

**EXHIBIT NO. \_\_\_(JMH-6)**  
**DOCKET NO. UE-09\_\_\_/UG-09\_\_\_**  
**2009 PSE GENERAL RATE CASE**  
**WITNESS: JOEY M. HENDERSON**

**BEFORE THE**  
**WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,**

**Complainant,**

**v.**

**PUGET SOUND ENERGY, INC.,**

**Respondent.**

**Docket No. UE-09\_\_\_**  
**Docket No. UG-09\_\_\_**

**FIFTH EXHIBIT (NONCONFIDENTIAL) TO THE  
PREFILED DIRECT TESTIMONY OF  
JOEY M. HENDERSON  
ON BEHALF OF PUGET SOUND ENERGY, INC.**

**MAY 8, 2009**



Puget Sound Energy, Inc.  
P.O. Box 97034  
Bellevue, WA 98009-9734

March 19, 2009

Dan Mahar, P.E.  
Environmental Engineer  
Northwest Clean Air Agency  
1600 South Second Street  
Mount Vernon, WA 98273-5202

Alan R. Newman, PE  
Senior Air Quality Engineer  
Washington State Department of Ecology  
P. O. Box 47600  
Olympia, WA 68504-7600

**CERTIFIED MAIL/RETURN RECEIPT REQUESTED**

**Subject: 2008 Annual GHG Emissions Report and  
EPS Compliance Determination Request for the  
Puget Sound Energy - Sumas Generating Station**

Dear Mr. Mahar and Mr. Newman:

**BACKGROUND AND PURPOSE**

Puget Sound Energy owns and operates the Sumas Generating Station, a modern, 125 megawatt (MW) (nominal) natural gas-fired combined-cycle cogeneration combustion turbine power plant located in Sumas, Washington. The Sumas Generating Station currently operates under authority of Order of Approval to Construct (OAC) No. 304c issued by the Northwest Clean Air Agency (NWCAA). A Title V Operating Permit Application will be submitted to NWCAA prior to the August 22, 2009 statutory deadline (i.e., one year after start of commercial operation on August 22, 2008).

As you are aware, Puget Sound Energy (PSE) purchased the Sumas Cogeneration Plant on July 25, 2008. The facility was originally permitted and constructed by its previous owner as a cogeneration plant as it provides low pressure steam to an adjacent lumber yard dry kiln. When the facility is not operating, the lumber yard produces steam via its own auxiliary boiler. The Sumas Generating Station is currently designed and permitted to operate as a baseload power plant, capable of achieving an annual capacity factor in excess of 60%. The actual annual capacity factor will vary with regional power grid system demands and PSE system economics.

January 28, 2009

Letter to Mr. Dan Mahar and Mr. Alan R. Newman

Page 2

The Sumas Generating Station utilizes a GE Frame 7EA industrial gas turbine generator to produce electrical energy. The facility burns only natural gas from the Williams Northwest Pipeline. Thermal energy in the gas turbine exhaust is used to produce steam in a heat recovery steam generator (HRSG), and the steam is converted into additional electrical energy in a steam turbine generator with condenser and cooling tower. The total nominal net electrical generation capacity of the gas and steam turbine generators is 125 MW, excluding internal "parasitic" plant load (e.g., fans, control systems, etc.). The plant's net electrical power output is delivered to the regional power transmission grid via an interconnection with the Kendall and Schuett Substations.

A selective catalytic reduction (SCR) system housed in the HRSG controls nitrogen oxide (NO<sub>x</sub>) emissions. The oxidation catalyst originally installed at the facility for CO emission control has since been demonstrated to be unnecessary to meet permitted CO emission limits, and it has been removed by PSE with NWCAA approval under OAC 304c. A standby diesel generator serves emergency power needs within the power plant, but does not produce power for sale to the regional transmission grid. Additional design details are on file in air quality permit applications at NWCAA offices.

Continuous emission monitors (CEMS) are installed and operated to continuously measure NO<sub>x</sub>, CO, oxygen (O<sub>2</sub>), and stack temperature and flow rate in the power plant stack during plant operation according to air permit and applicable regulatory requirements. Carbon dioxide (CO<sub>2</sub>) is not currently monitored, and nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) emissions have not specifically been tested to date. These pollutants are scheduled to be tested the week of March 16, 2009. Federal Acid Rain Program requirements under 40 CFR 75 recently became applicable to the Sumas Generating Station when PSE purchased the facility on July 25, 2008. CEMS equipment and software have been modified to meet applicable 40 CFR 75 requirements, and have recently undergone certification testing. Acid Rain Program Electronic Data Reports are not available at the time of this GHG report.

As a result of the Sumas Generating Station's change in ownership, the Sumas Generating Station has become subject to applicable greenhouse gas (GHG) emission monitoring and reporting, and the Emission Performance Standard (EPS) requirements set forth in Chapter 80.80 RCW and Chapter 174-407 WAC. This letter serves as PSE's first annual GHG emission and compliance report for calendar year 2008. It supplements the Sumas Generating Station's annual emission report that will be submitted to NWCAA by the April 15, 2009 due date. In addition to satisfying applicable reporting requirements of Chapter 174-407 WAC, PSE seeks the Washington Department of Ecology's (Ecology) determination of compliance with Washington State's (State) GHG EPS. Ecology's determination of compliance is being requested in support of a separate filing that PSE intends to make to the Washington Utilities and Transportation Commission.

## **FUEL USE AND POWER PRODUCTION RECORDS**

The facility began operation by PSE on August 22, 2008. To PSE's knowledge, the Sumas Generating Station was not operated by its previous owner in 2008.

The facility's natural gas heat content is recorded daily by PSE based on Williams Northwest Pipeline data, and are provided in Attachment 1 along with daily fuel consumption records and monthly and annual totals. During August through December 2008, the gas averaged approximately 1030 MMBtu/scf, and fuel consumption totaled approximately 1,764,068 MMBtu.

Attachment 1 lists monthly total energy production figures based on the Sumas Generating Station's records. Daily values will be provided to NWCAA and Ecology by May 31, 2008. Total energy production in 2008 was approximately 216,776.6 MW-hr during the period.

## **ESTIMATED GREEN HOUSE GAS EMISSION AND EPS COMPLIANCE**

### **Emission Factors**

The following "Tier B" GHG emission factors from The Climate Registry's General Reporting Protocol (GRP, ver. 1.1, dated May 2008) have been used for emission calculations, based on Mr. Bill Steiner's (URS Corporation) previous correspondence with Mr. Newman, on behalf of PSE:

- **CO<sub>2</sub>** – 53.06 kg/MMBtu (116.87 lb/MMBtu) [Source: GRP Table 12.1 for natural gas heat content ranging from 1,025 to 1,050 Btu/scf],
- **CH<sub>4</sub>** – 0.9 g/MMBtu (0.002 lb/MMBtu) [Source: GRP Table 12.5 for combined-cycle gas turbines],
- **N<sub>2</sub>O** – 2.8 g/MMBtu (0.006 lb/MMBtu) for natural gas-fired combined-cycle gas turbines [Source: GRP Table 12.5].
- **2008 Total GHG (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O)** – 56.8 kg/MMBtu (116.9 lb/MMBtu)

Although emission estimates in this letter are based on these emission factors, please note that we strongly suspect that these factors are conservatively high because they do not account for the effect that the SCR control device likely has on reducing N<sub>2</sub>O emissions. The CH<sub>4</sub> emission factor may also overstate actual emissions from the Sumas Generating Station's modern gas turbine. However, the resulting effect of this conservatism is small

January 28, 2009  
Letter to Mr. Dan Mahar and Mr. Alan R. Newman  
Page 4

because CH<sub>4</sub> and N<sub>2</sub>O emissions from natural gas combustion are negligible relative to CO<sub>2</sub> emissions.

### **Emission and EPS Compliance Calculations**

Based on the above emission factors and total fuel consumption in 2008, the total estimated GHG emission mass from the Sumas Generating Station is approximately 206,200,000 lb (1,764,068 x 116.9). This equates to 951 lb/MW-hr, which complies with Washington State's 1,100 lb/MW-hr EPS for baseload power plants.

Thank you for your consideration of this emission report and our request for a formal compliance determination from Ecology. If you have any questions or requests please do not hesitate to contact me at PSE (425-457-5835), or Bill Steiner at URS Corporation (503-948-7222). We would be pleased to provide additional information that you may need. We look forward to discussing our results and your results.

Sincerely,

Puget Sound Energy



Joey Henderson

Program Manager - CT Compliance

cc: Lorna Luebbe (PSE)  
Bill Steiner (URS Corporation)

Attachments: Attachment 1 – Sumas Generating Station Fuel Use and Energy  
Production Data

**Attachment 1. 2008 Monthly and Annual Fuel Heat Content and Consumption, and Energy Production by the Sumas Power Plant**

Month	Average MMBtu/scf	MMBtu consumed	Net Energy Production (MW-hr)
August	1028	198,855	24,362.0
September	1027	708,505	87,827.9
October	1029	429,670	53,033.2
November	1032	47,226	6,313.0
December	1034	379,811	45,240.5
Annual	1030	1,764,068	216,776.6

Notes:

1. Monthly natural gas Btu content and consumption values are based on monthly NSPS reports to NWCAA.
2. Monthly energy production figures are based on the Sumas Plant's internal monthly Availability Report records.

**Attachment 1 -- 2008 Monthly Data**  
**PUGET SOUND ENERGY CO.**  
**GAS CONTROL CENTER**

Aug-08

**SUMAS GAS QUALITY DATA**

DATE	DAY	BTU	DARS GAS klb/day	MMBTU/DAY	Density converion	44.2
08/01/2008	Friday	1031	0	0.00		
08/02/2008	Saturday	1032	0	0.00		
08/03/2008	Sunday	1028	0	0.00		
08/04/2008	Monday	1028	0	0.00		
08/05/2008	Tuesday	1029	0	0.00		
08/06/2008	Wednesday	1029	0	0.00		
08/07/2008	Thursday	1028	0	0.00		
08/08/2008	Friday	1028	0	0.00		
08/09/2008	Saturday	1029	0	0.00		
08/10/2008	Sunday	1028	0	0.00		
08/11/2008	Monday	1030	0	0.00		
08/12/2008	Tuesday	1028	0	0.00		
08/13/2008	Wednesday	1027	0	0.00		
08/14/2008	Thursday	1031	0	0.00		
08/15/2008	Friday	1029	0	0.00		
08/16/2008	Saturday	1027	0	0.00		
08/17/2008	Sunday	1028	0	0.00		
08/18/2008	Monday	1029	0	0.00		
08/19/2008	Tuesday	1027	0	0.00		
08/20/2008	Wednesday	1026	0	0.00		
08/21/2008	Thursday	1036	0	0.00		
08/22/2008	Friday	1033	93	2166.50		
08/23/2008	Saturday	1025	1043	24182.58		
08/24/2008	Sunday	1026	1051	24394.19		
08/25/2008	Monday	1027	1067	24782.76		
08/26/2008	Tuesday	1027	1074	24950.06		
08/27/2008	Wednesday	1028	1045	24313.83		
08/28/2008	Thursday	1027	1027	23860.32		
08/29/2008	Friday	1028	1057	24592.92		
08/30/2008	Saturday	1026	1076	24979.15		
08/31/2008	Sunday	1028	27	632.62		
Average:		1028	Total:	198854.94		

**Attachment 1 -- 2008 Monthly Data**  
**PUGET SOUND ENERGY CO.**  
**GAS CONTROL CENTER**

Sep-08

**SUMAS GAS QUALITY DATA**  
**DARS**

DATE	DAY	BTU	GAS klb/day	MMBTU/DAY	density conver
09/01/2008	Monday	1027	0	0.00	
09/02/2008	Tuesday	1027	917	21306.76	
09/03/2008	Wednesday	1026	1080	25074.33	
09/04/2008	Thursday	1026	1074	24921.12	
09/05/2008	Friday	1026	1072	24879.34	
09/06/2008	Saturday	1029	1060	24677.38	
09/07/2008	Sunday	1029	1041	24228.06	
09/08/2008	Monday	1026	1057	24524.19	
09/09/2008	Tuesday	1025	1065	24704.36	
09/10/2008	Wednesday	1027	1071	24882.68	
09/11/2008	Thursday	1027	1066	24757.21	
09/12/2008	Friday	1026	1065	24730.78	
09/13/2008	Saturday	1027	1064	24710.74	
09/14/2008	Sunday	1026	1063	24682.03	
09/15/2008	Monday	1026	1061	24630.96	
09/16/2008	Tuesday	1026	1051	24394.19	
09/17/2008	Wednesday	1025	1063	24644.06	
09/18/2008	Thursday	1026	1075	24953.62	
09/19/2008	Friday	1028	1069	24865.04	
09/20/2008	Saturday	1026	1076	24986.12	
09/21/2008	Sunday	1026	949	22035.79	
09/22/2008	Monday	1026	1052	24429.01	
09/23/2008	Tuesday	1026	1066	24733.10	
09/24/2008	Wednesday	1025	1067	24748.42	
09/25/2008	Thursday	1030	1072	24971.67	
09/26/2008	Friday	1029	1066	24810.07	
09/27/2008	Saturday	1031	1020	23799.31	
09/28/2008	Sunday	1028	1010	23478.87	
09/29/2008	Monday	1026	1059	24591.50	
09/30/2008	Tuesday	1025	1050	24354.19	
Average:		1027	Total:	708504.88	



**Attachment 1 -- 2008 Monthly Data**  
**PUGET SOUND ENERGY CO.**  
**GAS CONTROL CENTER**

Oct-08

**SUMAS GAS QUALITY DATA**  
**DARS**

DATE	DAY	BTU	GAS klb/day	MMBTU/DAY	Density conversion	44.2
10/01/2008	Wednesday	1027	1060	24627.09		
10/02/2008	Thursday	1026	1023	23751.20		
10/03/2008	Friday	1032	1047	24445.79		
10/04/2008	Saturday	1027	1048	24357.56		
10/05/2008	Sunday	1027	930	21613.47		
10/06/2008	Monday	1025	1076	24954.81		
10/07/2008	Tuesday	1026	1044	24227.06		
10/08/2008	Wednesday	1027	994	23095.88		
10/09/2008	Thursday	1028	1114	25909.32		
10/10/2008	Friday	1028	1099	25558.13		
10/11/2008	Saturday	1030	1104	25719.71		
10/12/2008	Sunday	1030	1006	23440.66		
10/13/2008	Monday	1028	965	22441.57		
10/14/2008	Tuesday	1030	983	22895.36		
10/15/2008	Wednesday	1029	0	0.00		
10/16/2008	Thursday	1038	0	0.00		
10/17/2008	Friday	1036	0	0.00		
10/18/2008	Saturday	1034	0	0.00		
10/19/2008	Sunday	1031	883	20587.34		
10/20/2008	Monday	1032	1074	25073.86		
10/21/2008	Tuesday	1030	0	0.00		
10/22/2008	Wednesday	1028	938	21820.58		
10/23/2008	Thursday	1026	1084	25150.93		
10/24/2008	Friday	1030	0	0.00		
10/25/2008	Saturday	1026	0	0.00		
10/26/2008	Sunday	1026	0	0.00		
10/27/2008	Monday	1034	0	0.00		
10/28/2008	Tuesday	1031	0	0.00		
10/29/2008	Wednesday	1031	0	0.00		
10/30/2008	Thursday	1031	0	0.00		
10/31/2008	Friday	1030	0	0.00		

Average: 1029 Total: 429670.32

**Attachment 1 -- 2008 Monthly Data**  
**PUGET SOUND ENERGY CO.**  
**GAS CONTROL CENTER**

Nov-08

**SUMAS GAS QUALITY DATA**

**DARS**

DATE	DAY	BTU	GAS klb/day	MMBTU/DAY	Density converion	44.2
11/1/2008	Saturday	1030	0	0.00		
11/2/2008	Sunday	1027	0	0.00		
11/3/2008	Monday	1029	0	0.00		
11/4/2008	Tuesday	1028	0	0.00		
11/5/2008	Wednesday	1029	0	0.00		
11/6/2008	Thursday	1030	0	0.00		
11/7/2008	Friday	1031	0	0.00		
11/8/2008	Saturday	1030	0	0.00		
11/9/2008	Sunday	1032	0	0.00		
11/10/2008	Monday	1033	0	0.00		
11/11/2008	Tuesday	1028	0	0.00		
11/12/2008	Wednesday	1028	0	0.00		
11/13/2008	Thursday	1031	0	0.00		
11/14/2008	Friday	1033	643	15025.24		
11/15/2008	Saturday	1031	391	9129.71		
11/16/2008	Sunday	1034	0	0.00		
11/17/2008	Monday	1032	0	0.00		
11/18/2008	Tuesday	1031	959	22367.10		
11/19/2008	Wednesday	1034	30	704.15		
11/20/2008	Thursday	1034	0	0.00		
11/21/2008	Friday	1031	0	0.00		
11/22/2008	Saturday	1033	0	0.00		
11/23/2008	Sunday	1034	0	0.00		
11/24/2008	Monday	1033	0	0.00		
11/25/2008	Tuesday	1036	0	0.00		
11/26/2008	Wednesday	1035	0	0.00		
11/27/2008	Thursday	1035	0	0.00		
11/28/2008	Friday	1039	0	0.00		
11/29/2008	Saturday	1035	0	0.00		
11/30/2008	Sunday	1031	0	0.00		
Average:		1032	Total:	47226.21		

Attachment 1 -- 2008 Monthly Data

PUGET SOUND ENERGY CO.  
GAS CONTROL CENTER

Dec-08

SUMAS GAS QUALITY DATA  
DARS

DATE	DAY	BTU	GAS klb/day	MMBTU/DAY	Density conversion	44.2
12/1/2008	Monday	1029	0	0.00		
12/2/2008	Tuesday	1028	0	0.00		
12/3/2008	Wednesday	1027	0	0.00		
12/4/2008	Thursday	1029	0	0.00		
12/5/2008	Friday	1029	0	0.00		
12/6/2008	Saturday	1032	0	0.00		
12/7/2008	Sunday	1035	0	0.00		
12/8/2008	Monday	1035	0	0.00		
12/9/2008	Tuesday	1033	0	0.00		
12/10/2008	Wednesday	1034	0	0.00		
12/11/2008	Thursday	1028	916	21311.23		
12/12/2008	Friday	1030	1051	24491.63		
12/13/2008	Saturday	1029	1005	23389.96		
12/14/2008	Sunday	1033	900	21022.25		
12/15/2008	Monday	1037	1127	26434.12		
12/16/2008	Tuesday	1042	1124	26486.13		
12/17/2008	Wednesday	1040	918	21610.33		
12/18/2008	Thursday	1037	876	20542.92		
12/19/2008	Friday	1039	867	20368.63		
12/20/2008	Saturday	1041	1175	27664.22		
12/21/2008	Sunday	1042	1030	24277.19		
12/22/2008	Monday	1046	1048	24801.09		
12/23/2008	Tuesday	1040	1048	24668.24		
12/24/2008	Wednesday	1036	1166	27318.05		
12/25/2008	Thursday	1035	1167	27322.13		
12/26/2008	Friday	1033	775	18103.21		
12/27/2008	Saturday	1034	0	0.00		
12/28/2008	Sunday	1033	0	0.00		
12/29/2008	Monday	1034	0	0.00		
12/30/2008	Tuesday	1034	0	0.00		
12/31/2008	Wednesday	1034				
	Average:	1034	Total:	379811.32		