EXHIBIT NO. ___(JMH-4)
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____**

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

MAY 8, 2009

PUGET SOUND ENERGY

Puget Sound Energy, Inc.
P.O. Box 90868
Bellevue, WA 98009-0868

November 21, 2008

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: Request for Determination of Compliance with State Greenhouse Gas Emission Performance Standard for Mint Farm Energy Company Power Plant

Dear Mr. Newman:

As you are aware, Puget Sound Energy, Inc. (PSE) has entered into a contract to acquire Mint Farm Energy Company, LLC (MFEC) and expects to close on the transaction in December 2008. In anticipation of this ownership change, PSE seeks your assistance in obtaining Washington Department of Ecology's (Ecology) determination of compliance with Washington State's (State) greenhouse gas (GHG) emission performance standard (EPS) set forth in Chapter 80.80 RCW for the Mint Farm Power Plant (Mint Farm) in Longview, Washington. 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.

BACKGROUND

MFEC owns and operates Mint Farm, a modern, 311-megawatt (MW) (nominal) natural gas-fired combined cycle combustion turbine power plant located in Longview, Washington. Mint Farm currently operates under authority of Air Discharge Permit no. 04-2571R2 issued by the Southwest Clean Air Agency (SWCAA). MFEC submitted a Title V Operating Permit Application to SWCAA on September 19, 2008.

Interstate pipeline grade natural gas is the only fuel used for power production at Mint Farm. Power production combustion sources include a GE Frame 7FA industrial gas turbine and duct burners in the heat recovery steam generator (HRSG). A standby diesel generator serves emergency power needs within the power plant, but does not produce power for sale to the regional transmission grid. Natural gas is provided from Williams

Northwest Pipeline by Cascade Natural Gas. The natural gas was sampled and tested by MFEC in 2008. Electrical power is produced by a combined-cycle gas turbine generator and a steam turbine generator. Electrical power consumed internally within the power plant (e.g., by fans, control systems, natural gas fuel compressors, etc.) amounts to approximately 7 MW during power plant operation. Mint Farm does not cogenerate. The plant's net electrical power output is delivered to the regional power transmission grid via an interconnection with the Bonneville Power Administration. Additional design details are on file in air quality permit applications at SWCAA offices, including the recent Title V Federal Operating Permit application.

The gas turbine and duct burners each utilize low-NOx burner technology, and the HRSG houses selective catalytic reduction (SCR) and oxidation catalyst emission control systems to reduce nitrogen oxide (NOx), carbon monoxide (CO) and volatile organic compound (VOC) emissions. In addition to VOC, the oxidation catalyst also reduces unburned methane (CH_4) stack emissions during power generation. Continuous emission monitors (CEMS) are installed and operated to continuously measure NOx, CO, oxygen (O_2), 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_2) is not currently monitored, and nitrous oxide (N_2O) and CH_4 emissions have not specifically been tested by MFEC to date.

Mint Farm was designed and permitted as a baseload "power plant." That is, its annual capacity factor assumed for design and permitting exceeded 60%. Mint Farm began commercial operation in January 2008. PSE understands that Mint Farm is currently not subject to the State's GHG EPS and related monitoring/recordkeeping/reporting requirements; however, the plant will become subject to these requirements upon transfer of plant ownership to PSE.

Mint Farm is operated as a merchant power plant by its current owners. As such, power is generated and sold under power purchase contracts, and is dispatched according to contract terms and varying power market demand. The plant operated during most months to date in 2008, cycling on and off for plant system maintenance and tests, and periods of low market demand. The majority of the startups and shutdowns were experienced due to market conditions. The intermittent nature of MFEC's operations in 2008 is not considered representative of PSE future operation. Not only will the plant require less start up testing, but because PSE is a regional investor owned utility with different needs than a merchant operator, the plant will likely operate at a greater capacity with more consistency. PSE intends to operate the facility at a greater capacity with fewer startups and shut downs than is currently observed.

PSE's Goldendale Generating Station (Goldendale) is the best available indicator of how PSE expects to operate Mint Farm. The Mint Farm and Goldendale plants have similar gas turbine, duct burner, power generation technology and heat rates. Both were designed and permitted as baseload plants with similar expected future operating scenarios. Moreover, PSE's operating policies, power demand and fuel pricing for Mint Farm and Goldendale Plant will be comparable. Regarding operational data and GHG

emission estimates, PSE believes that data from Goldendale is more representative of what Mint Farm will look like under PSE's ownership, so this letter presents both (1) Mint Farm 2008 operational data and GHG emission estimates, and (2) Goldendale operational data and GHG emission estimates.

FUEL USE AND POWER PRODUCTION RECORDS

The Mint Farm and Goldendale plants routinely monitor and records fuel consumption by the gas turbine and the duct burners, hourly average MW load on the electrical generators, and hours of operation. Relevant available data are provided below.

Mint Farm Power Plant Data

From January 2008 through September 2008, Mint Farm operated a total of approximately 3,534 hours (including testing periods and a number of startups and shutdowns), or approximately 54% of available hours. Appendix A summarizes fuel use (MMBtu) and energy production (MW-hr) for that period. October 2008 data are not yet complete from the current owners. We understand that there will be no plant operation in November and possibly December.

Eight (8) natural gas samples collected by MFEC on July 2 and July 9, 2008 were analyzed for major components and heat content, which averaged approximately 1,021 Btu/scf (standard cubic feet). Test results are provided in Attachment B.

Goldendale Power Plant Data

Attachment C is an Excel workbook that lists monthly natural gas consumption (scf) and power energy (MW-hr) generation by the Goldendale plant from 2003 through October 2008. MFEC's approximate 7 MW internal parasitic plant load is used in this workbook to estimate Mint Farm net power plant output from Goldendale gross power generation records. Although RCW 80.80 is based on calendar year annual operations, we analyzed 12-month running totals in the workbook to estimate the range of future operating years at Mint Farm.

GREEN HOUSE GAS EMISSION ESTIMATES

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) recent correspondence with you, on behalf of PSE:

- **CO_2** – 52.91 kg/MMBtu (116.5 lb/MMBtu) [Source: GRP Table 12.1 for natural gas heat content ranging 1,000-1,025 Btu/scf],

- **CH_4** – 0.9 g/MMBtu (0.002 lb/MMBtu) [Source: GRP Table 12.5 for natural gas-fired boilers (duct burners in this case) and combined-cycle gas turbines],

- **N_2O** – 0.9 g/MMBtu (0.002 lb/MMBtu) for natural gas-fired boilers (assumed to be representative of combined-cycle plant duct burners) and 2.8 g/MMBtu (0.006 lb/MMBtu) for natural gas-fired combined-cycle gas turbines [Source: GRP Table 12.5].

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 oxidation catalyst and SCR control devices have on reducing CH_4 and N_2O emissions, respectively, at Mint Farm and Goldendale facilities. However, the resulting effect of this conservatism is small because CH_4 and N_2O emissions from natural gas combustion are negligible relative to CO_2 emissions.

Based on these factors, the total GHG emission factor is 116.5 lb/MMBtu for CO_2, N_2O and CH_4.

Emission and EPS Compliance Calculations

Mint Farm Power Plant. Attachment A calculates GHG emissions and average GHG emissions per MW-hr during the available period of record: January through September 2008. The calculated result is 1,056 lb/MW-hr, which satisfies the State EPS (see the first sheet of Appendix A3). PSE anticipates that the plant will be operated more efficiently in future years and that GHG emissions per MW-hr will be significantly less when PSE owns and operates the plant. As evidence, we provide the following estimates based on performance at the Goldendale plant.

Goldendale Power Plant. The Excel workbook in Appendix C calculates GHG emissions from rolling 12-month total natural gas use at the Goldendale Plant from December 2003 through October 2008. Average GHG emissions per megawatt-hour (lb/MW-hr) values are also calculated for each 12-month period for comparison to the 1100 lb/MW-hr EPS. The highest 12-month average GHG emission rate for Goldendale was 837 lb/MW-hr in June 2006, and the lowest was 810 lb/MW-hr in August 2008. Based on this analysis and the supplemental Mint Farm data presented in this letter, PSE believes that Mint Farm complies with Washington State's GHG EPS for baseload power plants.

Thank you for your consideration of our request. If you have any questions or requests during your compliance determination, please do not hesitate to contact me at PSE (425-462-5835), 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,

Joey Henderson

CT Compliance Program Manager

Puget Sound Energy

cc: Wess Safford (SWCAA),

Lorna Luebbe (PSE),

Bill Steiner (URS Corporation)

Attachments: (digital files sent by email)

Appendix A – Mint Farm Power Plant Operations Data (Provided as four interlinked Excel files. The GHG summary is contained on the first sheet in Appendix A3)

Appendix B – Mint Farm Natural Gas Test Results

Appendix C – Estimates Based on Goldendale Power Plant Operations Data