

**THE STATE OF NEW HAMPSHIRE
before the
PUBLIC UTILITIES COMMISSION**

Public Service Company of New Hampshire
Merrimack Station Scrubber Project

Docket Nos. DE 08-103 and DE 11-250

Progress Report

March 22, 2012

Public Service Company of New Hampshire (“PSNH”) is pleased to provide this status update regarding the Clean Air Project (“Project”) involving the legislatively mandated installation of a Wet Flue Gas Desulfurization (“FGD”) System (i.e., “Scrubber” technology) by PSNH at its Merrimack Generating Station. This progress report will provide an update on significant activities that have occurred since our November 18, 2011 update. This report contains:

- I. Scrubber construction, equipment installation and start-up and in-service status.
- II. Equipment performance to date.
- III. An update on Project cost.
- IV. Summary of current operational and maintenance activities of the Project.
- V. Conclusions.

I. SCRUBBER CONSTRUCTION, EQUIPMENT INSTALLATION, START-UP, AND IN-SERVICE STATUS



Truck Scales

Since our previous reports provided in November 2011, progress continues to be made on the Project. The Project’s detailed planning and successful construction program has led to trouble free commissioning, start-up, and operation of the Project with an in-service date of the Scrubber system of September 28, 2011.

Since the last Progress Report, the truck scales and truck wash facility have been completed and were put in service on December 21, 2011 and February 22, 2011, respectively. The truck scales provide for the timely and efficient weighing of bulk materials including coal, limestone, ash, gypsum and other items, which has increased



Truck Wash Facility

greatly. The truck wash insures proper quality control of synthetic gypsum to meet cleanliness specifications of the purchasers. Trucks used for delivery of coal or other products will be used for gypsum transport. Both of these systems were successfully commissioned and proven to perform their intended use and put into use on the dates noted.

The only construction work remaining on the Project is completion of the Secondary Wastewater Treatment System. This Secondary System is designed to treat effluent exiting from the Primary Wastewater System. The

Secondary System itself consists of two distinct treatment processes. The first process in the Secondary System, referred to as the First Effect, is currently undergoing commissioning and testing operations and is expected to be placed in service by March 31, 2012. The second process in the Secondary System, or Second Effect, is expected to be placed in service in June 2012.

II. EQUIPMENT PERFORMANCE TO DATE

We are pleased to report exceptional success regarding the performance of the Scrubber system in meeting its critical performance obligations and guarantees. Sulfur dioxide removal from boiler flue-gas is approximately 96-98% -- well above the 90% sulfur dioxide removal objective in Merrimack Station's Temporary Permit issued by the New Hampshire Department of Environmental Services ("NHDES"). This level of sulfur dioxide removal was demonstrated and recorded via the NHDES and EPA approved Continuous Emissions Monitoring Systems (CEMS) which measure sulfur dioxide into and out of the Scrubber absorber vessel.

PSNH has received results of the mercury reduction testing conducted in January and March 2012 by an independent third party in accordance with a rigorous stack testing protocol. These stack test results show that the Scrubber is reducing mercury emissions in the range of approximately 97 to 98%. This test data demonstrates the Scrubber's high effectiveness for mercury removal. A summary report from the independent testing company, Air Compliance Group, is attached to this update with a full report expected soon. We firmly believe that this same level of mercury removal performance has been occurring since initial operation of the Scrubber in September 2011, consistent with the continuously monitored levels of sulfur dioxide removal.

The treated liquid effluent from the Primary Wastewater Treatment System has also been subjected to testing by an independent third party. The results of this testing show that the liquid effluent meets all system guarantees. This is another extremely positive factor illustrating that all equipment performance is fully meeting requirements and that the system has been designed, built properly, and is performing with excellent quality.

III. AN UPDATE ON PROJECT COST

Over \$400 Million has been expended to date. About 60 large contracts were issued, which cover approximately 90% of the Project costs, with a larger number of smaller contracts comprising the balance. The following summarizes the cash flow of the Project:

	Thru 2007	2008	2009	2010	2011	2012	2013
Cost By Year		24.8	119.3	149.7	100.4	23.2	1.9
Cumulative Cost	2.7	27.5	146.8	296.5	396.9	420.1	422.0

\$ Million

Original Project Estimate:	\$457 Million
Rev. August 2010	- 27 Million
Rev. January 2011	<u>-8 Million</u>
Current Project Estimate:	\$422 Million

IV. SUMMARY OF CURRENT OPERATIONAL AND MAINTENANCE ACTIVITIES

There are certain contractual commitments nearing final mechanical completion status as well as punchlists of miscellaneous tasks being completed by suppliers/contractors of systems and equipment used in the Clean Air Project. As mechanical completion occurs, systems are transitioned from the direct operational oversight and control of the supplier to PSNH. This process of transfer of responsibilities is proceeding very smoothly and successfully.

V. CONCLUSIONS

PSNH is pleased to report these additional milestones and successes, which allow the Project to provide the public benefits to the State over one year ahead of schedule and well under budget. Equipment continues to work well with more elements placed in service. Diligent efforts continue in order to finish all work and punchlist tasks and to close out contracts. Most importantly, the Project has clearly demonstrated its success in achieving significant reductions in mercury and sulfur dioxide emissions reductions – well beyond threshold expectations, and surpassing the requirements of RSA Chapter 125-O.

THE AIR COMPLIANCE GROUP, LLC

March 14, 2012

Mr. Rick Roy
PSNH Merrimack Station
97 River Road
Bow, NH 03304

**Subject: Mercury Test Results for Performance Testing
ACG Contract Number P11894**

Dear Mr. Roy:

Attached are copies of the mercury test results for the January 12 – 14, 2012 and the March 2 – 3, 2012 testing performed at the inlet to the AQCS and the stack. All test results are in the process of being finalized as part of the report preparation for this project, and we hope to have that to you in the near future.

Please do not hesitate to contact Kenley or me if you have any additional questions.

Sincerely,

The Air Compliance Group, LLC



Arthur B. Nunn, III
President

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**PRELIMINARY
MERCURY RESULTS SUMMARY
UNITS 1 AND 2 FGD INLET AND STACK**

PSNH MERRIMACK STATION

**Performance Testing
March 2-3, 2012**

	ALL RUNS						
	Run 1	Run 2 ^a	Run 3	Run 5	Run 6	Run 7	Average
FGD Inlet - Total Hg (lb/TBtu - CO ₂ based)*	7.4663	3.9760	6.2378	5.8181	6.7625	6.9689	6.2049
Stack - Total Hg(lb/TBtu - CO ₂ based)*	0.1905	0.2089	0.1781	0.1526	0.1634	0.1399	0.1722
Removal (%)	97.45	94.75	97.14	97.38	97.58	97.99	97.05
FGD Inlet - % Oxidized (lb/Tbtu - CO ₂ based)*	89.40	98.50	98.90	98.40	99.00	97.60	96.97

^a Spike Recovery and/or Relative Deviation QA requirements were not met.

	ALL VALID QA RUNS						
	Run 1	Run 3	Run 5	Run 6	Run 7	Average	
FGD Inlet - Total Hg (lb/TBtu - CO ₂ based)*	7.4663	6.2378	5.8181	6.7625	6.9689	6.6507	
Stack - Total Hg(lb/TBtu - CO ₂ based)*	0.1905	0.1781	0.1526	0.1634	0.1399	0.1649	
Removal (%)	97.45	97.14	97.38	97.58	97.99	97.51	
FGD Inlet - % Oxidized (lb/Tbtu - CO ₂ based)*	89.40	98.90	98.40	99.00	97.60	96.66	

Notes

* lb/MMBtu value based on F-factor for bituminous coal in Table 19-2 of 40 CFR 60, Appendix A, Method 19.
Run No. 4 was voided on site because the sample tube was broken upon extraction from the test apparatus.

**PRELIMINARY
MERCURY RESULTS SUMMARY
UNITS 1 AND 2 FGD INLET AND STACK**

PSNH MERRIMACK STATION

**Performance Testing
January 12-14, 2012**

	<u>Run 1</u>	<u>Run 2</u>	<u>Run 3</u>	<u>Run 4</u>	<u>Run 5</u>	<u>Run 6</u>	<u>Run 7</u>	<u>Average</u>
FGD Inlet - Total Hg (lb/TBtu - CO₂ based)*	6.8099	6.1999 ^a	6.2501	6.1442	6.5375 ^a	6.5808	6.4558	6.4255
Stack - Total Hg(lb/TBtu - CO₂ based)*	0.1494 ^a	0.1709	0.1591	0.1458	0.1602	0.1543	0.1433	0.1547
Removal (%)	97.81	97.24	97.45	97.63	97.55	97.66	97.78	97.59

^a Spike Recovery and/or Relative Deviation QA requirements were not met.

	<u>Run 3</u>	<u>Run 4</u>	<u>Run 6</u>	<u>Run 7</u>	<u>Average</u>
FGD Inlet - Total Hg (lb/TBtu - CO₂ based)*	6.2501	6.1442	6.5808	6.4558	6.3577
Stack - Total Hg(lb/TBtu - CO₂ based)*	0.1591	0.1458	0.1543	0.1433	0.1506
Removal (%)	97.45	97.63	97.66	97.78	97.63

Notes

* lb/MMBtu value based on F-factor for bituminous coal in Table 19-2 of 40 CFR 60, Appendix A, Method 19.