

# Memorandum

## Environment and Resources



**Date** September 14, 2011

**To** Kelly Meadows, Tetra Tech

**From** Michael Fisher, Lisa Tarquinio

**Subject** Estimated Rate Impact of Air Pollution Control Technology and Cooling Water System Technology Installation at Merrimack Station, Bow, NH

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In a separate memorandum, “Cost and Affordability Analysis of Cooling Water System Technology Options at Merrimack Station, Bow, NH,” dated September 14, 2011, Abt Associates reported the estimated residential consumer rate impact of installing certain cooling water system technology improvements at Merrimack Station, an electric power generating facility in Bow, New Hampshire, owned by Public Service of New Hampshire (PSNH), a wholly owned subsidiary of Northeast Utilities (NU). In this memorandum, as requested by Tetra Tech and EPA Region 1, we estimate the potential rate impact of installing flue gas scrubber technology at Merrimack Station, as required by the mercury emissions reduction law contained in Chapter 105 of the 2006 N.H. Laws. We brought these two potential rate effects together to aid in understanding the total rate impact that could result from the combination of these environmental improvements at the power plant:

- For the rate effect for installing scrubber technology, we used data from a PSNH submission to the New Hampshire Public Utilities Commission (NHPUC) for docket number DE 08-103, which presented the revenue requirements for the scrubber, as estimated at that time.<sup>1</sup> As described below, we modestly adjusted these estimates to use more current reported project costs in developing an updated rate impact.
- For the rate effect of the cooling water system improvements, we used estimates from the separate memorandum, “Cost and Affordability Analysis of Cooling Water System Technology Options at Merrimack Station, Bow, NH,” dated September 14, 2011.

In the following sections, we summarize key elements of this analysis and findings.

### **1 Rate Effect of Installing Scrubber Technology**

#### **1.1 Estimating the Revenue Requirement from Scrubber Installation and Operation**

- We used the values and revenue requirement analytic framework as reported in the PSNH filing to the NHPUC as the primary basis for this estimate. In this submission, PSNH provided estimated cost and other financial information for the scrubber installation, and an analysis of related electricity rate effects. The 2008 submission reported an estimated total outlay of \$457 million for scrubber installation.
- We adjusted the capital outlay used in the 2008 submission to reflect the change in the cost of the project from \$457 million to \$430 million as reported by NU in its 2010 Annual Report and Form

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<sup>1</sup> The State of New Hampshire before the Public Utilities Commission. Public Docket No. DE 08-103, Public Service Company of New Hampshire, Merrimack Station Scrubber Project, Request for Information, September 2, 2008.

10-K. As reported in the Form 10-K, the \$430 million includes the estimated total capital outlay for scrubber installation as well as “capitalized interest and equity returns.”<sup>2</sup>

- To the extent possible, we replicated and followed the analysis framework as presented by NU to estimate the revenue requirement from scrubber installation using the updated installation cost. In implementing this framework, we used the values presented in the PSNH filing for changes in fuel requirements and emission allowance-related outlays with no change<sup>3</sup>. We re-estimated certain items – working capital allowance and accumulated deferred income tax (ADIT) balance – based on the implied relationship between the total capital outlay and these accounts. We used 15 years as the recovery period for the scrubber outlay, and used straight-line depreciation to calculate the annual amount of depreciating rate base recovered in rates. We used the PSNH total allowed pre-tax return – equity and debt – from the 2008 submission, 10.8 percent, to calculate the annual return component of the revenue requirement.<sup>4</sup>
- This analysis yielded an average annual total revenue requirement of approximately \$28 million over the 15-year recovery period. The early year values are considerably higher than this average, approximately \$52 million for the first 12 months following placement of the scrubber into service, but then decline substantially over the recovery period due to rate base depreciation, and associated reduction in annual return on rate base.

## 1.2 Estimated Rate Impact to Residential Customers

- To estimate the rate impact to residential customers, we divided the total revenue requirement by total electricity sales for all customer classes to calculate a rate effect on a per kWh basis. We used the same electricity consumption information and approach documented in the cooling water system cost analysis memorandum, “Cost and Affordability Analysis of CWA 316(b) Technology Options at Merrimack Station, Bow, NH,” dated September 14, 2011. This cost estimation approach appears to be consistent with PSNH’s submission to the NHPUC, in which PSNH reports an approximate impact of energy service rates.
- Based on this calculation, we calculated an average annual increase per household customer over the 15-year recovery period of \$25.49 or \$2.12 monthly, based on average household consumption of 7,492 kWh per year, or 624 kWh monthly. The impact is higher in the early years, with a full year increase of \$47.68 or \$3.97, monthly, for the first 12 months of scrubber operation. Based on the NU/PSNH reports cited above, the first year of scrubber operation and thus, first year of the associated rate impact, would be 2012.

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<sup>2</sup> Northeast Utilities Form 10-K, ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934, for the Fiscal Year Ended December 31, 2010, page 36.

<sup>3</sup> Of note, in the 2008 analysis, PSNH reports a substantial reduction in expenses from avoided emission allowance costs from operation of the flue gas scrubber system.

<sup>4</sup> This rate reflects a combination of debt cost and pre-tax cost of equity, as of the time of the PSNH submission, as well as PSNH’s capital structure at that time. These individual rates, and the capital structure for combining them, could be different now given the passage of time and change in capital market conditions. The total pre-tax cost of capital used in our analysis of rate effects for cooling water system improvements (see “Cost and Affordability Analysis of Cooling Water System Technology Options at Merrimack Station, Bow, NH,” dated September 14, 2011) is modestly lower than the rate used in this analysis.

## 2 Residential Customer Effect of Installing Cooling Tower and Other Cooling Water Structure Upgrades

As described in the separate memorandum, we estimated annual residential customer rate effects ranging from \$13.83 to \$16.19, or \$1.15 to \$1.35, monthly, over the 20-year technology life and cost recovery period. Early year values, are higher, with the highest value occurring the second year following cooling tower installation. These values are \$14.49 to \$16.95 for the full year, or \$1.21 to \$1.41 on a monthly basis.

The rate effect from the cooling water system improvements would potentially begin as early as 2013, pending the initiation of construction activity for these improvements.

## 3 Combined Potential Impact on Residential Customers

Table 3-1, below, reports the estimated rate effect for both technology improvements at Merrimack Station. As reported, the total household impact could be approximately \$62 - \$64 annually during the highest rate impact years for the two technologies. Depending on when PSNH would commence construction on cooling water system technology, the highest rate impact years could occur in the same calendar year. Over the full rate recover period, the average yearly cost declines to approximately \$39 - \$42.

**Table 3-1: Residential Customer Impact of Environmental Improvements at Merrimack Station**

Environmental Technology Improvement	Maximum Year Impact		Average over Recovery Period	
	Annual	Monthly	Annual	Monthly
Cooling Water System Improvements	\$14.49-\$16.95	\$1.21-\$1.41	\$13.83-\$16.19	\$1.15-\$1.35
Scrubber Technology	\$47.68	\$3.97	\$25.49	\$2.12
Total	\$62.17-\$64.64	\$5.18-\$5.39	\$39.33-\$41.68	\$3.28-\$3.47