

April 26, 2007

M. G. Deacon, Jr.
Designated Representative
Manchester Street Station
Dominion Energy, Inc.
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

Re: Petition to Recalculate Emissions for Units 9, 10, and 11 at the Manchester Street Station
(Facility ID (ORISPL) 3236)

Dear Mr. Deacon:

This is in response to your March 1, 2006 petition under §75.66, in which Dominion New England (DNE) requested to use an alternative methodology to calculate the 2005 emissions for Units 9, 10, and 11 at the Manchester Street Station. EPA approves the petition in part, with conditions, as discussed below.

Background

The Manchester Street Station (Manchester) is located in Providence, Rhode Island. The facility consists of three identical combined-cycle combustion turbines, each rated at a maximum heat input capacity of 1,305 million Btu per hour (mmBtu/hr) and a maximum electrical output of 125 megawatts (MW). To control nitrogen oxides (NO_x) emissions, the units are equipped with dry low-NO_x technology, steam injection, and selective catalytic reduction (SCR). The units primarily burn pipeline natural gas. Fuel oil is burned only on occasion, due to restrictions specified in the units' operating permits. For each unit, the permit limit for NO_x emissions is 9 parts per million (ppm) at 15 percent oxygen (% O₂) while burning natural gas and 25 ppm at 15% O₂ while burning oil. The units typically operate at less than 7.5 ppm NO_x at 15% O₂ while burning pipeline natural gas, with the SCR out-of-service.

According to DNE, Manchester Units 9, 10, and 11 are subject to the Acid Rain Program and to the NO_x Budget Trading Program, under the Rhode Island Department of Environmental Management, Office of Air Resources, Air Pollution Control Regulation No. 41. These regulations require DNE to continuously monitor and report sulfur dioxide (SO₂), NO_x and carbon dioxide (CO₂) emissions, and heat input for Units 9, 10, and 11, in accordance with 40 CFR Part 75. To meet the Part 75 requirements, continuous emission monitoring systems (CEMS) for SO₂, NO_x, CO₂, flow rate, and moisture have been installed and certified on each unit. The SO₂ monitors are used only when burning oil. When pipeline natural gas is combusted, hourly SO₂ emissions are determined by multiplying the measured unit heat input rate by a default SO₂ emission factor of 0.0006 lb/mmBtu.

According to the March 1, 2006 petition, DNE purchased the Manchester Street Station on January 1, 2005. During an internal quality review of 2005 CEMS data in November 2005, DNE discovered that certain on-line daily calibration error tests required under sections 2.1.1.2 and 2.1.5.1 of Part 75, Appendix B were not being performed. These sections of Appendix B allow sources to use off-line calibrations on a limited basis to validate CEMS data, provided that certain conditions are met. First, it must be demonstrated that off-line and on-line calibrations performed within 26 clock hours of each other yield equivalent results, within a tight tolerance, when compared to the reference values. Then, if the demonstration is successful, off-line calibrations may be used to validate data in cycles of 26 consecutive unit operating hours. An on-line calibration is required at the end of each 26 operating hour cycle to maintain data validation.

DNE's audit of the 2005 CEMS data for Manchester Units 9, 10, and 11 revealed that an initial off-line/on-line calibration demonstration had been made for each unit and that acceptable results were obtained. However, subsequent to these demonstrations, numerous instances were found where the required on-line calibration was not done after 26 unit operating hours, resulting in a considerable amount of invalid data. Upon learning of this situation, corrective actions were immediately taken. DNE then evaluated three possible approaches for recalculating the reported 2005 emissions data, with particular emphasis on the NO_x mass emissions during the ozone season (i.e., from May 1 through September 30). Under the NO_x Budget Trading Program, starting on May 1, 2003, DNE is required, for each ozone season, to hold NO_x allowances equal to the NO_x mass emissions¹ from Units 9, 10, and 11.

First, DNE applied the standard Part 75 missing data procedures and determined that this would result in 3,755 tons of NO_x being reported for the 2005 ozone season. DNE believes this to be far out-of-proportion to the actual ozone season NO_x emissions from Manchester, which have averaged only about 100 tons per year for the past five years.

Second, DNE recalculated the 2005 ozone season NO_x mass emissions using 90th percentile values derived from historical quality-assured CEMS data for Units 9, 10, and 11. The historical CEMS data were sorted into different data "pools", according to the type of fuel combusted and whether or not the emission controls were operating. Then, the 90th percentile value from the appropriate data pool was applied to each unit operating hour in 2005. This calculation methodology resulted in 183 tons of NO_x being reported for the 2005 ozone season.

Believing the first two calculation methodologies to be overly punitive, DNE sought to develop a third, more reasonable approach. DNE began by collecting both off-line and on-line CEMS calibration data for approximately two weeks. Then, DNE compared the off-line calibration results to the on-line calibration results. The data indicated that for the NO_x and CO₂ analyzers and for the moisture and flow monitoring systems, all of the calibrations met the specifications of Part 75, Appendix A, Section 3.1, which are the same performance criteria that must be met to pass the off-line/on-line calibration demonstration in Part 75, Appendix B, Section 2.1.1.2. However, the SO₂ monitor, which is used only during oil firing, did not meet the acceptance criteria. The results of the paired on-line and off-line calibration tests were

¹ DNE must hold one NO_x allowance for every ton of NO_x emitted from the units.

provided as an attachment to the March 1, 2006 petition.

In view of these test results, DNE recalculated the 2005 emissions data for Units 9, 10, and 11 by applying calibration error adjustment factors. DNE’s calculation method assumes that all of the CEMS data are credible, but that the data recorded during periods where a required on-line calibration was not performed must be adjusted upward. DNE adjusted the data using the maximum calibration error percentages allowed by the off-line/on-line calibration demonstration described in Section 2.1.1.2 of Appendix B. These maximum calibration error percentages are: (a) 2.5% of the span value for NO_x and SO₂ monitors; (b) 0.5% CO₂ or O₂ for diluent gas monitors; and (c) 3.0% of the span value for flow monitors.

Units 9, 10, and 11 have dual-range NO_x analyzers. Therefore, for all NO_x concentration data below 30 parts per million (ppm), DNE based the 2.5% of span adjustment factor on the low-scale span value, and for data above 30 ppm, the data were adjusted based on the high-scale span value. A default SO₂ emission rate of 0.0006 lb/mmBtu was used to estimate SO₂ emissions when firing pipeline natural gas. Since the SO₂ monitor failed to meet the off-line/on-line acceptance criteria, the standard Part 75 missing data procedures were applied to all SO₂ data recorded during oil firing.

Using the appropriate calibration adjustment factors, DNE recalculated the emissions data for Units 9, 10, and 11, from January 1, 2005 through November 15, 2005, with the latter date corresponding to the date on which corrective actions were taken. The original and adjusted emissions data are shown below in Tables 1 and 2, respectively. In the March 1, 2006 petition, DNE requested to use the adjusted data in Table 2 as the official 2005 emissions data for Manchester Units 9, 10, and 11.

**Table 1: Original Emissions Data for Manchester Units 9, 10, and 11
(January 1, 2005 through November 15, 2005)**

Unit ID (Basis)²	Operating Hours	CO₂ Tons	Heat Input (mmBtu)	NO_x Rate (lb/mmBtu)	SO₂ Tons	NO_x Tons
9 (YTD)	2,843	157,432.3	2,654,106.0	0.054	1.0	54.7
9 (OS)	2,017	³ NR	1,930,747.6	0.048	NR	36.2
10 (YTD)	3,267	185,207.5	3,133,308.7	0.053	1.0	62.4
10 (OS)	2,157	NR	2,166,002.5	0.045	NR	38.0
11 (YTD)	3,600	200,379.8	3,377,631.3	0.052	1.1	66.0
11 (OS)	2,227	NR	2,154,395.6	0.043	NR	36.6

**Table 2: Proposed Adjusted Emissions Data for Manchester Units 9, 10, and 11
(January 1, 2005 through November 15, 2005)**

² “YTD” means “year-to-date” (January 1, 2005 through November 15, 2005). “OS” means “ozone season” (May 1, 2005 through September 30, 2005).

³ “NR” means that reporting of this parameter is not required by regulation.

Unit ID (Basis)	Operating Hours	CO ₂ Tons	Heat Input (mmBtu)	NO _x Rate (lb/mmBtu)	SO ₂ Tons	NO _x Tons
9 (YTD)	2,843	184,286.0	3,106,912.2	0.051	1.1	61.5
9 (OS)	2,017	NR	2,289,761.6	0.045	NR	41.5
10 (YTD)	3,267	218,900.6	3,692,361.9	0.050	1.2	70.2
10 (OS)	2,157	NR	2,568,643.4	0.042	NR	43.6
11 (YTD)	3,600	231,914.5	3,908,821.2	0.049	1.8	73.5
11 (OS)	2,227	NR	2,150,942.0	0.041	NR	41.4

EPA's Determination

Since monitoring systems may perform differently under various environmental conditions (e.g., temperature, pressure, and moisture concentration), standard engineering practice dictates that quality assurance tests such as the daily calibration error checks are best performed during normal operating conditions. On-line calibration checks provide good assurance that the monitoring system is functioning properly at the normal stack conditions. Off-line calibration checks alone do not provide the same level of assurance. In the case of Manchester Units 9, 10, and 11, both off-line and on-line calibrations of the CEMS were performed in 2005, but the frequency of the on-line tests was less than that prescribed by Part 75.

EPA agrees that using the standard Part 75 missing data procedures or the 90th percentile values from historical data during the periods when required on-line calibration checks were not conducted unreasonably overstates the NO_x emissions from these units. Further, DNE's two-week comparison of off-line and on-line calibration data to reference values for Units 9, 10, and 11 exceeds the requirements of the off-line/on-line calibration demonstration described in Section 2.1.1.2 of Appendix B, which is based on a single set of readings. This gives added credibility to the off-line calibration error test data from these units. However, EPA finds that DNE's proposal to adjust the CEMS data upward by the maximum calibration error percentages allowed by the off-line/on-line calibration demonstration does not provide appropriately conservative values for estimating the actual emissions from these units, because the maximum calibration error allowed under Part 75, Appendix B, Section 2.1.4(a) for daily operation of the CEMS is twice as high as the maximum error allowed by the off-line/on-line demonstration.⁴

Since thousands of hours of data recorded during daily operation of the CEMS at Units 9, 10, and 11 are being adjusted, EPA believes that the upward adjustment of the data should be based on the allowable calibration error for daily operation of the CEMS, rather than the calibration error allowed by the short-term on-line/off-line demonstration. Basing the data adjustments on the calibration error tolerances of Section 2.1.4(a) of Appendix B represents the worst-case

⁴ During the off-line/on-line calibration demonstration, candidate monitors are held to the more stringent performance specifications in Section 3.1 of Part 75, Appendix A. These are the same specifications that must be met during the 7-day calibration error test for initial certification. Applying the more stringent standards makes it more difficult to pass an off-line/on-line demonstration or a 7-day calibration error test. With respect to the 7-day test, this screens out candidate monitors that appear to have calibration drift problems. With respect to the off-line/on-line calibration demonstration, it limits the use of off-line calibrations to the more robust monitoring technologies, thereby providing added assurance of the data quality when off-line calibrations are used for data validation. Once the capability of a candidate monitor is established, the less stringent calibration error criteria of Part 75, Appendix B, Section 2.1.4(a) are applied for daily operation of the monitor.

potential error in the quality-assured data and so provides appropriately conservative emission estimates.

In view of these considerations, EPA approves DNE’s petition to recalculate the 2005 emissions data for Manchester Units 9, 10, and 11. However, instead of using DNE’s proposed adjustment factors, which are based on the maximum calibration error allowed by the off-line/on-line calibration error demonstration, DNE shall adjust all CEMS data recorded during periods where required on-line calibration error tests were not performed upward by the maximum calibration error allowed for daily operation of the CEMS under Section 2.1.4(a) of Appendix B to Part 75, with one exception: the standard missing data procedures in §75.33 shall be applied to all SO₂ data recorded during periods of fuel oil combustion. The results of making these adjustments to the 2005 emissions data are presented in Table 3, below.

Table 3: EPA-Accepted Emissions Data for Manchester Units 9, 10, and 11 (January 1, 2005 through November 15, 2005)

Unit ID (Basis)	Operating Hours	CO₂ Tons	Heat Input (mmBtu)	NO_x Rate (lb/mmBtu)	SO₂ Tons	NO_x Tons
9 (YTD)	2,843	212,896.0	3,589,232.0	0.049	1.3	69.1
9 (OS)	2,017	NR	2,670,249.0	0.043	NR	47.1
10 (YTD)	3,267	253,828.3	4,281,526.0	0.048	1.4	79.1
10 (OS)	2,157	NR	2,988,604.8	0.040	NR	49.3
11 (YTD)	3,600	265,442.2	4,473,648.0	0.047	1.9	81.8
11 (OS)	2,227	NR	2,886,301.5	0.039	NR	46.4

As a condition of approval, DNE must resubmit a complete set of corrected electronic data reports (EDRs) for Units 9, 10, and 11 for 2005. The recalculated hours shall be consistent with Table 3 above, shall be regarded as “data available” hours, and shall be used for missing data lookback purposes. Except for the SO₂ data recorded during oil combustion and for periods of actual monitor downtime, a method of determination code (MODC) of “01” (i.e., quality-assured data from a primary monitoring system) shall be reported for each hour of adjusted CEMS data. However, in each report, DNE shall include an explanatory note in EDR record type 910, indicating the number of hours of data that have been adjusted upward in accordance with the terms of this approval. In addition, DNE shall keep records, in a format suitable for audit and inspection, explaining which hours of emissions data required adjustment each quarter and how these hours were identified.

The required EDRs shall be submitted data within 30 days of receipt of this letter. DNE is directed to contact Craig Hillock, at hillock.craig@epa.gov or at (202)343-9105 for assistance in resubmitting the EDRs. If you have any questions concerning the allowance accounting for 2005, contact Kenon Smith, at smith.kenon@epa.gov, or at (202) 343-9164.

EPA’s determination in this letter relies on the accuracy and completeness of the information provided by DNE in the March 1, 2006 petition and is appealable under Part 78. If

you have any questions about this determination, please contact Theresa Alexander, at (202) 343-9747. Thank you for your continued cooperation.

Sincerely,

/s/

Sam Napolitano, Director
Clean Air Markets Division

cc: Dave Nuckols, DNE, Manchester Street Station
Ian Cohen, EPA Region I
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