

# **Estimation of Pennsylvania RACT II Rule on Pennsylvania Ozone Season NOx Emissions from Electric Generation Units**

**Prepared by:**

Olympus Power, LLC

67 E Park Pl

Morristown, NJ 07960

## January 2016

Olympus Power, LLC has estimated nitrogen oxides (NO<sub>x</sub>) emissions from Pennsylvania electric generating units after the implementation of Reasonably Available Control Technology II (RACT II). Pennsylvania RACT II limitations will be in effect year-round and become effective on January 1, 2017.

While the RACT II requirements are unit specific, for the purposes of this effort, the affected units are identified in the accompanying spreadsheet by facility. For the estimation, the 2014 ozone season heat input available from EPA's Clean Air Markets Division (CAMD) website was used for operational heat input with the exception of two facilities, Brunner Island and Montour Power Plants. For those two facilities, the 2015 ozone season operational heat input information from CAMD was used. This was done to ensure the estimation of their emissions and the overall Pennsylvania emissions were not underestimated.

For coal fired units, the RACT II limits are expressed as 0.12 lb NO<sub>2</sub>/MMBtu when the selective catalytic reduction (SCR) inlet temperature is 600 degree or above and 0.35 lb NO<sub>2</sub>/MMBtu when the temperature is below 600 degrees. This limit allows the units to cease injecting ammonia when prices in the PJM wholesale electric market are so low that these units must reduce their load to their absolute minimum sustainable load to reduce their losses. Essentially the rule requires control of emissions at higher loads using the SCR and at the lower loads by limiting the heat input to the boiler. As a consequence, the overall NO<sub>x</sub> emission rate for coal-fired units used to estimate emissions after the implementation of RACT II is 0.162 lb NO<sub>2</sub>/MMBtu. This is a conservative estimate as the actual rate that is achieved will be dependent upon the dispatch rates of the units. Based on concerns previously raised by Pennsylvania Department of Environmental Protection (PADEP), an emission rate of 0.20 lb NO<sub>2</sub>/MMBtu was used for Homer City Power Plant to reflect a "case by case" determination which is allowed under the PA RACT II regulation. Again, this was done to ensure the estimated emissions after implementation of PA RACT II aren't underestimated.

For the coal-fired units that have converted to natural gas or have the permitted capability to burn natural gas at 100% load, the PA RACT II limit of 0.1 lb NO<sub>2</sub>/MMBtu was used to estimate emissions.

For the coal refuse-fired facilities, the lower of actual emission rates or the RACT II limit of 0.16 lb NO<sub>2</sub>/MMBtu was used to estimate emissions.

For all other facilities the actual emissions rates which are already below the RACT II rate limits were used.

This effort has resulted in estimated ozone season NO<sub>x</sub> emissions from the Pennsylvania electric generating units after the implementation of RACT of 27,010 tons.

Estimation of Pennsylvania RACT II Rule on Ozone Season NOx Emissions from EGUs  
Emissions - Unit Level Data Report Nov 24, 2015  
Your query will return 57 Facility(s) and 141 Unit(s)  
Program: Clean Air Interstate Rule Ozone Season (CAIROS) (ended 2014) Data Set: Emissions - Unit Level Data  
Time Frame: Emissions : Ozone Season : 2014  
Criteria: State : Pennsylvania  
Aggregate Criteria: Facility  
Columns: State, Facility Name, Facility ID (ORISPL), Year, Program(s) Selected, NOx (tons), Heat Input (MMBtu)

Record Number	State	Facility Name	Facility ID (ORISPL)	Year	Program(s) Selected	NOx (tons)	Heat Input (MMBtu)	2014 Emission rate (lb NO2/MMBtu)	Projected 2017 Emission Rate w/RACT (lb NO2/MMBtu)	Projected 2017 OS NOx Emissions w/RACT (tons)
2	PA	Allegheny Energy Units 1 & 2	55196	2014	CAIROS	11.3	313,479	0.072094143	0.072094143	11.3
3	PA	Allegheny Energy Units 3, 4 & 5	55710	2014	CAIROS	43.6	10,773,628	0.008093838	0.008093838	43.6
4	PA	Allegheny Energy Units 8 & 9	55377	2014	CAIROS	3.6	91,337	0.078828952	0.078828952	3.6
5	PA	Armstrong Power, LLC	55347	2014	CAIROS	54.2	3,444,997	0.03146592	0.03146592	54.2
6	PA	Bethlehem Power Plant	55690	2014	CAIROS	45.7	17,468,994	0.005232127	0.005232127	45.7
7	PA	Bruce Mansfield	6094	2014	CAIROS	7,158.9	68,605,754	0.208696781	0.162	5557.066074
8	PA	Brunner Island, LLC	3140	2014	CAIROS	2,703.9	22,060,569	Converted to natural gas use during OS	0.1	1103.02845
9	PA	Brunot Island Power Station	3096	2014	CAIROS	6.1	345,029	0.035359347	0.035359347	6.1
10	PA	Cambria Cogen	10641	2014	CAIROS	449.1	4,120,446	0.217986111	0.16	329.63568
11	PA	Chambersburg Units 12 & 13	55654	2014	CAIROS	14.3	350,141	0.08168138	0.08168138	14.3
12	PA	Cheswick	8226	2014	CAIROS	2,192.9	11,092,539	0.395382879	0.162	898.495659
13	PA	Colver Power Project	10143	2014	CAIROS	392.8	4,775,359	0.164511192	0.16	382.02872
14	PA	Conemaugh	3118	2014	CAIROS	7,141.9	44,481,853	0.32111522	0.162	3603.030093
15	PA	Croydon Generating Station	8012	2014	CAIROS	5.6	17,333	0.646166272	0.646166272	5.6
16	PA	Dynegy Fayette II, LLC	55516	2014	CAIROS	52.4	14,896,972	0.007034987	0.007034987	52.4
17	PA	Ebensburg Power Company	10603	2014	CAIROS	99.5	2,165,139	0.091910958	0.091910958	99.49999985
18	PA	Eddystone Generating Station	3161	2014	CAIROS	43.3	676,917	0.127932967	0.127932967	43.3
19	PA	Fairless Energy, LLC	55298	2014	CAIROS	90.7	24,491,675	0.007406598	0.007406598	90.7
20	PA	Fairless Hills Generating Station	7701	2014	CAIROS	30.2	1,496,963	0.040348359	0.040348359	30.2
21	PA	Gilberton Power Company	10113	2014	CAIROS	82.2	3,557,502	0.046212202	0.046212202	82.20000052
22	PA	Grays Ferry Cogen Partnership	54785	2014	CAIROS	71.7	4,661,760	0.030760914	0.030760914	71.7
23	PA	Handsome Lake Energy	55233	2014	CAIROS	28.7	763,480	0.075182061	0.075182061	28.7
24	PA	Hazleton Generation	10870	2014	CAIROS	0.9	7,699	0.233796597	0.233796597	0.9
25	PA	Homer City	3122	2014	CAIROS	8,373.1	44,309,897	0.377933625	0.2	4430.9897
26	PA	Hunlock Creek Energy Center	3176	2014	CAIROS	12.6	2,972,340	0.008478169	0.008478169	12.6
27	PA	Hunlock Unit 4	56397	2014	CAIROS	0.7	16,963	0.082532571	0.082532571	0.7
28	PA	Hunterstown Combined Cycle	55976	2014	CAIROS	37	12,553,366	0.005894833	0.005894833	37
29	PA	Keystone	3136	2014	CAIROS	5,441.9	49,212,797	0.221157924	0.162	3986.236557
30	PA	Liberty Electric Power Plant	55231	2014	CAIROS	77.7	13,719,250	0.01132715	0.01132715	77.7
31	PA	Lower Mount Bethel Energy, LLC	55667	2014	CAIROS	67.2	13,574,542	0.009900887	0.009900887	67.2
32	PA	Martins Creek, LLC	3148	2014	CAIROS	920.8	10,362,703	0.177714251	0.177714251	920.8
33	PA	Montour, LLC	3149	2014	CAIROS	4,463.6	28,555,219	0.312629366	0.162	2312.972739
34	PA	Mountain	3111	2014	CAIROS	3.4	10,625	0.64	0.64	3.4

Estimation of Pennsylvania RACT II Rule on Ozone Season NOx Emissions from EGUs  
Emissions - Unit Level Data Report Nov 24, 2015  
Your query will return 57 Facility(s) and 141 Unit(s)  
Program: Clean Air Interstate Rule Ozone Season (CAIROS) (ended 2014) Data Set: Emissions - Unit Level Data  
Time Frame: Emissions : Ozone Season : 2014  
Criteria: State : Pennsylvania  
Aggregate Criteria: Facility  
Columns: State, Facility Name, Facility ID (ORISPL), Year, Program(s) Selected, NOx (tons), Heat Input (MMBtu)

Record Number	State	Facility Name	Facility ID (ORISPL)	Year	Program(s) Selected	NOx (tons)	Heat Input (MMBtu)	2014 Emission rate (lb NO2/MMBtu)	Projected 2017 Emission Rate w/RACT (lb NO2/MMBtu)	Projected 2017 OS NOx Emissions w/RACT (tons)
35	PA	Mt. Carmel Cogeneration	10343	2014	CAIROS	117.7	1,968,427	0.119587874	0.119587874	117.7
36	PA	New Castle	3138	2014	CAIROS	125.7	681,272	Converted to natural gas	0.1	34.0636
37	PA	NextEra Energy Marcus Hook, LP	55801	2014	CAIROS	105.5	18,759,894	0.011247398	0.011247398	105.5
39	PA	Northampton Generating Plant	50888	2014	CAIROS	139.7	3,438,808	0.081249084	0.081249084	139.7
40	PA	Northeastern Power Company	50039	2014	CAIROS	31	1,141,525	0.054313309	0.054313309	31
41	PA	Ontelaunee Energy Center	55193	2014	CAIROS	37.6	11,729,809	0.006411017	0.006411017	37.6
42	PA	PEI Power Corporation	50279	2014	CAIROS	7.3	193,333	0.075517372	0.075517372	7.3
43	PA	Panther Creek Energy Facility	50776	2014	CAIROS	214.1	3,562,568	0.120194197	0.120194197	214.1
45	PA	Portland	3113	2014	CAIROS	0.6	11,613	0.103332472	0.103332472	0.6
46	PA	Richmond	3168	2014	CAIROS	2.3	7,251	0.634395256	0.634395256	2.3
47	PA	Scrubgrass Generating Plant	50974	2014	CAIROS	233.3	3,064,233	0.152273016	0.152273016	233.3
48	PA	Seward	3130	2014	CAIROS	513.2	12,930,373	0.079378994	0.079378994	513.2
49	PA	Shawville	3131	2014	CAIROS	1,994.4	9,308,724	Converted to natural gas	0.1	465.4362
50	PA	St. Nicholas Cogeneration Project	54634	2014	CAIROS	99.5	4,488,918	0.044331396	0.044331396	99.5
51	PA	Talen Ironwood, LLC	55337	2014	CAIROS	133.6	18,061,861	0.014793603	0.014793603	133.6
52	PA	Tolna	3116	2014	CAIROS	1.1	3,359	0.654956832	0.654956832	1.1
53	PA	Veolia Energy Philadelphia - Schuylkill	50607	2014	CAIROS	0.8	17,014	0.094040202	0.094040202	0.8
54	PA	WPS Westwood Generation, LLC	50611	2014	CAIROS	111.8	1,492,789	0.149786741	0.149786741	111.8
55	PA	Warren	3132	2014	CAIROS	179.6	730,251	0.491885667	0.491885667	179.6
56	PA	Wheelabrator - Frackville	50879	2014	CAIROS	139.8	2,225,430	0.125638641	0.125638641	139.8
57	PA	York Energy Center	55524	2014	CAIROS	35.3	11,225,982	0.006288982	0.006288982	35.3

2014 OS NOx 44345.4

27010.18347

Coal refuse-fired
Coal-fired
Gas conversion
Retired