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APPROVAL OF GHG CREDIT APPLICATION

July 21, 2009

The Massachusetts Department of Environmental Protection (MassDEP or the Department) hereby approves two Applications for Verification of GHG (Greenhouse Gas) Credits (BWP AQ 28), submitted by Dominion Energy Brayton Point, dated December 31, 2008 and March 30, 2009. In accordance with the requirements of 310 CMR 7.00: Appendix B(7)(f), the Department conducted a 30-day public comment period on the Proposed Approval and considered all comments received. The public comment period ended on July 20, 2009.

This Final Approval of Dominion's December 31, 2008 and March 30, 2009 Applications for Verification of GHG Credits (BWP AQ 28) creates 182,640 verified GHG Credits for emission reductions that occurred between August 11, 2006 through December 31, 2008 at Brayton Point Power Plant in Massachusetts. GHG Credits from this project can only be used by affected facilities for compliance with the carbon dioxide (CO₂) emissions standards of 310 CMR 7.29, or exchanged for CO₂ allowances in accordance with 310 CMR 7.00: Appendix B(7)(h).

Included as part of this Final Approval of your Applications for Verification of GHG Credits are the following:

- (1) A description of the project.
- (2) A table showing the number of Certified and Verified GHG Credits.
- (3) A list of relevant determinations that the Department has made in accordance with the requirements of 310 CMR 7.00: Appendix B(7).
- (4) An explanation of how the number of GHG Credits was calculated.

Note that your applications are also incorporated, by reference, into this Final Approval.

(1) Description of the Project

GHG Credits were awarded to the applicant for a project which processes coal ash for use in place of Portland cement in concrete manufacture. The number of GHG Credits is based on an estimate of the emissions that would have occurred if Portland cement were used instead of processed coal ash to manufacture concrete. The applicant has identified Headwaters Resources

as an operator of the project, as Dominion’s “exclusive ash marketer,” and as the sole “direct purchaser” of fly ash from the project. As described in the applications:

Dominion Energy Brayton Point, LLC (Brayton Point) operates an Ash Reduction Process (ARP), which went into commercial operation on August 11, 2006. The ARP is a fluidized bed carbon burnout (CBO) combustion system that burns the carbon remaining in fly ash from the combustion of coal. The end product from the ARP is a Coal Combustion Product (CCP) that is a low carbon fly ash used as a replacement to Portland cement in the production of concrete.

Currently, approximately 95% of the ash from the ARP is transported by Headwaters’ subcontractors to one of 30 concrete producer’s plants. Each concrete producer has approximately 10 (mobile or stationary) plants. The remaining 5% of the ash is marketed by Headwaters to one of 15 stationary locations in the Pre-cast concrete market.

(2) Table showing the number of Certified and Verified GHG Credits.

Year	Total number Certified GHG Credits (June 10, 2009 Final Conditional Approval)	Total number of Verified GHG Credits
2006 (August-December)	66,771	9,173
2007	170,429	73,687
2008	170,429	99,780
Total	407,629*	182,640

* Additional certified GHG credits were approved for 2009 through 2012. Refer to MassDEP’s June 10, 2009 Final Conditional Approval letter.

(3) A list of relevant determinations that the Department has made in accordance with the requirements of 310 CMR 7.00: Appendix B(7). (Defined terms and language that is directly excerpted from regulations appear in italics.)

The Department has made the following determinations:

- The emission reductions are *Real*, in that, when the coal ash was used in place of cement, emissions that would have occurred during the manufacture of cement did not occur.
- The emission reductions were *Additional*, in that there was no legal requirement to process coal ash for use as a replacement for Portland cement, or to use processed coal ash as a replacement for Portland cement.
- The emission reductions are *Verifiable*, in that the applicant provided documents showing the transfer of processed coal ash to Headwaters, an ash marketer with which the applicant has established a contractual relationship.

- The emission reductions are *Permanent*, in that once concrete was manufactured using coal ash, the same concrete will never be manufactured using Portland cement.
- The emission reductions are *Enforceable*, in that, pursuant to 310 CMR 7.00: Appendix B(7)(g)8., violations of the requirements of 310 CMR 7.00: Appendix B(7) may be enforced against any person who applied for certification or verification of GHG Credits, an affected facility that purchases GHG Credits created by this project, or any combination thereof.
- The project commenced *on or after January 1, 2006*, in accordance with 310 CMR 7.00: Appendix B(7)(d)9, in that the ash processing facility commenced operation in August of 2006.
- The application has specified *the best management practice used to determine an emissions baseline*, in accordance with 310 CMR 7.00 B(7)(e)4.b, in that the project achieves GHG emissions reductions beyond those that would be achieved if current best management practice was employed. The Certification Application states:

We are aware of only three other CBO's [fluidized bed carbon burnout combustion systems] currently operating in the country for the express purpose of lowering carbon content in ash from an electric generating facility, so that the ash is then marketable to be beneficially used. Dominion also operates a CBO at its Chesapeake Power Station in Chesapeake, Virginia. In addition, ammoniated ash due to SCRs or SNCRs would normally need to be land filled, if not treated through the CBO so that it can be beneficially used. The only current solution to dealing with ammoniated ash contamination is to process this ash through the CBO, so that the ammonia thermally degrades to nitrogen and water.

Note: Based on the conclusion that the project goes beyond current best management practice for processing and using fly ash to avoid GHG emissions from cement production, per MassDEP's June 10, 2009 Final Conditional Approval letter, the Department will allow the use of an emissions baseline based on historical practice at this facility to calculate avoided emissions that occur on or before December 31, 2009. Refer to the Final Conditional Approval for additional information.

- The project does not present any potential project leakage.

(4) Explanation of how the number of GHG Credits for Verification was calculated

The number of GHG Credits was calculated using the following equation in accordance with MassDEP's June 10, 2009 Final Conditional Approval letter that created the certified GHG Credits:

$$\text{GHG Credits}_{(\text{total})} = (\text{GHG Credits}_{(2006)} + \text{GHG Credits}_{(2007)}) + \text{GHG Credits}_{(2008)}$$

Where $\text{GHG Credits}_{(\text{year})} = N_{\text{baseline}} - N_{\text{project}}$

Where $N_{\text{baseline}} - N_{\text{project}}$ = the total number of tons of CO_{2e} that would have been emitted without the project if best management practice had been followed.

$$N_{\text{baseline}} - N_{\text{project}} = (C \times E) - D$$

Where:

C = the net increase in the number of tons of ash used in place of Portland cement due to the project during the verification period, as compared to the baseline period, adjusted for any difference between the length of the certification period and the length of the verification period, calculated thus:

$$C = A - (51,796 \times T)$$

Where:

A = the number of tons of ash that were processed, transferred to Headwaters, and actually used in place of Portland cement in the manufacture of concrete during the verification period;

51,796 = the number of tons of ash processed for use in place of Portland cement during the baseline year.

T = the length of the verification period, in years;

E = An estimate of the number of tons of CO_{2e} emissions that are avoided when one ton of fly ash is used as a cement replacement. Note: Per MassDEP's June 10, 2009 Final Conditional Approval letter, the emissions factor shall be equal to 0.71 for avoided emissions that occur on or before December 31, 2009.¹

D = The estimated number of tons of CO_{2e} emissions reductions that would otherwise be eligible for GHG Credits from this project, but are not eligible because they have been, or will be, used to create offsets or other credits in any other voluntary or regulatory program anywhere in the world. Note: D = 0 for each year.

¹ MassDEP is using the BEES model in order ensure that the number of GHG Credits created represents a conservative estimate of the actual reductions that occurred. The BEES model is not the only model that could be used to estimate number of tons of CO_{2e} emissions that are avoided when one ton of fly ash is used as a cement replacement. However, MassDEP has concluded that the difference between the available estimates is associated with uncertainty, and therefore does not imply that one estimate is more correct than another. Using the more conservative of these estimates (i.e., the lower of the estimates, which is associated with the BEES model) provides greater certainty that all estimated avoided emissions have actually occurred. Further information regarding MassDEP's decision to use the BEES model for this purpose is contained in MassDEP's Conditional Approval of the certification application for this project, and in the associated Response to Public Comment. These documents are available at <http://www.mass.gov/dep/air/climate/ghgcred.htm>

Data and calculations for the applications are summarized in the following table:

Verification Year	C	A	T (years)	Total Annual GHG Credits
2006	12,919.49	33,223.52	0.392	9,172.84
2007	103,785.14	155,581.14	1	73,687.45
2008	140,535.73	192,331.73	1	99,780.37

$$\text{GHG Credits}_{(\text{total})} = (\text{GHG Credits}_{(2006)} + \text{GHG Credits}_{(2007)}) + \text{GHG Credits}_{(2008)}$$
$$\text{GHG Credits}_{(\text{total})} = (82,860) + 99,780$$
$$\text{GHG Credits}_{(\text{total})} = 182,640$$