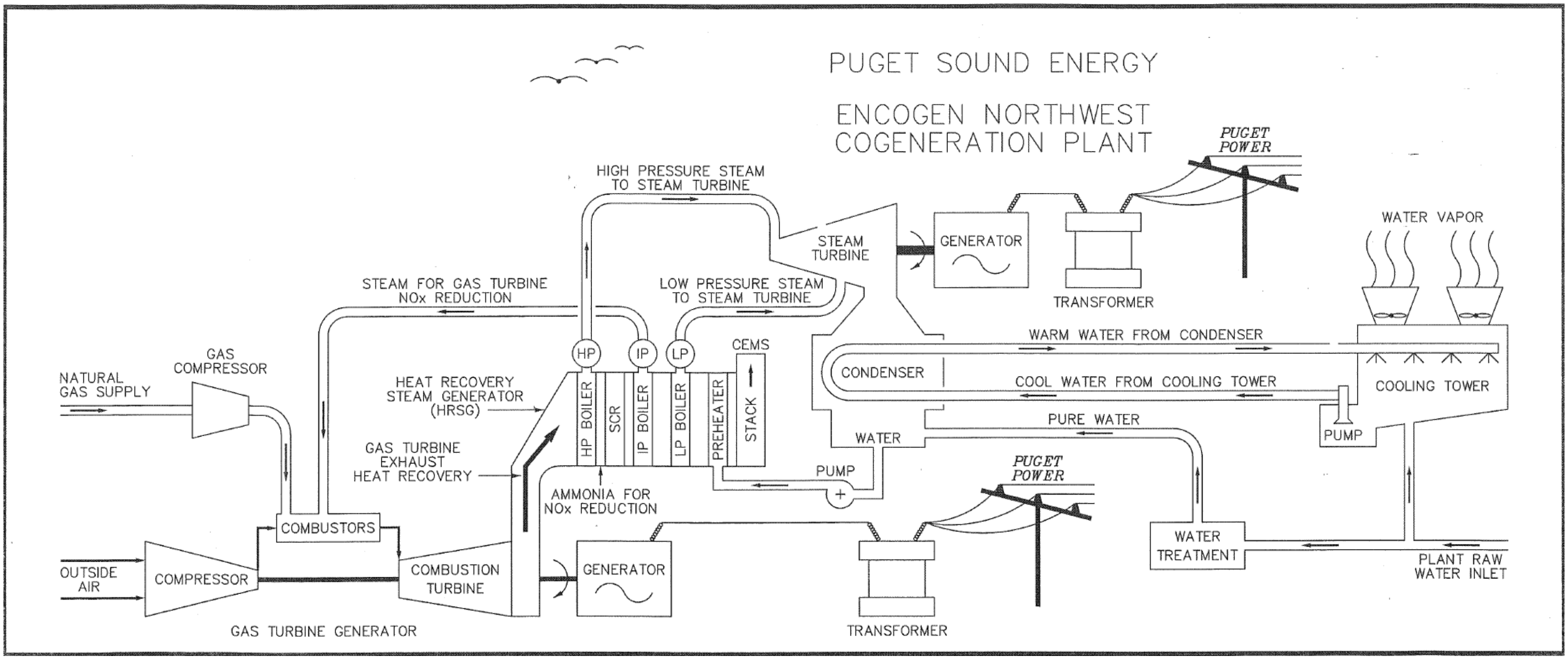

Figure 2-2 PSE Encogen Process Flow Diagram

2.2 Emission Unit Description

2.2.1 Turbine Units

The combustion turbines are GE Frame 6, Model MS6001B combined cycle combustion gas turbine generator systems with associated heat recovery steam generators (HRSG). These turbines are designated as Turbine Units 1, 2, and 3, and each has a separate exhaust stack. Each turbine is rated at 440 MMBtu/hr heat input and 41.5 MWe electrical output when burning natural gas. When burning No. 2 distillate fuel, each turbine is rated at 470 MMBtu/hr heat input and 39.9 MWe electrical output. PSE Encogen employs various techniques to control pollutants generated in the turbines during the combustion process.

Nitrogen oxides are controlled by injection of steam into the turbine combustors and the use of a selective catalytic reduction (SCR) system. Steam injection limits combustion temperatures thereby limiting formation of thermally generated NO_X. The SCR system controls NO_X through injection of ammonia (NH_3) ahead of a catalyst grid in the HRSG section. Most of the NO_X reacts to form elemental nitrogen and water in the presence of ammonia and catalyst. Ammonia emissions are controlled by regulating the rate of ammonia injection into the SCR system.

Sulfur dioxide emissions are controlled by use of natural gas and "on-road spec" diesel fuels, both of which are considered to be low-sulfur fuels.

Emissions of particulate matter, nearly all of which is composed of particles with a mean aerodynamic diameter smaller than 10 microns (PM_{10}), as well as carbon monoxide (CO) and volatile organic compounds (VOC), are minimized by the use of "good combustion practices." Turbines generate the least amount of combustion byproducts such as PM_{10}, CO, and VOC when they are operating most efficiently.

Continuous emission monitoring systems (CEMS) measure emissions of NO_X from each turbine exhaust stack.

2.2.2 Distillate Oil Storage Tanks

The facility has three distillate oil storage tanks; each tank has a capacity of 470,000 gallons. On March 20, 2004, one of the storage tanks (Tank 'A') was decommissioned due to a reduced requirement for on-site storage of backup fuel. "Good engineering practices" are used to minimize evaporative emissions of VOC from the oil storage tanks. Good engineering practices consist of painting the tanks a light color, using the tanks only for storage of low vapor pressure diesel fuel, and taking precautions to minimize spillage during fuel transfer activities.

2.2.3 Ammonia Storage

Originally, an anhydrous ammonia storage and delivery system was used in conjunction with the combustion turbine SCR system to reduce emissions of NO_X. In November 2006, the system was converted to an aqueous ammonia storage and delivery system. Aqueous ammonia has fewer risks associated with its storage and handling than does anhydrous ammonia; thus the risks to plant personnel and the public in the surrounding area are reduced by the switch to an aqueous ammonia system.

2.3 Emissions Inventory

With the original permit application in February of 1991, PSE Encogen (then known as the Encogen Northwest Cogeneration Facility) submitted their annual potential emissions. These potential emissions are listed on Table 2-1 below and are based on natural gas combustion at full load and are based on the steam injection and SCR/ammonia injection systems operating.

Table 2-1 Potential Emissions, natural gas combustion, tpy

NOx	CO	PM	PM2.5	VOC
194	131	33	33	66

SO2: PSE Encogen is limited by PSD permit 91-02 to emit no more than 658 lb of SO_2 per day when burning fuel oil. These limits translate to SO_2 PTE of 120 tpy when burning fuel oil. While PSE technically has the potential to emit 120 tpy of SO_2 when burning fuel oil, the facility can only burn fuel oil during natural gas curtailment and testing. In reality, curtailments and testing comprise only a small part of the annual operating hours. This is reflected in the actual emissions presented in Table 2-2.

HAP: PSE Encogen is a minor source with regards to HAP. Table 2-3 describes actual emissions for HAP. During 2015, emissions of total HAP were 1,657 lb, 829 lb of which is formaldehyde, the HAP emitted with the highest rate. According to information submitted by PSE Encogen, the three turbines operated for a total of 6,520 hours during 2015. Assuming that each turbine would operate for 8,760 hours in a year, for a total of 26,280 hours, the total HAP emissions would potentially be 6,679 lb, of which 3,386 lb would be formaldehyde. These numbers are well below the 50,000 lb of combined HAP or 20,000 lb of a single HAP needed for a source to be major.

Tables 2-2 and 2-3 below show the recent emissions history of the facility as identified in the annual emissions inventory submitted to NWCAA for the most recent five year period (2020 – 2024).

Table 2-2 Annual Emissions of criteria pollutants and GHG (tpy)

Pollutant ton/year	**2020**	**2021**	**2022**	**2023**	**2024**
PM_{10}	11	16	10	27	23
$PM_{2.5}$	11	16	10	27	23
NH_3	6	9	6	20	21
SO_2	3	4	4	8	7
CO	6	9	5	13	10
NO_X	43	62	50	100	87
VOC	1	1	1	1	1
CO_2	181,727	262,492	208,711	435,058	371,457.1
CH_4	14.3	20.5	16.3	34.01	29.0
N_2O	4.9	7.16	5.7	11.9	10.1

Table 2-3 Annual emissions of HAP (lb/yr)

Pollutant lb/year	2020	2021	2022	2023	2024
Acetaldehyde	132.2	190.9	151.8	316.4	269.2
Acrolein	21.1	30.6	24.3	50.6	43.1
Benzene	39.6	57.3	45.5	94.9	81.4
Ethylbenzene	105.7	152.7	96.4	253.1	215.4
Formaldehyde	679.4	974.3	759.44	1,591.5	1,357.7
Naphthalene	4.3	6.2	4.9	10.3	8.8
PAH, Total	7.2	10.5	8.4	17.4	14.8
Propylene Oxide	95.8	138.4	110.1	229.4	195.2
Toluene	429.4	1,620.4	493.3	1,028.32	875.1
Xylenes (Mixed Isomers)	211.4	305.5	242.9	506.2	430.8

2.4 Stack Tests

PSE Encogen performed the following stack tests since the last AOP renewal.

Table 2-4 Stack test history

Test Date	Emission Unit	Pollutant	Result
8/10/2021	Turbine 1	CO, NH_3	Pass
8/12/2021	Turbine 2	CO, NH_3	Pass
8/13/2021	Turbine 3	CO, NH_3	Pass
9/7/2022	Turbine 1	CO, NH_3	Pass
9/8/2022 and 10/25/2022	Turbine 2	CO, NH_3	Pass
9/9/2022	Turbine 3	CO, NH_3	Pass
8/16/2023	Turbine 1	CO, NH_3	Pass
8/17/2023	Turbine 2	CO, NH_3	Pass
8/15/2023	Turbine 3	CO, NH_3	Pass
8/13/2024	Turbine 1	NH_3	Fail
8/13/2024	Turbine 1	CO	Pass
8/14/2024	Turbine 2	CO, NH_3	Pass
8/15/2024	Turbine 3	CO, NH_3	Pass
11/14/2024	Turbine 1	NH_3	Pass

As shown above, the facility passed stack tests, with the exception of the ammonia stack test on Turbine 1 conducted on 8/13/2024. This resulted in NOV 4777, dated 4/18/2025. More details are given in Section 2.6 of this document.

2.5 Permitting History

This section provides a brief chronological history of the PSE Encogen facility owners and operators and associated permit activity.

On September 26, 1990, an agreement was signed for "Firm Power Purchase" between Puget Sound Power & Light Company ("Puget") and Encogen Northwest, LP, ("ENW"), a Delaware limited partnership. The agreement stated that ENW should sell and deliver to Puget the entire electrical output of the plant. The agreement stated that the ENW facility was a "qualifying co-generation facility" pursuant to the provisions of Section 210 of the Public Utility Regulatory Policies Act of 1978 (PURPA).

After a twenty-five-month construction effort by Enserch Development Corporation, the plant was made available for commercial service on July 1, 1993. Lone Star Energy operated the cogeneration facility, which was owned by ENW.

PSD 91-02 and OAC 310 issued September 1991: The facility was permitted to burn only natural gas and was issued both a PSD Permit (No. 91-02) from the Washington Department of Ecology (Ecology) and Order of Approval to Construct (OAC) 310 from the Northwest Air Pollution Authority (now the Northwest Clean Air Agency, or NWCAA). The PSD and OAC permits included specific conditions for construction and operation of the facility.

PSD 91-02 Amendment 1 and OAC 400 issued December 1993: OAC 310 was superseded by OAC 400 in December 1993, which permitted the use of #2 low-sulfur diesel oil as a backup fuel. PSD No. 91-02 was also modified at this time to allow use of diesel as a backup fuel.

OAC 400R1 issued May 1995 and OAC 400R2 issued August 1995: Minor revisions were incorporated into OAC 400 to provide clarity and consistency.

In 1997, Puget Sound Power & Light Company merged with Washington Natural Gas to form PSE.

PSD 91-02 Amendment 2 issued July 23, 1998 and OAC 400R3 issued May 29, 1998: ENW submitted an application to revise PSD permit No. 91-02 Amendment 1 to allow higher daily NO_X emission levels, which were granted in PSD No. 91-02 Amendment 2. OAC 400R2 was similarly revised to allow higher daily NO_X mass emissions.

Air Operating Permit 004: On January 1, 1999, ENW received a Title V Air Operating Permit (AOP) from NWCAA for the Encogen Northwest Cogeneration Plant.

On November 1, 1999, PSE became the majority shareholder of ENW. At this time, the facility became subject to the Acid Rain Regulation, 40 CFR 75; see Section 3.3 for more details.

On May 1, 2005, ENW, a subsidiary of PSE, dissolved and the cogeneration facility became wholly owned by PSE. The facility was renamed Puget Sound Energy, Encogen Generating Station (now PSE Encogen). About May 22, 2005, facility operation was taken over by PSE, and the contract with PTE North America/PTS Exodus Energy Operations Company LLC as facility operator (an operator subsequent to Lone Star Energy) was terminated.

OAC 951 issued January 2006: OAC 951 was issued to allow construction of an auxiliary boiler at the facility for the purpose of providing steam to the adjacent GP plant during periods when the combustion turbines were not operating.

OAC 951a issued June 13, 2008: OAC 951 was revised to allow performance testing on an elapsed operating hours basis instead of an annual basis. This eliminated the need to bring the boiler out of inactive status for the sole purpose of source testing. Source testing for NO_X, CO, and NH_3 is required within 30 days of the first reintroduction of fuel into the boiler for any reason and every 4,000 operating hours or every twenty-four months thereafter, whichever occurs sooner.

This OAC does not apply since the auxiliary boiler has been sold and removed from the facility site.

OAC 400d issued March 6, 2009: OAC 400R3 was revised to update permit formatting, NWCAA regulatory references, and the monthly emissions report due date.

OAC 400e issued January 13, 2011: OAC 400d was revised to include periodic source testing requirements for ammonia and carbon monoxide. The ammonia stack test method was updated to the Bay Area Air Quality Management District (BAAQMD) Method ST-1B. Unburned hydrocarbon emission limits were removed, as were initial testing requirements.

The earliest versions of OAC 400 required the use of "pipeline grade" natural gas. This requirement was written prior to the formal and more stringent Code of Federal Regulations (CFR) definition of "pipeline grade natural gas". The intention of the original OAC 400 requirement is more consistent with the federal CFR definition of "natural gas". Therefore, the reference to "pipeline grade" natural gas was removed, and a regulatory citation (40 CFR 60.331[u] [7/8/04]) for the definition of "natural gas" was added. In addition, a clear definition taken from 40 CFR 63.7575 for "natural gas curtailment" was added.

Particulate matter mass emission limits and SO_2 mass and concentration emission limits were dropped from OAC 400e since PM and SO_2 are regulated through the PSD permit; the limits dropped from the OAC were simply duplicates of the limits established by the PSD. Furthermore, reporting requirements already established in the PSD permit were removed from the OAC. The nuisance odor condition was also dropped from the OAC since that requirement is covered by NWCAA regulations. Finally, a requirement to maintain a current and readily available continuous emission monitor (CEM) quality assurance manual was added.

OAC 400f issued October 7, 2020: OAC 400e was revised to modify permit conditions for the turbines by removing references to ISO standard conditions and allowing the facility to track fuel use in MMBtu instead of therms.

This will align the permit with the corresponding Prevention of Significant Deterioration permit (PSD 91-02, Amendment 3, issued on 09/11/2020) for the same equipment.

PSD 91-02 Amendment 3 issued September 11, 2020: On September 11, 2020, the Washington Department of Ecology issued PSD 91-02, Amendment 3. Ecology issued the original PSD 91-02 for the three combustion gas turbines and the associated heat recovery steam generators (HRSG) at PSE Encogen on September 26, 1991. The permit has been amended during 1993 and 1998.

For Amendment 3, PSE Encogen had requested to make minor changes to its permit. The changes include:

- Clarify that short-term emission limits for nitrogen oxide (NOx) and carbon monoxide (CO) do not apply during start-up and shutdown.
- Update the sulfur dioxide (SO_2) emission limit to be more consistent with the sulfur content in the natural gas that the facility receives.
- Change permit conditions for NOx and CO emissions to be consistent with the New Source Performance Standard (NSPS), including the removal of correcting NOx measurements to ISO conditions.

PSD 91-02 Amendment 4 issued January 5, 2021: Amendment 4 was issued by Ecology on January 5, 2021, to include an important term that was left out of Amendment 3 by accident.

2.6 Compliance History

The PSE Encogen facility has been either a registered air pollution source or a Title V Air Operating Permit source since its startup in 1993.

2.6.1 Notice of Violation

Table 2-5 presents a listing of Notices of Violation (NOV) issued to PSE Encogen by the NWCAA since January 2015. Violations are resolved through a combination of penalty assessments and corrective action taken by the source. In most cases a summary of corrective action taken by the source was submitted to the NWCAA as a written response to the violation. Additional information about each violation can be obtained upon request from the NWCAA.

Table 2-5 PSE Encogen Notices of Violation

NOV	Date Issued	Description
4253	09/15/2017	PSE Encogen conducted engineering test runs on Unit 1 on 09/14/16 where they found the average of three 30-minute tests for ammonia was 13.3 ppmvd at 15% O_2, ISO standard conditions. Engineering tests on 9/22/16 found two 30-min runs at 10.4 and 12.0 ppmvd at 15% O_2, ISO standard conditions.
4276	02/27/2018	PSE Encogen conducted engineering tests on Combustion Turbine 1 that found excess ammonia emissions on the following dates: 11/10/2017 - seven 15-minute tests measured average ammonia emissions of 12.8 ppmvd at 15% O_2, ISO standard conditions. 11/16/2017 - four 15-minute test runs measured average ammonia emissions of 11.1 ppmvd at 15% O_2, ISO standard conditions.
4378	9/3/2019	Unit 1 NOX CEMS was out-of-control from on or about November 9, 2018 to August 27, 2019 after a 40 CFR 60 relative accuracy test audit result of 26% relative accuracy with respect to NOx ppm limits in AOP 004R3 terms 5.1.11, 5.1.12 and 5.1.14. PSE failed to determine and report the deviation from the 90% data availability requirement for this same period.
4778	4/18/2025	Combustion turbine #1 emitted an estimated 14 lb of excess ammonia emissions due to corrosion, plugging, and failed valve internals of the selective catalytic reduction ammonia injection system, constituting a failure to maintain the control system in good operating condition and repair.

2.6.2 Compliance Reports

The PSE Encogen AOP requires monthly, quarterly, semiannual, and annual reports to be submitted to the NWCAA as part of the facility's ongoing compliance demonstration. The facility submits a monthly summary report of emissions and process information. The monthly report also must identify any excess emissions and provide a discussion as to the cause and what was done to correct the problem. PSE Encogen submits information about quality assurance/quality control (QA/QC) actions taken on continuous emission monitoring systems (such as Linearity Tests or Relative Accuracy Test Audits) in quarterly reports submitted as part of the monthly report for the month in which the QA/QC actions occur. Semiannual reports provide for the certification by the responsible corporate official of the truth, accuracy, and completeness of reports submitted during the previous six-month period. Annually, the responsible corporate official also certifies compliance with all applicable requirements in the AOP term by term and whether the facility was fully or intermittently in compliance with each term.

3 BASIS OF REGULATION APPLICABILITY

3.1 New Source Performance Standards (NSPS)

40 CFR 60 Subpart A – General Provisions: The NSPS General Provisions apply to the owner or operator of a stationary source that contains an affected facility. Since the combustion turbines at PSE Encogen are subject to 40 CFR 60 Subpart GG - NSPS for Stationary Gas Turbines, they are "affected facilities". Therefore, the General Provisions of 40 CFR 60 Subpart A apply to those units. NSPS Subpart A requirements are listed in Section 3 of the AOP as generally applicable to affected facilities.

40 CFR 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units: The heat recovery steam generators (HRSGs) are not subject to NSPS Subparts D, Da, Db or Dc (NSPS for steam generating units) because they are not directly fired with duct burners.

40 CFR 60 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels for which Construction, Reconstruction, or Modification Commenced after July 23, 1984: This regulation does not apply to the fuel storage tanks at PSE Encogen because, although the tanks were constructed after July 23, 1984 and have a capacity greater than 151 m^3 (the tanks have an approximate capacity of 1780 m^3), the maximum true vapor pressure of the diesel fuel stored in the tanks is below the 3.5 kPa (0.5 psia) applicability threshold.

40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines: The provisions of NSPS Subpart GG apply to stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 million Btu) per hour, based on the lower heating value of the fuel fired, for which construction, modification, or reconstruction is commenced after October 3, 1977. The three stationary gas turbines were installed at PSE Encogen after the adoption of NSPS Subpart GG; therefore, NSPS Subpart GG applies to the combustion turbines.

PSE Encogen was released by EPA Region 10 from the daily monitoring of fuel sulfur and nitrogen content as required in Subpart GG in a letter dated March 10, 1993. This determination was based on the condition that PSE Encogen monitor the sulfur content of fuels and operate and maintain continuous emission monitors for nitrogen oxides.

PSE Encogen was also granted relief from the semi-annual excess emission reporting requirements under Subpart GG by the NWCAA in a letter dated January 31, 1995. PSE Encogen monitors NO_X continuously and submits reports on a monthly basis as required by their permit. Furthermore, water and steam rates do not need to be monitored due to post-combustion NO_X control and continuous emissions monitoring employed by PSE Encogen.

Subpart GG was last amended by EPA on January 15, 2026. The only change that affects PSE Encogen is that now the facility is required to report via CEDRI. AOP term 3.1.1 has been modified to reflect this requirement.

40 CFR 60 Subpart KKKK – Standards of Performance for Stationary Combustion Turbines: The provisions of NSPS Subpart KKKK apply to stationary combustion turbines that commenced construction, modification or reconstruction after February 18, 2005. Since the turbines at the facility began operation in 1993, this subpart does not apply.

40 CFR 60 Subpart KKKKa – Standards of Performance for Stationary Combustion Turbines: This subpart establishes emission standards and compliance schedules for the control of emissions from stationary combustion turbines that commenced construction, modification, or reconstruction after December 13, 2024. Since the turbines at the facility began operation in 1993, this subpart does not apply.

40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines: Other than the combustion turbines, there is no other combustion unit at the facility. Thus, 40 CFR 60 Subpart JJJJ does not apply.

3.2 National Emission Standards for Hazardous Air Pollutants (NESHAP)

PSE Encogen is an area source of HAPs due primarily to the small amounts of formaldehyde and other HAPs generated during the combustion of natural gas. Potentially applicable NESHAP regulations are addressed below.

40 CFR 63 Subpart Q – National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers: This standard would apply had PSE Encogen emitted more than 10 tons per year of a single HAP or if the total HAP emitted from the plant exceeded 25 tons per year. Based on 1993 source test data taken at PSE Encogen and annual emissions inventory reports from the facility, formaldehyde emissions are estimated to be 0.075 lb/hr per stack or about 1.0 ton per year for the entire plant. Because formaldehyde is the overwhelming driver for NESHAP applicability and because the facility's potential to emit (PTE) formaldehyde is less than 10 tons per year, the standard does not apply to PSE Encogen. Furthermore, chromium has never been used as a biocide in the cooling towers at PSE Encogen.

40 CFR 63 Subpart YYYY – National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines: On January 14, 2003, the proposed combustion turbine NESHAP (CAA Section 112(b)) was published as 40 CFR 63 Subpart YYYY. Since PSE Encogen is not a major source for HAP, this standard does not apply.

40 CFR 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE): Other than the combustion turbines, there is no other combustion unit at the facility. Thus, 40 CFR 63 Subpart ZZZZ does not apply.

3.3 Acid Rain Program

40 CFR Parts 72, 73, 74, 75, 77, and 78 – The Acid Rain Program: Permits, Allowance System, Sulfur Dioxide Opt-Ins, Continuous Emission Monitoring, Excess Emissions, and Appeal Procedures: Title IV of the Clean Air Act authorizes the EPA to establish the Acid Rain Program. The purpose of the Acid Rain Program is to significantly reduce emissions of sulfur dioxide and nitrogen oxides from utility electric generating plants in order to reduce the adverse health and ecological impacts of acidic deposition (or acid rain) resulting from such emissions. The EPA promulgated these rules on January 11 and March 23, 1993. Initially, PSE Encogen was exempt from the acid rain regulations per 40 CFR 72.6 (b)(5) since the facility was:

- classified as a qualifying cogeneration facility pursuant to the provisions of Section 210 of the Public Utility Regulatory Policies Act of 1978 (PURPA),
- had as of November 15, 1990 a qualifying power purchase commitment to sell the entire electrical output of the plant to Puget Sound Power & Light Company, and
- did not exceed 130% of total planned net output capacity.

This exemption was lost when PSE purchased the facility in November 1999 since PSE is a public electric generating utility and, therefore, subject to the acid rain regulations. PSE Encogen did not come into compliance with the rule until 2005 when their Acid Rain Permit application was submitted and approved. A copy of the recent Acid Rain permit is included in Section 6 of the Title V permit.

PSE Encogen converted its CEM systems on the turbines from performance and quality assurance/quality control requirements under 40 CFR 60 to those under 40 CFR 75. NWCAA

Regulation Appendix A and 40 CFR 75 require specific quality assurance methods including daily calibration checks, quarterly linearity checks, and annual Relative Accuracy Test Audits (RATA) that assure precise and accurate CEM information is collected. Cylinder gas audits (CGA) are required by 40 CFR 60 Appendix F, which is required by NWCAA Regulation Appendix A (III)(A)(2), but the acid rain regulations (40 CFR 75) require more stringent quarterly linearity checks that meet the requirements of NWCAA Regulation Appendix A (III)(A)(1)[3].

3.4 Compliance Assurance Monitoring (CAM)

40 CFR 64 – Compliance Assurance Monitoring: PSE Encogen is not subject to the CAM rule. The CAM rule under 40 CFR 64 requires owners or operators of subject sources to conduct monitoring that satisfies specific criteria established in the rule to provide a reasonable assurance of compliance with applicable requirements. Monitoring focuses on emissions units that rely on pollution control equipment to achieve compliance. The CAM rule coordinates existing monitoring requirements with additional monitoring if current requirements fail to specify adequate detail. CAM applies to units that (1) are subject to an emission limit, (2) use an add-on control device to meet the emission limit, and (3) have potential pre-control device emissions that would classify the unit as a major source (referred to as an "uncontrolled major source").

The three combustion turbines are equipped with add-on controls and therefore need to be evaluated further to determine CAM applicability.

The three combustion turbines at PSE Encogen are subject to NO_X emission limits, and all units employ selective catalytic reduction control devices to achieve compliance. The combustion turbines also employ steam injection to control NO_X emissions. The turbines' pre-control NO_X emissions exceed major source status (greater than 100 tons NO_X per year). These criteria would generally cause the combustion turbines to be subject to the CAM rule. However, the AOP requires PSE Encogen to operate a NO_X continuous emission monitor, which is accepted as a continuous compliance determination method, on each combustion turbine. 40 CFR 64.2(b)(1)(vi) exempts units from CAM if the AOP specifies a continuous compliance determination method. Therefore, the combustion turbines are also not subject to CAM.

3.5 Risk Management Plan (RMP)

40 CFR 68 – Chemical Accident Prevention Provisions: PSE Encogen is not subject to the provisions of this program. The goal of 40 CFR 68 and RMP it requires is to prevent accidental release of substances that can cause serious harm to the public and the environment and to mitigate the severity of releases if they do occur. If a tank, drum, container, pipe, or other process at a facility contains any of the regulated toxic and flammable substances listed in 40 CFR 68.130 in an amount above the threshold quantity specified for that substance, the facility operator is required to develop and implement a risk management program.

PSE Encogen uses ammonia in selective catalytic reduction systems for NO_X control at the combustion turbines. Anhydrous ammonia in quantities greater than 10,000 pounds and

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[3] NWCAA Regulation Appendix A (III)(A)(2) requires that all CEMs be operated in accordance with the appropriate Section of 40 CFR 60 Appendix F, and 40 CFR 60 Appendix F requires Cylinder Gas Audits (CGAs). However, NWCAA Regulation Appendix A (III)(A)(1) states that CEMs subject to acid rain regulations shall be capable of meeting the specifications outlined in the appropriate section of 40 CFR 75. NWCAA Appendix A (III)(A)(2), which requires all CEMs to be operated in accordance with the appropriate section of 40 CFR 60 Appendix F is interpreted to apply to all CEMs not otherwise covered by 40 CFR 75, and the PSE Encogen CEMs, which are subject to the 40 CFR 75 acid rain regulations, shall be capable of meeting the specifications outlined in the appropriate section of 40 CFR 75 per NWCAA Appendix A (III)(A)(1).

aqueous ammonia (concentration of 20% or greater) in quantities greater than 20,000 pounds are regulated substances under 40 CFR 68 – Chemical Accident Prevention Provisions. In 2006, PSE Encogen converted the anhydrous ammonia injection system on the turbine SCR systems to an aqueous ammonia injection system. The aqueous ammonia used in the new system contains 17-19.5% ammonium hydroxide; therefore, the requirements of 40 CFR 68 are not triggered by this material. As long as the amount of anhydrous ammonia onsite remains below 10,000 lb and the concentration of the aqueous ammonia used at the facility remains below 20% ammonia, PSE Encogen is not subject to the provisions of this program.

3.6 New Source Review (NSR)

3.6.1 Basic Information

New Source Review (NSR) requires stationary sources of air pollution to acquire permits before they begin construction. NSR is also referred to as construction permitting or preconstruction permitting.

There are three types of NSR permits. A source may have to acquire one or more of these permits:

- Prevention of Significant Deterioration (PSD) permits, which are required for new major sources or a major source making a major modification in an attainment[4] area;
- Nonattainment NSR permits, which are required for new major sources or major sources making a major modification in a nonattainment area; and
- Minor source permits, which are required for sources that emit pollutants below the major source threshold but above the minor source threshold. It is generally the case that a major new or modified source will also require minor NSR permitting that covers a different subset of pollutants.

PSE Encogen is located in an area that is in attainment for all pollutants. Therefore, only PSD permits and minor source permits are required for projects at the facility.

3.6.2 What are Permits?

Permits are legal documents that the source must follow. Permits specify what emission limits must not be exceeded and how the source is to demonstrate compliance with the set limits. Permits may contain conditions to ensure that the source is built according to the permit application upon which the permitting agency relies for air impact analysis. For example, the permit may specify a stack height that was used by the permitting agency to determine compliance with air pollutant limits. Some limits in the permit may be specified at the request of the source to keep them from being subject to other requirements. For example, the source may take limits in a minor NSR permit to keep the source out of PSD permitting. To assure that sources follow permit requirements, permits also contain monitoring, recordkeeping, and reporting (MR&R) requirements.

3.6.3 Who Issues the Permits?

In Washington State most NSR permits are issued by the Washington State Department of Ecology ("Ecology") or local air pollution control agencies. The EPA issues the permit in some cases. Ecology and local air pollution control agencies have their own permit programs that are approved by EPA in the State Implementation Plan (SIP). In general, in the NWCAA jurisdiction, which encompasses Island, Skagit, San Juan, and Whatcom Counties, Ecology issues major NSR

[4] An attainment area means a geographic area designated by EPA at 40 CFR 81 as having attained the National Ambient Air Quality Standard for a given criteria pollutant (Reference: WAC 173-400-030 (9)).

permits (PSD permits) and NWCAA issues minor NSR permits (Orders of Approval to Construct, or OAC).

3.6.4 Prevention of Significant Deterioration (PSD)

The PSE Encogen facility qualifies as a major source and is, therefore, an applicable source under the PSD program (40 CFR 52.21) since the facility is located in an attainment area. Emissions of NO_X, CO, SO_2, PM, and PM_{10} were subject to PSD review. The PSD-91-02 permit was issued in September 1991 by Ecology prior to commencement of construction of the facility. Details on revisions to this PSD permit are given in Section 2.4.

Before a major source can be constructed or modified in an area that meets all the health-based ambient air standards (i.e. in an attainment area), the owner or operator must demonstrate that the project will not cause or contribute to violations of any ambient air quality standard or air quality increment. Also, the owner or operator must demonstrate that the project will not cause significant deterioration in nearby Class I Areas (parks and wilderness areas).

3.6.5 Minor NSR

New or modified sources of air pollution are required to obtain a permit from the NWCAA before beginning construction. Permits contain a wide range of local, state, and federal requirements to minimize air pollution impacts on the environment. The type of activity, the size of the operation, and the kinds of pollutants emitted determine permit conditions. PSE Encogen was subject to minor NSR for ammonia and VOC (which was originally listed in the permit as unburned hydrocarbons). Ammonia is used in the selective catalytic reduction system as part of the NO_X emission control; however, some ammonia "slips" through the catalyst. Ammonia emissions are subject to minor NSR since, although ammonia is neither a criteria pollutant nor on EPA's list of Hazardous Air Pollutants (HAPs), ammonia is a state-listed Toxic Air Pollutant (TAP; see WAC 173-460-150). Section 2.4 details the minor NSR permits that cover the PSE Encogen facility.

3.7 <u>Greenhouse Gas (GHG) Regulation</u>

Greenhouse gases are chemicals that contribute to climate change by trapping heat in the atmosphere. The greenhouse gases recognized by EPA and Ecology are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). "Hydrofluorocarbons" or "HFCs" means a class of greenhouse gases primarily used as refrigerants, consisting of hydrogen, fluorine, and carbon.

PSE Encogen is required to meet the following federal and state greenhouse gas emission requirements. Because federal GHG rules do not meet the criteria that define "applicable requirements" under Title V (WAC 173-401-200(4)), they are not included in the air operating permit. However, the state GHG rules do meet the definition of Title V "applicable requirements" and therefore are incorporated into the permit.

3.7.1 40 CFR 98, Federal Mandatory Greenhouse Gas Emission Inventory Regulation

This regulation applies to PSE Encogen due to its GHG emission levels and facility type. The rule requires annual GHG inventories and reporting starting in calendar year 2010, with reports due to EPA by no later than March 31 of the following year. Reports for reporting year 2024 were due May 30, and for reporting year 2025 on October 30. This regulation is implemented in its entirety by the EPA. This regulation is excluded from appearing in a Title V air operating permit because it does not contain applicable requirements under the Title V program (WAC 173-401-200(4)).

3.7.2 WAC Chapter 173-407, Carbon Dioxide Mitigation Program, Greenhouse Gases Emissions Performance Standard and Sequestration Plans and Programs for Thermal Electric Generating Facilities, Part I WAC 173-407-010 through -070, and Part II, WAC 173-407-100 through -320.

At the time of AOP renewal, PSE Encogen is not subject to the provisions of this regulation. Chapter 173-407 WAC, "Carbon Dioxide Mitigation Program, Greenhouse Gases Emissions Performance Standard And Sequestration Plans And Programs For Thermal Electric Generating Facilities" ", consists of two parts: Part I, WAC 173-407-010 through -080, and Part II, WAC 173-407-100 through -320. According to WAC 173-407-005, Part II, "Greenhouse Gases Emissions Performance Standard and Sequestration Plans and Programs for Baseload Electric Generation Facilities Implementing Chapter 80.80 RCW" is the emissions performance standard that must be met first. Then the requirements of Part I, "Carbon Dioxide Mitigation for Fossil-Fueled Thermal Electric Generating Facilities, Implementing Chapter 80.70 RCW", are applied.

The Part II greenhouse gases emissions performance standard is applicable to all existing baseload electric generation facilities and units when a new baseload electric generating facility or unit at the existing facility is issued construction approval or site certification agreement (WAC 173-407-120 (3)(a)), the existing facility or a unit is upgraded (WAC 173-407-120 (3)(b)), or the existing facility or unit is subject to a new long-term financial commitment (WAC 173-407-120 (3)(c)). A "baseload electric generation facility" means a power plant that provides "baseload electric generation", which is defined as electric generation from a power plant that is *designed and intended* to provide electricity at an annualized plant capacity factor of at least sixty percent. For purposes of the rule, designed "means originally specified by the design engineers for the power plant or generating units (such as simple cycle combustion turbines) installed at a power plant; and intended means allowed for by the current permits for the power plant, recognizing the capability of the installed equipment or intent of the owner or operator of the power plant." At this time, Part II performance standards do not apply to the PSE Encogen facility since it is an existing facility and no triggering events have occurred since June 30, 2008 (the date specified in the rule to delineate existing facilities).

3.7.3 WAC Chapter 173-441, Reporting of Emissions of Greenhouse Gases

Chapter 173-441 WAC, "Reporting of Emissions of Greenhouse Gases", is a mandatory greenhouse gas (GHG) reporting rule for:

- Suppliers that supply applicable fuels sold in Washington State of which the complete combustion or oxidation would result in at least 10,000 metric tons of carbon dioxide annually; or
- Any listed facility that emits at least 10,000 metric tons of CO_2-equivalents (CO_2e) of greenhouse gases annually in the state.

WAC 173-441 was adopted by Ecology on December 1, 2010 and became effective on January 1, 2011. This regulation applies to PSE Encogen because the facility emits at least 10,000 metric tons of CO_2e of greenhouse gases per year. See Table 2-2 for annual GHG emissions for the last five years for PSE Encogen. WAC 173-441 requires annual GHG inventories with reports due no later than March 31 of the following year for facilities that are also subject to 40 CFR 98. Under WAC 173-441, annual emissions are reported to Ecology. This regulation is implemented in its entirety by Ecology. Because the statutory authority for chapter 173-441 WAC was the state Clean Air Act (chapter 70A.15 RCW), it is considered an applicable requirement under the air operating permit program (WAC 173-401-200(4)); as such, it is included in the AOP.

4 GENERAL ASSUMPTIONS OF THE PERMIT

4.1 Permit Content

The permit contains standard terms, generally applicable conditions for the type of facility permitted, and specifically applicable conditions originating from PSD permits, OAC, and local, state, and federal rules. Applicable requirements that were satisfied by a single past action on the part of the source are not included in the AOP. An example of this would be performance testing to demonstrate compliance with applicable emission limitations as a requirement of initial startup. Also, regulations that require action by a regulatory agency but not of the regulated source are not included as applicable permit conditions.

4.2 Federal Enforceability

Federally enforceable requirements are terms and conditions required under the Federal Clean Air Act (FCAA) or under any of its promulgated regulations. NWCAA and state regulations may become federally enforceable by formal approval and incorporation into the State Implementation Plan (SIP). Federally enforceable requirements are enforceable by the EPA and citizens. All applicable requirements in the permit, including standard terms and conditions, generally applicable requirements, and specifically applicable requirements are federally enforceable unless they are identified in the permit as enforceable only by the state. Two different versions (identified by the date) of the same regulatory citation may apply to the source if SIP approval/delegation lags behind changes made to the Washington Administrative Code (WAC) or to the NWCAA Regulation. For WAC regulations, the date listed in parenthesis in the air operating permit represents the State Effective date. For NWCAA regulations, the date represents the NWCAA Board of Directors adoption date, which is identified as the "Passed" or "Amended" date in the NWCAA Regulation. The date associated with an OAC or PSD permit represents the issuance date of that order. For Federal rules, the date is the rule's promulgation date.

Chapter 173-401 WAC is not federally enforceable although the requirements of this regulation are based on federal requirements for the air operating permit program. Upon issuance of the permit, the terms based on Chapter 173-401 WAC will become federally enforceable for the source.

4.3 Gap-Filling and Sufficiency Monitoring

Title V of the Federal Clean Air Act is the basis for the EPA's 40 CFR 70, which is the basis for the State of Washington air operating permit regulation, Chapter 173-401 WAC. Title V requires that all air pollution regulations applicable to the source be called out in the AOP for that source. Title V also requires that each applicable regulation be accompanied by a federally enforceable means of "reasonably assuring continuous compliance." Title V, 40 CFR 70, and WAC 173-401-615 all contain a "gap-filling" provision that enables NWCAA to add monitoring where no monitoring is present[5]. 40 CFR Part 70.6(c)(1) and WAC 173-401-630(1) contain authority to

[5] WAC 173-401-615(1) Monitoring. Each permit shall contain the following requirements with respect to monitoring:
(a) All emissions monitoring and analysis procedures or test methods required under the applicable requirements, including any procedures and methods promulgated pursuant to sections 504(b) or 114 (a)(3) of the FCAA;
(b) Where the applicable requirement does not require periodic testing or instrumental or noninstrumental monitoring (which may consist of recordkeeping designed to serve as monitoring), periodic monitoring sufficient to yield reliable data from the relevant time period that are representative of the source's compliance with the permit, as reported pursuant to subsection (3) of this section. Such monitoring requirements shall assure use of terms, test methods, units, averaging periods, and other statistical

address situations where monitoring exists, but is deemed to be insufficient. NWCAA relied upon these authorities to add monitoring where needed to the AOP.

The majority of cases where monitoring needed to be added were older regulations and permits that contain no monitoring. For example, NWCAA used its gap-filling authority to add monitoring for the 20% visible emission standard, NWCAA 451.1. In any term where gap-filling has taken place, the regulatory citation for that term will contain the words "directly enforceable" and the introductory paragraphs for the AOP table include the reference to the citation of the gap-filling requirement.

While NWCAA has authority to add monitoring where existing monitoring was insufficient, this was not needed for the PSE Encogen AOP. All additional monitoring for PSE Encogen was done based on NWCAA's gap-filling authority, WAC 173-401-615.

The type and frequency of monitoring added under the authority in WAC 173-401-615 were set based on the following factors:

1. Historical Compliance: NWCAA reviewed the facility's past compliance with the underlying requirement. This information helped inform the decision about monitoring frequency and stringency.
2. Margin of Compliance: The margin of compliance is a measure of whether the facility can easily achieve compliance with a requirement, or whether they operate close to the limit. NWCAA considered the facility's margin of compliance for each underlying requirement in setting monitoring for that requirement.
3. Variability of Process and Emissions: Processes that vary their production rates and/or emissions over time require different monitoring from steady-state processes. NWCAA considered process and emission variability in setting monitoring.
4. Environmental Impact of a Problem: Exceedances of some permit requirements have greater environmental consequences than others. For example, a problem that causes an exceedance of the ammonia emission limit in the SCR for a turbine could have a greater environmental impact than failing to use ultra-low sulfur diesel at an emergency generator. NWCAA considered the environmental impact of a problem in setting monitoring.
5. Clarity and Complexity: The requirements that apply to AOP facilities are numerous, varied, and can be complex. The greater the number, variety, and complexity of requirements, the harder it is for a facility to understand and comply. NWCAA's goal is to write clear, concise permits the facilities can understand. To help achieve this goal, when possible, NWCAA aligned additional monitoring with monitoring that the facility is already performing. This approach required careful thought. NWCAA reviewed the monitoring the facility is already performing to see if it was adequate to stand-in as monitoring for the permit term, and only used it if deemed adequate.

The following table lists where NWCAA used its gap-filling monitoring authority. No Directly enforceable – sufficiency provisions exist in the AOP.

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conventions consistent with the applicable requirement. Recordkeeping provisions may be sufficient to meet the requirements of this paragraph; and
(c) As necessary, requirements concerning the use, maintenance, and, where appropriate, installation of monitoring equipment or methods.

Table 4-1 AOP terms with Directly Enforceable gapfill provisions

AOP Term	Description	Monitoring
4.1	Required monitoring reports	Reporting periods identified
4.2	Operation and maintenance	Monitor, keep records and report
4.3-4.6, 4.22	Nuisance and Odor	Procedure followed when complaints are received
4.7-4.11	Fugitive PM	Procedure followed when complaints are received
4.12-4.17	Visible emissions	Visible emissions monitoring
4.18-4.23	Sulfur dioxide	Burn biomass or natural gas only
5.1.1	Sampling ports and platforms	Inspection and repair of sampling ports as necessary
5.1.9-5.1.10	Turbine visual emissions, PM	Action taken to monitor VE
5.1.13	NSPS Subpart GG NOx limit	Calculating and recordkeeping daily and 12 month rolling NOX emissions
5.1.18	Sulfur content of natural gas	Recordkeeping to demonstrate sulfur content of fuel
5.2.1	Color of fuel tanks	Visual inspection of fuel tanks
5.2.2-5.2.3	Fuel stored in tanks	Recordkeeping that describes fuel stored

4.4 Future Requirements

Applicable requirements promulgated with future effective compliance dates may be included as applicable requirements in the permit. Some requirements that are not applicable until triggered by an action, such as the requirement to file an application prior to constructing a new source, are addressed within the standard terms and conditions section of the permit.

There are presently no pending applications to construct or modify PSE Encogen in such a way as to trigger New Source Review. PSE Encogen has certified in the permit renewal application that the facility will meet any future applicable requirements on a timely basis.

4.5 Compliance Options

PSE Encogen did not request emissions trading provisions or specify more than one operating scenario in the air operating permit application; therefore, the permit does not address these options as allowed under WAC 173-401-650. This permit does not condense overlapping applicable requirements (i.e., streamlining) nor does it provide any alternative emission limitations.

5 PERMIT ELEMENTS AND BASIS FOR TERMS AND CONDITIONS

5.1 Permit Organization

The PSE Encogen Air Operating Permit (AOP) is divided into the following sections:

- Permit Information
- Attest
- Table of Contents
- Section 1 Emission Unit Identification
- Section 2 Standard Terms and Conditions
- Section 3 Standard Terms and Conditions for New Source Performance Standards
- Section 4 Generally Applicable Requirements
- Section 5 Specifically Applicable Requirements
- Section 6 Acid Rain Permit for Combustions Turbines 1, 2, and 3
- Section 7 Inapplicable Requirements

5.2 Permit Information and Attest

5.2.1 Permit Information

The Permit Information page identifies the source and provides the facility address, the responsible corporate official, the permit issuance date and the permit expiration date, and the agency personnel responsible for permit preparation, review, and issuance.

5.2.2 Attest

The Attest page provides authorization for the source to operate under the terms and conditions contained in the permit.

5.3 Section 1 Emission Unit Identification

The Emission Unit Identification section lists emission units, equipment ratings, and control devices present at PSE Encogen. Additional information about the facility may be found in the operating permit application and in associated files.

5.4 Section 2 Standard Terms and Conditions

The Standard Terms and Conditions section contains administrative requirements and prohibitions that do not have ongoing compliance monitoring requirements. Regulations that give legal authority to the standard terms and conditions are cited for each topic. At times, requirements are paraphrased; the language of the cited regulation takes precedence over the paraphrased summary. For understanding and readability, the terms and conditions have been grouped by function. Similar requirements from the State and the NWCAA are grouped together where possible. Requirements that are not applicable until triggered are also included. An example of these would be the requirement to file a "Notice of Construction" and "Application for Approval."

5.5 Section 3 Standard Terms and Conditions for New Source

Performance Standards

Section 3 contains applicable requirements from 40 CFR 60 Subpart A – General Provisions. PSE Encogen is subject to the NSPS General Provisions because the facility is subject to 40 CFR 60 Subpart GG – Standards of Performance for Stationary Gas Turbines.

5.6 Sections 4 and 5: Generally and Specifically Applicable Requirements

Requirements that limit emissions and broadly apply through the facility are identified in Section 4 - Generally Applicable Requirements. Requirements that limit emissions and apply specifically to emission units at PSE Encogen are identified in Section 5 - Specifically Applicable Requirements. Both section tables are organized by pollutant type for better readability. The first column contains the term number followed by the pollutant type. The second column identifies the regulatory citation. The third column provides a brief description of the applicable requirements for informational purposes and is not enforceable. The fourth column identifies monitoring, recordkeeping and reporting requirements in accordance with WAC 173-401-605(1), -615(1) & (2) and is enforceable except that insignificant emission units are exempt from all MR&R. Test methods associated with each applicable requirement or in accordance with WAC 173-401-615(1)(a) are included in this column.

Many generally applicable requirements do not specify test and/or monitoring methods within the text of the regulation or statute even though WAC 173-401-615 requires the permit to feature monitoring and recordkeeping adequate to demonstrate compliance with such requirements. In these cases, site-specific monitoring methods (gap filling) were developed as discussed in Section 4.4 above.

Sulfur emission limits of all units contained in the Generally and Specifically Applicable Requirements section of the permit are inherently met if the turbines burn only natural gas containing less than 20 grain/100 SCF sulfur. This is reflected in the July 2004 NSPS Subpart GG revisions which allow the source to keep documentation from its natural gas supplier that the fuel has less than 20 grains/100 SCF sulfur in lieu of testing or perform initial testing demonstrating that the natural gas meets the definition.

Requirements pertaining to operation and maintenance, nuisance, fugitive emissions and odor may be met through adherence to PSE Encogen internal operation and maintenance (O&M) plan and a commitment to timely complaint response and follow-up corrective action. It should be noted that the PSE Encogen O&M plan is not included as part of their air operating permit.

5.6.1 Fugitive Emission Standards

PSE Encogen does not conduct activities that typically generate fugitive emissions such as storage or transport of solid materials. Permit conditions require the facility to respond to and correct nuisance emissions as soon as possible. If emissions cannot be corrected within four hours, PSE Encogen must notify the NWCAA within twelve hours with a description of the complaint and action being taken to resolve the problem. PSE Encogen will provide assurance of compliance with these requirements in the annual compliance certification and by maintaining a log of nuisance complaints and associated repairs and mitigation actions.

5.6.2 Opacity Standard

The generally applicable opacity requirement limits any source at the facility to 20% opacity according to Ecology Method 9A. Because the combustion turbines have more stringent opacity requirements at 5% opacity by EPA Method 9 and Ecology Method 9A, respectively, and because visible emissions are not known to occur in general at PSE Encogen, the MR&R for the opacity standard is written such that any visible emissions require immediate action with increasing stages of monitoring, depending on the situation. Any observed visible emissions require that one of three steps be taken within 24 hours: correct the problem, a certified reader shall determine the opacity by EPA Method 9, or shut the unit down. If an EPA Method 9 test shows emissions in excess of any standard, an Ecology Method 9A reading must be taken. If a certified VE reader is unavailable to read the emissions, NWCAA will assume that all opacity standards have been exceeded. Observations and actions taken must be recorded and made available at the facility for inspection. Visible emission observations are required monthly and each time a turbine begins operating on fuel oil.

If opacity is greater than an applicable emission standard, the exceedance must be reported to NWCAA. All Method 9 or 9A opacity readings must be taken by an individual holding a valid Certification of Completion for Plume Evaluation Training from Ecology or other authorized training facility.

5.6.3 Particulate Matter Standards

The gas turbine exhaust stacks are sources of particulate matter emissions at the PSE Encogen facility. Modern gas turbines, when fueled by natural gas or low-sulfur oil, are unlikely to exceed particulate matter emission standards if the units are properly operated and maintained.

Performance tests conducted during May and June 1993 using EPA Reference Method 5 demonstrated compliance with particulate matter emission standards for the gas turbines. Tests were conducted on units operating at 100 percent of full load during both natural gas and oil firing.

Permit conditions require that PSE Encogen visually monitor emissions from these stacks as a surrogate to stack testing. In addition, PSE Encogen provides assurance of compliance with these requirements in an annual compliance certification, which is signed by a Responsible Official who is held accountable for the truth and accuracy of the statements he or she certifies.

5.6.4 Sulfur Dioxide Standards

The gas turbines are sources of sulfur dioxide emissions. The gas turbines are limited by the conditions specified in the AOP to burning either natural gas or fuel oil containing no more than 0.05% by weight sulfur.

“Natural gas” is defined in NSPS 40 CFR 60.331(u) Subpart GG as follows:

> ***Natural gas*** means a fluid mixture of hydrocarbons (*e.g.,* methane, ethane, or propane) that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions. Natural gas contains 20.0 grains or less of total sulfur per 100 standard cubic feet. Equivalents of this in other units are as follows: 0.068 weight percent total sulfur, 680 parts per million by weight (ppmw) total sulfur, and 338 parts per million by volume (ppmv) at 15.5 degrees Celsius total sulfur. Additionally, natural gas must be composed of at least 70 percent methane by volume and have a gross calorific value between 950 and 1100 British thermal units (Btu) per standard cubic foot. Unless refined to meet the definition of natural gas in this paragraph (u), natural gas does not include the following gaseous fuels: landfill gas, digester gas, refinery gas, sour gas, blast furnace gas, coal-derived gas, producer gas, coke oven gas, or any gaseous fuel produced in a process which might result in highly variable sulfur content or heating value.

PSE Encogen receives natural gas from Cascade Natural Gas. This same natural gas is used by all the other natural gas consumers, private and industrial, in the northwest WA state. Natural gas contains approximately 1 to 2 grains of sulfur per 100 standard cubic feet on average and up to 6 grains of sulfur per 100 standard cubic feet, which includes 0.26 grains of sulfur per 100 standard cubic feet contributed by the methyl mercaptan added to this otherwise odorless gas for the purposes of leak detection.

NWCAA Regulation Section 460 requires a sulfur dioxide ambient monitoring plan for sources with a heat input greater than 500 MMBtu/hour. NWCAA has determined that the requirement to burn only natural gas or “on-road spec” oil satisfies this requirement.

When natural gas is burned, the gas turbines will emit about 0.0163 lb SO_2 per MMBtu as shown in the following calculation:

$$\frac{6\ gr\ S}{100\ scf\ natural\ gas} \times \frac{1\ lb\ S}{7000\ gr\ S} \times \frac{1{,}000\ scf\ natural\ gas}{1.05\ MMBtu} \times \frac{2\ lb\ SO_2}{1\ lb\ S} = \frac{0.0163\ lb\ SO_2}{MMBtu}$$

Note: A "lb-mole" of a pure gas weighs the molecular weight of that gas in pounds and occupies 385.3 ft^3 at 68° F and 760 mmHg pressure. (A temperature of 68° F and a pressure of 760 mmHg are standard conditions according to NWCAA Section 200). A "lb-mole" of sulfur weighs 32 lb and reacts with a lb-mole of oxygen which also weighs 32 lb to form a lb-mole of sulfur dioxide, which weighs 64 lb. Therefore, 2 lb of SO_2 are generated for every lb of sulfur in the fuel.

The only diesel oil that is available for purchase now is ULSD (ultra-low sulfur diesel), which must contain no more than 15 ppm sulfur, or 0.0015%. According to Section 3.1 of the EPA's AP-42 emission factors (*Stationary Gas Turbines, 4/00*), the emission factor for sulfur dioxide from turbines burning fuel oil is 1.01 lb SO_2 per MMBtu times the percent sulfur of the fuel (by weight). Therefore, in the case of ULSD, the emission factor would be

$$\frac{1.01\ lb\ SO_2}{MMBtu \cdot \%S} \times 0.0015\ \%S\ = \frac{0.001515\ lb\ SO_2}{MMBtu}$$

This is well below the limit of 1.5 lb SO_2 per MMBtu.
The current sulfur content of the diesel fuel contained in the fuel tanks at the facility is 0.0388%, or about 26 times larger than that in ULSD. This means that the emission factor for SO_2 would be 0.04 lb SO_2 per MMBtu.

Permit terms 4.18 – 4.21 limit emissions to 1,000 parts of sulfur dioxide per million parts of stack gas, on a dry volumetric basis, corrected to 7 percent oxygen, calculated as an hourly average. During performance testing conducted in May and June of 1993 the turbines emitted an average of 0.3 ppmvd SO_2 corrected to 15% O_2 when fired on natural gas and 9.6 ppm SO_2 corrected to 15% O_2 when fired on 0.078% sulfur oil (which is equivalent to 6.2 ppm SO_2 when the turbines are fired on 0.05 wt% sulfur oil as shown in the discussion in Section 5.7.6 below).

When natural gas is burned, assuming the sulfur content of the gas is the same as it was during initial source testing, the gas turbines will emit about 0.7 ppm (corrected to 7 percent oxygen) as shown in the following calculation:

$$0.3\ ppmdv\ SO_2\ corrected\ to\ 15\%\ O_2\ \times \frac{(21-7)\%\ O_2}{(21-15)\%\ O_2} =\ 0.7\ ppmdv\ SO_2\ corrected\ to\ 7\%\ O_2$$

However, the sulfur content of natural gas varies somewhat over time. Nonetheless, even if the sulfur content of the natural gas is 100 times greater than the sulfur content of the natural gas burned during source testing, the amount of sulfur dioxide emitted (approximately 70 ppmvd SO_2) would still be much less than the 1,000 ppmvd limit.

When oil is burned, the gas turbines will emit about 14.5 ppm (corrected to 7 percent oxygen) as shown in the following calculation:

$$6.2\ ppmdv\ SO_2\ corrected\ to\ 15\%\ O_2\ \times \frac{(21-7)\%\ O_2}{(21-15)\%\ O_2} =\ 14.5\ ppmdv\ SO_2\ corrected\ to\ 7\%\ O_2$$

Both of the calculated SO_2 emission rates are below the 1,000 ppmvd limit. PSE Encogen can adequately show compliance with this requirement by burning only natural gas or "on-road spec" oil and maintaining fuel oil supplier-provided records of fuel oil specification, including sulfur content, for all oil burned.

Permit terms 4.22 – 4.23 limit sulfur content in the fuels used at the facility. Natural gas, the only gaseous fuel allowed at PSE Encogen, is limited to 412 ppm, and No.2 distillate, the only liquid fuel allowed at PSE Encogen, is limited to 0.5% by weight sulfur. Natural gas contains approximately one to two grains of sulfur per 100 standard cubic feet as supplied; the sulfur content of the natural gas is limited by Northwest Pipeline's (NWP) Federal Energy Regulatory Commission (FERC) tariff (NWP supplies natural gas to Cascade, who then supplies natural gas to PSE Encogen) to a maximum of 6 grains of total sulfur per 100 standard cubic feet.

Natural gas may contain up to 103 parts per million sulfur, as shown in the following calculation:

$$\frac{6\ gr\ S}{100\ ft^3\ natural\ gas} \times \frac{1\ lb\ S}{7{,}000\ gr\ S} \times \frac{1\ lbmol\ S}{32\ lb\ S} \times \frac{385.3\ ft^3\ S}{1\ lbmol\ S} = \frac{103.2\ ft^3\ S}{1{,}000{,}000\ ft^3\ natural\ gas} = 103\ ppmdv\ S$$

On-road specification oil is limited by OAC 400 for the turbines to 0.05% by weight sulfur, which is 1/10th of the allowable level under NWCAA 520. PSE Encogen can adequately show compliance with this requirement by burning only natural gas or "on-road spec" oil, and maintaining fuel oil supplier-provided records of fuel oil specification, including sulfur content, for all oil burned.

5.7 Section 5 Specifically Applicable Requirements

5.7.1 General, Sampling Ports (Permit Term 5.1.1)

PSE Encogen is required to have sampling ports that meet the requirements of 40 CFR 60 Appendix A Method 20 per PSD 91-02 Amendment 4 condition 9. NSPS 40 CFR 60 Subpart A 60.8(e) also requires that the facility provide safe sampling platforms, safe access to sampling platforms, and utilities for sampling and testing equipment. NWCAA determined that once per year PSE Encogen personnel shall demonstrate compliance with these requirements by confirming that the sampling platforms are intact and have not corroded away and include the results of the inspection as a line item in the annual compliance certification.

5.7.2 Opacity Standard (Permit Terms 5.1.9 and 5.2.2)

The specifically applicable opacity standards limit the combustion turbines to 5% opacity according to EPA Method 9. The specifically applicable opacity permit terms reference the MR&R for the generally applicable opacity term.

The gas turbine exhaust stacks are potential sources of visible emissions at the PSE Encogen facility. Modern gas turbines, when fueled by natural gas or low-sulfur oil, are unlikely to exceed visible emission standards if the units are properly maintained.

5.7.3 Particulate Matter (PM_{10}) Standard for Combustion Turbines (Permit Term 5.1.10)

This permit term covers condition 8 in PSD 91-02 Amendment 4, which limits PM_{10} emissions from each turbine exhaust to 60 pounds per day when fired on gas and 408 pounds per day when fired on oil. Total PM_{10} emissions from the turbine stacks are limited to 180 pounds per day when fired on natural gas or 1,224 pounds per day when fired on oil.

Particulate matter emissions from combustion turbines result from condensation of exhaust gases, carryover of noncombustible trace constituents in the fuel, or from agglomerated soot particles, particularly during liquid fuel firing. Particulate matter emissions are typically low with natural gas and distillate oil firing because of the very low ash content in both fuels. Modern gas turbines, when fueled by natural gas or low-sulfur oil, are unlikely to exceed fine particulate matter emission standards if the units are properly operated and maintained.

EPA Reference Method 5 performance tests were conducted on the turbines operating at 100 percent of full load with both natural gas and oil firing during May and June 1993, demonstrating compliance with particulate matter emission standards. The highest results when the units were operated on natural gas were approximately 70 percent of the limits in Permit Term 5.1.10. The highest results when the units were operated on oil were approximately 10 percent of the limits in Permit Term 5.1.10. It is noted that there was high variability among the individual runs that comprised the average PM result for a given turbine.

5.7.4 Oxides of Nitrogen (NO_X) Standard for Combustion Turbines (Permit Terms 5.1.11-14)

Permit Term 5.1.13 (40 CFR 60.332(a)(1)) limits NO_X emissions from each turbine to 0.0075% (equivalent to 75 ppm) corrected to 15% oxygen on a dry basis, plus allowances for heat rate and fuel bound nitrogen. According to PSE Encogen, the manufacturer's rated heat rate at load is 10,660 Btu/kW-hr, and the fuel-bound nitrogen is essentially zero (F = 0 in the equation below). After accounting for the heat content allowance, the allowable NO_X concentration under 40 CFR 60.332(a)(1) is 96 ppmvd, calculated from the equation given in § 60.332(a)(1):

$$STD = 0.0075\% \times \frac{14.4}{Y} + F = 0.0075\% \times \frac{14.4}{11.246} + 0 \approx 0.009603\% = 96\ ppmdv\ NO_x$$

where:

$$Y = \ 10{,}660 \frac{Btu}{kW \cdot hr} \times \frac{1.055\ kJ}{Btu} \times \frac{1\ kW}{1{,}000\ W} = 11.246 \frac{kJ}{W \cdot hr}$$

The turbines are subject to a second set of NO_X limitations stemming from NWCAA OAC 400f and PSD 91-02. These limits are listed in Permit Term 5.1.11. The numeric standards in Permit Term 5.1.11 are more stringent than those found in Permit Term 5.1.13, but the averaging periods are longer (daily average for the OAC and PSD limits vs. 4-hour average for the NSPS limit). When fired on natural gas, the limit in Permit Term 5.1.11 is 7.0 ppmvd NO_X corrected to 15% oxygen daily average. When fired on fuel oil, the limit in Permit Term 5.1.11 is 11.0 ppmvd corrected to 15% oxygen daily average. If the rolling four-hour 96 ppmvd NO_X limit is exceeded, either daily NO_X limit will likely also be exceeded (depending on fuel usage). PSE Encogen demonstrates compliance with NO_X emission limits by utilizing a CEMS on each turbine stack.

5.7.5 Ammonia (NH_3) Standard for Combustion Turbines (Permit Term 5.1.15)

NWCAA OAC 400f conditions 2(C), 3(C), and 5(B) limit NH_3 emissions from all three turbines to 437 pounds per day and to 10.0 ppmvd corrected to 15% O_2 on an hourly average from each turbine exhaust stack.

The SCR unit is the final part of the NO_X control system. SCR involves injection of ammonia into the turbine exhaust stream ahead of a catalyst grid in the HRSG section. Most of the NO_X reacts to form elemental nitrogen and water in the presence of ammonia and the catalyst. Some ammonia gets through the HRSG without reacting with the NO_X. This excess ammonia is sometimes referred to as "ammonia slip".

PSE Encogen controls NO_X emissions by steam injection into the combustion zone and by varying the amount of ammonia that is injected into the exhaust stream of each gas turbine. The amount of ammonia required to adequately control NO_X depends on the amount of NO_X control achieved by steam injection. Also, the amount of ammonia required to reduce the exhaust NO_X concentration increases over time as the catalyst degrades. PSE Encogen records the ammonia flow regulator valve setting (displayed as percent open) for each gas turbine/HRSG unit in order to monitor ammonia usage. PSE Encogen sends catalyst samples to an independent laboratory for testing on a periodic basis.

PSE Encogen demonstrates compliance with ammonia limits by conducting an annual source test for ammonia and by maintaining the ammonia injection rate relative to NO_X concentration and stack flow.

5.7.6 Sulfur Dioxide Standard, Stack Emissions from Combustion Turbines (Permit Term 5.1.16)

This permit term cites condition 6 of PSD 91-02 Amendment 4, which limits SO_2 emissions from each turbine exhaust to 9.0 ppm corrected to 15% O_2 on a daily average when fired on oil. SO_2 emissions from the facility are limited to 658 pounds per day when fired on oil.

Sulfur dioxide is formed when sulfur in the fuels reacts with oxygen in the air during the combustion process. Two pounds of sulfur dioxide are emitted from the stack for every pound of sulfur in the fuel.

The amount of SO_2 emitted depends on the amount of sulfur in the fuel. The amount of sulfur in natural gas is generally between 1 and 2 grains total sulfur per 100 standard cubic feet of natural gas, but can be as high as 6 grains total sulfur per 100 standard cubic feet of natural gas according to the FERC tariff. When the turbines operate at capacity on natural gas containing 6 grains sulfur per 100 standard cubic feet (0.0163 lb SO_2 per MMBtu), approximately 517 lb sulfur dioxide are emitted per day as shown in the following calculation:

$$\frac{0.0163\ lb\ SO_2}{MMBtu} \times \frac{440\ MMBtu}{turbine \cdot hr} \times 3\ turbines \times \frac{24\ hr}{day} = \frac{517\ lb\ SO_2}{day}$$

The limit for sulfur dioxide emissions from the turbines is 658 lb/day while combusting diesel fuel, but this calculation shows that they also meet the limit when combusting natural gas fuel

During performance testing conducted in May and June of 1993, the turbines emitted an average of 9.6 ppmvd SO_2 when fired on 0.078 wt% sulfur oil. This test was run before 0.05 wt% sulfur oil was available and was done with the knowledge that 0.05 wt% sulfur would be required for all future operations and that the SO_2 emissions were directly proportional to the sulfur content of the oil. However, the diesel available for purchase now is ultra low sulfur diesel, which must contain no more than 15 ppm sulfur. The maximum theoretical SO_2 concentration is the measured value multiplied by a ratio of the maximum allowable fuel sulfur to the fuel sulfur measured at the time of the test, as shown below:

$$9.6\ ppmvd\ SO_2\ \times\ \frac{0.0015\ wt\%\ S_{allowable}}{0.078\ wt\%\ S_{one-time}} =\ 0.2\ ppmvd\ SO_2$$

Note that this SO_2 concentration is less than the allowable 9.0 ppmvd.

When the turbines operate at capacity on 0.0015 wt% sulfur oil (ULSD), they will emit approximately 51 lb SO_2/day as shown in the following calculation:

$$\frac{0.001515\ lb\ SO_2}{MMBtu} \times \frac{470\ MMBtu}{turbine \cdot hr} \times 3\ turbines \times \frac{24\ hr}{day} = \frac{51\ lb\ SO_2}{day}$$

PSE Encogen can adequately show compliance with this permit term by burning only natural gas and maintaining fuel oil supplier-provided records of fuel oil specification, including sulfur content, for all oil burned.

5.7.7 Fuel Sulfur Content (Permit Term 5.1.17)

Permit Term 5.1.17 (40 CFR 60.333) limits the sulfur content of fuel burned in the turbine to 0.8% by weight and SO_2 stack emissions to 0.015% (150 ppm) corrected to 15% O_2 on a dry basis.

As previously stated, natural gas is contractually limited to 6 grains of sulfur per 100 standard cubic feet. The sulfur content of natural gas is about 0.0171 percent by weight, as shown below[6]:

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[6] A "lb-mole" of a mixed gas weighs the molecular weight of that gas in pounds and occupies 378.8 ft^3 at 288.15 K and 101.325 kPa pressure (59° F and 1 atmosphere pressure) per International Standard Metric Conditions. The molecular weight of a mixed gas is calculated from the weight fractions of the various pure gases combining to form that gas. Natural gas is composed primarily of methane, with small amounts of higher molecular weight hydrocarbons, such as ethane and propane. A "lb-mole" of natural gas weighs approximately 19 lb. The maximum sulfur content of low-sulfur diesel oil is 0.05 percent by weight.

$$\frac{6\ gr\ S}{100\ ft^3\ natural\ gas} \times \frac{1\ lb\ S}{7{,}000\ gr\ S} \times \frac{378.8\ ft^3\ natural\ gas}{1\ lbmol\ natural\ gas} \times \frac{lbmol\ natural\ gas}{19\ lb\ natural\ gas} = 0.000171 \frac{lb\ S}{lb\ natural\ gas}$$

As shown above, SO_2 was measured from the turbines at 0.7 ppm when fired on natural gas and 14.5 ppm when the units were fired on oil.

Natural gas and low-sulfur oil do not contain enough sulfur to exceed the limits in 40 CFR 60.333. Therefore, the use of natural gas and ULSD will adequately demonstrate compliance with this requirement.

5.7.8 Carbon Monoxide Standard for Combustion Turbines (Permit Terms 5.1.19)

NWCAA OAC 400e conditions 2(B), 3(B), and 5 and PSD 91-02 Amendment 4 condition 7 limit CO emissions from each turbine exhaust stack to 10.0 ppmvd corrected to 15% O_2 and ISO on an hourly average and CO emissions from the facility to 718 pounds per day. During initial performance testing in May and June 1993, the CO emissions averaged 2.6 ppmvd and 69.8 pounds per day while firing natural gas and 2.1 ppmvd and 57.6 pounds per day while firing oil. The measured CO concentration was approximately 25% of the standard and the CO emission rate was less than 10% of the standard during initial performance testing.

Compliance Assurance Monitoring (CAM) in 40 CFR 64 would require PSE Encogen to submit a CAM plan for CO at the time of permit renewal if any turbine had an uncontrolled CO potential to emit (PTE) greater than 100 tons per year and was equipped with an active CO control device. PSE Encogen initially monitored CO emissions for two years and found CO emissions were consistently less than 30% of the CO limit (limits are 10.0 ppmvd corrected to 15% oxygen and ISO conditions, one-hour average, and 718 lb/day from the three turbine stacks, which is approximately 131 tons per year from the three turbines, and less than 45 tons per year per turbine). Therefore, the turbines do not meet the PTE applicability requirement of 40 CFR 64.2(a)(3). In addition, because there is no active CO control device, the source is exempt from CAM under 40 CFR 64.2(a)(2).

NWCAA determined that CO is an appropriate surrogate for incomplete combustion and VOC emissions from the combustion turbine stacks at the PSE Encogen facility. In the previous version of the PSE Encogen AOP, Permit Term 5.21 limited VOC emissions (referred to as "unburned hydrocarbons" in the underlying OAC 400d) from each turbine exhaust stack to 7.0 ppmvd corrected to 15% O_2 and ISO on an hourly average and from the project to 362 pounds per day. During initial performance testing in May and June 1993, VOC emissions averaged 0.1 ppmvd and 3.8 pounds per day while firing natural gas and 1.3 ppmvd and 56.0 pounds per day while firing fuel oil. The maximum measured VOC concentration was approximately 20% of the standard and the maximum measured mass emission rate was approximately 15% of the standard. However, PSE Encogen requested that the unburned hydrocarbon limits be dropped from OAC 400e in return for an annual CO source testing requirement. NWCAA agreed; therefore, there are no direct VOC limits for the PSE Encogen facility listed in the current AOP. However, as discussed, limiting CO emissions is also expected to limit VOC.

5.8 Section 6 Acid Rain Permit for Combustions Turbines 1, 2, and 3

The permittee is required to resubmit the Acid Rain Permit Application and Certificate of Representation every five years. The current documents as of permit issuance are included in Section 6 of the AOP.

5.9 Section 7 Inapplicable Requirements

Washington Administrative Code 173-401-640(2) allows a determination regarding the applicability of requirements with which the source must comply. Section 7 of the permit lists requirements deemed inapplicable based on the applicability of the cited regulation. It is stated in the AOP that the permit shield applies to the specific, listed inapplicable requirements.

6 INSIGNIFICANT EMISSION UNITS

Categorically exempt insignificant emission units as defined in WAC 173-401-532 are not included in the AOP. The following table lists the categorically exempt insignificant emission units and activities at PSE Encogen.

Table 6-1 Insignificant Activities and Emission Units

Exempt Unit	WAC Citation	Comment
Emissions from fuel oil transfer system	WAC 173-401-530 (1) (d)	Fugitive emissions
Emissions from natural gas fuel system	WAC 173-401-530 (1) (d)	Fugitive emissions
Emissions from roadways	WAC 173-401-530 (1) (d)	Fugitive emissions
Pressure sprayer engine - gasoline-powered	WAC 173-401-533 (2) (f)	Unit rated at 7.5 HP
Pump engine - gasoline-powered	WAC 173-401-533 (2) (f)	Unit rated at 5 HP
Space heaters (3) - diesel-fueled	WAC 173-401-533 (2) (f)	Units rated at 50,000 Btu/hour
Space heaters (4) - diesel-fueled	WAC 173-401-533 (2) (f)	Units rated at 150,000 Btu/hour
Welder engine - gasoline-powered	WAC 173-401-533 (2) (f)	Unit rated at 20 HP
Welding	WAC 173-401-533 (2) (i)	Less than 1 ton per day of welding rod
2,000-Gallon sulfuric acid tank	WAC 173-401-533 (2) (s)	Tank with lid (less than 99% solution)
4,000-Gallon sodium hydroxide tank	WAC 173-401-533 (2) (s)	Tank with lid
550-Gallon corrosion control tank	WAC 173-401-533 (2) (s)	Tank with lid
1,000-Gallon sodium hypochlorite tank	WAC 173-401-533 [TBD]	Double walled tank with lid

7 DEFINITIONS AND ACRONYMS

Definitions are assumed to be those found in the underlying regulation. A short list of definitions applicable to this document is included here.

An "applicable requirement" is a provision, standard, condition, or requirement in any of the listed regulations or statutes as it applies to an emission unit or facility at a stationary source.

A "cogeneration facility" is a generating facility that sequentially produces electricity and another form of useful thermal energy (such as heat or steam) in a way that is more efficient than the separate production of both forms of energy. For example, in addition to the production of electricity, large cogeneration facilities might provide steam for industrial uses in facilities such as paper mills, refineries, or factories, or for HVAC applications in commercial or residential buildings.

"Ecology" means the Washington State Department of Ecology.

An "emission unit" is any part or activity of a stationary source that emits or has the potential to emit any regulated air pollutant.

"Oil" or "on-road spec oil" means "on-road specification diesel fuel," containing no more than 0.05 percent sulfur by weight, as specified in 40 CFR § 80.29, as amended through January 18, 2001. The terms "On-road specification diesel fuel", "No. 2 distillate", "diesel fuel", "diesel oil", "No. 2 diesel", "fuel oil", and "oil" all are synonymous with the term "on-road spec oil" within the context of the PSE Encogen AOP and Statement of Basis.

A "permit" means for the purposes of the air operating permit program an air operating permit issued pursuant to Title V of the 1990 Federal Clean Air Act.

"PSE Encogen" means Puget Sound Energy – Encogen Generating Station.

"State" means for the purposes of the air operating permit program NWCAA or the Washington State Department of Ecology.

The following is a list of acronyms and abbreviations used in the Air Operating Permit and/or Statement of Basis:

AIRS	Aerometric Information Retrieval System
ASIL	Acceptable source impact level
ASTM	American Society for Testing and Materials
CAM	Compliance Assurance Monitoring (40 CFR 64)
CEM	Continuous emission monitor
CEMS	Continuous emission monitoring system
CFR	Code of Federal Regulations
CO	Carbon monoxide
EPA	The United States Environmental Protection Agency
FCAA	Federal Clean Air Act

gr	grains (there are 7,000 grains in one pound)
GP	Georgia-Pacific
HRSG	Heat Recovery Steam Generator
ISO	International Organization for Standardization
MMBtu	Million British thermal units (units of energy)
MMBtu/hr	Million British thermal units per hour (units of power)
MR&R	Monitoring, recordkeeping and reporting requirements
MWe	Megawatts electrical (units of power)
MWh	Megawatt hours (units of energy)
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOC	Notice of Construction
NO_X	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
NWCAA	Northwest Clean Air Agency
O_2	Oxygen
OAC	Order of Approval to Construct (minor New Source Review)
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in diameter
ppmvd	parts per million dry volume; parts of pollutant per million parts of dry stack gas on a volumetric basis
PSD	Prevention of Significant Deterioration (federally required program for pre-construction review of sources)
psia	pounds per square inch absolute
QA/QC	Quality assurance/quality control
RCW	Revised Code of Washington
scf	standard cubic feet
SCR	Selective Catalytic Reduction

SIP	State Implementation Plan
SO_2	Sulfur dioxide
STP	Standard Temperature and Pressure: 20° C (68° F) and 760 mm Hg (29.92 in. Hg) per NWCAA Regulation (e.g. applies to fuel sulfur limit) 288 K (15° C, 59° F) and 101.3 kPa (1 atmosphere) per ISO (e.g. applies to natural gas volume measurement)
VE	Visible emissions
VOC	Volatile Organic Compound
WAC	Washington Administrative Code

8 PUBLIC DOCKET

Copies of PSE Encogen's Air Operating Permit, permit application, and any technical support documents are available online at www.nwcleanair.org or at the following location:

Northwest Clean Air Agency
1600 South Second Street
Mount Vernon, WA 98273-52