

**OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY  
OREGON TITLE V OPERATING PERMIT and ACID RAIN PERMIT  
SIGNIFICANT PERMIT MODIFICATION REVIEW REPORT**

Eastern Region  
475 NE Bellevue Dr., Suite 110  
Bend, OR 97701

**Source Information:**

SIC	4911
NAICS	221112

Source Categories (Part and code)	
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**Compliance and Emissions Monitoring Requirements:**

Unassigned emissions	
Emission credits	
Compliance schedule	
Source test [date(s)]	Annual RATA

COMS	
CEMS	X
Ambient monitoring	

**Reporting Requirements**

Annual report (due date)	2/15
Emission fee report (due date)	2/15
SACC (due date)	2/15 and 7/30
Quarterly report (due dates)	1/30, 4/30, 7/30, 10/30

Monthly report (due dates)	
Excess emissions report (due date)	15 days after event
Other reports	

**Air Programs**

NSPS (list subparts)	A, KKKK
NESHAP (list subparts)	
CAM	
Regional Haze (RH)	
Synthetic Minor (SM)	
Part 68 Risk Management	X
CFC	
RACT	
TACT	

Title V	X
ACDP (SIP)	
Major HAP source	
Federal major source	X
NSR	
PSD	X
Acid Rain	X

**SIGNIFICANT MODIFICATION  
OREGON TITLE V OPERATING PERMIT**

**PROPOSED PERMIT ACTION**

1. This is a significant modification of Oregon Title V Operating Permit 25-0031-TV-01 issued on 7/16/08. The permit is being modified to include the requirements from 40 CFR Part 60 subpart KKKK that apply to combustion turbine 1 (CT1.EU) as a result of modifications to the combustion turbine 1.
2. The combustion turbine modifications will increase the total power output of combustion turbine 1. Natural gas usage is expected to increase approximately 3.7% on an hourly basis. The upgrades to unit 1 include a new compressor, turbine and casings with higher temperature combustion, abraded first stage seal for the power turbine, casing cooling system, new dry low NO<sub>x</sub> combustion system, and upgrades to the control system processing hardware. The increased efficiency and output will be a result of a new compressor seal design which reduces leakage through the compressor. The hourly fuel flow will increase by 3.7% and therefore hourly emission will also increase slightly. However, PGE is not requesting an increase in the annual PSELs.

**CT1 Natural Gas Capacity:**

pre-change	1.797	MMft <sup>3</sup> /hr
post change	1.863	MMft <sup>3</sup> /hr

**CT1 Emissions:**

Pollutant	Emission Factor (lb/MMcf)	Emissions (lb/hr)		Increase (lb/hr)
		Pre-change	Post Change	
PM <sub>10</sub>	2.25	4.04	4.19	0.15
SO <sub>2</sub>	0.64	1.15	1.19	0.04
NO <sub>x</sub>	16.7	30.01	31.11	1.10
CO	28.4	51.03	52.91	1.87
VOC	0.83	1.49	1.55	0.05

3. As a result of the hourly emissions increase, this is considered a modification as defined in 40 CFR 60.14, making the unit an affected facility under subpart KKKK. Once subject to subpart KKKK, the combustion turbine is no longer subject to subparts Db and GG. The requirements of subpart KKKK are summarized in attachment 1.

**PUBLIC NOTICE**

4. This permit was placed on public notice from **February 9, 2011 to March 16, 2011**. One comment was received in response to the public notice. See “Response to Comments” at the end of this report. No changes have been made to the permit. A proposed permit will be sent to EPA for a 45 day review period. The Department will request and EPA may agree to an expedited review of 5 days.

If the EPA does not object in writing, any person may petition the EPA within 60 days after the expiration of EPA's 45-day review period to make such objection. Any such petition must be based only on objections to the permit that were raised with reasonable specificity during the public comment period provided for in OAR 340-218-0210, unless the petitioner demonstrates that it was impracticable to raise such objections within such period, or unless the grounds for such objection arose after such period.

<b>Permit Condition</b>	<b>Summary of Proposed Revision</b>
Table 2	Delete subpart Db and GG requirements for CT1, add subpart KKKK requirements for CT1.
14	Delete subpart Db and GG requirements for CT1, add subpart KKKK requirements for CT1.
22	Changed permitted emissions for fees based on revised emission detail sheet.
36	Remove monitoring required by subpart GG and add subpart KKKK monitoring requirements for CT1.
39	Remove monitoring required by subpart GG and add subpart KKKK monitoring requirements for CT1.
41.a	Change the emission factors for CT1.
54	Add subpart Db and GG as non-applicable requirements for both CT1. Remove subpart KKKK as a non-applicable requirement for CT1.

**ATTACHMENT 1: 40 CFR PART 60, SUBPART KKKK REQUIREMENTS:**

<b>Subpart KKKK Citation</b>	<b>Description</b>	<b>Applicable (yes/no)</b>	<b>Reason for Not Being Applicable</b>	<b>Permit Condition Revisions</b>
60.4305(a)	Applicability	Yes	Combustion turbine 2 is being modified after 2/18/05.	None
60.4305(b)	Subpart Db and GG exemption	Yes		54
60.4315	Regulated pollutants (NO <sub>x</sub> and SO <sub>2</sub> )	Yes		14
60.4320(a)	NO <sub>x</sub> emission limits	Yes	The limits in Table 1 for new, modified or reconstructed turbins greater than 850 MMBtu/h heat input apply to combustion turbine 1. The limits are 15 ppm corrected to 15% O <sub>2</sub> or 0.43 lb/MWh, whichever is higher. All other limits in Table 1 are not applicable.	14
60/4320(b)	Provisions for two or more turbines serving a single generator	No	There are no other turbines connected to the combustion turbine 2 generator.	None
60.4325	Emission limits for multiple fuels	No	Only natural gas is burned in combustion turbine 1.	None
60.4330(a)(1)	SO <sub>2</sub> emission limit based on power output	No	PGE proposed to comply with the limit based on heat input.	None
60.4330(a)(2)	SO <sub>2</sub> emission limit based on heat input	Yes	The limit is 0.060 lb/MMBtu heat input.	14
60.4330(b)	Limits for non-continental areas	No	The facility is not located in the specified area.	None
60.4333(a)	Good air pollution control practices	Yes		7
60.4333(b)	Provisions for common steam header for more than on combustion turbine	No	There is only one heat recovery steam generator unit connected to combustion turbine 1.	None
60.4335	Compliance provisions for water or steam injection systems	No	Water or steam injection is not used to control NO <sub>x</sub> emissions for combustion turbine 1.	None
60.4340(a)	Performance testing for demonstrating compliance with the emissions limits	No	A CEMS will be used for monitoring compliance instead of annual performance tests.	None
60.4340(b)(1)	CEMS	Yes		36
60.4340(b)(2)	Continuous parameter monitoring	No	A CEMS will be used for monitoring compliance instead of a continuous parameter monitoring system.	None
60.4345	CEMS requirements	Yes		36
60.4350	CEMS excess emissions	Yes, except 60.4350(f)(1) and (3), and (g)	Provisions for simple cycle and mechanical drive are not applicable.	36

<b>Subpart K K K K Citation</b>	<b>Description</b>	<b>Applicable (yes/no)</b>	<b>Reason for Not Being Applicable</b>	<b>Permit Condition Revisions</b>
60.4355	Parameter monitoring plan	No	A CEMS will be used for monitoring compliance instead of a continuous parameter monitoring system.	None
60.4360	Total fuel sulfur monitoring	No	PGE will comply with 60.4365 instead.	None
60.4365(a)	Tariff	Yes		39
60.4365(b)	Representative fuel sampling data	No	PGE will use current tariff.	None
60.4370	Frequency of fuel sulfur content monitoring	No	PGE will use current tariff.	None
60.4375(a)	Reports for parameter monitoring and annual performance tests	No	PGE will be monitoring compliance with a CEMS.	None
60.4380(a)	Excess emissions reports when using water or steam injection	No	Water or steam injection is not used to control NO <sub>x</sub> emissions.	None
60.4380(b)	CEMS excess emission reports	Yes	Defines excess emissions, monitoring downtime, and clarifies that excess emissions are based on the highest emissions standard if there are multiple emissions standards (e.g., ppm and lb/MWh).	14 and 36
60.4380(c)	Excess emissions reports for parameter monitoring	No	PGE will be monitoring compliance with a CEMS	None
60.4385	Excess emissions for fuel sulfur monitoring	No	PGE will use current tariff.	None
60.4390	Reporting requirements for emergency or research combustion turbines	No		None
60.4395	When are reports due	Yes	Reports must be postmarked by the 30 <sup>th</sup> day following the end of each 6-month period.	53.b
60.4400	Initial and annual performance test for NO <sub>x</sub>	No	A CEMS will be used for monitoring compliance.	None
60.4405	Initial performance test if using a NO <sub>x</sub> CEMS	Yes	Use RATA to satisfy requirements of 40 CFR 60.8.	25.a
60.4410	Establishing valid parameter ranges or NO <sub>x</sub>	No	A CEMS will be used for monitoring compliance instead of a continuous parameter monitoring system.	None
60.4415(a)(1)	Initial and subsequent performance tests for SO <sub>2</sub>	Yes	Collect and analyze a fuel sample annually.	25.b
60.4415(a)(2) and (3)	Stack test for SO <sub>2</sub>	No	PGE will use option 1 instead of options 2 and 3.	None

# **RESPONSE TO COMMENTS**



# Oregon

John A. Kitzhaber, MD, Governor

Department of Environmental Quality  
Eastern Region Bend Office  
475 NE Bellevue Drive, Suite 110  
Bend, OR 97701  
(541) 388-6146  
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TTY 711

Amelia Schlusser  
Air Quality Group, NEDC  
National Environmental Defense Center  
10015 SW Terwilliger Blvd.  
Portland, OR 97219

Re: Comments on revision to the Oregon Title V Operating Permit (25-00310TV-01) for Portland General Electric Company, Coyote Springs Plant.

Dear Ms. Schlusser:

Thank you for your comments on the draft significant permit modification of the Title V permit for the PGE Coyote Springs plant. The purpose of this permit action is to incorporate the requirements of 40 CFR Part 60, subpart KKKK that are now applicable to Combustion Turbine 1. As discussed in the public notice and permit review report, PGE plans to make changes to the turbine that may increase the hourly emissions, but not the annual emissions. Because the hourly emissions may increase slightly, the changes to the turbine are a modification under the federal New Source Performance Standards making the turbine subject to subpart KKKK instead of GG.

## **The Facility's Potential Emissions Limits for Hazardous Air Pollutants Should Be Lowered or Eliminated**

The information provided for this permit action was specific to the proposed permit revisions, none of which address hazardous air pollutants. However, DEQ also provided a summary of the potential hazardous air pollutant emissions from the plant. Attached is a spreadsheet showing how the potential hazardous air pollutant emissions were estimated. The potential emissions are based on EPA emission factors for most of the hazardous air pollutants, except the formaldehyde emission factor is based on site specific source testing. This information was provided when the permit was re-issued on July 1, 2008. The entire permit will be up for renewal again on July 1, 2013.

DEQ issues permits in accordance with the regulations. The regulations do not require Plant Site Emission Limits for hazardous air pollutants (see OAR 340-222-0020(3)(c)). In addition, since this facility is a "minor" source of hazardous air pollutants, there are not any specific state or federal regulations for hazardous air pollutants.

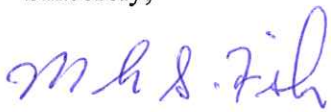
## **The Department Must Require Testing, Monitoring, Recordkeeping, and Reporting for Particulate Matter and Visible Emissions Limits While Burning Natural Gas**

DEQ has no data to suggest that particulate matter or volatile organic compounds (VOC) emissions while burning natural gas will be higher than estimated. A VOC stack test was conducted in 1996 demonstrating that the actual VOC emissions (<0.5 lb/hr) were well below the emission estimate of 6 lb/hr. Testing on other similar type combustion turbines has confirmed that actual PM emissions are

less than the emission limit in the permit (0.001 gr/dscf measured versus 0.1 gr/dscf limit – Klamath Cogeneration Project 18-0003 Sept. 2002).

DEQ agrees that complete combustion of natural gas is important to minimize PM and VOC emissions. One indicator of complete combustion is carbon monoxide (CO) emissions. The permit includes limits for carbon monoxide (CO) that are based on good combustion practices as a result of the best available control technology determination (BACT) in 1995 when this facility was first permitted. To ensure compliance with the BACT limit, the permit requires continuous monitoring of the CO emissions. DEQ has conducted inspections of the facility and observed that CO emissions are well below the limit (typically 1 ppm actual as compared to the limit of 15 ppm). For these reasons, additional testing, monitoring, recordkeeping, and reporting are not warranted.

Sincerely,



Mark Fisher  
Senior Permit Writer  
DEQ Eastern Region – Air Quality Section

**Hazardous Air Pollutant Emissions:**

**Turbines - Natural Gas** (AP-42 Table 3.2-3, except formaldehyde based on 1995 source test)  
31446.75 million cubic feet per year for both turbines

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/MMcf)	Emissions (tons/yr)
<i>1,3 Butadiene</i>	4.30E-07	4.39E-04	0.007
Acetaldehyde	4.00E-05	4.08E-02	0.642
Acrolein	6.40E-06	6.53E-03	0.103
Benzene	1.20E-05	1.22E-02	0.192
Ethylbenzene	3.20E-05	3.26E-02	0.513
Formaldehyde	3.50E-06	3.57E-03	0.056
Naphthalene	1.30E-06	1.33E-03	0.021
PAH	2.20E-06	2.24E-03	0.035
<i>Propylene Oxide</i>	2.90E-05	2.96E-02	0.465
Toluene	1.30E-04	1.33E-01	2.085
Xylenes	6.40E-05	6.53E-02	1.026
Turbines – natural gas total			5.145

**Turbine 1 - Distillate oil** (AP-42 Tables 3.1-4 and 3.1-5),

2207.8 thousand gallons per year for turbine #1

Pollutant	Emission Factor (lb/MMBtu)	Emission Factor (lb/Mgal)	Emissions (tons/yr)
<i>1,3 Butadiene</i>	1.60E-05	2.22E-03	0.002
Benzene	5.50E-05	7.65E-03	0.008
Formaldehyde	2.80E-04	3.89E-02	0.043
Naphthalene	3.50E-05	4.87E-03	0.005
PAH	4.00E-05	5.56E-03	0.006
<i>Arsenic</i>	1.10E-05	1.53E-03	0.002
<i>Beryllium</i>	3.10E-07	4.31E-05	0.000
Cadmium	4.80E-06	6.67E-04	0.001
Chromium	1.10E-05	1.53E-03	0.002
Lead	1.40E-05	1.95E-03	0.002
Manganese	7.90E-04	1.10E-01	0.121
Mercury	1.20E-06	1.67E-04	0.000
<i>Nickel</i>	4.60E-06	6.39E-04	0.001
<i>Selenium</i>	2.50E-05	3.48E-03	0.004
Turbine 1 – distillate total			0.198

**Aux. boiler - natural gas (AP-42 tables 1.4-3 and 1.4-4)**

6079.4 million cubic feet per year

Pollutant	Emission Factor (lb/MMcf)	Emissions (tons/yr)
Benzene	2.10E-03	0.006
Dichlorobenzene	1.20E-03	0.004
Formaldehyde	7.50E-02	0.228
Hexane	1.80E+00	5.471
Napthalene	6.10E-04	0.002
Toluene	3.40E-03	0.010
POM	8.82E-05	0.000
Arsenic	2.00E-04	0.001
<i>Beryllium</i>	1.20E-05	0.000
Cadmium	1.10E-03	0.003
Chromium	1.40E-03	0.004
Cobalt	8.40E-05	0.000
Manganese	3.80E-04	0.001
Mercury	2.60E-04	0.001
Nickel	2.10E-03	0.006
<i>Selenium</i>	2.40E-05	0.000
Aux. boiler total		5.739
<b>Total HAPS</b>		<b>11.082</b>

**1995 source test results for turbine 1.**

Run #	CH2O (lb/hr)	Heat input (MMBtu/hr)	CH2O (lb/MMBtu)
1	0.0038	1384.5	2.74E-06
2	0.0058	1402.3	4.14E-06
3	0.0051	1404.5	3.63E-06
Avg.			3.50E-06