



STATE OF WASHINGTON  
**UTILITIES AND TRANSPORTATION COMMISSION**

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December 12, 2019

Mark L. Johnson, Executive Director and Secretary  
Washington Utilities and Transportation Commission  
P. O. Box 47250  
Olympia, Washington 98504-7250

RE: UE-121373 - *In the Matter of the Petition of PUGET SOUND ENERGY, For Approval of a Power Purchase Agreement for Acquisition of Coal Transition Power, as Defined in RCW 80.80.010, and the Recovery of Related Acquisition Costs.*

Dear Mr. Johnson:

On March 12, 2019, Puget Sound Energy (PSE or company) filed its annual compliance report for the year 2018. In Order 03 (Order 03) of the above referenced docket, the Commission required PSE to monitor, and report annually, TransAlta's production levels at the Centralia Coal Transition Facility (CCTF). The report also includes the source of replacement power, amount of contributions by TransAlta to the community and total plant headcount. This is PSE's fifth annual compliance report since the company began taking deliveries of power from TransAlta in December of 2014 under the Coal Transition Power Purchase Agreement (PPA).

This memorandum provides Staff's assessment of PSE's compliance with the reporting requirements of Order 03, and identifies issues that Staff believes are of interest to the Commissioners.

### DISCUSSION

In light of the emission issues that plagued the Colstrip power plant in 2018, Staff reviewed the CCTF's air permit status on Southwest Clean Air Agency's (SWCAA) website. As a result of its review, Staff uncovered a number of concerning issues with respect to the CCTF's NOx and Mercury emission levels. The violations recorded against the CCTF relate to two specific emission issues: 1) NOx emissions remain above the level envisioned by the BART Order; and 2) Mercury emissions exceeded the Federal standard. A summary of the air emission violations recorded at the CCTF since 2013 is included in Appendix B to this memorandum. PSE's annual compliance reports since 2013 make no mention of these emission violations.

In mid-July 2019, Staff reached out to both Ecology and SWCAA in order to gather facts related to these numerous emission violations recorded against the CCTF. On August 22, 2019, Staff met with Phil Gent, Air Quality Engineer for the Department of Ecology (Ecology) and Clint Lamoreaux, Air Quality Engineer for SWCAA to more fully understand the nature of the violations and, more importantly, whether these developments in any way upset the numerous agreements currently in effect for the CCTF.

## **NOx Optimization**

At the meeting, Phil Gent provided Staff with a timeline of TransAlta's progress towards meeting the NOx optimization goals specified under the BART Order.<sup>1</sup> TransAlta, the Washington Department of Ecology, and SWCAA have been working on a new Selective Non-catalytic Reduction (SNCR) optimization protocol since late 2014. In 2019, TransAlta purchased and installed a Neural Net system for Unit 2. For coal plants, neural networks learn the cause-and-effect relationship between a desired plant output parameter, like NOx emission levels, and inputs like auxiliary air, feeder biases, emission reduction chemicals, and load. As a result, neural networks identify the optimal combination of control actions for the plant to achieve the desired output parameter. In the case of CCCTF, the output goal parameter is the NOx emission level envisioned by the BART Order; 0.18 lb/MMBtu.<sup>2</sup> The current round of SNCR optimization testing using the neural network commenced in earnest in October of 2019. So far, results have been good with the latest 30-day rolling average achieving a NOX level of 0.0175 lb/MMBtu. TransAlta has committed to provide SWCAA with a progress report on December 12, 2019.

A Neural Net system is not planned for Unit 1, which is slated to close at the end of next year, but the plan is to use the values and settings from Unit 2 as much as possible to minimize NOx emissions.

## **Mercury**

In the last three years, the CCTF has repeatedly exceeded its allowable Mercury emission level.<sup>3</sup> At the August meeting, both Ecology and SWCAA addressed the underlying causes for these exceedances and were satisfied with the corrective action implemented by TransAlta to resolve this problem.

### **RECOMMENDATION**

For 2018, PSE has complied fully with the reporting requirements contained in Order 3. Unless otherwise directed by the Commission, Staff will continue to monitor the Coal Transition PPA commensurate with the requirements contained in Order 03. For the 2019 report, Staff's annual compliance report will follow up with Ecology and SWCAA and update the Commissioners on the CCTF emission issue.

Sincerely,

David C. Gomez  
Assistant Power Supply Manager, Energy Regulation

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<sup>1</sup> Staff has included the SNCR Optimization timeline in Appendix B.

<sup>2</sup> According to Phil Gent, achieving this level removes 5,000 tons of NOx emissions from the CCTF before it closes at the end of 2025.

<sup>3</sup> According to SWCAA, excess emissions of Mercury pose a risk to human health and the environment. Mercury is a hazardous air pollutant which bio-accumulates in the environment and can cause damage to the brain, nervous system, kidneys and liver. It also can cause neurological and developmental birth defects.

## APPENDIX A; ANNUAL REPORTING REQUIREMENTS

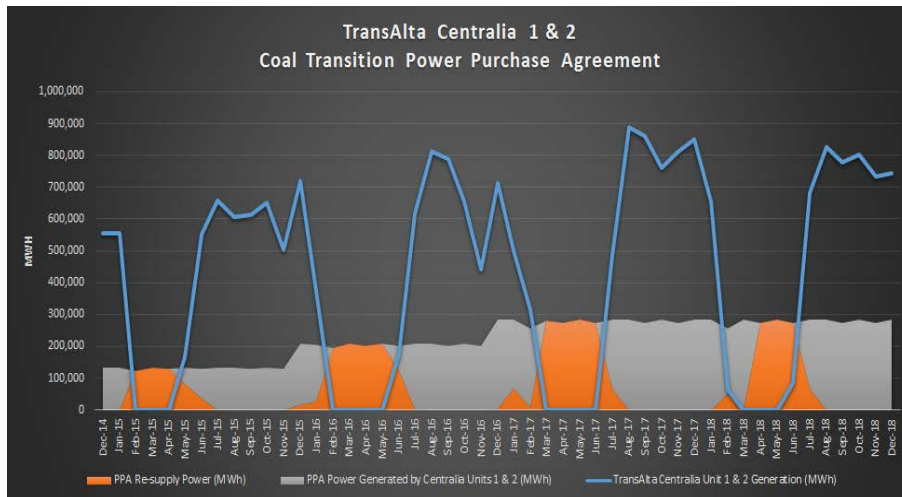
### CCTF’s 2018 Generation and Resupply Power

Taking into account total generation for 2018, the CCTF continues to operate at about half of its total capacity.

CCTF Capacity Factor					
2013	2014	2015	2016	2017	2018
57.2%	56.9%	42.8%	39.0%	46.6%	45.7%

When the CCTF is not generating power, TransAlta satisfies delivery obligations under the PPA using other sources of power, referred to as “resupply power.” Figure 1 below compares the CCTF’s total generation with the amount and source of power provided by TransAlta to meet its contractual obligation under the terms of the PPA.

Staff analyzed the sources of replacement power provided by PSE and TransAlta. Hydro is bar far the largest source comprising over 90 percent of the replacement power in 2018. Natural gas was second, providing 5 percent. Wind, Biomass and Coal contributed small amounts also (individually under 1 percent). Resupply as a percentage of total power delivered under the PPA is lower than last year, totaling 24.6 percent of the total MWh delivered under the PPA in 2018 compared to 37.8 percent in 2017.



**Figure 1 TransAlta Centralia Generation**

### Contributions of Financial Assistance

PSE is required to report on TransAlta’s “contributions of financial assistance” made pursuant to Section 3 of the Memorandum of Agreement (MOA) between TransAlta and the State of Washington. Under the MOA, each year, three payments are made which sum to \$4,583,333.<sup>4</sup> PSE reports that TransAlta has made all of the payments required under the MOA for 2018.

### FTEs Employed at the CCTF

TransAlta also reports annually the average number of full-time equivalent employees (FTEs) employed at the CCTF. For 2018, the number of FTEs employed at the CCTF is 205, which is one less employee than what TransAlta had reported in both 2016 and 2017.

<sup>4</sup> The three separate annual payments are: \$833,333 to the Weatherization Fund; \$1,666,667 to the Economic and Community Development Fund; and \$2,083,333 to the Energy Technology Fund. Payments under the MOA began in 2012 and are scheduled until 2023.

Month	TransAlta Centralia Unit 1 & 2 Generation (MWh)	a PPA Re-supply Power (MWh)	b PPA Power Generated by Centralia Units 1 & 2 (MWh)	c=a+b Total Power Deliveries to PSE by TransAlta (MWh)	d PPA Price (\$/MWh) w/equity adder	e=c*d Total Contract Deliveries @ PPA prices	f MidC Spot Market Price (\$/MWh)	g=(a*(d-f)) Resupply Power @ Difference of PPA & MidC Spot Price (\$/MWh)
Dec-14	554,742	0	133,020	133,020	\$47.66	\$6,339,733	\$28.12	\$0
Jan-15	554,454	0	133,920	133,920	\$47.66	\$6,382,627	\$21.39	\$0
Feb-15	68	120,959	0	120,959	\$47.66	\$5,764,906	\$13.26	\$4,161,191
Mar-15	0	133,739	0	133,739	\$47.66	\$6,374,001	\$16.72	\$4,137,315
Apr-15	0	129,560	0	129,560	\$47.66	\$6,174,830	\$13.06	\$4,482,448
May-15	166,959	79,927	53,971	133,898	\$47.66	\$6,381,579	\$26.03	\$1,728,627
Jun-15	550,606	35,975	93,600	129,575	\$47.66	\$6,175,545	\$31.71	\$573,892
Jul-15	657,969	0	133,920	133,920	\$47.66	\$6,382,627	\$30.80	\$0
Aug-15	605,176	0	133,920	133,920	\$47.66	\$6,382,627	\$27.53	\$0
Sep-15	612,886	0	129,600	129,600	\$47.66	\$6,176,736	\$27.49	\$0
Oct-15	650,671	0	133,920	133,920	\$47.66	\$6,382,627	\$22.75	\$0
Nov-15	505,152	0	129,780	129,780	\$47.66	\$6,185,315	\$19.50	\$0
Dec-15	719,736	15,329	192,991	208,320	\$48.81	\$10,168,985	\$19.82	\$444,415
Jan-16	372,134	26,369	179,746	206,115	\$48.81	\$10,061,349	\$22.96	\$681,751
Feb-16	0	194,879	0	194,879	\$48.81	\$9,512,872	\$17.08	\$6,184,339
Mar-16	0	207,665	0	207,665	\$48.81	\$10,137,011	\$13.25	\$7,385,450
Apr-16	0	201,600	0	201,600	\$48.81	\$9,840,953	\$12.53	\$7,314,905
May-16	0	208,303	0	208,303	\$48.81	\$10,168,155	\$14.66	\$7,114,433
Jun-16	178,020	121,926	79,674	201,600	\$48.81	\$9,840,953	\$22.12	\$3,254,723
Jul-16	616,784	1,400	206,920	208,320	\$48.81	\$10,168,985	\$30.44	\$25,724
Aug-16	811,096	0	208,320	208,320	\$48.81	\$10,168,985	\$35.49	\$0
Sep-16	789,020	0	201,600	201,600	\$48.81	\$9,840,953	\$28.39	\$0
Oct-16	655,933	0	208,320	208,320	\$48.81	\$10,168,099	\$23.16	\$0
Nov-16	440,097		201,880	201,880	\$48.81	\$9,853,763	\$19.28	\$0
Dec-16	713,751	375	282,345	282,720	\$50.00	\$14,136,000	\$34.25	\$5,906
Jan-17	498,913	65,879	216,841	282,720	\$50.00	\$14,136,000	\$25.33	\$1,625,235
Feb-17	313,578	9,846	245,511	255,357	\$50.00	\$12,767,850	\$17.69	\$318,124
Mar-17	0	281,790	0	281,790	\$50.00	\$14,089,500	\$8.62	\$11,660,470
Apr-17	0	273,600	0	273,600	\$50.00	\$13,680,000	\$5.62	\$12,142,368
May-17	0	282,720	0	282,720	\$50.00	\$14,136,000	\$3.01	\$13,285,013
Jun-17	0	273,600	0	273,600	\$50.00	\$13,680,000	\$1.81	\$13,184,784
Jul-17	486,973	68,639	214,265	282,904	\$50.00	\$14,145,200	\$22.54	\$1,884,827
Aug-17	888,159	0	282,305	282,305	\$50.00	\$14,115,250	\$23.76	\$0
Sep-17	860,708	0	273,600	273,600	\$50.00	\$13,680,000	\$30.25	\$0
Oct-17	760,189	294	282,216	282,510	\$50.00	\$14,125,500	\$24.38	\$7,532
Nov-17	812,144	0	273,684	273,684	\$50.00	\$13,684,200	\$22.57	\$0
Dec-17	851,050	0	282,720	282,720	\$51.21	\$14,478,091	\$22.57	\$0
Jan-18	654,698	0	282,720	282,720	\$51.21	\$14,478,091	\$21.58	\$0
Feb-18	63,155	48,575	206,785	255,360	\$51.21	\$13,076,986	\$16.33	\$1,694,296
Mar-18	0	0	282,340	282,340	\$51.21	\$14,458,631	\$17.60	\$0
Apr-18	0	273,600	0	273,600	\$51.21	\$14,011,056	\$15.04	\$9,896,112
May-18	0	282,720	0	282,720	\$51.21	\$14,478,091	\$9.85	\$11,693,299
Jun-18	84,252	273,600	0	273,600	\$51.21	\$14,011,056	\$12.43	\$10,610,208
Jul-18	681,421	68,639	214,265	282,904	\$51.21	\$14,487,514	\$37.29	\$955,455
Aug-18	825,129	0	282,305	282,305	\$51.21	\$14,456,839	\$44.46	\$0
Sep-18	778,360	0	273,600	273,600	\$51.21	\$14,011,056	\$26.07	\$0
Oct-18	801,921	294	282,216	282,510	\$51.21	\$14,467,337	\$39.40	\$3,472
Nov-18	734,403	0	273,684	273,684	\$51.21	\$14,015,358	\$45.50	\$0
Dec-18	744,044	0	282,720	282,720	\$52.45	\$14,828,664	\$45.56	\$0

Table 1; 2014 – 2018 Coal Transition PPA Results

## APPENDIX B; CCTF EMISSION ISSUE BACKGROUND

### **TransAlta's Memorandum of Agreement (MOA) with the State of Washington**

On December 23, 2011, TransAlta entered into its MOA with the State which imposed several requirements on TransAlta, including the installation of selective non-catalytic reduction (SNCR) pollution control technology and the reduction of certain emissions. Under the MOA, the State's responsibilities include, among other things, the establishment of air emission requirements based on the use of SNCR.

### **NOx Emissions**

The MOA required the installation and use of SNCR equipment in each boiler no later than January 1, 2013, and under the terms and conditions established under the Washington Department of Ecology's (Ecology) administrative order No. 6246 (the BART order) dated December 13, 2011. Once SNCR was installed at the CCTF, the BART order specified a thirty operating day rolling average NOx emission limit for the plant (both units) of 0.21 lb/MMBtu.<sup>5</sup> After discussions with staff at Ecology responsible for monitoring emissions at the CCTF, it is Staff's understanding that the plant has installed SNCR equipment in both boilers and has been able to consistently meet the NOx limit of 0.21 lb/MMBtu.

However, the BART Determination Support Document for TransAlta Centralia Generation LLC<sup>6</sup> states that Ecology had established the 0.21 lb/MMBtu as an interim limit, and that during calendar years 2013 and 2014, TransAlta was required under Condition 5 of the BART order to optimize the SNCR system to maximize NOx reduction. Ecology had determined that optimization of the SNCR system installed at Centralia would allow for a 0.18 lb/MMBtu NOx emission limit.<sup>7</sup> To date, the CCTF has not met this objective and, as a result, Ecology was unable to modify the BART order in 2015 as planned to include the 0.18 lb/MMBtu NOx limit.<sup>8</sup>

### **Mercury Emission Violations**

During 2018, the CCTF repeatedly violated its Air Operating Permit by exceeding its allowable Mercury emission level over a nine month period (January through September).<sup>9</sup> In 2019, SWCAA issued a new Mercury emission violation making 2019 the CCTF's third consecutive year of violating the Federal Mercury emission standard and its third civil penalty for similar violations over the past five years.<sup>10</sup>

In its root cause analysis, SWCAA concluded that the Mercury emission exceedances were the result of TransAlta's "[a]ttempt to minimize operational costs, [and its] inattention to detail."<sup>11</sup> SWCAA goes on to explain that:

"A significant aspect of the attempt to minimize operational costs is related to the fact that the mercury emission control system has been operational since 2011 in order to comply with an agreement with Washington State, however TransAlta never attempted to reduce mercury emissions to the level required by Subpart UUUUU [40 CFR Part 63 Subpart UUUUU] until

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<sup>5</sup> The NOx emission limit for the period December 13, 2011, through December 31, 2012, was 0.24 lb/MMBtu.

<sup>6</sup> FN2, Page 99.

<sup>7</sup> Washington State Department of Ecology, BART Determination Support Document for Centralia Generation LLC Power Plant dated November 2011, Appendix I; Establishing SNCR NOx Emission Limitation for Revised Order, Page 98 (<http://www.swcleanair.org/docs/permits/2011-12-02%20Transalta%20Revised%20Final%20BART%20TSD.pdf>).

<sup>8</sup> The attached summary of emission violations includes Notice of Violation (NOV) No. 5882 which was issued to TransAlta for not completing the SNCR optimization testing as planned.

<sup>9</sup> The allowable Mercury emission level is 1.20 lb/TBtu, as measured over a 30-day operating average.

<sup>10</sup> According to SWCAA, excess emissions of Mercury pose a risk to human health and the environment. Mercury is a hazardous air pollutant which bio-accumulates in the environment and can cause damage to the brain, nervous system, kidneys and liver. It also can cause neurological and developmental birth defects.

<sup>11</sup> 2019-06-13 TransAlta Generation – NOV 10101, Page 25 of 42.

April 2015 when the rule became effective. The problems encountered here that led to excess mercury emissions could have been discovered and addressed before April 2015.”<sup>12</sup>

### Staff’s meeting with Ecology and SWCAA

As mentioned at the beginning of this report, UTC Staff and representatives from Ecology and SWCAA met to discuss the emission violations along with TransAlta’s progress toward meeting its NO<sub>x</sub> emission goals. At the meeting, both SWCAA and Ecology briefed UTC Staff on TransAlta’s SNCR optimization plan timeline (see below) and the background behind repeated Mercury exceedances.

According to Ecology, TransAlta remains committed toward meeting its obligations under its various agreements with the State and is actively engaged in resolving these problems prior to closure.

### CCTF SNCR TIMELINE

Date	Description
April 29, 2011	Senate Bill 5769 signed. This bill establishes the requirement for the Governor's office to enter into a binding and enforceable agreement (Memorandum of Agreement or MOA) with TransAlta Centralia Generation. One of the items to be addressed in the MOA was "...binding commitments to install selective non-catalytic reduction pollution control technology in any coal-fired generating boilers by January 1, 2013, after discussing the proper use of ammonia in this technology."
December 13, 2011	Washington Department of Ecology issues "First Revision: Order No. 6426" – the revised BART Order to limit NO <sub>x</sub> emissions. This revision includes the following requirements: <ol style="list-style-type: none"> <li>1. Limit NO<sub>x</sub> to 0.21 lb/MMBtu beginning in 2013.</li> <li>2. Inject ammonia or urea to control NO<sub>x</sub> beginning January 1, 2013.</li> <li>3. Complete SNCR optimization and submit an optimization report by December 31, 2014.</li> </ol>
December 23, 2011	MOA entered into by Governor Christine Gregoire and TransAlta president Paul Taylor. Section 6 of the MOA reads: <i>"NO later than January 1, 2013, the Company shall install SNCR equipment in each Boiler on the terms and conditions set forth in the Department of Ecology administrative order, First Revision: Order No. 6426, dated December 13, 2011, regarding the Best Available Retrofit Technology for the eligible emission units at the Facility (the "BART Order"). The Company and the State have discussed the proper use of ammonia in this technology as required by RCW 80.80.100(2)(b), and the Company shall operate the Facility in conformance with the requirements in Section 2 of the BART Order."</i> Section 2 of the BART Order is the ammonia slip limitations.
December 13, 2014	SNCR Optimization report submitted. Testing was completed in November 2013.
January 28, 2015	Department of Ecology and the Southwest Clean Air Agency issued a joint letter to TransAlta identifying problems with the initial SNCR Optimization testing. The letter required that additional testing be completed no later than February 28, 2015 and clarified that TransAlta must operate the SNCR system on Unit 1 with a minimum urea injection rate of 1.2 gallons per minute and the SNCR system on Unit 2 with a minimum urea injection rate of 2.0 gallons per minute.
July 23, 2015	SWCAA issued Notice of Violation 5882 for failure to complete the SNCR Optimization testing and submit the report by the original December 31, 2014 deadline. As a corrective action, required additional SNCR testing.
August 25, 2016	TransAlta provided SWCAA with a copy of the results from additional SNCR testing conducted in July 2016.

<sup>12</sup> The specific agreement referenced by SWCAA is the *Settlement Agreement between the State of Washington Department of Ecology and TransAlta Generation LLC of Air Quality Matters*, Section III B. See <https://ecology.wa.gov/DOE/files/16/166eadf6-b137-44e7-b970-ee637dec99a9.pdf>.



Date	Description
March 8, 2018	SWCAA issued Notice of Violation 6426 for improper operation of the SNCR system. During the investigation of these issues SWCAA determined that SNCR settings had been swapped between the two units since prior to the second round of optimization testing. This invalidated the optimization testing conducted in July 2016. To resolve these issues TransAlta paid a penalty of \$209,975 and agreed to additional SNCR optimization testing.
2018 – 2019	Electrostatic precipitators (ESPs) used to control particulate matter emissions were apparently fouled with ammonium bisulfate due to excessive ammonia slip from the SNCR system. This impacted the ESPs but did not result in excess emissions to the environment. This issue caused deration of the boilers prior to the 2019 spring outage and costly cleaning of the ESPs.
Present (August 2019)	TransAlta, the Washington Department of Ecology, and SWCAA are working to finalize a new SNCR Optimization testing protocol. SNCR optimization testing could commence as early as August 2019. Meanwhile, TransAlta is testing and evaluating alternative methods of reducing NO <sub>x</sub> emissions to meet the goals of the Memorandum of Agreement. This round of activity is expected to resolve TransAlta's SNCR optimization obligations.

Number	Violation Year/Period	Description	Penalty
10103	2019	Failure to operate the selective non-catalytic reduction system.	
10102	2019	Bypass of the Unit 1 Scrubber	
10101	02/27/19	Mercury emissions in excess of 1.2 lb/Tbtu (30-boiler operating day rolling average).	\$22,800
6427	1/23/18 - 9/27/18	Mercury emissions to exceed 1.2lb/Tbtu, 30-boiler operating day rolling average.	\$607,020
6426	2017	Improper operation of selective non-catalytic reduction systems.	\$209,975
6125	U1: 8/5/17 - 9/14/17 U2: 7/21/17 - 9/13/17	Mercury emissions in excess of 1.2 pounds per trillion British thermal units.	\$121,600
6123	7/28/17, 8/3/17, & 10/9/17	Combined SO2 emissions from Unit #1 and Unit #2 to exceed 1.350 pounds per hour (1-hour average)	
6121	2017	Failure to operate SNCR system.	\$4,530
6111	2016	Visual emissions in excess of 20% opacity for more than 3 minutes, in excess of 27% opacity for (1) 6-minute overage.	
5882	2015	Failure to complete SNCR Optimization Testing by the end of calendar year 2014.	
5881	6/12/15	Bypass of the Unit #2 scrubber during normal operation.	\$2,500
5255	2014	Operations/activities inconsistent with specified permit conditions.	
4644	2013	Late linearity checks for 4th quarter	
4977	2013	Failure to submit 1st Qtr. 2013 Asbestos Report by 04/15	

**Table 2; SWCAA CCTF Violation History**