APPENDIX 5

EGU Inventory Methodology and Emissions for 2011, 2014, 2020 and 2030

5.1 EGU 2011 and 2014 Base Year Emissions

There is only one EGU point source facility in the eastern Kenosha nonattainment area, the Pleasant Prairie coal-fired power plant. The 2011 and 2014 NOx emissions, emission rates and fuel consumption for Pleasant Prairie generating units were derived from data reported by the utility to EPA's Clean Air Markets Division (CAMD) database. WDNR used the ozone season day with the 99th percentile highest heat input during each ozone season to represent summer day operations during the 2011 and 2014 ozone seasons. Using this 99th percentile value provides a conservative but reasonable representation of maximum summer day operation.

The summer day emissions were then calculated by multiplying the maximum summer day heat input in 2011 and 2014 by the average emission rate for each ozone season. The NOx emission rate was derived from the CAMD emissions data for each ozone season. This base data and the tons per summer day emissions calculated from this data are provided in Table 5.1.1. In 2011 and 2014, the NOx tons per summer day (tpsd) emissions are 11.05 and 10.75 tpsd, respectively.

The VOC summer day emissions are also derived by multiplying the maximum day heat input by an average VOC emission rate. The base data used in the calculation and the resulting emissions are provided in Table 5.1.1. In this case, however, VOC emissions are not monitored by continuous emissions monitors and reported to the CAMD database as is done for NOx. Therefore, the VOC emission rate was derived by dividing the annual VOC emissions reported to the WDNR Air Emissions Inventory (AEI) by the annual heat input reported to the CAMD database for each year. The data applied in deriving the VOC emission rates are shown in table 5.1.2. Multiplying these VOC emission rates for each year by the respective maximum heat inputs resulted in 0.54 tpsd of VOC in 2011 and 0.56 tpsd in 2014.

Note: emissions from non-electric generating emission units at the plant (i.e., units other than the two coal boilers) are not included because they are insignificant (less than 0.5% of the total plant emissions on a tons per year basis) compared to the coal boiler emissions.

Table 5.1.1. EGU Summer Day Operation and Emissions.

Variable	2011	2014
Summer Day Heat Input (mmBtu) [1]	329,924	330,759
NOx Rate (lbs/mmBtu) [2]	0.067	0.065
NOx (tpsd)	11.05	10.75
VOC Rate (lbs/mmBtu) [3]	0.0033	0.0034
VOC (tpsd)	0.54	0.56

[1] Heat input is for the day with the 99th percentile highest heat input during each ozone season.
[2] Emission rates derived from EPA CAMD ozone season NOx emissions and heat input.
[3] Calculated in Table 5.1.2.

Table 5.1.2. VOC Annual Emissions and Emission Rate.

Variable	2011	2014
Annual VOC (tons) [1]	123.4	125.7
Annual Heat Input (mmBtu) [2]	75,084,093	74,423,973
VOC Rate (lbs/mmBtu) [3]	0.0033	0.0034

[1] Emissions reported to the WDNR Air Emissions Inventory.
[2] Heat input reported to the CAMD database.
[3] Calculated by the equation (annual VOC tons x 2000 lbs/ton) / annual Heat Input (mmBtu).

5.2 EGU 2020 and 2030 Projected Emissions.

The Pleasant Prairie power plant is anticipated to continue operation at close to its current levels through the initial maintenance period based on all available modeling studies including EPA's Integrated Planning Model analysis. Following the same methodology as used in calculating 2011 and 2014 emissions, WDNR projected summer day emissions for the Pleasant Prairie power plant by multiplying a projected maximum daily heat input by a projected average ozone season emission rate. The data used in this calculation and resulting emissions are summarized in Table 5.2.1.

To determine the appropriate projected maximum heat input, the WDNR first evaluated historical maximum day ozone season values for 2010 through 2015 as listed in Table 5.2.2. As for the 2011 and 2014 inventory years, each maximum daily value is for the day of the 99th percentile of all daily values. Based on this approach, the maximum summer day heat input during this time period was 330,759 mmBtu which occurred in 2014. Because this measured value for 2014 exceeds the nominal capacity value of 309,552 mmBtu reported for the plant, the WDNR assumes the power plant would not operate at levels exceeding 2014 operation in the future. Thus 330,759 mmBtu is used to represent the maximum daily heat input for 2020 and 2030.

The WDNR evaluated historical data in determining an appropriate NOx emission rate for calculating projected emissions. Since 2006, the Pleasant Prairie power plant has been subject to a consent decree requiring the operation of a selective catalytic reduction (SCR) system for controlling NOx emissions (refer to section 6 of the eastern Kenosha County ozone redesignation request for additional details). The average ozone season NOx emission rates since 2010 and reflecting operation of the SCR are shown in Table 5.2.2. During this time, the plant NOx emission rates exceeded 0.065 lbs/mmBtu in only one year. In addition, the heat input weighted average for these ozone seasons is 0.064 lbs/mmBtu. Based on this information, the value of 0.065 lbs/mmBtu is a reasonable, conservative representation of the future expected emission rate. This rate is applied in calculating projected summer day emissions for 2020 and 2030.

Based on this information, NOx emissions projected for 2020 and 2030 are calculated to be 10.75 tpsd. It should be noted that the value of 10.75 tpsd is not intended to constitute a daily

enforceable emission limitation on the power plant. This value represents the best reasonable approximation of the SCR system, a compliance margin, and projected maximum actual summer day emissions that could be expected going into the future. The NOx emission rate limitation for Pleasant Prairie is 0.08 lbs/mmBtu. Multiplying this emission limit by the nominal heat input capacity allows for emissions as high as 12.4 tons on any given day.

VOC emissions are calculated by assuming the VOC emission factor of 0.0034 lbs/mmBtu demonstrated during the 2014 ozone season will continue through 2030. There is no action anticipated that would significantly reduce this value. Multiplying the maximum day heat input value and this emission rate yields 0.56 tpsd of VOC. The base information used in this calculation and the resulting VOC emissions are shown in Table 5.2.1

Table 5.2.1. EGU 2020 and 2030 Emissions (tpsd).

Variable	Projected Values
Summer Day Heat Input (mmBtu) [1]	330,759
NOx Rate (lbs/mmBtu) [2]	0.065
NOx (tpsd)	10.75
VOC Rate (lbs/mmBtu) [3]	0.0034
VOC (tpsd)	0.56

[1] Heat input is for the day with the 99th percentile highest heat input during each ozone season.
[2] Ozone season NOx emission rates derived from EPA CAMD ozone season NOx emissions and heat input.
[3] The VOC projected emission rate is assumed to be the same as the 2014 derived emission rate.

Table 5.2.2. EGU Ozone Season Maximum Daily Heat Input and NOx Emissions.

Year	Ozone Season Average NOx Emission Rate (lbs/mmBtu) [1]	Ozone Season Maximum Daily Heat Input [2]	Calculated NOx Emissions (tpsd) [3]
2010	0.063	316,271	9.96
2011	0.067	329,924	11.05
2012	0.064	329,328	10.54
2013	0.064	319,606	10.23
2014	0.065	330,759	10.75
2015	0.064	292,008	9.34

[1] Derived from ozone season heat input and NOx emissions reported to the CAMD database for each year.
[2] The heat input for the ozone season day with the 99th percentile highest daily heat input.
[3] Calculated by multiplying the ozone season average emission rate by the ozone season maximum daily heat input.