

March 21, 2013

Mr. Michael Boslet  
Alternate Designated Representative  
Niagara Generation, LLC  
5300 Frontier Ave.  
Niagara Falls, NY 14304

Re: Petition for Approval of a Site-specific F-Factor Methodology for Unit 1 at the Niagara Generating Facility (Facility ID (ORISPL) 50202)

Dear Mr. Boslet:

The United States Environmental Protection Agency (EPA) has reviewed the October 19, 2012 petition submitted under §75.66(1) by Niagara Generation, LLC (“Niagara”) in which Niagara requested approval of a site-specific F-factor methodology for Unit 1 at the Niagara Generating Facility. EPA approves the petition, with conditions, as discussed below.

#### Background

Niagara owns and operates the Niagara Generating Facility, which is located in Niagara County, New York. The facility consists of a circulating fluidized bed boiler, known as Unit 1. According to Niagara, Unit 1 is subject to the Acid Rain Program, the Clean Air Interstate Rule (CAIR) Annual Sulfur Dioxide (SO<sub>2</sub>) and Nitrogen Oxides (NO<sub>x</sub>) Trading Programs and the CAIR Ozone Season NO<sub>x</sub> Trading Program. Therefore, Niagara is required to continuously monitor and report SO<sub>2</sub>, NO<sub>x</sub>, and carbon dioxide (CO<sub>2</sub>) emissions and heat input for this unit, in accordance with 40 CFR Part 75. To meet these requirements, Niagara has installed continuous emission monitoring systems (CEMS) for SO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>, and stack gas flow rate.

Historically, Unit 1 has been permitted to fire (or co-fire) fossil fuels (natural gas, coal, petroleum coke, tire-derived fuel and used oil) and clean, unadulterated wood. A carbon-based F-factor (F<sub>c</sub>) for each of these fuels is listed in Table 1 of Appendix F to Part 75. However, during the most recent Title V operating permit renewal process, Niagara was given permission to combust one additional fuel, i.e., construction and demolition (C&D) debris-derived wood fuel. Niagara began burning C&D fuel (which is not listed in Table 1 of Appendix F) in Unit 1 in the first quarter of 2012.

Niagara originally considered C&D fuel to be "wood", and assumed that whenever C&D fuel was combusted in Unit 1, the default F<sub>c</sub> value of 1,830 scf CO<sub>2</sub>/mmBtu for wood residue from Table 1 of Appendix F could be used in the emissions calculations. However, EPA's Clean Air Markets Division (CAMD) informed Niagara that the C&D fuel, which contains resins and

other contaminants, is more appropriately classified as "other solid fuel" than as wood. Therefore, a custom  $F_c$  value would have to be determined for the C&D fuel. Further, section 3.3.6.3 of Appendix F specifies that when a fuel (such as C&D fuel) which is not listed in Table 1 is co-fired with fuels listed in Table 1, the  $F_c$  value used in the emissions calculations is subject to approval by the Administrator. In view of these considerations, on October 19, 2012, Niagara submitted a petition to EPA, requesting approval of procedures for determining the appropriate  $F_c$  value to use in the emissions calculations when C&D fuel is combusted in Unit 1, either alone or in combination with other fuels.

According to Niagara, measurements of stack gas flow rate and pollutant concentration are used to calculate Unit 1's  $SO_2$  and  $CO_2$  mass emissions. These calculations do not require the use of a carbon-based F-factor and therefore are unaffected by the October 19, 2012 petition. However, Niagara uses Equations F-6 and F-15 from Appendix F to Part 75 to calculate the  $NO_x$  emission rate and unit heat input rate, respectively. Both of these equations require the use of an  $F_c$  factor.<sup>1</sup>

The October 19, 2012 petition states that natural gas is combusted during unit startup and may also be co-fired with solid fuels to augment the heat input to the boiler. According to Niagara, the facility's distributed control system (DCS) and the CEMS data acquisition and handling system (DAHS), as presently configured, can tell whether a solid or gaseous fuel is being fired in the boiler at any given time but cannot identify the type(s) of solid fuel(s) being fired.

For this reason, Niagara has proposed to use the default  $F_c$  factor of 1,040 scf  $CO_2/mmBtu$  (from Table 1 in Appendix F) in the  $NO_x$  emission rate and heat input rate calculations when natural gas is the only fuel fired in the boiler, and to use the "worst-case"  $F_c$  factor (as described in section 3.3.6.5 of Appendix F to Part 75) when co-firing natural gas and solid fuel(s) (including the new C&D fuel) or when combinations of solid fuels are co-fired. When two or more fuels are co-fired, section 3.3.6.5 of Appendix F allows the highest ("worst case")  $F_c$  value for any of the fuels to be used in the emissions calculations, as an alternative to prorating  $F_c$ . According to Niagara, prorating  $F_c$ , which requires precise knowledge of the types of fuel being combusted and the fraction of the unit heat input contributed by each fuel, is not feasible for Unit 1, due to the limitations of the DCS/DAHS configuration.

To determine the appropriate  $F_c$  factor to be used in the  $NO_x$  emission rate and heat input rate calculations, Niagara has proposed a two step process:

1. A site-specific  $F_c$  factor would be determined for each month in which C&D fuel is combusted in Unit 1. When C&D fuel is fired in the boiler, samples of the fuel would be taken every three hours and composited into a daily super sample. The daily super samples would be aggregated into a monthly composite, which would then be shipped

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<sup>1</sup> Note that  $NO_x$  mass emissions (which are calculated as the product of Equations F-6 and F-15) are unaffected by the petition, because the same  $F_c$  appears in the numerator of Equation F-6 and in the denominator of Equation F-15. Therefore, the two  $F_c$  factors cancel out.

off-site for analysis. The monthly composite sample would be analyzed for carbon content (weight percentage) and gross calorific value (Btu/lb). The  $F_c$  factor for that month would then be calculated using Equation F-7b from section 3.3.6 of Appendix F to Part 75. If the sample analyses for a particular month are missing or invalid, the highest  $F_c$  factor from the previous three months of C&D combustion would be used for that month. According to Niagara, this methodology began to be used in the first quarter of 2012. Niagara provided the results of the  $F_c$  determinations for the first eight months of 2012 as an attachment to the October 19, 2012 petition. The monthly  $F_c$  values ranged from 1,899 to 1,996 scf CO<sub>2</sub>/mmBtu.

2. For each month in which combinations of fuels are co-fired in Unit 1, the highest (“worst case”)  $F_c$  factor for any of the fuels combusted during that month would be determined. If C&D fuel is one of the fuels combusted in a particular month, the C&D fuel  $F_c$  factor for that month would be determined as described in Step 1 above. For all other fuels, the  $F_c$  factor would be the default value from Table 1 in section 3.3.5 of Appendix F to Part 75. To illustrate the process for selecting the worst case  $F_c$  value, Niagara provided an attachment to the October 19, 2012 petition (i.e, Table B), which shows each type of fuel that was combusted in Unit 1 in the first eight months of 2012 and its respective  $F_c$  value. For example, in May 2012, bituminous coal, tire-derived fuel, and C&D fuel were combusted in Unit 1. The monthly  $F_c$  value for the C&D fuel (obtained from fuel sampling and analysis) was 1,971 scf CO<sub>2</sub>/mmBtu, and the default  $F_c$  values for bituminous coal and tire-derived fuel were both 1,800 scf CO<sub>2</sub>/mmBtu. Therefore, the  $F_c$  value for C&D fuel was the highest (“worst case”) F-factor and was used in the NO<sub>x</sub> emission rate and heat input rate calculations for May 2012.

#### EPA’s Determination

EPA approves Niagara’s proposed strategy for determining the appropriate carbon-based F-factors ( $F_c$ ) to use in the calculation of hourly NO<sub>x</sub> emission rates and heat input rates for Unit 1 at the Niagara Generating Facility. The terms and conditions of this approval are as follows:

- (1) For all unit operating hours in which natural gas is the only fuel combusted in Unit 1, Niagara shall calculate the hourly NO<sub>x</sub> emission rates and heat input rates using the default  $F_c$  value of 1,040 scf CO<sub>2</sub>/mmBtu from Table 1 of Appendix F to 40 CFR Part 75.
- (2) For each calendar month in which fuels are co-fired, Niagara shall calculate the hourly NO<sub>x</sub> emission rates and heat input rates using the highest (“worst-case”)  $F_c$  value for any of the fuels combusted during that month.
- (3) For all fuels except C&D fuel, the default  $F_c$  values from Table 1 in Appendix F to Part 75 shall be used in the process of determining the worst-case  $F_c$  factor for each month.
- (4) For each month in which C&D fuel is combusted in Unit 1, Niagara shall perform fuel sampling and analysis as follows to determine the  $F_c$  value that shall be used in the process of determining the worst-case  $F_c$  factor for that month. Niagara shall obtain at

least nine (9) samples of the C&D fuel during the month. The samples shall be aggregated into a monthly composite, which shall be analyzed for carbon content (weight percentage) and GCV (Btu/lb). Based on the results of the analysis, Equation F-7b in Appendix F to Part 75 shall be used to calculate the  $F_c$  value for that month.

- (5) If, for any month in which C&D fuel is combusted in Unit 1, the results of the fuel analyses described in Condition (4) above are missing or invalid, the  $F_c$  value for C&D fuel for that month shall be the highest  $F_c$  value from the previous three months of C&D fuel combustion.
- (6) Notwithstanding Conditions (1) and (3) above, Niagara may, if warranted (e.g., due to a change in operations), determine a site-specific  $F_c$  factor for one (or more) of the fuels listed in Table 1 of Appendix F to Part 75, as described in section 3.3.6 of Appendix F, or may determine prorated  $F$  factors when combinations of these fuels are combusted in Unit 1 in the absence of C&D fuel. Administrative approval of such emission factors is not required.
- (7) Resubmission of the 2012 electronic data reports (EDRs) for Unit 1 is not required. EPA has reviewed the first, second, third, and fourth quarter 2012 EDRs and finds that Niagara has been properly implementing the approved  $F_c$  factor methodology since the first quarter of 2012, when C&D fuel was first combusted in the unit.

EPA's determination relies on the accuracy and completeness of Niagara's October 19, 2012 petition and is appealable under 40 CFR Part 78. If you have any questions regarding this determination, please contact Mr. Carlos R. Martinez at (202) 343-9747 or by e-mail at [martinez.carlos@epa.gov](mailto:martinez.carlos@epa.gov). Thank you for your continued cooperation.

Sincerely,

/ s /

Reid P. Harvey, Director  
Clean Air Markets Division

cc: Esther Nelson, EPA Region II  
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