

October 23, 2013

Mr. Mark B. Vandebusch  
Designated Representative  
Wisconsin Public Service Corporation  
700 North Adams Street  
P.O. Box 19001  
Green Bay, Wisconsin 54307-9001

Re: Petition for a Waiver from NO<sub>x</sub> Apportionment Requirement for Weston Unit 3  
(Facility ID (ORISPL) 4078)

Dear Mr. Vandebusch:

The United States Environmental Protection Agency (EPA) has reviewed the March 28, 2013 petition submitted under 40 CFR § 75.66 by Wisconsin Public Service Corporation (WPSC) requesting a waiver of the requirement under 40 CFR 75.17(b) to apportion among individual units the combined nitrogen oxides (NO<sub>x</sub>) emission rate measured at the common stack that Weston Unit 3 will share with two process heaters being installed as part of an emission control project. EPA approves the petition, with conditions, as explained below.

### **Background**

Weston Unit 3, located in Marathon County, Wisconsin, is a coal-fueled boiler with a permitted heat input rate of 3423.5 million Btus per hour (mmBtu/hr), serving a generator with a nameplate capacity of 350 megawatts. The unit's current emission controls include a fabric filter and low-NO<sub>x</sub> burners with separated overfire air. According to WPSC, Unit 3 is subject to the Acid Rain Program (ARP) and the Clean Air Interstate Rule (CAIR). WPSC is therefore required to continuously monitor and report Unit 3's NO<sub>x</sub>, sulfur dioxide (SO<sub>2</sub>), and carbon dioxide (CO<sub>2</sub>) mass emissions, NO<sub>x</sub> emission rate, and heat input rate, all in accordance with 40 CFR Part 75. To meet these monitoring requirements, WPSC has installed and certified a NO<sub>x</sub>-diluent continuous emission monitoring system (CEMS), an SO<sub>2</sub> CEMS, a CO<sub>2</sub> CEMS, and a stack gas flow monitor on the Unit 3 stack.

WPSC is also a party to a consent decree that requires WPSC, among other things, to install and continuously operate additional emission controls for NO<sub>x</sub> and SO<sub>2</sub> at Weston Unit 3.<sup>1</sup> Under the consent decree, Unit 3 is subject to specified maximum 30-day rolling average NO<sub>x</sub> and SO<sub>2</sub> emission rates, including ultimately a NO<sub>x</sub> emission rate of 0.100 pounds per mmBtu (lb/mmBtu),<sup>2</sup> and a group of units including Unit 3 is subject to aggregated annual

<sup>1</sup> Consent Decree, United States v. Wis. Pub. Serv. Corp., No. 1:13-cv-00010-WCG (E.D. Wis. entered Mar. 2013).

<sup>2</sup> The 30-day rolling average emission rates specified for Unit 3 in the consent decree are as follows:

	NO <sub>x</sub>	SO <sub>2</sub>
12/31/2012 – 12/30/2013	0.140 lb/mmBtu	0.750 lb/mmBtu

tonnage limits for NO<sub>x</sub> and SO<sub>2</sub> mass emissions. The consent decree calls for WPSC's compliance with the emission rate and tonnage limits to be determined using CEMS in accordance with the procedures of Part 75 (with certain exceptions).

The March 28 petition states that WPSC is adding a ReACT process at Weston Unit 3. ReACT is an integrated multipollutant control technology that addresses NO<sub>x</sub>, SO<sub>2</sub>, and mercury emissions using a three-stage process. Removal of the pollutants from the exhaust gases occurs in the adsorption stage where the pollutants are adsorbed onto activated coke. The activated coke from the adsorption stage is then transferred to the regeneration stage where pollutants are removed from the activated coke by thermal desorption, regenerating most of the activated coke so that it can be fed back into the adsorption stage. NO<sub>x</sub> is reduced to elemental nitrogen gas and released, while the sulfur-rich desorbed gases are transferred to the byproduct recovery stage where sulfuric acid is produced.

To create the heat needed to drive thermal desorption in the regeneration stage, the ReACT process at Weston Unit 3 will use two natural gas-fueled process heaters. The exhaust gas from the process heaters will be combined with the Unit 3 boiler exhaust gas upstream of the ReACT adsorption stage and will therefore be treated by the ReACT process along with the boiler exhaust gas prior to monitoring and discharge through the Unit 3 stack. According to the petition, the process heaters will have a combined heat input rate of 50 mmBtu/hr, and the AP-42 default pre-ReACT NO<sub>x</sub> emission factor for the process heaters is approximately 0.10 lb/mmBtu. By comparison, the Unit 3 boiler's heat input rate typically ranges from 1500 to 3400 mmBtu/hr, and since 2010 (i.e., reflecting the unit's current NO<sub>x</sub> controls but before addition of the ReACT process) the Unit 3 boiler's annual average NO<sub>x</sub> emission rate has ranged from 0.11 to 0.12 lb/mmBtu.

According to the petition, the process heaters are not affected units for purposes of the ARP or CAIR programs. Under Part 75, special monitoring and reporting provisions apply in situations where an affected unit (such as the Unit 3 boiler) shares a common stack with non-affected units. With respect to mass emissions of NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub>, the monitoring and reporting alternatives available under Part 75 include the option to attribute all of the combined emissions at the common stack to the affected unit.<sup>3</sup> However, with respect to NO<sub>x</sub> emission rate and heat input rate, Part 75 generally requires monitoring and reporting for affected units on a basis separate from any non-affected units sharing a common stack. More specifically, § 75.17(b) generally requires either (1) monitoring the NO<sub>x</sub> emission rate of affected units before their exhaust gases are combined with exhaust gases from non-affected units, or (2) monitoring the combined NO<sub>x</sub> emission rate at the common stack and then apportioning the combined rate among the individual units for reporting purposes. Section 75.16(e)(1) generally requires determining and reporting the heat input rate for each individual affected unit exhausting through

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12/31/2013 – 12/30/2016	0.130 lb/mmBtu	0.750 lb/mmBtu
12/31/2016 and thereafter	0.100 lb/mmBtu	0.080 lb/mmBtu

<sup>3</sup> See 40 CFR 75.72(b)(2)(iii) (NO<sub>x</sub>); *id.* § 75.16(b)(2)(ii)(C) (SO<sub>2</sub>); *id.* § 75.13(a) (CO<sub>2</sub>).

a common stack (in addition to monitoring and reporting on a combined basis if the operator so chooses).

In the petition, WPSC observes that configuring Unit 3's new emission controls so that the process heaters' exhaust gases are treated by the ReACT process prior to discharge is environmentally desirable because it lowers overall NO<sub>x</sub> emissions. As WPSC points out, this configuration also makes it impossible to directly monitor the Unit 3 boiler's individual post-ReACT NO<sub>x</sub> emission rate because the boiler's exhaust gases will be combined with the process heaters' exhaust gases prior to treatment by the ReACT process. The petition describes two alternate approaches for indirectly determining the Unit 3 boiler's individual post-ReACT NO<sub>x</sub> emission rate by adjusting – i.e., apportioning – the combined post-ReACT NO<sub>x</sub> emission rate so as to back out the estimated impact of the process heaters. The petition then goes on to describe why WPSC views those two approaches as either infeasible or impractical.

WPSC also argues in the petition that reporting the combined NO<sub>x</sub> emission rate would be reasonable even if separate reporting of Unit 3's apportioned or individually monitored NO<sub>x</sub> emission rate were possible, for several reasons. First, WPSC claims that the combined post-ReACT NO<sub>x</sub> emission rate at the common stack would be very close to the Unit 3 boiler's individual post-ReACT NO<sub>x</sub> emission rate, because the process heaters will produce only a small portion of the combined exhaust gases and because WPSC expects the differential between the pre-ReACT NO<sub>x</sub> emission rate of the Unit 3 boiler and the pre-ReACT NO<sub>x</sub> emission rate of the process heaters to be small. Second, WPSC asserts that under any monitoring or apportionment approach Unit 3's NO<sub>x</sub> emission rate would be well below the ARP NO<sub>x</sub> emission rate limit applicable to the unit under 40 CFR Part 76. Finally, WPSC argues that the ReACT process should be considered part of the process of operating the Unit 3 boiler, because in order to meet the unit's emission rate limits under the consent decree the ReACT process must be operated whenever the boiler operates.

For all the reasons summarized above, in the petition WPSC seeks a waiver of the otherwise applicable NO<sub>x</sub> emission rate apportionment requirement under 40 CFR 75.17(b) and requests permission to instead monitor and report for Weston Unit 3 the combined NO<sub>x</sub> emission rate measured at the common stack.

## **Discussion**

Because the process heaters being installed for the ReACT process at Weston Unit 3 will not serve a generator, EPA agrees that, considered independently of the Unit 3 boiler, the process heaters would not be affected units for purposes of either the ARP or CAIR.<sup>4</sup> Absent a waiver, 40 CFR 75.17(b) would therefore require Unit 3's NO<sub>x</sub> emission rate to be monitored or apportioned and reported for the Unit 3 boiler on an individual basis designed to exclude the NO<sub>x</sub> emissions of the process heaters sharing the common stack, and 40 CFR 75.16(e)(1) would similarly require the Unit 3 boiler's heat input rate to be determined and reported on an individual basis.

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<sup>4</sup> See 40 CFR 72.2 (ARP definition of "utility unit"); *id.* § 72.6 (ARP applicability provisions); *id.* § 97.104 (typical CAIR applicability provisions).

EPA has not concluded that it would be infeasible for WPSC to comply with the generally applicable requirements of §§ 75.17(b) and 75.16(e)(1) just described. We agree with WPSC that that configuring Unit 3's new emission controls so that the process heaters' exhaust gases are treated by the ReACT process along with the boiler's exhaust gases is environmentally desirable, and WPSC is clearly correct that this configuration will make it impossible to directly monitor the post-ReACT NO<sub>x</sub> emission rate for the Unit 3 boiler on an individual basis because the exhaust streams from the boiler and the process heaters will be combined upstream of the ReACT process. However, while WPSC also asserts that apportionment of the combined NO<sub>x</sub> emission rate would be infeasible, or at best impractical, the petition provides limited factual support for these assertions with respect to the two alternative approaches discussed in the petition, and we note that additional approaches could be considered beyond those two. Further, although not addressed in the petition, we believe that individual heat input rates for the boiler and process heaters could be determined using measurements of fuel flow to the process heaters together with measurements of the combined heat input rate at the common stack.

Nevertheless, EPA agrees with WPSC's additional arguments that a waiver of the NO<sub>x</sub> emission rate apportionment requirement would be reasonable in these circumstances, subject to appropriate conditions as discussed below. First, we agree that the combined NO<sub>x</sub> emission rate measured at the common stack is likely to be very close to any properly apportioned individual emission rate for the Unit 3 boiler. The maximum heat input rate of the two process heaters together is 50 mmBtu/hr, which is between 3.3% and 1.5% of the typical heat input range for the Unit 3 boiler.<sup>5</sup> Based on information in the petition, the pre-ReACT emission rate differential between the boiler and process heaters can be estimated at approximately 0.02 lb/mmBtu.<sup>6</sup> The post-ReACT emission rate differential will be smaller than the pre-ReACT differential.<sup>7</sup> Yet even if the actual post-ReACT differential were double the estimated pre-ReACT differential – i.e., 0.04 lb/mmBtu – and even if the process heaters routinely provided 3.3% of the combined heat input to the common stack, the combined NO<sub>x</sub> emission rate at the common stack would be only 0.0013 lb/mmBtu less than the properly apportioned individual emission rate of the boiler.<sup>8</sup> We view the assumptions used in this example as conservative, and we therefore expect that the difference between the combined NO<sub>x</sub> emission rate measured at the Unit 3 common stack and a properly apportioned individual NO<sub>x</sub> emission rate for the Unit 3 boiler would likely be smaller than 0.0013 lb/mmBtu.

Second, EPA agrees that under any monitoring or apportionment approach Unit 3's NO<sub>x</sub> emission rate is likely to be well below the ARP NO<sub>x</sub> emission rate limit applicable to the unit under 40 CFR Part 76. In the petition, WPSC states that the NO<sub>x</sub> emission rate limit applicable

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<sup>5</sup> The process heater's maximum combined heat input rate of 50 mmBtu/hr is 3.3% of the lower end of the boiler's typical heat input range (1500 mmBtu/hr) and 1.5% of the upper end of the boiler's typical heat input range (3400 mmBtu/hr). These percentage calculations are not intended to imply that the process heaters would always operate at their maximum heat input rate.

<sup>6</sup> 0.02 lb/mmBtu is the difference between the Unit 3 boiler's highest annual average NO<sub>x</sub> emission rate in the 2010-2012 period (0.12 lb/mmBtu) and the AP-42 default pre-ReACT NO<sub>x</sub> emission factor for the process heaters as stated in the petition (0.10 lb/mmBtu).

<sup>7</sup> EPA reaches this conclusion based on the assumption that the ReACT process will eliminate the same proportion of the input NO<sub>x</sub> emissions from each of the exhaust gas streams jointly treated by the process.

<sup>8</sup>  $-0.04 \text{ lb/mmBtu} * 3.3\% = -0.0013 \text{ lb/mmBtu}$ .

to Unit 3 under Part 76 is 0.45 lb/mmBtu. We note that currently Unit 3 appears to be subject to an alternative contemporaneous emission rate limit of 0.28 lb/mmBtu under a Part 76 averaging plan approved for 2008-2013 by the Wisconsin Department of Natural Resources. Nevertheless, whichever emission rate limit may apply to Unit 3 under Part 76 after 2013, given the unit's more stringent emission rate limits under the consent decree of 0.10 to 0.14 lb/mmBtu and the unit's recently reported annual average emission rates of 0.11 to 0.12 lb/mmBtu, we see no reason to dispute WPSC's contention that Unit 3 would readily comply with the applicable NO<sub>x</sub> emission rate limit under Part 76 using either a common stack or an apportioned reporting approach.

Third, EPA agrees that in this circumstance it is reasonable to consider the ReACT process part of the process of operating the Unit 3 boiler. According to both the petition and the terms of the consent decree, WPSC must continuously operate the ReACT process whenever the boiler is operating, and the essential function of the process heaters is to facilitate operation of the boiler by acting as part of the boiler's emission control equipment. In fact, because of the close linkage between boiler operation and process heater operation, we believe the combined NO<sub>x</sub> emission rate data would better represent the overall NO<sub>x</sub> emission rate resulting from operation of Unit 3 than would the emission rate data apportioned for the Unit 3 boiler on a separate basis.

As noted earlier, WPSC must monitor and report in accordance with Part 75 not only the unit's NO<sub>x</sub> emission rate but also its heat input rate and its NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub> mass emissions. The close linkage just discussed between boiler operation and process heater operation means that for all of these variables, combined measurements at the common stack will better represent the full consequences of Unit 3's operation than would measurements for the boiler alone. EPA therefore believes that because we are relying on the close linkage between boiler operation and process heater operation as a basis to allow WPSC to monitor and report Unit 3's NO<sub>x</sub> emission rate using combined measurements at the common stack, WPSC should be required to likewise monitor and report the other variables using measurements at the common stack as well.

With respect specifically to the Unit 3 heat input rate, EPA sees a further reason for requiring WPSC to monitor and report the combined heat input rate for the boiler and process heaters rather than the individual heat input rate for the boiler alone. Use of the individual heat input rate for the boiler together with the combined NO<sub>x</sub> emission rate measured at the common stack could cause slight underreporting of the boiler's NO<sub>x</sub> mass emissions, because the combined NO<sub>x</sub> emission rate is expected to be very slightly below the apportioned individual emission rate of the boiler.<sup>9</sup> However, this potential underreporting problem is eliminated if the NO<sub>x</sub> emission rate and the heat input rate are both based on the combined measurements at the common stack. Although § 75.16(e)(1) would generally require Unit 3's heat input rate to be determined and reported separately from the heat input rate of the non-affected units sharing the common stack, this requirement may be waived, and we believe the circumstances here support a waiver.

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<sup>9</sup> WPSC's monitoring plan for Weston Unit 3 calls for the unit's reported NO<sub>x</sub> mass emissions in each hour to be calculated as the product of the unit's reported NO<sub>x</sub> emission rate for the hour times the unit's reported heat input rate for the hour.

Finally, EPA notes that the effect of monitoring and reporting NO<sub>x</sub>, SO<sub>2</sub>, and CO<sub>2</sub> mass emissions, NO<sub>x</sub> emission rate, and heat input rate for Unit 3 based on combined measurements at the common stack is to treat the fuel combustion emissions from the process heaters just like the fuel combustion emissions from the Unit 3 boiler for monitoring and reporting purposes. For this reason, it is also appropriate to require WPSC to include the process heaters' fuel usage in the fuel usage weights when determining any input-weighted F-factor or F<sub>C</sub>-factor for use in Unit 3's monitoring plan.<sup>10</sup>

### **EPA's Determination**

EPA hereby approves WPSC's request to waive the NO<sub>x</sub> emission rate apportionment requirement under 40 CFR 75.17(b) for Weston Unit 3 and to allow WPSC instead to monitor and report for Unit 3 the combined NO<sub>x</sub> emission rate for the Unit 3 boiler and ReACT process heaters exhausting through the Unit 3 common stack, subject to the conditions below. EPA's basis for this approval consists of conclusions that (1) the difference in the NO<sub>x</sub> emission rate reported without apportionment will be very close to the NO<sub>x</sub> emission rate that would have been reported with apportionment; (2) the purposes under 40 Part 76 for the requirement to monitor and report Unit 3's NO<sub>x</sub> emission rate will continue to be fully served; and (3) reporting of the combined NO<sub>x</sub> emission rate for the boiler and process heaters will better represent the NO<sub>x</sub> - related consequences of Unit 3's operation than would reporting of the NO<sub>x</sub> emission rate for the boiler alone.

EPA also hereby waives the otherwise applicable separate heat input rate determination requirement under 40 CFR 75.16(e)(1) for Weston Unit 3. EPA's basis for this waiver consists of conclusions that (1) reporting of the combined heat input rate for the boilers and process heaters will better represent the heat input-related consequences of Unit 3's operation than would reporting of the heat input rate for the boiler alone; and (2) reporting of the combined heat input rate will eliminate the potential for underreporting of NO<sub>x</sub> mass emissions that might otherwise exist where the NO<sub>x</sub> emission rate is reported on a combined basis and the heat input rate is reported on the basis of the boiler alone.

The conditions of these determinations are as follows:

- (1) Upon commencement of the operation of the ReACT process heaters at Weston Unit 3 in a configuration where their exhaust gases are combined with the exhaust gases of the Unit 3 boiler prior to discharge through the Unit 3 common stack, WPSC shall monitor, record, and report for Unit 3 the combined NO<sub>x</sub> emission rate, combined heat input rate, combined NO<sub>x</sub> mass emissions, combined SO<sub>2</sub> mass emissions, and combined CO<sub>2</sub> mass emissions for the Unit 3 boiler and process heaters at the common stack.
- (2) WPSC shall account for the fuel used by the ReACT process heaters exhausting through the common stack as well as the fuel used by the Weston Unit 3 boiler when determining any input-weighted F-factor or F<sub>C</sub>-factor for use in Unit 3's monitoring plan.

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<sup>10</sup> See section 3.3.6.4 of Appendix F of Part 75.

(3) WPSC shall update the electronic monitoring plan for Weston Unit 3 as necessary to provide for monitoring, recording, and reporting to be performed consistent with these requirements.

EPA's determination relies on the accuracy and completeness of WPSC's March 28, 2013 petition and is appealable under 40 CFR Part 78. If you have any questions regarding this determination, please contact Louis Nichols at (202) 343-9008. Thank you for your continued cooperation.

Sincerely,

/s/

Reid P. Harvey, Director  
Clean Air Markets Division

cc: Loretta Lehrman, EPA Region 5  
Sabrina Argentieri, EPA Region 5  
Andrew Seeber, WI DNR  
Louis Nichols, EPA, CAMD