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March 15, 2012

Debra A. Howland
Executive Director
New Hampshire Public Utilities Commission
21 South Fruit Street Suite 10
Concord, New Hampshire 03301

Re: Docket No. DE 11-250
Public Service Company of New Hampshire
Investigation of Scrubber Costs and Cost Recovery
Filing Pursuant to Order No. 25,332

Dear Ms. Howland:

On February 6, 2012, the Commission issued Order No. 25,332 in Docket Nos. DE 08-103[1] and DE 11-250. The Order addressed the Motion for Protective Order filed by the petitioner, Public Service Company of New Hampshire (PSNH). PSNH's Motion requested confidential treatment of certain information contained in a June 2011 "due diligence report" prepared by Jacobs Consultancy, Inc. (Jacobs) and filed by Staff on January 20, 2012 in Docket No. DE 08-103. Staff's January 20 filing consisted of three unredacted quarterly reports prepared by Jacobs and the due diligence report redacted in conformance with PSNH's Motion.

In Order No. 25,332, the Commission granted in part and denied in part PSNH's Motion for Protective Order, and directed Staff to file all Jacobs reports in Docket No. DE 11-250, including the due diligence report "redacted consistent with the terms of this order." Order No. 25,332 at 21. The Commission further instructed Staff to review the records filed in DE 08-103 to determine whether additional documents should be filed in Docket No. DE 11-250 "and to identify any other documents filed in Docket No. DE 08-103 as to which administrative notice should be taken in DE 11-250." *Id.* at 21-22.

Staff has reviewed the filings in Docket No. DE 08-103 and has identified documents to be filed in Docket No. DE 11-250. Staff determined that filing the documents rather than

[1]Docket No. DE 08-103, *Public Service Company of N.H., Investigation of PSNH Installation of Scrubber Technology Station.*

requesting the Commission to take administrative notice of them will better advance the orderly conduct of the proceeding. As a result of its review, Staff hereby files the following records filed in Docket No. DE 08-103:

- PSNH's letter and report filed September 2, 2008. The filing includes a one-page spread sheet for which PSNH originally requested confidential treatment. Based on Staff's discussion with PSNH, Staff represents that PSNH no longer claims confidentiality for the one-page document because of the information is out-of-date.
- PSNH's progress report filed on March 19, 2010.
- PSNH's power point presentation filed on March 31, 2010.
- PSNH's progress report filed on October 15, 2010.
- The Jacobs quarterly reports dated June 15, 2011, September 20, 2011 and December 22, 2011.
- The Jacobs due diligence report dated June, 2011 redacted in conformance with Order No. 25,332. The report now discloses the contract prices and not-to-exceed amounts for contracts where work is completed; for the ongoing contract work, that information will not be publicly available until the work is completed. *See* Order No. 25,332 at 20.

The above documents are attached to this correspondence.

In addition, Staff recommends that the Commission make available for inspection in Docket No. DE 11-250 certain documents submitted by Sierra Club on April 9, 2010 in Docket No. DE 08-103. Those documents consist of consultant studies prepared by Burns & McDonnell, GZA GeoEnvironmental (GZA), and Sargent and Lundy, LLC (S&L). On June 25, 2010 the Commission issued a secretarial letter addressing comments by Sierra Club and PSNH on the public availability of the studies and stated that the studies would be available for public inspection upon the resolution of confidentiality issues pending before the New Hampshire Air Resources Council.

As part of its review, Staff confirmed with PSNH that the Burns & McDonnell report is not confidential but contains information proprietary to the vendor; and that the New Hampshire Air Resource Council denied PSNH's motion for confidential treatment of the GZA and S&L reports. While the GZA and S&L are not confidential, both are subject to copyright protection. Therefore, Staff is not filing the studies in Docket No. DE 11-250 but recommends that the Commission make them available for inspection by the parties to Docket No. DE 11-250 consistent with the Commission's directive in the June 25, 2010 secretarial letter in DE 08-103.

Pursuant to Order No 25,332, the parties in Docket No. DE 11-250 will have 7 days to file motions regarding disclosure of the redacted portions of the Jacobs due diligence report and/or objections to Staff's recommendations made herein.

Please let me know if you have any questions. I certify that a copy of this filing will be made electronically to parties on the service list at the time the filing is made with the Commission

Sincerely,

Suzanne G. Amidon
Staff Attorney/Hearings Examiner

CC: Service List via email only

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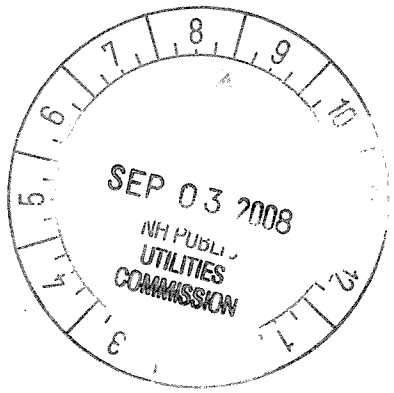
The Northeast Utilities System

Gary A. Long
President and Chief Operating Officer

September 2, 2008



Ms. Debra A. Howland
Executive Director and Secretary
New Hampshire Public Utilities Commission
21 Fruit Street
Concord, New Hampshire 03301

Re: ***Docket No. DE 08-103***
Public Service Company of New Hampshire
Merrimack Station Scrubber Project
Request for Information

Dear Secretary Howland:

Pursuant to the Commission's Secretarial Letter, dated August 22, 2008, Public Service Company of New Hampshire ("PSNH" or the "Company") provides this response to the Request for Information regarding the legislatively mandated installation of wet flue gas desulphurization technology ("scrubber" technology) at Merrimack Station, to be installed as soon as possible but in no case later than July 2013. We have enclosed an original and six copies of PSNH's response.

This filing demonstrates that following the installation of the scrubber, Merrimack Station will continue to be a vital base-load source for reliable and affordable power in the State of New Hampshire, and will have the added benefit of being among the cleanest coal-burning plants in the nation. PSNH is confident that up to the initiation of this inquiry, it was diligently pursuing and complying with the legal mandates contained in 2006 N.H. Laws, Chapter 105, the mercury emissions reduction law ("Scrubber Law"), by moving forward rapidly with the installation of scrubber technology at Merrimack Station.

As required by the Commission's Request for Information, PSNH is providing a memorandum of law, project status report, and response to specific economic inquiries. This information will serve to support the legislature's finding that the installation of the scrubber at Merrimack Station ("the scrubber project" or "Clean Air Project") is "in the public interest of the citizens of New Hampshire and the customers of the affected sources." RSA 125-O:11, VI. The legislature, in reaching its conclusion that the scrubber installation is in the public interest, did

not limit itself to economic considerations, but rather performed a careful balancing of the costs and the ensuing benefits to the public health, welfare, economy, and environment (including improved air quality and the protection of natural resources)—benefits which contribute to sustaining the vibrancy of the State and its citizens as a whole. As part of its inquiry, the Commission must review and comply with the General Court's Statement of Purpose and Findings (RSA 125-O:11) as well as the larger statutory context as delineated in the Findings and Purpose of the Multiple Pollutant Reduction Program (RSA 125-O:1)("the Clean Power Act") in which these societal prerogatives are prioritized.

PSNH has a long history of collaboration with state policymakers and the resolution of difficult and challenging environmental issues. We are proud of our consistently proactive environmental stewardship which includes: installation of the first-in-the-nation utility-owned selective catalytic reduction system at Merrimack Station Unit 2 in 1995 and Unit 1 in 1999 to capture NOx emissions; the successful, internationally lauded conversion of a fossil-fuel unit (Schiller Unit 5) in our fleet to a wood-burning facility; our vigorous collaboration on, and crafting of, the first-in-the-nation groundbreaking four-pollutant bill, the Clean Power Act, RSA Chapter 125-O; and now, the aggressive installation of a scrubber system at Merrimack Station to significantly reduce mercury and sulfur dioxide emissions in compliance with the Scrubber Law. At its core, the Scrubber Law is an environmentally motivated law which will result in improvements to air quality. With the Clean Air Project, PSNH will capture, at a minimum, 80% of the mercury entering its coal-fired power boilers which otherwise could be released to the atmosphere. Additionally, the scrubber technology will remove more than 30,000 tons of SO2 emissions each year. These significant environmental benefits were viewed by the legislature as critical goals, in the public interest, to be accomplished on an accelerated basis.

The Scrubber Law is itself another example of PSNH's willingness to work with state policymakers in resolving critical issues. It is the product of a lengthy collaborative effort that PSNH spearheaded along with the Governor's Office, the Office of Energy and Planning, the Department of Environmental Services, and a number of legislators and environmental groups. (See the legislative history included in PSNH's Memorandum of Law.) The legislature, recognizing that the Scrubber Law represented the delicate balancing of numerous interests, found the law in its entirety to be in the public interest, as it has plainly and clearly stated within the law itself, and, in fact, further determined to protect the integrity of the statutory language with a finding emphasizing the non-severability of the law's provisions. (RSA 125-O:11, VIII: "The mercury reduction requirements set forth in this subdivision represent a careful, thoughtful balancing of cost, benefits, and technological feasibility and therefore the requirements shall be viewed as an integrated strategy of non-severable components.")

The Clean Air Project is a vast and complex engineering and craft labor challenge that is in progress and will take another four years to complete. At its peak, and in addition to the engineering and management support services, the project will require the efforts of more than 300 union craft workers. PSNH has reached a written accord with organized labor leadership to utilize union labor on this project to ensure the availability of critical skilled craft workers and to prioritize work safety on the job. In a recessionary national economy, the importance of this

project to craft labor in terms of steady in-state employment cannot be over-emphasized—one more example of an important public interest.

Because of its size and complexity, the Clean Air Project must be an extremely well managed, carefully orchestrated project, and must firmly adhere to critical milestones established in the overarching project schedule which will control the work of numerous contractors and subcontractors. PSNH has already completed a number of critical milestones to ensure project success, as further detailed in this filing.

At this juncture, PSNH has diligently gone through competitive bidding processes for each major "island" of work and has proceeded to negotiate fixed-price contracts with selected vendors. The contracts for the scrubber itself and for the new chimney stand ready to be finalized and executed; the contract for the waste-water treatment facility and site preparation are in final negotiations. Any delay in issuing these contracts will be a major setback for this project and will result in additional costs to our customers. Contractors and their subcontractors are only willing to hold fixed prices for an abbreviated period of time given the rapid escalation of the prices of raw materials and their need to lock in shop time well in advance for the manufacturing of components. If any one of PSNH's major contractors is unwilling to hold prices or contractual terms or to extend the deadline for execution of contracts, the scrubber project schedule has the potential to be irreparably disrupted and harmed. This is because the nature of the scrubber project and the site layout require the sequential completion of many of the construction islands (for example, consider the new chimney: the foundation work must be done in non-winter months, followed by the construction of the chimney "shell" which must be completed in order for the area surrounding the chimney or "drop zone" to be released before other work can proceed for obvious safety reasons). As a result, this means that even a short delay now will have a domino effect and a greater than day-for-day impact on the entire project with the likely result of significant additional costs to the project.

We are mindful of the legislature's mandate that the scrubber project proceed on an accelerated basis and refer the Commission, once again, to the Statement of Purpose and Findings, as well as the legislative history (see PSNH's Memorandum of Law). Any delay in this project will result in added costs, while, conversely, an accelerated schedule will save money. Shaving six months to a year off the project timeline saves significantly on AFUDC costs, avoids escalation in costs of materials and labor, and will result in early compliance credits for PSNH's customers (Economic Performance Incentives, RSA 125-O:16). We respectfully ask the Commission's assistance in complying with the law by expediting the resolution of this inquiry.

It should surprise no one that the costs of this project have increased significantly over the original preliminary estimates made in late 2004-2005. On May 15, 2008, the *Wall Street Journal* reported on the escalation in prices of commodities due to unrelenting global demand--steel prices, just five months into the new year, were already up 40-50% for the year; coking coal and scrap steel, key ingredients in steelmaking, had soared 100%; along with a 71% increase in iron ore prices--all of which are "part of a broader surge in raw-materials prices amid tight supplies and soaring global demand, fueled in part by the rapid industrialization of India, China and other developing nations." However, the cost increases involved in a plant modification are

dwarfed by the costs of constructing a new plant which have more than doubled in recent years. According to the Cambridge Energy Research Associates, "the construction of new generating capacity that would have cost $1 billion in 2000 would cost $2.31 billion if construction began today" with most of that increase occurring since 2005. (*Wall Street Journal*, May 27, 2008.) PSNH would like to emphasize: time is money in this market.

Merrimack Station's continued operation ensures that New England has continued fuel diversity and energy security. The New England region is already highly reliant on natural gas, and subject to its high price volatility and the vagaries of the natural gas market, as a fuel source for the power generation sector. Even so, there is very limited activity, and to this point in time, very unsuccessful efforts, to add new base-load power generation to the New England grid. As the economy remains difficult, and credit markets tight, the ability to site, permit, finance, and construct new base-load generation has become nearly impossible. Preservation of the key existing base-load generation resources like Merrimack Station, while maintaining its positive economics for customers, is critical to the region's future. This is particularly true in the case of Merrimack Station which provides not only low-cost energy but has a remarkable record of reliability characterized by record-breaking periods of lengthy continuous operation (in 2004, Merrimack Unit 1 and Merrimack Unit 2 both outperformed previous station operation records—Merrimack Unit 1 ran continuously 122 days and Merrimack Unit 2 ran 147 days). In addition, in 2007, Merrimack Station produced more energy than it ever has in its decades of operation. Clearly, the Station is functioning extremely well, as a direct result of strategic equipment repairs and replacements, well executed maintenance work, well performed operations activities, a dedicated workforce, and a strong and experienced management team.

Beyond the benefits PSNH's operation of Merrimack Station provides to customers in terms of lower electric energy prices and reliability to the New England electric grid, it should be recognized that the operation of Merrimack Station is a significant contributor to the local and state economy—another fact supporting the legislature's public interest finding. Merrimack Station employs approximately 100 highly skilled and dedicated employees in what has become an increasingly limited "manufacturing" sector of our state's economy. In addition, there is significant company support staff for the Station. During annual outages and construction projects, the number of jobs provided increases substantially. PSNH, through its operation of Merrimack Station, contributes annually $758,000 in state utility/property taxes and $2.7 million in local property taxes. This in-state support to the economy reaches beyond wages and tax benefits and extends to the large quantity of materials and supplies and services for which PSNH contracts to operate and maintain the facility on an annual basis.

PSNH has met every environmental challenge head on and met or exceeded expectations in achieving environmental benefits, all of which have been in the public interest. Today, the challenge is mercury—a challenge we are striving to meet. With the installation of a scrubber at Merrimack Station, PSNH will maintain and enhance its standing as the lowest emitting coal-fired power generator in the region. We are excited about this project and the positive impact it will have on our environment. We remain confident that this can be achieved while continuing to provide economic, reliable base-load power for our customers over the period of the scrubber's operation.

PSNH urges the Commission to act expeditiously to resolve this inquiry so that PSNH may resume the commitment of capital and manpower necessary to install the scrubber technology at its Merrimack Station as mandated by law. PSNH stands ready and willing to keep the Commission up to date on the status and progress of the Clean Air Project once we are able to proceed in accordance with the law.

Sincerely,

Gary A. Long

Gary A. Long
President and Chief Operating Officer

THE STATE OF NEW HAMPSHIRE
before the
PUBLIC UTILITIES COMMISSION

Public Service Company of New Hampshire
Merrimack Station Scrubber Project
Request for Information

Docket No. DE 08-103

Report

In its Secretarial Letter dated August 22, 2008 in this docket, the Commission notified Public Service Company of New Hampshire (PSNH) that it was conducting an inquiry into the status of PSNH's efforts to install a wet flue gas desulphurization system (scrubber technology) at Merrimack Station in Bow. Installation of the scrubber (the "Clean Air Project") is mandated by RSA 125-O:11 through 18 (the "Scrubber Law") to achieve reductions in mercury emissions. The Commission directed PSNH to file, by September 12, 2008:

I. a comprehensive status report on its installation plans;

II. a detailed cost estimate for the project;

III. an analysis of the anticipated effect of the project on energy service rates; and

IV. an analysis of the effect on energy service rates if Merrimack Station were not in the mix of fossil and hydro facilities operated by PSNH.

This report provides the information concerning PSNH's scrubber installation project (the Clean Air Project) requested by the Commission's secretarial letter.

I. SCRUBBER STATUS

PSNH is moving rapidly forward with the Clean Air Project to comply with the Scrubber Law's mandate to achieve significant reductions in mercury emissions at the coal-burning electric power plants in the state as soon as possible. RSA 125-O:11, I. Unless further delayed, PSNH will meet the statutory installation deadline of July 1, 2013, and is striving to have the scrubber operational sooner than that deadline. The scope of the Clean Air Project will encompass planning and design; schedule and cost development; oversight of multiple competitive bidding processes for engineering; equipment and system procurement, selection of contractors, contract negotiations and execution; sequential construction management of the various project components and interfaces, followed by the integration of those components into a functioning system; and operational start-up activities. All work on the Clean Air Project will be performed with safety as a high priority. To date, PSNH has spent approximately $10 million on the Clean Air Project.

A. Activities Performed during 2006

1. Merrimack Station began investigating operational changes at the facility that would provide the necessary flexibility in the design and engineering of a scrubber system. The catalyst replacement program on the previously installed selective catalytic reduction systems was reviewed and updated to accommodate operating requirements of a new scrubber and potentially improve the overall performance of the equipment.

2. Merrimack Station revised, tested and modified its ash handling operations and capabilities to provide necessary options for ash management in order to maximize unit operations when a new scrubber is installed.

3. Initial engineering was completed by Sargent and Lundy ("S&L") based upon information provided in 2005. S&L also evaluated a number of equipment options integral to the scrubber project and completed a layout of the project. Budgetary quotes and lead times were solicited from major scrubber vendors, also during 2005.

4. General specifications for the scrubber island, material handling system and the chimney were provided to PSNH by S&L to further develop project requirements. To complement this preliminary engineering work, site visits to the other scrubber installations were completed by PSNH/Merrimack Station personnel.

5. Preliminary work in support of the temporary air permit application was completed including emissions netting calculations and suggested modeling protocol.

6. Water quality testing was completed to define and identify appropriate sources for make-up water to the scrubber system.

7. Electrical work was reviewed with PSNH transmission and distribution divisions to outline the power requirements for the new scrubber system. A two phase approach was defined. Plans were made to relocate and upgrade an existing, old construction yard in order for the land to be used for construction power for the scrubber system. A new substation will be installed to power the scrubber operations.

8. Also in preparation for the scrubber installation, an unused oil tank was removed from the north side of the plant. This space will eventually house portions of the material handling system required by the scrubber project.

9. A study of the Merrimack property's south yard was performed to ensure an adequate layout area for the necessary equipment and building surrounding the scrubber. A number of contractor facilities in the south end of the plant, as well as the existing training facility, were identified for relocation.

10. A portion of the southern-most yard was cleared to make room for a new warehouse building. Although a separate effort from construction of the scrubber project itself, it

was necessary to complete this work prior to the extensive construction and labor effort that will be underway during the construction of the scrubber islands. Preliminary engineering, design, surveying and permitting for this new warehouse were completed.

11. A number of appropriate purchasing and procurement efforts were completed including contract options and strategy analysis and vendor lists for scrubber manufacturers and architect/engineers.

12. Engineering efforts included review of the latest equipment options, equipment integration capabilities, and mercury capture capabilities.

13. Also initial investigation into gypsum disposal and sale opportunities was pursued with various wallboard manufacturers.

B. Activities Performed during 2007

1. Merrimack Station continued operational changes at the facility that would provide the necessary flexibility to accommodate the design and engineering of a scrubber system. The station worked to modify boiler combustion temperatures. Tube shields were removed from the boiler reheater to increase heat transfer and improve steam temperatures.

2. The station's south yard was cleared for the new warehouse on schedule. This new warehouse will initially house displaced inventory from existing warehouse buildings. The building permit application was submitted on May 17, 2007. Preliminary design of the building was completed.

3. PSNH went out to bid for the Program Manager for the Clean Air Project on May 15, 2007. URS Washington Division ("URS") was hired in October 2007 following lengthy contract negotiations.

4. PSNH submitted a Temporary Air Permit application for the Clean Air Project with NHDES on June 6, 2007. An emissions netting calculation and determination of a stack height consistent with good engineering practice ("GEP") were required information to support the Temporary Air Permit application submittal. Necessary air dispersion modeling services were contracted for and have begun.

5. The first legislative update, as required annually by RSA 125-O:13, IX was completed on June 26, 2007. PSNH is required to report on the progress, status, and cost of complying with the provisions of the scrubber law to the legislative oversight committee on electric utility restructuring, and the chairpersons of the house science, technology and energy committee and the senate energy and economic development committee,. A brief summary of that first update follows:

- Engineering
    i. Specifications developed for key components
    ii. Possible site plan layouts developed
    iii. Equipment options identified
    iv. Vendor lists and contacts established
    v. Industry impact of high number of scrubber installations analyzed
- Commercial and Purchasing
    i. Contract strategy determined and approved
    ii. Program Manager specification written
    iii. Program Manager out to bid
- Permits and Approvals
    i. Temporary Air Permit Application submitted to NHDES-ARD June 7, 2007
    ii. Town of Bow presentations and submittals underway
    iii. Company financing approvals initiated
- Site work
    i. Existing oil tank removal completed
    ii. Site surveys completed
    iii. South Yard studies completed

C. Activities Performed during 2008 to date

1. Construction of the major components of the Clean Air Project has been broken down into the engineering, procurement, and construction of four major work islands which include the scrubber, chimney, waste water treatment facility, and material handling system. Construction must occur on a sequential basis. Of these islands, the chimney and scrubber require completion first for safety reasons given the physical orientation of the equipment and constraints of the site. Following foundation work, the chimney "shell" construction must precede all work because of the necessity of preserving a "drop zone" or area around the chimney for evident safety reasons. As a result of these sequential construction requirements, both the scrubber island and chimney specifications were prioritized and sent out to bid first, vendor bid proposals were received, bid proposals were reviewed to identify the lowest evaluated bidder and negotiations with lowest evaluated bidders were undertaken. The negotiations are in final stages on both contracts and the contracts were expected to be executed this week; however, as a result of the initiation of this inquiry, such contracts must await the Commission's action in this inquiry. The material handling system and waste water treatment system followed with specifications sent out to bid, bid proposals received and evaluated, and negotiations well under way. Contracts will be finalized in short order and will be ready to execute in the near-term.

2. A second annual legislative update was completed on June 18, 2008. The status of the scrubber installation and mercury reductions was reported on to the legislative oversight committee on electric utility restructuring, and the chairpersons of the house science, technology and energy committee and the senate energy and economic development committee. A summary of that update follows:

- Engineering
    i. Project's components
    ii. Specifications developed for 4 key components
- Commercial and Purchasing
    i. Program Manager hired Sept 2007
    ii. Scrubber Island and Chimney proposals are in negotiations
    iii. Vendor Proposals requested and received for Wastewater Treatment Facility and Material Handling System
- Review, Permits and Approvals
    i. NHDES – May 12 presentation
    ii. Temporary Permit expected October 2008
    iii. Town of Bow –Local permitting
    iv. Regional Planning Commission
- Site work
    i. Existing oil tank removed
    ii. Site surveys and studies completed
    iii. Warehouse construction underway
    iv. On-site engineering facilities completed
- Schedule and Costs
    i. Tie-ins: MK#1 Fall 2012, MK#2 Spring 2013
    ii. Project costs will be updated with review of major equipment bids

3. It was reiterated at this update that PSNH was focused on expediting the schedule; and with two major equipment islands in negotiations, it would soon be known to what extent the critical path of this project could be potentially shortened. These negotiations would also provide updated costs associated with a new timeline.

4. As referenced earlier, negotiations with the scrubber island and chimney are now in their final phase. Recently completed boiler implosion, burner management and electrical supply studies are being reviewed. Multiple meetings have been attended in the Town of Bow focusing on local permitting requirements and also addressing any Regional Impact considerations. With that, public outreach and education meetings have been conducted and/or scheduled with a variety of organizations, such as the Southern New Hampshire Planning Commission, the Town of Pembroke, Town of Hooksett, etc.

5. Finally, air modeling is being completed with current engineering and equipment design information and proposed site orientation. Drafting of the Temporary Air Permit continues by the New Hampshire Department of Environmental Services (NHDES) Air Division.

D. Schedule Status

1. As the project has moved forward steadily, PSNH has obtained more detailed information from major equipment and system suppliers, and has adjusted the schedule accordingly. The current optimized schedule shows that completion of the Clean Air Project in 2012 is

possible if there are no additional delays. PSNH's efforts are now focused on an early completion, as required by RSA 125-O:11, I. The early completion date is attributable to PSNH's diligence in complying with the Scrubber Law's mandates as rapidly as reasonably possible. Early completion will be beneficial to customers because AFUDC will be reduced, customers will benefit from early reductions credits provided by the Scrubber Law's Economic Performance Incentives at RSA 125-O:16, and, most importantly, mercury and sulfur oxide emissions will be reduced. In addition, by finalizing fixed price contracts and locking in prices, additional escalation of commodities can be avoided to some extent.

2. An early completion date is predicated on successful completion of a number of critical activities on a timely basis. These activities include obtaining permits to proceed with construction in the Fall of 2008 from the Town of Bow, and the receipt of a Temporary Air Permit from the New Hampshire Department of Environmental Services in the Fall of 2008. Moreover, procurement of engineering services and equipment must proceed on an aggressive schedule. Even a short delay at this time could trigger a six to eight month delay in completion of the project because foundation construction work must commence in the Fall of 2009. If foundation construction work is not completed in the Fall of 2009, the work will have to be delayed until the Spring of 2010 because it cannot be performed during winter months. This illustrates the valid concern that even a brief delay has the potential for creating a domino effect on project schedule with far more than a day-for-day delay.

3. The schedule is aggressive and has only a small tolerance for unpredictable delays due to inclement weather, equipment delivery problems, resolving engineering or design problems, or start-up and testing problems. Consequently, any delays caused by regulatory actions or other unanticipated events could jeopardize PSNH's ability to adhere to the schedule. Any such delay would increase the cost of the project.

E. Engineering Status

1. URS has overall responsibility to develop the cost and schedule, subject to PSNH's review and approval.

2. The initial estimated cost of the project was based on a Sargent & Lundy estimate performed in 2005. There have been significant increases in the cost of raw materials, steel, labor, and energy, since this estimate was made, as noted by the *Wall Street Journal* in a May 27, 2008 article entitled "Costs to Build Power Plants Pressure Rates" (Atch 1) and echoed by the FERC's Office of Enforcement's report to the FERC Commissioners on Increasing Costs in Electric Markets, presented on June 19, 2008 (Atch 2). URS has more current information and experience with this type of work, and they developed a revised estimated project cost based on their experience with such projects and on bids received from the four major system vendors (Scrubber, Stack, Material Handling, and Waste Water Treatment Islands).

3. Approximately 60% to 70% percent of the revised project cost is now based on firm contracts or firm bids PSNH has received. Only small system and interconnection field systems (electrical, ductwork, piping, yard work, etc.) have yet to be finalized by bids. If bids in hand are not acted on in a timely manner, such delay in execution of contracts can and will result in a delay in project completion and higher costs.

4. URS has 30 engineers currently working on the project in the following areas:
   a. Electrical engineering
   b. Civil engineering
   c. Structural engineering
   d. Controls
   e. Fire Protection
   f. Estimators
   g. Schedulers
   h. Draftsmen.

5. URS's efforts are approaching peak workload. This is a critical time in their efforts and any upset will create risk of delay and added cost.

6. Current work activities include site preparation, planning, and design. Once the shovel is in the ground, construction activities will go on for approximately four years. Because there will be more than 300 people working on the project at peak periods, the work must be carefully planned and performed. Construction will be performed by union craft labor, and an organized labor National Maintenance Agreement has been executed to ensure availability of workers and eliminate the potential for labor disputes as well as to prioritize safety on the job.

7. Parts lay-down and storage areas must be developed, site trench layout for electrical and piping systems need to be designed, and contractor parking and access paths need to be built.

F. Current Procurement and Construction Activities

1. PSNH has been actively engaged in negotiating contracts for various aspects of the project. PSNH has completed bid evaluations for the waste water treatment system and material handling system and those contracts are under negotiation. Bidding is currently in progress for items like the construction power electrical switching panel, booster fans and motors, and a new electrical substation.

2. Negotiations are about to be finalized on the scrubber and chimney. However, as noted in the Motion to Accelerate Schedule filed with the Commission on August 25th, PSNH and its corporate parent, Northeast Utilities, cannot continue to commit additional dollars to the scrubber project until the Commission determines its actions in this inquiry. PSNH will initiate discussions with various bidders and contractors to seek ways to continue to allow limited critical path work to proceed, if possible. However, as stated above,

escalating costs for global commodities such as steel and cabling make it likely that any delay in the receipt of Commission action will increase the cost of the project.

3. PSNH has also been designing and procuring equipment for the two substations that will be constructed to support the project. One substation is replacing an existing substation and will eventually be used for construction and a second larger substation will be needed to provide power to the scrubber once it is operational.

4. Site drawings have been developed to show new gates, new access roads, the construction guard house, office trailer locations, new parts lay-down and storage locations, security, and first aid locations. Work is progressing on soil borings to support foundation design, site surveys are being conducted for general equipment locations, and extensive underground surveying is being performed to locate all buried items.

5. Other current activities include developing specifications for booster fans and duct work, designing yard fire protection systems, conducting noise studies, and performing electrical usage studies. Myriad other tasks are also currently being performed in order to successfully complete the project.

G. Permitting Activities

1. The permitting activities began with submittal of the Temporary Air Permit application submitted to NHDES on June 7, 2007. NHDES has indicated that it will facilitate the permitting process however possible and has offered to provide a staff liaison to assist.

2. Other permitting activities have occurred over the last six months and are ongoing. Most notably, PSNH must receive approval from the Town of Bow. PSNH currently expects to receive the necessary approvals within the next few months.

II. PROJECT COST ESTIMATE

A. PSNH, in consultation with URS, has developed a revised project cost estimate of $457 million. This cost equates to approximately $830 per kW for all of the "affected sources" subject to the emissions limitations of the Scrubber Law (RSA 125-O:12, I) or $1,054 per kW installed for Merrimack Station alone. This estimate includes the cost of the project, project management costs, AFUDC, indirect costs, and contingency. Confidential Attachment 3 hereto provides a detailed breakdown of project costs.

B. The current project cost estimate is in-line with recently published information on other multiple unit scrubber installations occurring elsewhere in the country. SNL Financial reported in their July 8, 2008 edition that the Wisconsin PSC had given verbal authorization for Wisconsin Energy Corp to proceed with its plans to install Scrubber and Selective Catalytic Reduction technologies to its Oak Creek units 5-8, a total of 525 MW's of existing Coal fired generating capacity at a cost of $774 Million. While this cost includes the addition of two emissions reduction technologies, the installed cost equates to $1,474 per kW at Oak Creek.

III. Effect of Clean Air Project on Energy Service Rates

A. PSNH has assured the cost of energy produced by Merrimack Station will remain lower cost for customers than reasonable potential alternatives, even when the costs of the Clean Air Project are included. An analysis consisting of a detailed net present value of revenue requirements including capital and operating costs over the expected 15 year depreciation life of the scrubber demonstrates the continued economics of installing the scrubber provides this assurance. The spreadsheets which contain this analysis are included as Attachment 4 to this filing.

B. The primary assumptions used as inputs to the revenue requirements analysis include:

Capital cost: $457M
Capital structure: 47.23% Equity, 52.77% Debt
Assumed Return on Equity: 9.81% (PSNH's current allowed ROE on generation)
In-Service Date: July 1, 2012
Coal cost: $4.82 per Million BTU escalated at 2.5% per year for the period of the analysis
RGGI or equivalent CO2 allowance cost: $7 per ton escalated at 2.5% per year for the period of the analysis

Utilizing these inputs produced the following summary results:
First year bus bar cost: $94.55/MWh
Levelized (15 year) bus bar cost: $99.28/MWh

C. Using the 2012 - 2027 average bus bar cost, the effect that the Clean Air Project will have on energy service rates is estimated to be approximately one-third of a cent per kWh (1/3¢/kWh). In the first year of operation, the year with the highest cost impact due to the highest value of undepreciated plant, absent any rate-smoothing initiatives, the impact on energy service rates is estimated to be approximately one-half cent per kWh (1/2¢/kWh).

D. Sensitivity analyses were conducted to test the impact of changes to each of the key assumptions (capital cost, coal cost and equivalent CO2 allowance cost) on the overall bus bar cost of Merrimack Station. These sensitivity analyses indicated the economics of the project are most sensitive to variations in the future price of coal, and far less sensitive to variations in the capital cost or equivalent CO2 allowance cost.

IV. Effect on Energy Service Rates if Merrimack Station is Retired

A. The Commission's Secretarial Letter requires "an analysis of the effect on energy service rates if Merrimack Station were not in the mix of fossil and hydro facilities operated by PSNH." Three alternatives were chosen for this analysis. These comparison cases included analyses over the time frame of 2012 through 2027 of the following options:

1. Purchase of energy and capacity to replace the equivalent of Merrimack Station through a "Cost of Service" contract with new base load coal fired generating station;

2. Purchase of energy and capacity to replace the equivalent of Merrimack Station through a "Cost of Service" contract with a new combined cycle natural gas fired generating station; and

3. Purchase of energy and capacity to replace the equivalent of Merrimack Station through market purchases.

B. The 2012 through 2027 analysis period was chosen to coincide with the anticipated 15 year depreciable life of the scrubber, as defined in the base case. Cost of service style contracts, though not routinely in place in ISO-New England at this time, provided a presumed floor for total operating costs for a new coal or natural gas fired unit, employing a presumed "regulated return" and debt/equity ratio consistent with the PSNH values used in the base case, of operating with the scrubber.

C. PSNH undertook a data review of energy trade press and publications to determine current estimates of newly proposed coal and natural gas combined cycle generating stations.

1. For recently proposed coal plants, PSNH found references to the Virginia City Hybrid facility (Attachment 5). This is a 585 MW fluidized bed facility with a currently reported capital cost of $1.8 billion. A net present value of revenue requirements model was created that employed this capital cost, the PSNH capital structure and anticipated ROE, and for the sake of consistency, coal price and equivalent CO2 allowance cost assumptions consistent with those used in the scrubber analysis. FERC has estimated significantly higher costs for construction of new coal generation, as set forth in Attachment 2.

2. For recently proposed combined cycle natural gas plants, PSNH found references to the Middletown Kleen plant, a 620 MW plant with a currently reported financing of $985 Million (Attachment 6). This cost is consistent with the FERC estimated cost of new generation contained in Attachment 2.

D. For future market conditions, PSNH examined the forward market for natural gas delivered to New England and applied a "heat rate" factor to translate the raw delivered fuel cost to electrical energy. To the energy cost derived from these calculations, an adder was applied for ISO-NE capacity value, which would be required to replace the lost capacity value existing with the operation of Merrimack Station.

E. In the market purchase and combined cycle natural gas scenarios, a year 2012 price of $11 per MMbtu was used as the first year price of natural gas. This value was escalated at a rate 2.5% per year for future years of the analysis.

F. The results of these analyses indicated that the new coal and new combined cycle natural gas plants would have bus bar costs of about $135 per MWhr. For the market purchase alternative the sum of the energy and capacity costs resulted in a total cost per MWhr value of $107.10. To this amount, PSNH calculated and added a recovery of the estimated $63 Million of stranded assets (undepreciated plant and inventories) that would exist at Merrimack Station over a period of five years (as required by RSA 369-B:3-a). The overall cost of a market purchase plus retirement scenario produced a levelized bus bar cost of $107.83/MWhr, which is nearly 15% higher than the cost calculated to operate Merrimack Station in the first year after completion of the Clean Air Project.

G. From these results, PSNH has computed that the average net effect on energy service rates if Merrimack Station is retired and replaced by market purchases would be 0.73 cents/kWh of additional costs to customers over the period of 2012 through 2027.

H. Comparison and sensitivity analyses were conducted using the scrubber and market purchase plus retirement scenarios. Under the base case assumptions the scrubber scenario produced a nominal benefit to customers of $583 Million; $132 Million benefit on a net present value basis, over the depreciable life of the scrubber. Additional net present value benefit of $34.2 Million is attributable to customers associated with the scrubber, as the charges for stranded assets are avoided in the scenario where the scrubber is installed and the station continues to operate.

I. As a result of these analyses, PSNH has concluded that installation of the scrubber, and continued operation of Merrimack Station is the best economic alternative for the benefit of its customers.

CONCLUSION

PSNH has historically provided Clean Air Project status reports to the Legislature and the committees having oversight responsibilities for this project, NHDES, Office of Consumer Advocate, and this Commission; we continue to be ready and willing to meet with the Commission Staff and OCA to discuss the Clean Air Project whenever requested.

PSNH urges the Commission to act promptly in this docket so that the project work can resume without further delay. PSNH is at a critical juncture in the project since some contract work is on hold, while other contracts are not being executed pending the outcome of the Commission's inquiry. Any delay to the project will increase its cost and therefore result in higher costs to customers once the project is in service.

Attachment 1

The Wall Street Journal

Costs to Build Power Plants Pressure Rates

By REBECCA SMITH

May 27, 2008; Page B3

Construction costs for power plants have more than doubled since 2000, according to new index data to be released Tuesday, and inflationary pressures will continue to put the squeeze on electricity prices.

The findings are bad news for consumers and utilities alike, and help explain why power-plant development has become something of a quagmire in the U.S. -- with no type of plant emerging as a reasonably priced option that can meet rising demand for electricity.

The analysis comes in the form of a price index from Cambridge Energy Research Associates Inc., a research and consulting firm in Massachusetts that is a unit of IHS Co. Similar to the consumer-price index, it calculates the cost of building new power plants based on the cost of materials and other factors.

"Costs for labor, materials, equipment and design and engineering -- all are up," said Candida Scott, senior director of cost and technology for CERA. As a result, the cost of building new plants is up 19% from a year ago and up 69% from 2005.

The skyrocketing price tag comes as the world is roiled by surging electricity demand and as it weathers various supply disruptions, some caused by what appear to be changing weather patterns.

In all, CERA says, the construction of new generating capacity that would have cost $1 billion in 2000 would cost $2.31 billion if construction began today.

According to the index, all types of power plants are feeling the pinch. Components and construction materials for nuclear power plants scored the biggest run-up in costs, up 173% -- nearly tripled -- since 2000. Most of that increase has taken place since 2005. Costs for turbines used to generate wind power more than doubled, at 108%, and natural gas-fueled and coal-fired plants saw their capital costs nearly double, up 92% and 78%, respectively.

If anything, the index likely minimizes the rising cost of building power plants, because it doesn't factor in financing costs, and it doesn't include fuel costs. But as prices for coal, natural gas and uranium have risen, they have put added pressure on the operating costs of many companies, and those increases are pushing up electricity prices, too.

The upshot, Ms. Scott said, is that prudent utility regulators should make sure they are basing future decisions on data that are updated frequently, because even calculations less than a year old can be dangerously out of date.

One practical consequence of the inflationary pressures is that they make it harder for plant developers, such as utilities, to lock in prices as part of big projects. The longer the time period involved in construction, the bigger the risks inherent in any fixed-price contracts. Instead of paying for "time and materials," many firms are seeking contracts in which prices are tied to various indexes.

In some states, utilities are rolling out big programs to install millions of "smart" electric meters in the belief they will help cut electricity consumption and reduce the need for new power plants. Oncor, a big utility in Texas, last week said it plans to install three million advanced meters on homes and small businesses, giving consumers a tool to help get a handle on electricity use.

The CERA report underscores the tough choices facing utilities and regulators. Both are interested in finding the technology that will be most affordable.

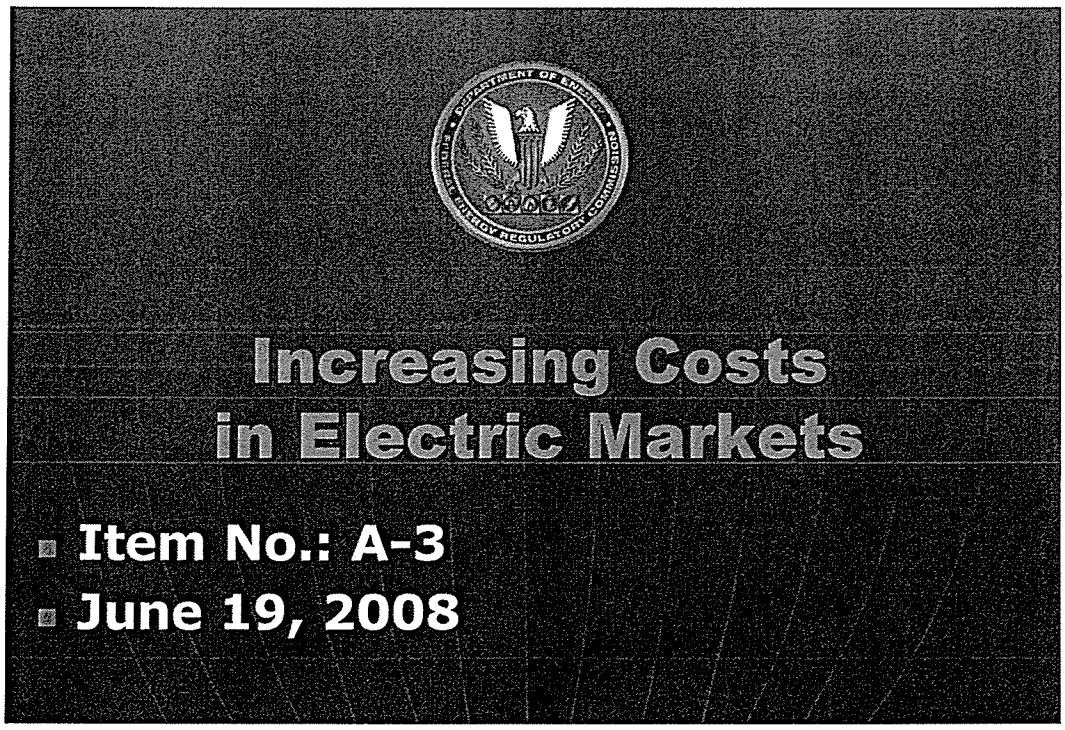
That is especially difficult, since big power plants often remain in service 40 to 60 years.
One commodity whose cost has risen markedly is steel, a important material for building both power-plant structures and power-generating equipment. The cost of iron ore, needed to make steel, rose about 10% in 2007 but has surged 65% in recent months. Shortages of coking coal, also needed to make steel, have been another problem in Australia, a big export country. CERA said steel costs could rise 40% to 60% this year.

A weak dollar also is a factor, since roughly 30% of equipment needed by the U.S. power industry comes from outside the U.S.

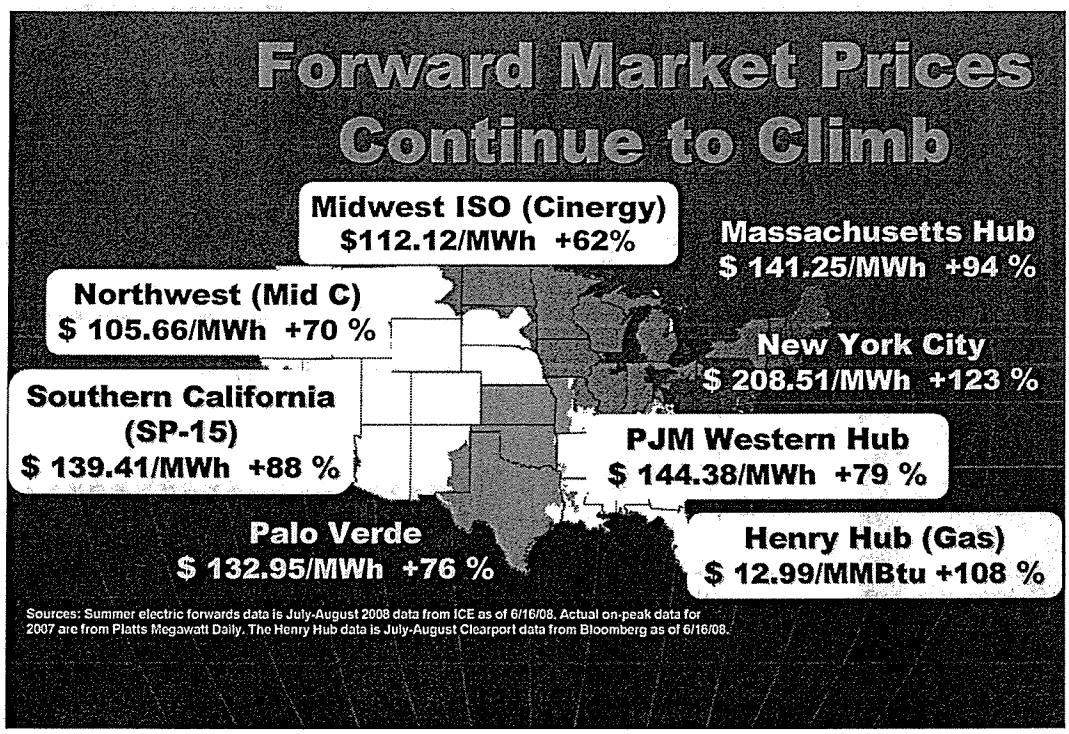
The analysis is of interest because it is difficult to get solid cost data until after plants have been built. Even then, data aren't always available.

Attachment 2

FERC's Office of Enforcement's Report to the FERC Commissioners on Increasing Costs in Electric Markets, presented on June 19, 2008

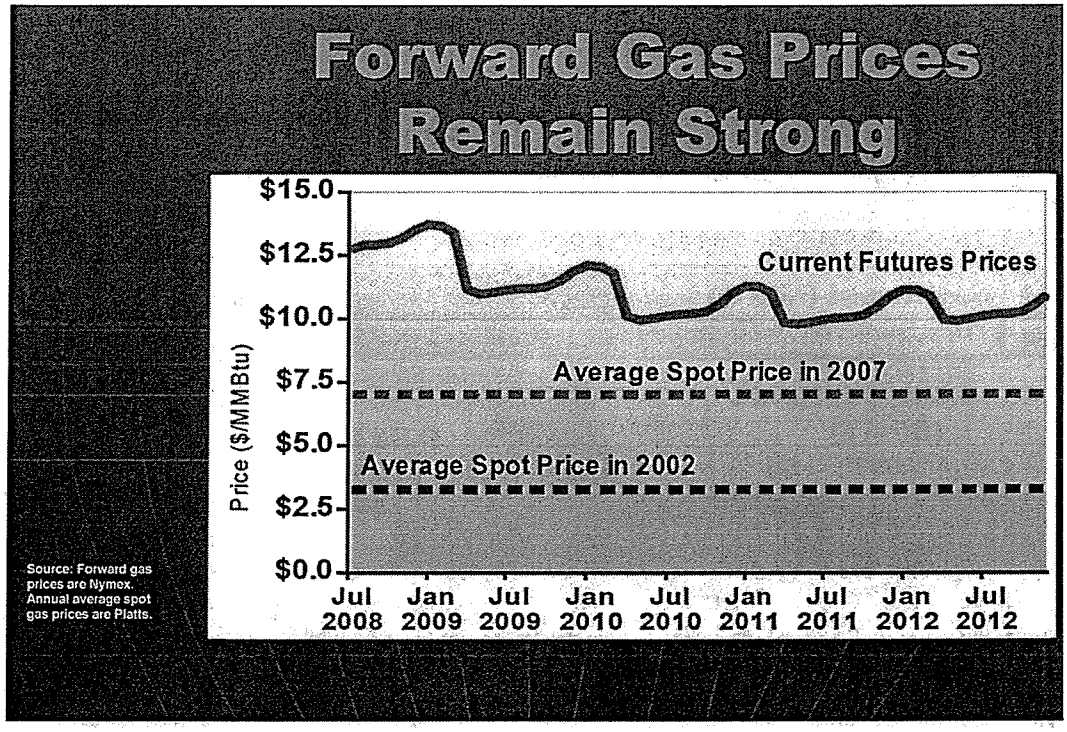


Mr. Chairman and Commissioners, good morning. I am here to present the Office of Enforcement's assessment of likely electricity costs in coming years. This presentation will be posted on the Commission's Web site today.

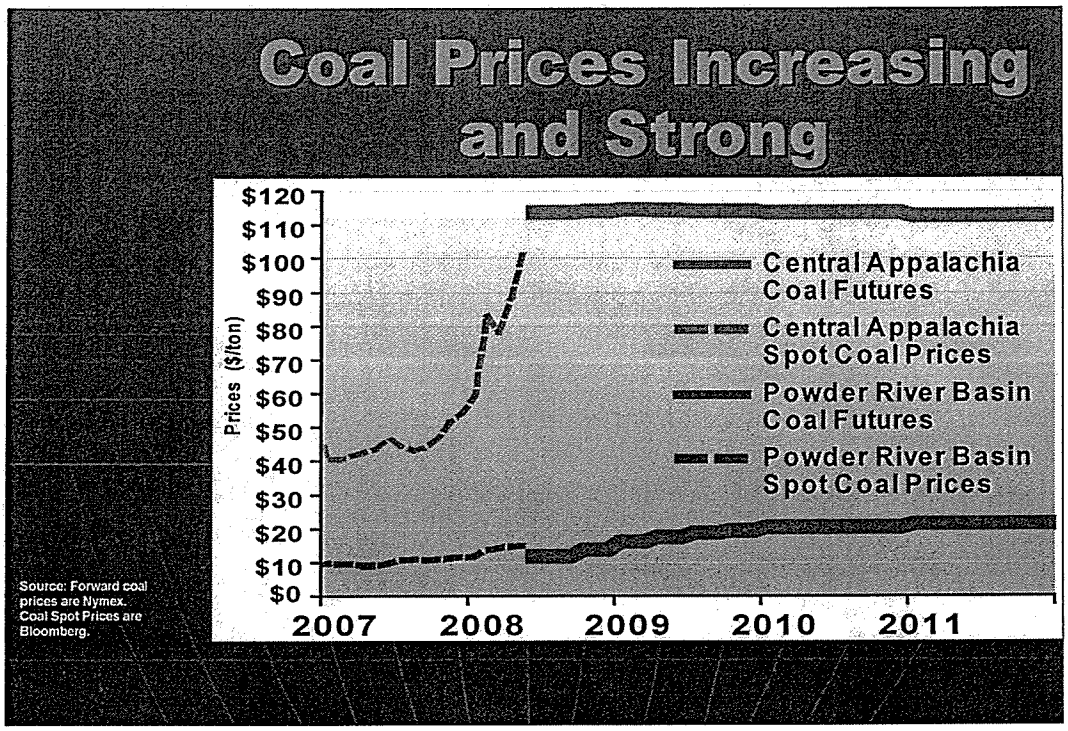


At last month's meeting, we reported that forward market prices for electric power are much higher than the prices we actually experienced last year. This trend is universal around the country. The slide shows the increases in forward prices for July and August as of this week. They have risen further during the last month as natural gas prices have continued to rise.

There is little reason to believe that this summer is unusual. Rather, it may be the beginning of significantly higher power prices that will last for years. The purpose of this presentation is to explain why that is so. The two major factors pushing the costs of electric generation higher are increased fuel costs and increased cost for new construction. These factors affect all parts of the country. That is, higher future prices are likely to affect all regions.

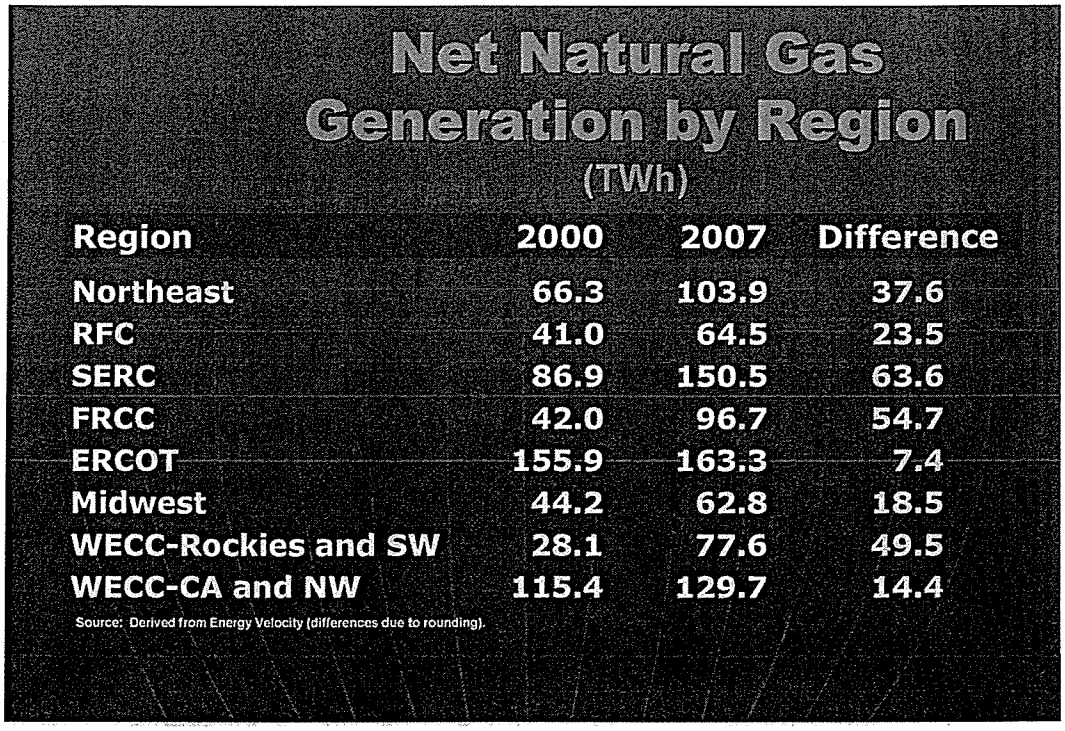


The primary reason for the electric power price increases this year is high fuel prices. All current market indications suggest that they will remain high. Let's look at natural gas, which often determines prices because it is so frequently on the margin. The slide shows futures prices for the next few years. The futures prices are somewhat lower for 2009 than for 2008. Even so, they are a good deal higher for all years than the prices people actually paid last year, and they are much higher than the prices many of us remember from earlier in the decade. The implication is that markets anticipate continuing high prices, even though they know that the United States has seen a significant increase in domestic natural gas production over the last year and a half. The anticipation of further high prices makes more sense when one considers the likely increase in gas demand for generation and the global nature of competition for LNG.

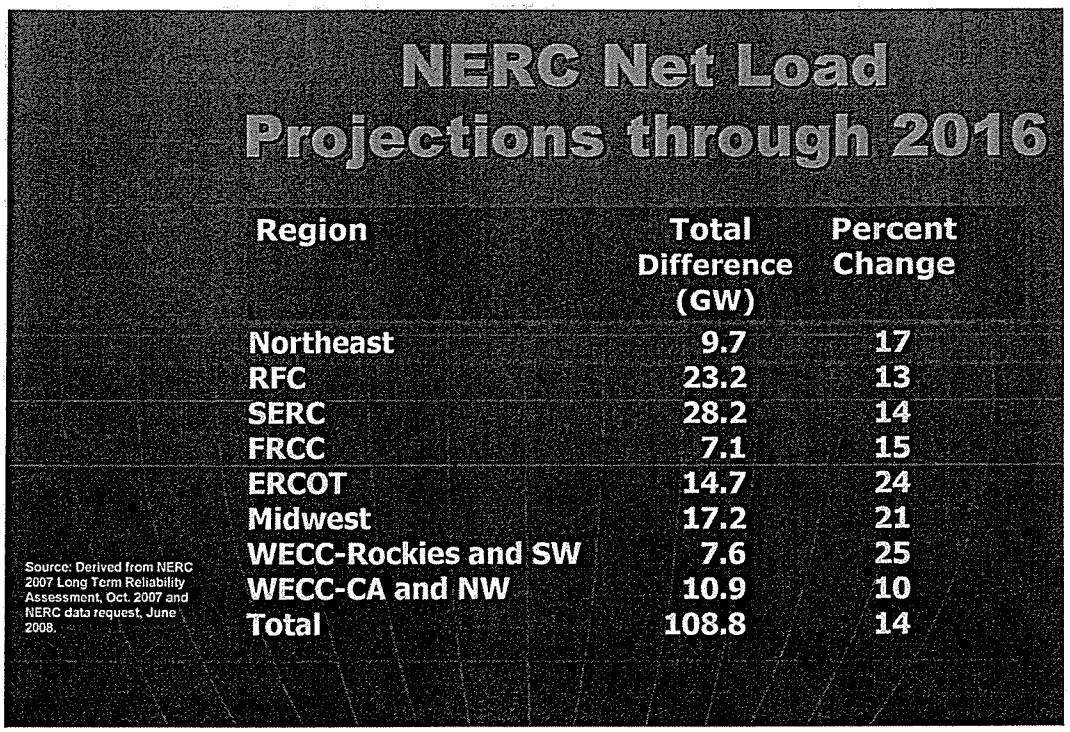


Natural gas is not the only important fuel in setting electric power prices. Coal still powers half of all power produced in the U.S. In some markets – the Midwest and the Southeast, for example – coal is often on the margin and plays a major role in setting average prices over time. The slide shows that the price of one key form of coal – Central Appalachian coal - has risen rapidly over the last year. Forward markets show continuing high prices for Central Appalachian coal for the next three years. This reflects, in part, the growing global market for coal and the relatively weak US dollar. Coal imports are becoming more costly and coal exports more profitable, both of which contribute to higher prices in the United States.

I should mention that other coal prices behave somewhat differently from Central Appalachian coal. For example, a majority of the overall cost for Powder River Basin coal comes from transportation rates and can be more difficult to see. Nonetheless, the implication of the prices we can see is that electric power prices are likely to increase even where coal is on the margin. This may take place somewhat differently from the way natural gas price increases flow through into power prices. Generally, companies buy coal under fairly long term contracts, so there may be a lag before the higher prices show their full effects. But the effects are coming.

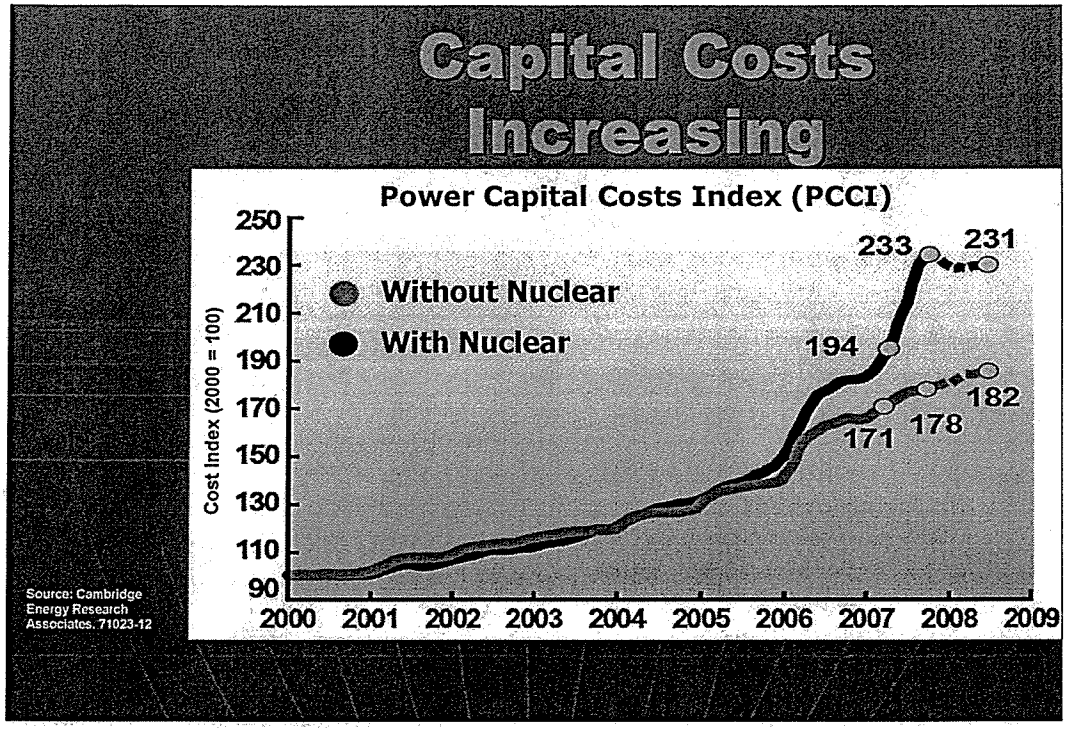


While both natural gas and coal prices have increased rapidly, natural gas is increasingly important in every region of the country. The slide shows that even in regions where coal has historically dominated – most noticeably in SERC– natural gas usage has grown substantially since 2000, up 63.6 TWh in 2007, more than in any other region. Noticeable increases also occurred in FRCC, which has flexibility to burn either gas or oil at many facilities, and also in the Rockies and Southwest where demand continues to grow considerably.

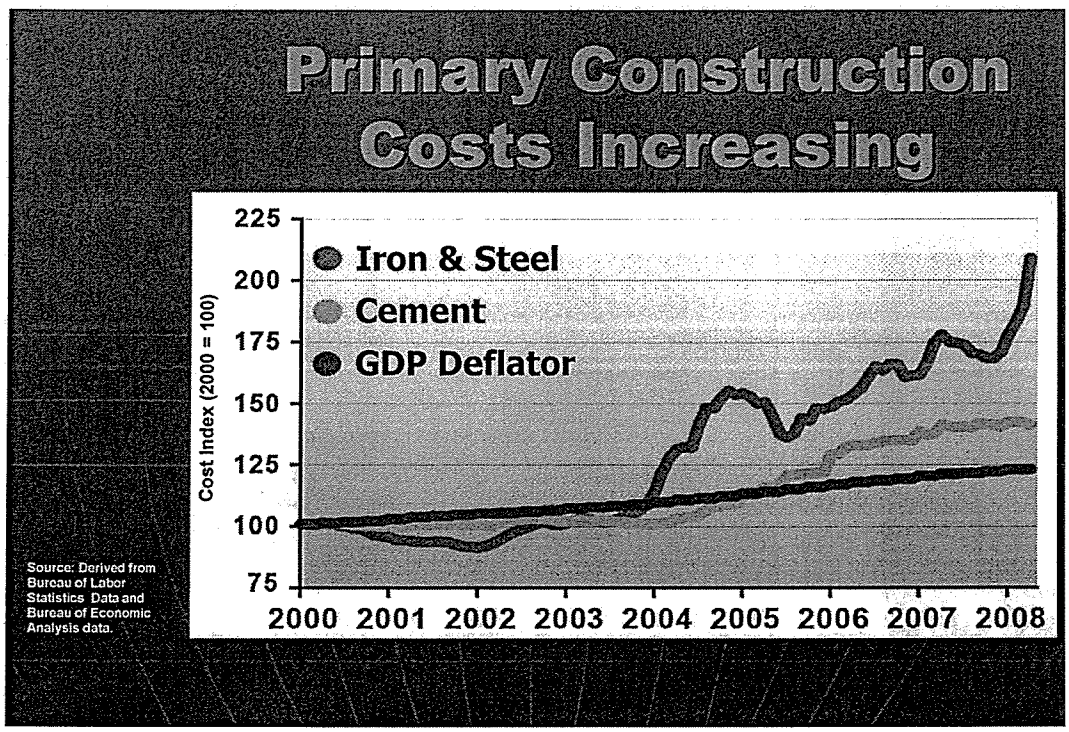


The second major factor that will put upward pressure on electric power prices is the increasing cost of new construction. This effect is particularly important because the country is entering a period when we will need to make substantial new investments, especially in generation.

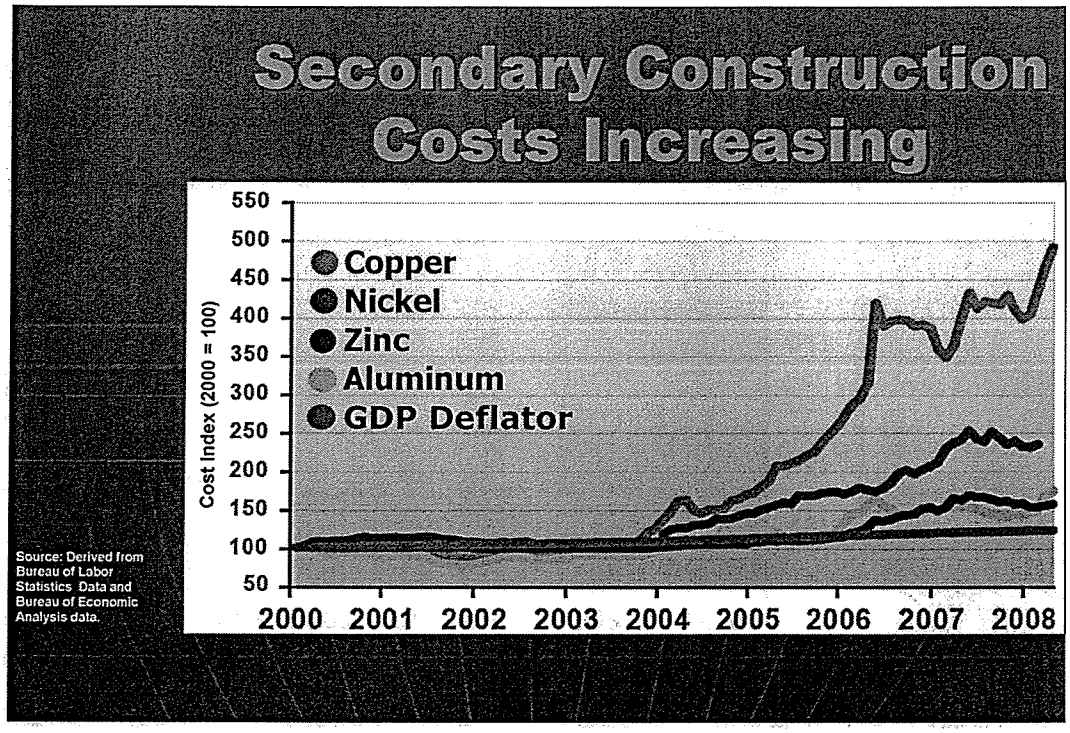
Natural gas fueled most of the last great wave of generation investment, which occurred between 1995 and 2004. In recent years, demand in most regions has gradually caught up with the capacity built around 2000. Looking forward, demand will continue to grow, and the need for new capacity will become ever more acute and ever more widespread. The slide shows NERC's expectation of peak net load growth in different regions for the next 10 years. We at the Commission are not in the business of forecasting, so I would just say this: There are legitimate reasons to be unsure about exactly how much new generation the country will need in the coming years. For one thing, higher prices will themselves discourage some power demand. Nonetheless, a significant level of demand increase seems virtually inevitable. So will be the need to build more capacity.



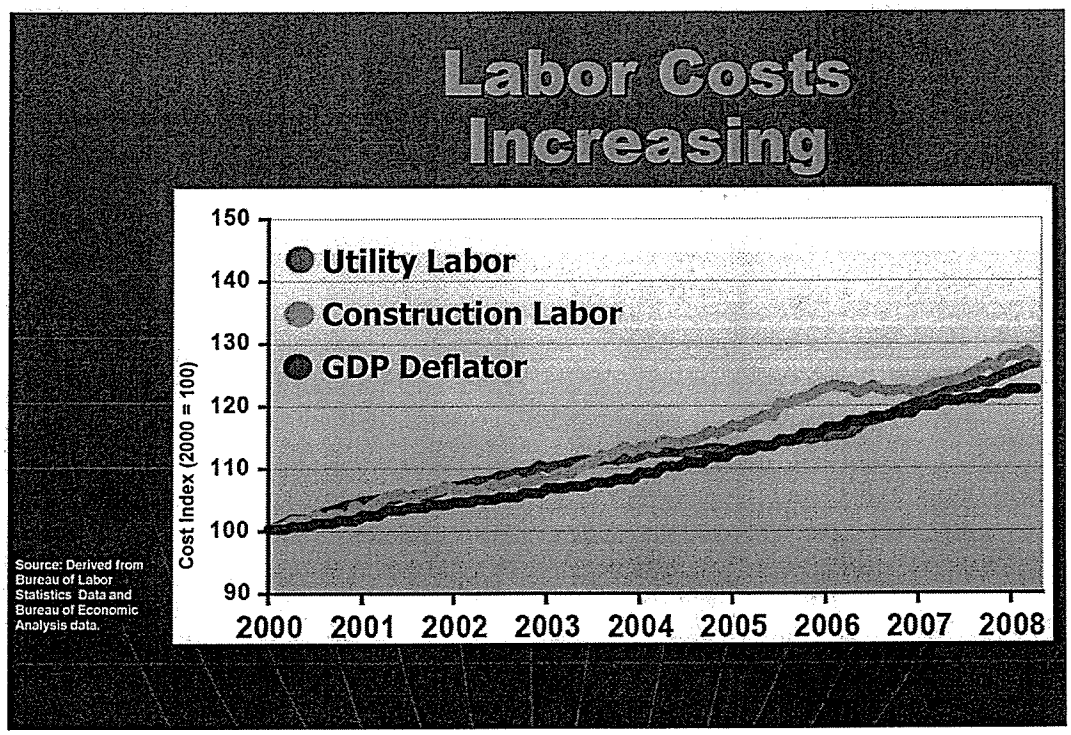
The need for new generation is important because new construction is becoming more expensive – quite aside from fuel price increases. Cambridge Energy Research Associates – CERA – produces an index of costs for the main inputs that go into building new generating plants. The slide shows how that index has almost doubled since 2003. The increase in nuclear plant inputs has risen even faster. Much of this cost increase results from rising global demand for basic materials. Part of it also comes from shortages of people to do key engineering and construction jobs. In any case, the implication is that, we will pay more, not less, for the next round of construction.



Let's look at some of the reasons that CERA's index is rising so rapidly. The slide shows two of the primary construction materials for electric generating plants – concrete is on the blue line and iron and steel on the red line. As you can see, the prices of both have been rising recently – especially steel, which is now more than twice as expensive as it was four years ago. Rising costs for iron and steel will also affect fuel prices for the power industry. For example, natural gas wells and pipelines both use substantial amounts of steel, so natural gas costs will also reflect rising iron and steel prices.

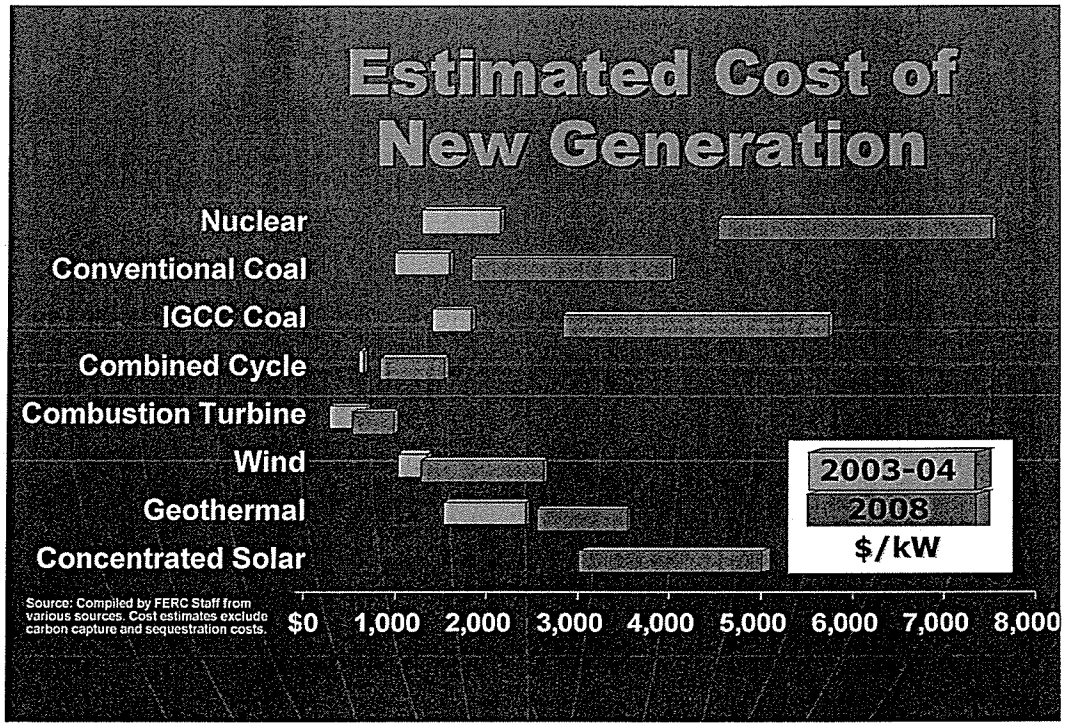


Of course, new generating plants require many other basic commodities. The slide shows the pricing for four key metals that go into generators. As you can see, all of these metals are increasing in price. The one that stands out is copper, up more than five times over the past four years. Indeed, copper is now so valuable there are reports of copper thieves cutting live cables to steal the metal.



Labor costs are also increasing. Perhaps the most frequently cited labor shortage is that for nuclear engineers. It has been a full generation since the nation built its last nuclear plant. Most of the engineers who worked on those plants are near retirement – and many have moved on to other occupations. In fact, the labor shortages are more widespread than just nuclear engineers. The slide shows that there has been about a 27% nominal change in average hourly earnings for both construction labor generally and for non-construction utility labor since 2000, outpacing inflation by over 4% for the same period.

In practice, the American labor market is quite responsive to market forces, so short-term labor shortages tend to be self-correcting over the mid-term. Still, there is no quick way to force several years of education into six months, or decades of experience into a year or two.



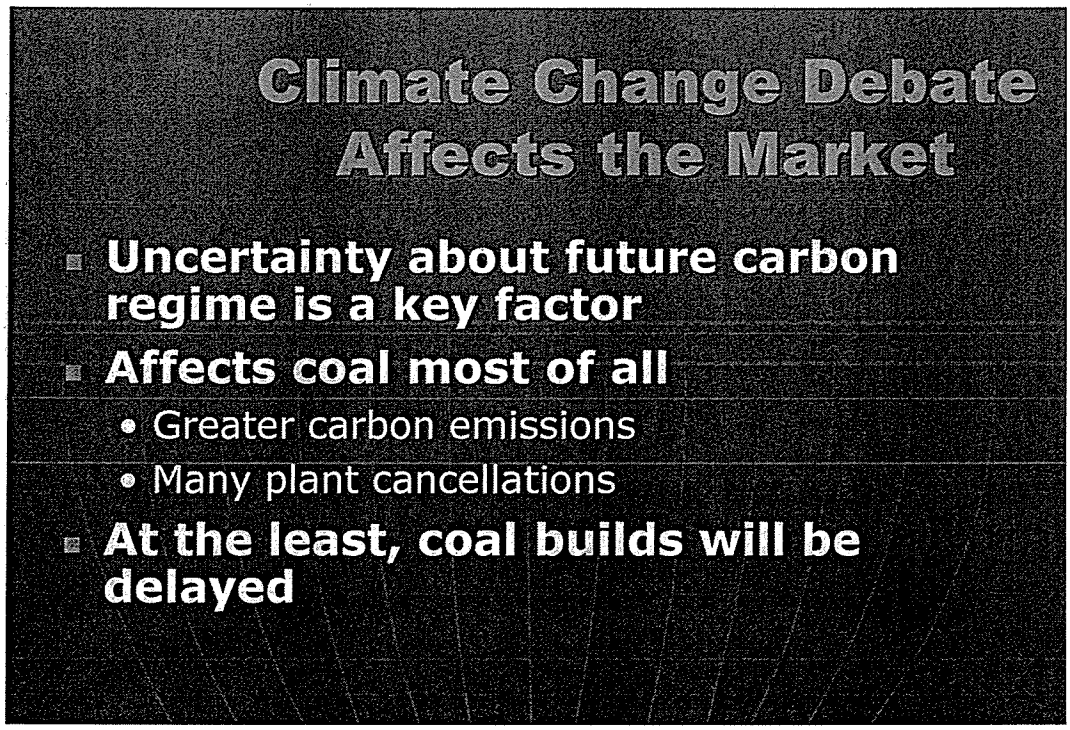
What do all these cost increases mean for the cost of building a new generating plant?

No one knows precisely. It's difficult to get consistent and trustworthy numbers about plant costs, both because they are commercially sensitive and because the assumptions behind them vary greatly. The numbers reflected on the slide come from a variety of sources and include different assumptions about, for example, location or exactly what facilities are included in the estimate. To take one example: Two recent nuclear procurements in South Carolina and Georgia produced cost estimates of $5,100 and $6,400 per kW, respectively, for the same technology. We have been told that most of the difference may be due to different uses of Allowances for Funds Used during Construction – AFUDC.

Despite the difficulties in being precise, the slide represents a good general indication of how capital costs have been changing. If anything, the cost estimates may be lower than the final costs of projects, if input costs continue to rise.

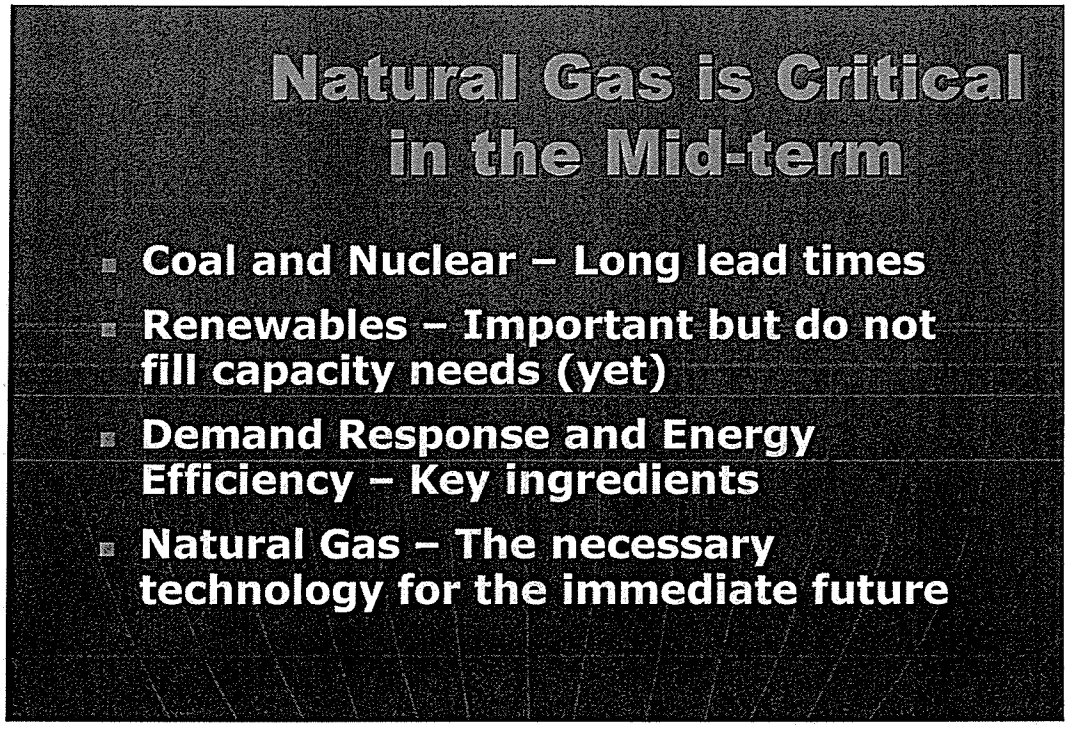
It's also important to remember that these cost estimates cover only capital costs. They do not include fuel costs, which as we've seen earlier will be a large factor for both natural gas and coal-fired plants. To the extent that plants do not have major fuel costs - they may be more competitive over their life cycles than would be suggested just looking at the capital costs. That would affect renewables and, to a degree, nuclear plants.

Similarly, these estimates generally do not include a full accounting of major risk factors, especially those affecting coal and nuclear plants. Both of these technologies have long lead times. That increases the chance that market conditions will change before they are complete and adds to the financial risk of building them. Nuclear plants also have risks associated with both decommissioning and waste fuel disposal. And coal plants have risks associated with the future treatment of greenhouse gases. Of course, relatively new technologies like wind and the new approaches to nuclear also have some risks, simply because they do not have the same track record of more mature technologies.



Climate change has become an increasingly urgent national issue. The debate over how to address carbon dioxide emissions is lively and has already affected how companies think about investments. Until recently, rising natural gas prices made coal plants attractive. However, the national uncertainty about carbon policy has made investing in coal plants more risky. Without carbon capture or sequestration, coal unit emit about four times as much carbon as natural gas combined cycle units per MWh. Since January 2007, 50 coal plants have been canceled or postponed. Only 26 remain under construction.

Whatever the eventual result of the climate change debate, costs of producing power from both coal and natural gas are likely to increase. Moreover, as long as future climate change policy is unclear, market participants will have a considerable disincentive to invest in coal plants. Even when the issues are resolved, it remains an open question how competitive coal-fired generation will be, and it would take another four to eight years to build new coal-fired capacity.



Over the long run, the nation can meet its increasing need for generation in several ways. But for the next few years, the options are more limited, and natural gas will be crucial.

The lead times for both nuclear and coal units mean that they will not supply a significant amount of new capacity for nearly a decade.

Most people expect renewables to supply an increasing proportion of the nation's power. For the next few years, wind will almost certainly account for a large share of generation investment and will account for a growing share of overall generation. Wind power has no fuel costs, and so will generally operate when available. However, wind is a variable, weather-dependent resource. As a result, it will not make up as strong a share of the Nation's capacity needs over the next few years. Other renewables are becoming more competitive. Geothermal power is already an important resource in the west, and concentrated solar is becoming economically attractive in desert areas like the Southwest. But these sources are likely to remain relatively small in the national picture over the next few years.

Both demand response and energy efficiency will be important – I'll talk more about them on the next slide – but they are unlikely to eliminate the need for new capacity.

Overall, the most likely outcome is that natural gas will continue to be the leading fuel for new capacity over the next half decade. For example, the consulting firm, Wood Mackenzie estimates that in a carbon constrained environment, gas consumption for power will increase by 69 % by 2017. That's in addition to the 55% increase we've seen since 2000.

Over the years, we have learned repeatedly that people respond to prices. In the case of electric power, this is likely to take several forms.

First, there is likely to be more demand response. In the simplest terms, high prices at peak will lead some customers – both businesses and others – to prefer to save their money rather than use power. In fact, the first round of demand response may be both the cheapest and fastest way to improve capacity margins on many systems. The best cost estimates for the first rounds of demand response suggest that it should be available for about $165/kW, far less than any generation side options. The results of ISO-NE's first Forward Capacity Market auction last year corroborates the economic importance of demand response - 7.4 % of the accepted bids were for demand response. However, there are impediments that limit the full use of demand response. For example, most customers do not have the option to respond directly to real-time prices. As a result, they are unlikely to reduce peak consumption as much as they might prefer to if they could take advantage of the price.

Second, customers are likely to be more energy efficient. While few customers see real-time prices, most get an average price over a month. As a result, high prices give them considerable incentive to reduce their overall consumption of power – though no more at peak than at other times. That is, energy efficiency is essentially a substitute for baseload capacity, while demand response is a substitute for peaking capacity. Energy efficiency is also likely to be economically important. Cost estimates show that the first round of energy efficiency may be available for about 3 cents/kWh. At

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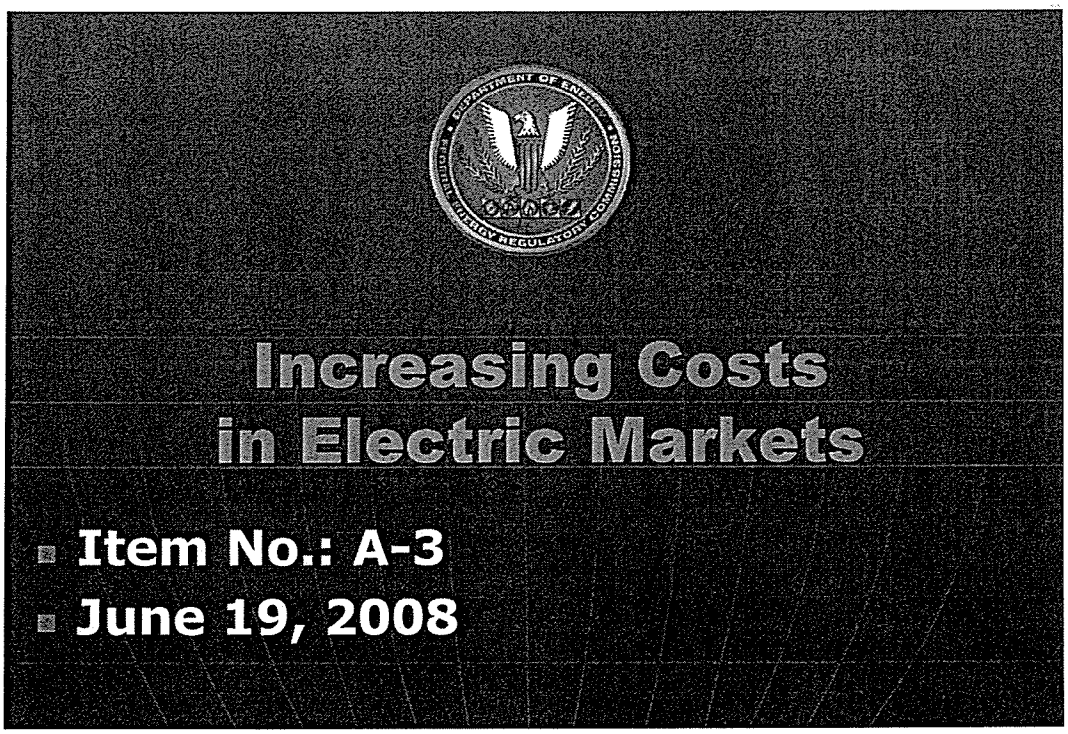
current prices, supplying that same kWh from a combined cycle gas plant would cost 9 cents just for the fuel. Adding to the likelihood of greater energy efficiency is that many states have adopted fairly strong energy efficiency standards.

Third, innovators see higher prices as an opportunity. By the nature of things, it's hard to predict what innovations will succeed. The electric industry has a number of technologies that might take off – including concentrating solar power, hydrokinetic power, and vehicle to grid technologies. In addition, distributed generation is becoming more important, and may continue to do so for both cost and emissions reasons In other newly competitive industries, such as telecoms and natural gas, innovations have produced large changes, sometimes quickly. Given continuing high electric prices, the electric power industry may see similar results.



That concludes our presentation. We welcome comments and questions.

Confidential Attachment 3

Detailed Project Cost Breakdown

Confidential attachment filed pursuant to "Motion for Protective Order" pursuant to the Commission's August 22, 2008 Secretarial Letter

Attachment 4

DETAILED NET PRESENT VALUE OF REVENUE REQUIREMENTS

Detailed Net Present Value of Revenue Requirements

Rate Base Calculation (2006–2016)

			2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Scrubber Only Incremental Costs													
RateBase Build													
Cumulative Capital			871,913	2,734,966	44,061,397	145,377,133	310,955,865	407,418,024	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069
Accumulated Book Dep			-	-	-	-	-	-	15,240,702	45,722,107	76,203,512	106,684,916	137,166,321
Net Book Value			871,913	2,734,966	44,061,397	145,377,133	310,955,865	407,418,024	441,980,367	411,498,962	381,017,558	350,536,153	320,054,748
Working Capital									366,918	731,914	750,314	769,178	788,516
Month end Fuel Inventory									(71,563)	(293,407)	(300,742)	(306,260)	(315,967)
Nox/Sox									-	-	-	-	-
M&S inventory									6,693,835	5,850,483	5,007,132	4,163,781	3,320,429
ADIT			-	-	-	-	-	-	24,537,531	44,247,660	63,759,539	83,068,529	102,247,799
RateBase End of Year			871,913	1,803,439	23,398,181	94,719,265	228,166,499	359,186,944	424,432,026	373,540,293	322,714,723	272,072,322	221,599,927
Average Rate Base			871,913	1,803,439	23,398,181	94,719,265	228,166,499	359,186,944	440,826,548	398,986,160	348,127,508	297,393,522	246,836,125
Revenue Requirements													
Pre-tax Capital Return			-	-	-	-	-	-	23,952,745	43,356,612	37,831,702	32,318,340	26,824,188
Depreciation			-	-	-	-	-	-	15,240,702	30,481,405	30,481,405	30,481,405	30,481,405
O&M			-	-	-	-	-	-	2,976,112	5,936,636	6,065,864	6,238,866	6,395,739
Fuel					-	-	-	-	(397,570)	(1,630,037)	(1,670,788)	(1,712,558)	(1,755,372)
Emmisions Costs			-	-	-	-	-	-	(8,867,412)	(29,775,129)	(30,519,507)	(28,647,698)	(22,838,582)
Property Tax			-	-	-	-	-	-	-	$0	$0	$0	$0
Subotal Revenue Requirements			-	-	-	-	-	-	32,904,577	48,371,489	42,208,696	38,878,375	39,107,358
Percentage of Year In-Service			-	-	-	-	-	-	50%	100%	100%	100%	100%
Existing Plant With Capital Adds													
RateBase Build													
Cumulative Capital				168,935,000	232,935,000	241,935,000	250,935,000	259,935,000	268,935,000	277,935,000	286,935,000	295,935,000	304,935,000
Accumulated Book Depr				140,727,000	149,245,701	159,564,403	171,683,104	185,601,805	201,320,507	218,839,208	236,357,909	253,876,611	271,395,312
Net Book Value				48,208,000	83,689,299	82,370,597	79,251,896	74,333,195	67,614,493	59,095,792	50,577,091	42,058,389	33,539,688
Working Capital				3,457,356	3,543,790	3,632,385	3,723,194	3,816,274	3,911,681	4,009,473	4,109,710	4,212,453	4,317,764
Month end Fuel Inventory				19,159,000	28,112,102	28,112,102	28,112,102	28,112,102	28,112,102	28,814,904	29,535,277	30,273,659	31,030,500
Nox/Sox				22,920,000	18,336,000	13,752,000	9,168,000	4,584,000	-	-	-	-	-
M&S inventory				3,161,728	5,523,494	5,436,459	5,230,625	4,905,991	4,462,557	3,900,322	3,338,088	2,775,854	2,213,619
ADIT					-	-	-	-	-	-	-	-	-
RateBase End of Year				96,926,064	139,204,684	133,303,543	125,485,817	115,751,561	104,100,833	95,820,492	87,560,165	79,320,354	71,101,571
Average Rate Base				96,926,064	118,065,384	136,254,114	129,394,680	120,618,689	109,926,197	99,960,662	91,690,328	83,440,260	71,101,571
Revenue Requirements													
Pre-tax Capital Return			-	10,533,149	12,830,398	14,807,003	14,061,575	13,107,871	11,945,896	10,862,922	9,964,169	9,067,617	7,726,748
Depreciation			-	10,599,000	8,518,701	10,318,701	12,118,701	13,918,701	15,718,701	17,518,701	17,518,701	17,518,701	17,518,701
O&M			-	28,043,000	28,744,075	29,462,677	30,199,244	30,954,225	31,728,081	32,521,283	33,334,315	34,167,672	35,021,864
Fuel			-	118,776,109	159,028,012	159,028,012	159,028,012	159,028,012	159,028,012	163,003,713	167,078,806	171,255,775	175,537,170
Emmisions Costs				-	-	-	-	-	31,624,367	32,414,996	33,225,371	45,363,357	46,497,441
Property Tax			-	3,304,000	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600
Subotal Revenue Requirements			-	171,255,257	212,507,786	217,002,993	218,794,132	220,395,409	253,431,677	259,706,215	264,507,961	280,756,724	285,686,524
Total New Plant With Scrubber													
Revenue Requirements													
Pre-tax Capital Return			-	10,533,149	12,830,398	14,807,003	14,061,575	13,107,871	35,898,641	54,221,534	47,795,871	41,385,957	34,550,916
Depreciation			-	10,599,000	8,518,701	10,318,701	12,118,701	13,918,701	30,959,404	48,000,106	48,000,106	48,000,106	48,000,106
O&M			-	28,043,000	28,744,075	29,462,677	30,199,244	30,954,225	34,704,192	38,457,921	39,420,199	40,406,559	41,417,603
Fuel			-	118,776,109	159,028,012	159,028,012	159,028,012	159,028,012	158,630,442	161,373,675	165,408,017	169,543,218	173,781,798
Emmisions Costs			-	-	-	-	-	-	22,756,975	2,639,868	2,705,865	16,715,659	23,658,860
Property Tax			-	3,304,000	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600
Subotal Revenue Requirements	Levelized 2012-2027	[redacted]	-	171,255,257	212,507,786	217,002,993	218,794,132	220,395,409	286,336,254	308,079,704	306,716,657	319,438,099	324,795,883
NPV Gross Revenue Requirements	$323,475,945	[redacted]							1	2	3	4	5
Less Market Energy	$325,874,915	[redacted]			$273,109,197	$273,109,197	$273,109,197	$273,109,197	$283,537,003	$290,625,428	$297,891,064	$305,338,340	$312,971,799
Less Market Capacity	$23,069,219	[redacted]			$17,957,400	$20,500,500	$21,746,100	$20,065,300	$18,891,600	$19,151,100	$19,566,300	$20,065,300	$20,656,200
NPV Net Revenue Requirements	($23,468,297)	[illegible] 2012			(78,558,811)	(76,606,704)	(76,061,165)	(72,799,088)	(18,092,349)	(1,696,824)	(10,740,706)	(5,965,542)	(8,832,116)
	($17,763,910)	($132,036,833) 2008											
Busbar Cost, Prior	$98.90			52.56	65.22	66.60	67.15	67.64	77.78	79.71	81.18	86.17	87.68
Busbar Cost, Scrubber	$10.29			0.00	0.00	0.00	0.00	-67.64	10.10	14.65	12.95	11.87	12.00
Busbar Cost, Total	$99.25			52.56	65.22	66.60	67.15		87.88	94.55	94.13	98.04	99.68
cents				0.000	0.000	0.000	0.000	-6.764	1.010	1.485	1.295	1.187	1.200

(2017–2028)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Scrubber Only Incremental Costs												
RateBase Build												
Cumulative Capital	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069	457,221,069
Accumulated Book Dep	167,647,725	198,129,130	228,610,535	259,091,936	289,573,344	320,054,748	350,536,153	381,017,558	411,498,962	441,980,367	457,221,069	457,221,069
Net Book Value	289,573,344	259,091,939	228,610,535	198,129,130	167,647,725	137,166,321	106,684,916	76,203,512	45,722,107	15,240,702	-	-
Working Capital	808,340	828,664	849,499	870,859	892,756	915,205	938,219	961,812	985,999	1,010,794	1,036,214	-
Month end Fuel Inventory	(323,866)	(331,963)	(340,262)	(348,768)	(357,488)	(366,425)	(375,585)	(384,975)	(394,599)	(404,464)	(414,576)	(424,940)
Nox/Sox	-	-	-	-	-	-	-	-	-	-	-	-
M&S inventory	2,477,078	2,069,328	1,782,000	1,782,000	1,782,000	1,782,000	1,782,000	1,782,000	1,782,000	1,782,000	1,782,000	
ADIT	91,968,366	81,583,723	71,045,204	60,484,739	49,923,908	39,363,442	28,802,611	18,242,145	7,681,314	(2,879,152)	(7,343,702)	(5,711,606)
RateBase End of Year	200,546,526	180,074,244	159,856,566	139,948,462	120,041,067	100,133,659	80,226,939	60,320,203	40,414,192	20,506,184	9,747,340	5,286,665
Average Rate Base	211,073,226	190,310,386	169,965,405	149,902,525	129,994,784	110,087,373	90,180,299	70,273,571	50,367,197	30,461,188	15,127,762	7,517,003
Revenue Requirements												
Pre-tax Capital Return	22,937,743	20,681,405	18,470,475	16,290,203	14,126,789	11,963,412	9,800,071	7,636,767	5,473,503	3,310,277	821,982	-
Depreciation	30,481,405	30,481,405	30,481,405	30,481,405	30,481,405	30,481,405	30,481,405	30,481,405	30,481,405	30,481,405	15,240,702	-
O&M	6,556,539	6,721,387	6,890,384	7,063,635	7,241,246	7,423,329	7,609,995	7,801,360	7,997,543	8,198,665	8,404,851	-
Fuel	(1,799,256)	(1,844,237)	(1,890,343)	(1,937,602)	(1,986,042)	(2,035,693)	(2,086,585)	(2,138,750)	(2,192,219)	(2,247,024)	(2,303,200)	(2,360,780)
Emmisions Costs	(20,065,325)	(20,566,958)	(21,081,132)	(21,608,161)	(22,148,365)	(22,702,074)	(23,269,626)	(23,851,366)	(24,447,650)	(25,058,842)	(25,685,313)	(26,327,446)
Property Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subotal Revenue Requirements	38,111,106	35,473,000	32,870,788	30,289,479	27,715,034	25,130,378	22,535,260	19,929,418	17,312,561	14,664,481	(3,520,977)	(26,666,225)
Percentage of Year In-Service	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	0%
Existing Plant With Capital Adds												
RateBase Build												
Cumulative Capital	313,935,000	322,935,000	331,935,000	340,935,000	349,935,000	358,935,000	367,935,000	376,935,000	385,935,000	394,935,000	403,935,000	412,935,000
Accumulated Book Depr	288,914,014	302,032,715	313,935,000	322,935,000	331,935,000	340,935,000	349,935,000	358,935,000	367,935,000	376,935,000	385,935,000	393,135,000
Net Book Value	25,020,986	20,902,285	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	18,000,000	19,800,000
Working Capital	4,425,708	4,536,351	4,649,760	4,766,004	4,885,154	5,007,283	5,132,465	5,260,776	5,392,296	5,527,103	5,665,281	5,806,913
Month end Fuel Inventory	31,806,263	32,601,419	33,416,455	34,251,866	35,108,163	35,985,867	36,885,513	37,807,651	38,752,843	39,721,664	40,714,705	41,732,573
Nox/Sox	-	-	-	-	-	-	-	-	-	-	-	-
M&S inventory	1,651,385	1,379,551	1,188,000	1,188,000	1,188,000	1,188,000	1,188,000	1,188,000	1,188,000	1,188,000	1,188,000	1,306,800
ADIT	-	-	-	-	-	-	-	-	-	-	-	-
RateBase End of Year	62,904,342	59,419,606	57,254,214	56,205,870	59,181,316	60,181,149	61,205,978	62,256,428	63,333,138	64,436,767	65,567,966	66,646,286
Average Rate Base	62,904,342	59,419,606	57,254,214	56,205,870	59,181,316	60,181,149	61,205,978	62,256,428	63,333,138	64,436,767	65,567,966	66,646,286
Revenue Requirements												
Pre-tax Capital Return	6,835,939	6,457,246	6,221,926	6,325,347	6,431,350	6,540,004	6,651,374	6,765,529	6,882,537	7,002,470	7,125,402	7,459,927
Depreciation	17,518,701	13,118,701	11,902,285	9,000,000	9,000,000	9,000,000	9,000,000	9,000,000	9,000,000	9,000,000	9,000,000	7,200,000
O&M	35,897,411	36,794,846	37,714,717	38,657,585	39,624,025	40,614,625	41,629,991	42,670,741	43,737,509	44,830,947	45,951,721	47,100,514
Fuel	179,925,599	184,423,739	189,034,333	193,760,191	198,604,196	203,569,301	208,658,533	213,874,996	219,221,871	224,702,418	230,319,979	236,077,978
Emmisions Costs	47,659,877	48,851,374	50,072,658	51,324,475	52,607,587	53,922,776	55,270,846	56,652,617	58,068,932	59,520,656	61,008,672	62,533,889
Property Tax	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600
Subotal Revenue Requirements	291,224,127	293,032,506	298,332,522	302,454,196	309,653,757	317,033,306	324,597,344	332,350,483	340,297,450	348,443,091	356,792,374	363,756,906
Total New Plant With Scrubber												
Revenue Requirements												
Pre-tax Capital Return	29,773,682	27,138,650	24,692,404	22,615,549	20,558,140	18,503,416	16,451,445	14,402,296	12,356,039	10,312,748	7,947,384	7,459,927
Depreciation	48,000,106	43,600,106	42,383,690	39,481,405	39,481,405	39,481,405	39,481,405	39,481,405	39,481,405	39,481,405	24,240,702	7,200,000
O&M	42,453,950	43,516,233	44,605,101	45,721,220	46,865,271	48,037,954	49,239,986	50,472,101	51,735,053	53,029,613	54,356,572	47,100,514
Fuel	178,126,343	182,579,502	187,143,989	191,822,589	196,618,154	201,533,608	206,571,948	211,736,246	217,029,653	222,455,394	228,016,779	233,717,198
Emmisions Costs	27,594,552	28,284,416	28,991,526	29,716,314	30,459,222	31,220,703	32,001,220	32,801,251	33,621,282	34,461,814	35,323,359	36,206,443
Property Tax	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600	3,386,600
Subotal Revenue Requirements	329,335,234	328,505,507	331,203,310	332,743,677	337,366,791	342,163,685	347,132,604	352,279,899	357,610,031	363,127,573	353,271,396	335,070,663
NPV Gross Revenue Requirements	6	7	8	9	10	11	12	13	14	15	16	
Less Market Energy	$320,796,094	$328,815,996	$337,036,396	$345,462,306	$354,098,864	$362,951,335	$372,025,119	$381,325,747	$390,858,890	$400,630,362	$410,646,122	$420,912,275
Less Market Capacity	$21,175,200	$21,694,200	$22,887,900	$24,600,600	$26,313,300	$27,974,100	$29,686,800	$31,399,500	$33,060,300	$34,773,000	$36,485,700	$38,146,500
NPV Net Revenue Requirements	(12,636,060)	(22,004,669)	(26,720,966)	(37,319,229)	(43,043,372)	(48,761,750)	(54,579,315)	(60,445,347)	(66,309,159)	(72,275,790)	(93,860,425)	(123,958,092)
Busbar Cost, Prior	89.38	89.93	91.56	92.83	95.04	97.30	99.62	102.00	104.44	106.94	109.50	111.64
Busbar Cost, Scrubber	11.70	10.89	10.09	9.30	8.51	7.71	6.92	6.12	5.31	4.51	-1.08	-8.80
Busbar Cost, Total	101.08	100.82	101.65	102.12	103.54	105.01	106.54	108.12	109.75	111.45	108.42	102.84
cents	1.170	1.069	1.009	0.930	0.851	0.771	0.692	0.612	0.531	0.451	-0.108	-0.880

Attachment 5

SNLi article, July 1, 2008

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Power & Coal - Infrastructure Development

Dominion starts construction on Virginia clean coal plant

July 01, 2008 8:14 AM ET

By Adnan Munawar

Dominion Virginia Power said June 30 it began construction on the 585-MW Virginia City Hybrid clean coal plant in Wise County, Va.

Construction of the plant is scheduled to take four years, Dominion said.

The plant is part of Dominion Virginia Power's response to a projected growth in demand for electricity of 4,000 MW from its customers by 2017.

The Virginia Department of Environmental Quality issued the necessary air permits following the unanimous approval June 25 by the State Air Pollution Control Board. The Virginia State Corporation Commission approved the $1.8 billion project on March 31.

The circulating fluidized bed unit will use coal and up to 20% biomass for its fuel. The station will provide nearly 1,000 jobs during construction and require a permanent staff of more than 75 people once it begins operating, the company said.

Dominion Virginia Power is the trade name of Virginia Electric and Power Co., a subsidiary of Dominion Resources Inc.

Attachment 6

SNLi article, June 26, 2008

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Power & Natural Gas - Operations and Strategy

EIF raises financing to build 620-MW Kleen plant in Connecticut

June 26, 2008 2:16 PM ET

By Jay Hodgkins

Energy Investors Funds Group on June 26 said its United States Power Fund II LP and United States Power Fund III LP have raised construction financing for the Kleen Energy Systems LLC power plant in Middletown, Conn., known as Middletown Kleen.

The financing totaled $985 million of senior secured bank loans and a revolving credit facility, the company said. EIF said it is the majority owner of the project, with the balance owned by White Rock Holdings Associates LLC.

Goldman Sachs & Co. acted as joint lead arranger and sole book runner for senior secured loans raised to help finance the construction of the project. The bank loans were rated as investment grade at BBB- by Fitch Ratings, EIF said.

"With this construction financing in place, we're able to build a first-class power plant to serve the people of Connecticut," said William Corvo of Kleen Energy Systems. "This plant will provide clean, economical power to an area in need of new power generation."

Construction of the project began in February and is expected to be completed in mid-2010, EIF said. The project will be operated by Itochu Corp. subsidiary North American Energy Services and will be managed by Power Plant Management Services.

The Kleen plant will be a 620-MW, combined-cycle natural gas-fired facility. The project won a competitive request for proposals process run by the state of Connecticut and has entered into a 15-year capacity agreement with Northeast Utilities subsidiary Connecticut Light and Power Co. for the electricity produced by the plant.

The project has also finalized a multiyear tolling agreement, EIF said.

THE STATE OF NEW HAMPSHIRE
before the
PUBLIC UTILITIES COMMISSION

Public Service Company of New Hampshire
Merrimack Station Scrubber Project
Request for Information

Docket No. DE 08-103

MEMORANDUM OF LAW

Pursuant to the Commission's Secretarial Letter dated August 22, 2008, Public Service Company of New Hampshire ("PSNH" or the "Company") provides this Memorandum of Law concerning the legal mandate placed on the Company by the General Court to install a wet flue gas desulphurization system ("scrubber technology") at PSNH's Merrimack Station in Bow.

On June 8, 2006, "AN ACT relative to the reduction of mercury emissions," 2006 N.H. Laws Chapter 105 (the "Scrubber Law") took effect. By that law, the General Court imposed an unmistakable legislative mandate for PSNH to install and have operational scrubber technology to control mercury emissions at Merrimack Units 1 and 2 no later than July 1, 2013. RSA 125-O:13, I. Three years earlier, in 2003 N.H. Laws, Chapter 21, the legislature had enacted RSA 369-B:3-a. RSA 369-B:3-a authorizes PSNH to modify its generation assets upon a finding that such modifications are "in the public interest of retail customers of PSNH to do so." In its Secretarial Letter, the Commission requested this Memorandum of Law to address "the nature and extent of the Commission's authority relative to the Merrimack Station scrubber project" in light of the statutory requirements contained in RSA 125-O:11, *et seq.*, and RSA 369-B:3-a.

Subject to acknowledged constitutional limitations, the regulation of utilities and the setting of appropriate rates to be charged for public utility products and services is the unique province of the legislature. *Duquesne Light Co. v. Barasch*, 488 U.S. 299, 313 (1989); *The Minnesota Rate Cases*, 230 U.S. 352, 433 (1913); *LUCC v. Public Serv. Co. of N.H.*, 119 N.H. 332, 340 (1979). The Public Utilities Commission ("PUC") derives its authority from powers delegated by the legislature. *Appeal of Richards*, 134 N.H. 148, 158 (1991).

The "nature and extent of the Commission's authority" has been clearly set forth in numerous New Hampshire Supreme Court decisions. *Petition of Boston & Maine Railroad*, 82 N.H. 116 (1925); *State of New Hampshire v. New Hampshire Gas & Electric Co.*, 86 N.H. 16 (1932); *H.P. Welch Co. v. State*, 89 N.H. 428 (1938); *Blair and Savoie v. Manchester Water Works*, 103 N.H. 505 (1961); *State v. New England Telephone & Telegraph Co.*, 103 N.H. 394 (1961); *Appeal of Public Service Co.*, 122 N.H. 1062 (1982). *See also, The Manchester Press Club v. State Liquor Comm'n*, 89 N.H. 442 (1938).

As early as 1925, the Court held:

> ***The public service commission is an agency of limited powers and authority.*** While the legislature may delegate to such an agency certain of its own powers and authority, ***the exercise of such delegation does not extend beyond expressed enactment or its fairly implied inferences.*** The establishment of such an agency is of a special rather than general character, and ***power and authority not granted are withheld.***

Boston & Maine Railroad, id. at 116 (emphases added).

The Court, citing to this 1925 precedent, re-affirmed the limited authority of the PUC in *Appeal of Public Service Co.*:

> The PUC is a creation of the legislature and as such is endowed with ***only*** the powers and authority which are ***expressly granted or fairly implied by statute.*** *Petition of Boston & Maine Railroad,* 82 N.H. 116, 116, 129 A. 880, 880 (1925). ***Consequently, the authority of the PUC...is limited to that specifically delegated or fairly implied by the legislature and may not be derived from other generalized powers of supervision.***

Appeal of Public Service Co., id. at 1066 (emphases added).

Recently, the Commission itself noted these restrictions on its power and authority. In *Re RCC Minnesota, Inc.*, 88 NH PUC 611 (2003), discussing the Commission's authority to regulate cellular carriers, the Commission found:

> The New Hampshire Supreme Court has held that "[t]he PUC is a creation of the legislature and as such is endowed with only the powers and authority which are expressly granted or fairly implied by statute." *Appeal of Public Service Company of New Hampshire,* 122 NH 1062, 1066 (1982). Consequently, ***the Commission must look to its statutory authority to determine whether it has jurisdiction*** over cellular providers. RSA 362:6 expressly states that it does not. A cellular provider is not a public utility, and its "services shall not be subject to the jurisdiction of the public utilities commission pursuant to this title." RSA 362:6. ***We therefore must conclude that the Commission does not have jurisdiction over any cellular carrier because the New Hampshire legislature specifically removed cellular carriers from the jurisdiction of this Commission.***

Re RCC Minnesota, Inc., at 615 (emphases added). *See also, Re Congestion on the Telephone Network Caused by Internet Traffic,* 89 NH PUC 173, 175 (2004) ("It is a well-established principle that this Commission possesses only those powers that are granted to it by the legislature.")

These precedents clearly and consistently note that "the regulation of utilities...is the unique province of the legislature"; the Commission "derives its authority from powers delegated by the legislature"; "[t]he...commission is an agency of limited powers and authority"; and, "the authority of the PUC...is limited

to that specifically delegated or fairly implied by the legislature and may not be derived from other generalized powers of supervision." These holdings detail the limits of the Commission's authority and form the bases for any discussion concerning the nature and extent of the Commission's authority relative to the Merrimack Station scrubber project.

The Scrubber Law, codified at RSA 125-O:11 through 125-O:18, is clear, straightforward, and unambiguous in its mandate, as set forth in the first words of the statute:

> ***Statement of Purpose and Findings. The general court finds that:***
>
> ***I. It is in the public interest to achieve significant reductions in mercury emissions at the coal-burning electric power plants in the state as soon as possible.*** The requirements of this subdivision will prevent, at a minimum, 80 percent of the aggregated mercury content of the coal burned at these plants from being emitted into the air by no later than the year 2013. ***To accomplish this objective, the best known commercially available technology shall be installed at Merrimack Station no later than July 1, 2013.***

RSA 125-O:11, I (emphases added).

The General Court provided unequivocal notice of the Scrubber Law's intent in eight such findings in the law's ***Statement of Purpose and Findings***:

> I. ***It is in the public interest to achieve significant reductions in mercury emissions at the coal-burning electric power plants in the state as soon as possible.*** The requirements of this subdivision will prevent, at a minimum, 80 percent of the aggregated mercury content of the coal burned at these plants from being emitted into the air by no later than the year 2013. ***To accomplish this objective, the best known commercially available technology shall be installed at Merrimack Station no later than July 1, 2013.***
>
> II. ***The department of environmental services has determined that the best known commercially available technology is a wet flue gas desulphurization system, hereafter "scrubber***

technology," as it best balances the procurement, installation, operation, and plant efficiency costs with the projected reductions in mercury and other pollutants from the flue gas streams of Merrimack Units 1 and 2. Scrubber technology achieves significant emissions reduction benefits, including but not limited to, cost effective reductions in sulfur dioxide, sulfur trioxide, small particulate matter, and improved visibility (regional haze).

III. ***After scrubber technology is installed at Merrimack Station,*** and after a period of operation has reliably established a consistent level of mercury removal at or greater than 80 percent, the department will ensure through monitoring that that level of mercury removal is sustained, consistent with the proven operational capability of the system at Merrimack Station.

IV. To ensure that an ongoing and steadfast effort is made to implement practicable technological or operational solutions to achieve significant mercury reductions prior to the construction and operation of the scrubber technology at Merrimack Station, the owner of the affected coal-burning sources shall work to bring about such early reductions and shall be provided incentives to do so.

V. ***The installation of scrubber technology will not only reduce mercury emissions significantly but will do so without jeopardizing electric reliability and with reasonable costs to consumers.***

VI. ***The installation of such technology is in the public interest of the citizens of New Hampshire and the customers of the affected sources.***

VII. Notwithstanding the provisions of RSA 125-O:1, VI, the purchase of mercury credits or allowances to comply with the mercury reduction requirements of this subdivision or the sale of mercury credits or allowances earned under this subdivision is not in the public interest.

VIII. ***The mercury reduction requirements set forth in this subdivision represent a careful, thoughtful balancing of cost, benefits, and technological feasibility and therefore the requirements shall be viewed as an integrated strategy of non-severable components.***

RSA 125-O:11 (emphases added).

The Scrubber Law's mandate that a scrubber shall be installed at Merrimack Station is detailed in the statutory provisions contained in its "Statement of Purpose

and Findings." In RSA 125-O:13, I, the General Court unequivocally requires PSNH to install a scrubber at Merrimack Station within a set timeframe:

> I. ***The owner [PSNH] shall install and have operational scrubber technology to control mercury emissions at Merrimack Units 1 and 2 no later than July 1, 2013. The achievement of this requirement is contingent upon obtaining all necessary permits and approvals from federal, state, and local regulatory agencies and bodies; however, all such regulatory agencies and bodies are encouraged to give due consideration to the general court's finding that the installation and operation of scrubber technology at Merrimack Station is in the public interest.*** The owner shall make appropriate initial filings with the department and the public utilities commission, if applicable, within one year of the effective date of this section, and with any other applicable regulatory agency or body in a timely manner.

(Emphasis added).

The General Court could not be clearer regarding the purpose and intent of the Scrubber Law. ***PSNH shall install a scrubber at Merrimack Station as soon as possible.*** This mandate is binding not just on PSNH, but also on the Commission. As noted earlier, "the authority of the PUC...is limited to that specifically delegated or fairly implied by the legislature and may not be derived from other generalized powers of supervision." *Appeal of Public Service Co., supra,* 122 N.H. at 1066. In the Scrubber Law, the General Court has:

I. Found that "It is in the public interest to achieve significant reductions in mercury emissions at the coal-burning electric power plants in the state as soon as possible."

II. Mandated that scrubber "technology shall be installed at Merrimack Station no later than July 1, 2013."

III. Found that "the best known commercially available technology is a wet flue gas desulphurization system, hereafter 'scrubber technology,' as it best balances the procurement, installation, operation, and plant efficiency costs with the projected reductions in mercury and other pollutants from the flue gas streams of Merrimack Units 1 and 2."

IV. Found that "Scrubber technology achieves significant emissions reduction benefits, including but not limited to, cost effective reductions in sulfur dioxide, sulfur trioxide, small particulate matter, and improved visibility (regional haze)."

V. Found that "The installation of scrubber technology will not only reduce mercury emissions significantly but will do so without jeopardizing electric reliability and with reasonable costs to consumers."

VI. Found that "The installation of such technology is in the public interest of the citizens of New Hampshire and the customers of the affected sources."

VII. And declared that "The mercury reduction requirements set forth in this subdivision represent a careful, thoughtful balancing of cost, benefits, and technological feasibility and therefore the requirements shall be viewed as an integrated strategy of non-severable components."

The Scrubber Law does not delegate authority to the Commission to second-guess the mandates and findings of the General Court. There is absolutely no implication within the Scrubber Law that the mandate to install a scrubber at Merrimack Station as soon as possible can be delayed, conditioned, or eliminated in its entirety, by the Commission.

Interpretation of the Scrubber Law is not difficult. Just a few days ago, the Supreme Court issued its most recent holdings on statutory interpretation:

> We are the final arbiters of the legislative intent as expressed in the words of the statute considered as a whole. *State v. Langill*, 157 N.H. ___, ___ (decided April 4, 2008). We begin by examining the language of the statute, *State v. Whittey*, 149 N.H. 463, 467 (2003), and ascribe the plain and ordinary meaning to the words used, *Langill*, 157 N.H. at ___. We interpret legislative intent from the statute as written and will not consider what the legislature might have said or add language that the legislature did not see fit to include. *Id.* We also interpret a statute in the context of the overall statutory scheme and not in isolation. *Id.* If a statute is ambiguous, however, we consider legislative history to aid our analysis. *Whittey*, 149 N.H. at 467. Our goal is to apply statutes in light of the legislature's intent in enacting

> them, and in light of the policy sought to be advanced by the entire statutory scheme. *Id.*

State v. Dansereau, ___ N.H. ___ (August 15, 2008, *slip op.* at 2); *See also, Oulette v. Town of Kingston*, ___ N.H. ___ (August 15, 2008, *slip op.).*

In the case of the Scrubber Law, the overall statutory scheme includes not just the contents of 2006 N.H. Laws 105, but the entirety of RSA Chapter 125-O, the state's Multiple Pollution Reduction Program. Enacted during the 2002 legislative session as "AN ACT relative to additional emissions reductions from existing fossil fuel burning steam electric power plants," (2002 N.H. Laws, Chapter 130), RSA 125-O:1 contains additional findings by the General Court that are part of the overall statutory scheme leading to the Scrubber Law. The Legislature's findings include: a finding that "scientific advances have demonstrated that adequate protection of public health, environmental quality, and economic well-being - the 3 cornerstones of New Hampshire's quality of life - requires additional, concerted reductions in air pollutant emissions." RSA 125-O:1, I; a finding "that protecting New Hampshire's high quality-of-life environment by reducing air pollutant emissions returns substantial economic benefit to the state through avoided health care costs; greater tourism resulting from healthier lakes and improved vistas; more visits by fishermen, hunters, and wildlife viewers to wildlife ecosystems, and a more productive forest and agricultural sector." RSA 125-O:1, IV; a finding "that aggressive further reductions in emissions of sulfur dioxide (SO2), oxides of nitrogen (NOx), mercury, and carbon dioxide (CO2) must be pursued." RSA 125-O:1, III; and, a finding "that substantial additional reductions in emissions of SO2, NOx, mercury, and CO2 must be required of New Hampshire's existing fossil fuel burning steam electric power plants.." RSA 125-O:1, V.

When viewed with the Supreme Court's stated goal of applying statutes in light of the legislature's intent in enacting them, and in light of the policy sought to be advanced by the entire statutory scheme, there is no doubt what was intended by passage of the Scrubber Law. The public interest findings of the General Court in RSA 125-O:1 overwhelmingly dictate the policy objectives; the Scrubber Law was intended to expeditiously implement these objectives via installation of the scrubber as quickly as possible.

The language of the Scrubber Law is clear. Ascribing the "plain and ordinary meaning to the words used" in the Scrubber Law leaves no doubt that the General Court has mandated installation of a scrubber at Merrimack Station as soon as possible. The intent of the Scrubber Law is obvious and apparent from the statute as written. The overall statutory scheme and the policy sought to be advanced is obvious and unwaivering: "The mercury reduction requirements set forth in this subdivision represent a careful, thoughtful balancing of cost, benefits, and technological feasibility and therefore the requirements shall be viewed as an integrated strategy of non-severable components."

The Supreme Court has also discussed the importance of the General Court's use of the word "shall," as used in the Scrubber Law. (A scrubber "***shall*** be installed at Merrimack Station no later than July 1, 2013." RSA 125-O:11, I. The requirements of the Scrubber Law "***shall*** be viewed as an integrated strategy of non-severable components." RSA 125-O:11, VIII. "The owner ***shall*** install and have operational scrubber technology to control mercury emissions at Merrimack Units 1 and 2 no later than July 1, 2013." RSA 125-O:13, I. "Total mercury emissions from the affected sources ***shall*** be at least 80 percent less on an annual basis than the

baseline mercury input, as defined in RSA 125-O:12, III, beginning on July 1, 2013." RSA 125-O:13, II. In *State v. Johanson*, 156 N.H. 148, 151 (2007), the Court noted:

> "The use of the word 'shall' is generally regarded as a command; although not controlling, it is significant as indicating the intent that the statute is mandatory. This is especially so where the purpose of the statute is to protect private rights." *McCarthy v. Wheeler*, 152 N.H. 643, 645, 886 A.2d 972 (2005).

Similarly, in *City of Rochester v. Corpening*, 153 N.H. 571, 574 (2006) the Court held:

> "The intention of the Legislature as to the mandatory or directory nature of a particular statutory provision is determined primarily from the language thereof." *Appeal of Rowan*, 142 N.H. 67, 71, 694 A.2d 1002 (1997) (quotation and citation omitted). The general rule of statutory construction is that "the word 'may' makes enforcement of a statute permissive and that the word 'shall' requires mandatory enforcement." *Town of Nottingham v. Harvey*, 120 N.H. 889, 895, 424 A.2d 1125 (1980).

As recently as July 25th of this year, the Supreme Court reiterated this principle of statutory construction. Discussing the Legislature's use of the word "shall" in RSA 402-C:34, the Court cited to *Rowan, supra,* and held that "having used the word 'shall,' the legislature is presumed to have intended setoff under RSA 402-C:34 to be mandatory rather than discretionary." *In the Matter of the Liquidation of The Home Insurance Company*, ___ N.H. ___, *slip op. at* 10 (July 25, 2008).

The use of the word "shall" in the Scrubber Law emphasizes the Legislature's intent that installation of a scrubber at Merrimack Station is "commanded" and is "mandatory." Indeed, within the Scrubber Law, the General Court used the word "shall" sixty times! There can be no doubt of the mandatory and unequivocal direction expressed in the Scrubber Law.

When the Scrubber Law is analyzed using the Supreme Court's statutory interpretation rules, the General Court's meaning, intent, and command is clear. If there was any ambiguity, which there is not, the Court has indicated that legislative history would be used to aid in the statute's analysis. The Scrubber Law's legislative history is equally clear and unambiguous:

> SCIENCE, TECHNOLOGY AND ENERGY
>
> HB 1673-FN, relative to the reduction of mercury emissions.
>
> MAJORITY: OUGHT TO PASS WITH AMENDMENT. MINORITY: OUGHT TO PASS WITH AMENDMENT.
>
> Rep. Roy D. Maxfield for the Majority of Science, Technology and Energy: ***This bill provides for at least an 80% reduction of mercury emissions from coal-fired power plants by requiring the installation of a scrubber technology no later than July 1, 2013 and provides economic incentives for earlier installation timeframes and greater reduction in emissions.*** The committee amendment provides for annual progress reports from Public Service of New Hampshire (PSNH) and also cost recovery language. ***This legislation is a result of months of collaborative work by PSNH, the Department of Environmental Services, the Governor's office, multiple environmental groups, members of the committee and other stakeholders.*** The scrubber technology not only will reduce mercury by at least 80%, it will dramatically reduce SO2 emissions. ***Our committee held multiple work sessions and all had an opportunity to present their views.*** A comprehensive review of the timeframe was conducted by two members of the committee who concluded that the 2013 date is appropriate. ***It is in the best interests of PSNH to achieve early reductions for mercury*** and they are proceeding with a US Department of Energy (DOE) grant to accomplish this objective. ***This bill has consensus support from the Governor and stakeholders, and has wide bipartisan support in the General Court. The bill achieves the primary objectives of reasonable reductions, in a reasonable timeframe, at a reasonable cost to electricity users.*** Vote 13-2.
>
> Rep. Gene F. Andersen for the Minority of Science, Technology and Energy: ***The bill provides for significant mercury reductions from facilities operated by Public Service of New Hampshire (PSNH) by 2013.*** Some testimony indicated that an optimal permit

> and construction schedule could provide a 2011 completion for mercury removal equipment; thereby providing the necessary and desired reductions of mercury and other pollutants during that two year period. ***The minority felt the 2011 date should be utilized for implementation of the mercury reduction requirement*** and provide for extensions beyond that date if and only if PSNH was unable to complete by 2011 due to circumstance beyond its control.

House Calendar, Vol. 28, No. 22, February 17, 2008, p. 1280 (emphases added).

Moreover, the Analysis accompanying the Scrubber Law reads:

> ANALYSIS
>
> This bill provides for an 80 percent reduction of mercury emissions from coal-burning power plants by requiring the installation of scrubber technology no later than July 1, 2013 and provides economic incentives for earlier installation and greater reductions in emissions.

2006 N.H. Laws, Chapter 105.

The Scrubber Law's legislative history and Analysis echo the mandates found in the plain language of the law itself - - the bill requires the installation of scrubber technology no later than July 1, 2013. The only difference of opinion between the legislative majority and minority was on the schedule for the mandated installation of the scrubber - - the minority wanted the scrubber installed earlier - - a goal that is being materially hindered by the Commission's creation of this docket.

The Secretarial Letter states that there is "a potential conflict between" the Scrubber Law and RSA 369-B:3-a. PSNH finds no such conflict. The Scrubber Law uses plain and ordinary words which mandate that a scrubber "shall be installed at Merrimack Station no later than July 1, 2013." RSA 369-B:3-a, enacted during the 2003 legislative session, reads:

> 369-B:3-a Divestiture of PSNH Generation Assets. The sale of PSNH fossil and hydro generation assets shall not take place before April 30, 2006. Notwithstanding RSA 374:30, subsequent to April 30, 2006, PSNH may divest its generation assets if the commission finds that it is in the economic interest of retail customers of PSNH to do so, and

> provides for the cost recovery of such divestiture. ***Prior to any divestiture of its generation assets, PSNH may modify or retire such generation assets if the commission finds that it is in the public interest of retail customers of PSNH to do so***, and provides for the cost recovery of such modification or retirement.

(Emphasis added).

The "potential conflict" noted in the Secretarial Letter appears to be whether PSNH is required to obtain a Commission finding under RSA 369-B:3-a that the modification of Merrimack Station by the installation of a scrubber "is in the public interest of retail customers of PSNH" before such installation may proceed. As noted in *Appeal of Pinetree Power, Inc.*, 152 N.H. 92, 97 (2005), "By the plain language of the statute [RSA 369-B:3-a], the public interest standard for modification is broader than just economic interests." The General Court has weighed and ruled on the broader public interest and found that the Scrubber Law's requirements "represent a careful, thoughtful balancing of cost, benefits, and technological feasibility...." RSA 125-O:11, VIII.

Due to the mandatory language and express findings of the General Court contained in the Scrubber Law, there is no need nor authority for the Commission to render an additional and duplicative public interest finding under RSA 369-B:3-a prior to the installation of the scrubber. Any such proceeding under RSA 369-B:3-a would be held to determine only one thing - - whether it is "in the public interest of retail customers of PSNH" to modify Merrimack Station by installation of a scrubber. ***That precise finding has already been made by the General Court*** - - "The installation of [scrubber] technology is in the public interest of the citizens of New Hampshire and the customers of the affected sources." RSA 125-O:11, VI. As the General Court has already made the requisite RSA 369-B:3-a finding, the

Commission lacks authority to contravene this Legislative finding and there is no need for a separate and redundant Commission finding. Such a reading of the law is consistent with General Court's express statements of purpose and findings contained in the Scrubber Law. Statutes are to be interpreted "not in isolation, but in the context of the overall statutory scheme." *State v. Farrow,* 140 N.H. 473, 475 (1995); *Appeal of Ashland Elec. Dept.*, 141 N.H. 336, 340 (1996); *Pinetree Power, id.* at 96.

By finding that "The installation of [scrubber] technology is in the public interest of...the customers of [PSNH]," the General Court has removed from the Commission any authority to reach a contrary finding. Recall, "the authority of the PUC...is limited to that specifically delegated or fairly implied by the legislature and may not be derived from other generalized powers of supervision." *Appeal of Public Service Co., id.* The General Court has not delegated authority to the Commission to determine whether installing a scrubber at Merrimack Station is in the public interest, nor is such authority fairly implied. That public interest finding has been made, and is clearly and definitively embodied in the law.

It should be noted that two of the sponsors of the Scrubber Law were also sponsors of 2003 N.H. Laws, Chapter 21, the law creating RSA 369-B:3-a. Senators Green and Odell both sponsored Senate Bill 170 during the 2003 legislative session and House Bill 1673-FN during the 2006 legislative session. It is inconceivable that these two Senators would sponsor legislation in 2006 finding that installation of scrubber technology at Merrimack Station is in the public interest of PSNH's customers (the precise finding required in their earlier 2003 law), yet would delegate to the Commission the authority and duty to make (or contradict) that same finding.

Any other reading of the interplay between the Scrubber Law and RSA 369-B:3-a would create the very conflict implied in the Secretarial Letter. In the event that there was a conflict between two statutes, the Supreme Court has held:

> When a conflict exists between two statutes, the later statute will control, especially when the later statute deals with a subject in a specific way and the earlier enactment treats that subject in a general fashion. 2A C. D. Sands, Sutherland Statutes and Statutory Construction § 51.05 (4th ed. 1973). However, as we noted in *Ingersoll v. Williams*, 118 N.H. 135, 138, 383 A.2d 1119, 1121 (1978), decided this day, implied repeal of former statutes is a disfavored doctrine in this State. *See also State v. Miller*, 115 N.H. 662, 348 A.2d 345 (1975); *Opinion of the Justices*, 107 N.H. 325, 221 A.2d 255 (1966). The party arguing a repeal by implication must demonstrate it by evidence of convincing force. *Opinion of the Justices, id.* at 328, 221 A.2d at 257. If any reasonable construction of the two statutes taken together can be found, this court will not find that there has been an implied repeal. *State v. Miller supra; Public Serv. Co. v. Lovejoy Granite Co.*, 114 N.H. 630, 325 A.2d 785 (1974).

Board of Selectmen of Merrimack v. Planning Board of Merrimack, 118 N.H. 150 (1978).

More recently the Court re-affirmed this principle:

> "It is a well-recognized rule of statutory construction that where one statute deals with a subject in general terms, and another deals with a part of the same subject in a more detailed way, the latter will be regarded as an exception to the general enactment where the two conflict." *State v. Bell*, 125 N.H. 425, 432, 480 A.2d 906 (1984). We also note that RSA 161:4, VI was enacted in 1991, while RSA chapter 151-E was enacted in 1998. "When a conflict exists between two statutes, the later statute will control, especially when the later statute deals with a subject in a specific way and the earlier enactment treats that subject in a general fashion." *Petition of Public Serv. Co. of N.H.*, 130 N.H. 265, 283, 539 A.2d 263 (1988) (quotations omitted), appeal dismissed, 488 U.S. 1035, 109 S. Ct. 858, 102 L. Ed. 2d 983 (1989).

Bel Air Associates v. Dept. of Health and Human Services, 154 N.H. 228, 233 (2006).

Of the two laws in question, the Scrubber Law is the later statute, enacted during the 2006 legislative session versus the 2003 enactment for RSA 369-B:3-a. In addition, RSA 369-B:3-a deals with undefined, potential modifications of PSNH's

generation assets in a general way. The Scrubber Law contains specific findings and mandates. In accordance with the Court's holding in *Bel Air Associates*, the explicit directions provided in the Scrubber Law must be regarded as controlling over the general RSA 369-B:3-a enactment.

The instant situation is similar to the facts facing the Supreme Court in *Petition of Public Service Co. of N.H.*, 130 N.H. 265 (1988), cited in *Bel Air, supra.* In *Petition of Public Service Co. of N.H.*, the Court dealt with the power of the Commission to grant PSNH an emergency rate increase per RSA 378:9 during the construction of the Seabrook nuclear plant despite the enactment of the so-called "anti-CWIP" law, RSA 378:30-a. The Court noted that the emergency rate statute "grants the commission broad discretionary powers." *Petition of PSNH* at 283. "The anti-CWIP statute, on the other hand, restricts the commission's discretionary powers in the ratemaking process." *Id.* The Court then held:

> The one statute grants the commission general ratemaking powers under emergencies, and the other, enacted after the first, restricts the commission's discretion when determining rates. "When a conflict exists between two statutes, the later statute will control, especially when the later statute deals with a subject in a specific way and the earlier enactment treats that subject in a general fashion." *Board of Selectmen v. Planning Bd.*, 118 N.H. 150, 152, 383 A.2d 1122, 1124 (1978). RSA 378:30-a was enacted after the emergency statute. The anti-CWIP statute is unconditional in its prohibition, and makes no exceptions for emergencies.

Id.

Once again, PSNH faces a situation involving the enactment of a more recent, specific statute and an older statute of general application. Like the anti-CWIP law, the Scrubber Law, enacted after RSA 369-B:3-a, restricts the Commission's discretion. It also deals with the subject of modifying Merrimack

Station by the installation of a scrubber in a specific way, versus the general supervisory authority found in the earlier statute. Under the Court's holding in *Petition of PSNH*, the Scrubber Law's mandate for the installation of a scrubber at Merrimack Station and finding of such action to be in the public interest are controlling and binding upon the Commission.

The legislative mandates contained in the Scrubber Law are made even more apparent when the Scrubber Law is compared to the language in RSA Chapter 362-C, "Reorganization of Public Service Company of New Hampshire." As in the Scrubber Law, RSA Chapter 362-C begins with a legislative "Declaration of Purpose and Findings." RSA 362-C:1. Notably, the RSA 362-C:1 findings include a grant of authority to the Commission:

> ...the public utilities commission should be authorized to determine whether a proposed agreement relating to the reorganization of Public Service Company of New Hampshire and, upon receipt of required regulatory approvals, the acquisition of Public Service Company of New Hampshire by Northeast Utilities, would be consistent with the public good and whether the rates for electric service to be established in connection with the reorganization are just and reasonable and should be approved.

RSA 362-C:1, IV. In RSA Chapter 362-C, the General Court specifically delegated authority to the Commission to make a determination whether the cited agreement "would be consistent with the public good." RSA 362-C:3. In the Scrubber Law, no such delegation of authority to the Commission is included; the General Court itself has determined that installation of a scrubber "is in the public interest of the citizens of New Hampshire and the customers of the affected sources." Had the Legislature intended to delegate such authority to the Commission, it certainly knew how to do so, as it had done in the past in RSA Chapter 362-C for another

matter involving the Commission's regulatory authority concerning PSNH. *See also, Cannata v. Town of Deerfield*, 132 N.H. 235, 243 (1989) (...the legislature knew how to include real property in a definition when it intended to do so.); *Barry v. Amherst*, 121 N.H. 335, 339 (1981) (The express language of RSA 36:23 (Supp. 1979) demonstrates that the legislature knew how to provide for automatic approval when that was its intention.).

PSNH notes that in a recent e-mail, the Commission's former general counsel, citing to RSA 125-O:13, I, indicated that the General Court's findings in the Scrubber Law were not binding upon the Commission, but were only to be afforded "due consideration." The complete wording of RSA 125-O:13, I, reads:

> I. The owner shall install and have operational scrubber technology to control mercury emissions at Merrimack Units 1 and 2 no later than July 1, 2013. The achievement of this requirement is contingent upon obtaining ***all necessary permits and approvals*** from federal, state, and local regulatory agencies and bodies; however, ***all such regulatory agencies and bodies are encouraged to give due consideration to the general court's finding that the installation and operation of scrubber technology at Merrimack Station is in the public interest. The owner shall make appropriate initial filings with the department and the public utilities commission, if applicable***, within one year of the effective date of this section, and with any other applicable regulatory agency or body in a timely manner.

For all the reasons set forth earlier, the Scrubber Law eliminates any need for a Commission determination under RSA 369-B:3-a; it is just not applicable and is not a necessary approval. Indeed, the creation of any such proceeding before the Commission (including the instant proceeding) would frustrate the General Court's specific finding that "It is in the public interest to achieve significant reductions in mercury emissions at the coal-burning electric power plants in the state as soon as possible." RSA 125-O:13, I. Any delays in the project will cause increases in the

ultimate price tag to be borne by PSNH's customers as costs of materials and labor continue to escalate, AFUDC continues to accrue, and the possibility to achieve early emissions reduction credits under RSA 125-O:16 evaporates. In the only other proceeding held under RSA 369-B:3-a, a total of 16 months elapsed between PSNH's initial filing and the achievement of a final, unappealable decision. NHPUC Docket No. DE 03-166, *PSNH Petition for Authority to Modify Schiller Station; Pinetree Power, id.* It is inconceivable that the General Court intended to subject the scrubber project to delays arising from a similar proceeding, given the "significant emissions reduction benefits, including but not limited to, cost effective reductions in sulfur dioxide, sulfur trioxide, small particulate matter, and improved visibility (regional haze)" (RSA 125-O:11, II) and incentives (that would benefit PSNH's retail customers) provided for early completion of the scrubber (RSA 125-O:16).

Notwithstanding the clarity of the mandate and intent of the Scrubber Law, if any ambiguity in the meaning of RSA 125-O:13, I, remained, the principles of statutory construction established by the Supreme Court, *supra*, would be applied. Recall the Court's direction in *Dansereau, supra*:

> We also interpret a statute in the context of the overall statutory scheme and not in isolation. If a statute is ambiguous, however, we consider legislative history to aid our analysis. Our goal is to apply statutes in light of the legislature's intent in enacting them, and in light of the policy sought to be advanced by the entire statutory scheme.

(Internal citations omitted).

The "overall statutory scheme" set forth in RSA 125-O:13, "Compliance," is clear, when these remaining provisions of that section are considered:

I. ***The owner shall install and have operational scrubber technology*** to control mercury emissions at Merrimack Units 1 and 2 ***no later than July 1, 2013.***

II. ***Total mercury emissions from the affected sources shall be at least 80 percent less*** on an annual basis than the baseline mercury input, as defined in RSA 125-O:12, III, beginning on July 1, 2013.

IV. If the net power output (as measured in megawatts) from Merrimack Station is reduced, ***due to the power consumption requirements or operational inefficiencies of the installed scrubber technology,*** the owner may invest in capital improvements at Merrimack Station that increase its net capability...

V. Mercury reductions achieved ***through the operation of the scrubber technology*** greater than 80 percent shall be sustained insofar as the proven operational capability of the system, as installed, allows.

VI. The purchase of mercury emissions allowances or credits from any established emissions allowance or credit program shall not be allowed for compliance with ***the mercury reduction requirements of this chapter.***

VII. If the mercury reduction requirement of paragraph II is not achieved in any year after the July 1, 2013 implementation date, and ***after full operation of the scrubber technology,....***

VIII. If the mercury reduction requirement of paragraph II is not achieved by the owner in any year after the July 1, 2013 implementation date ***despite the owner's installation and full operation of scrubber technology....***

IX. The owner shall report by June 30, 2007 and annually thereafter, to the legislative oversight committee on electric utility restructuring, established under RSA 374-F:5, and the chairpersons of the house science, technology and energy committee and the senate energy and economic development committee, on ***the progress and status of complying with the requirements of paragraphs I and III, relative to achieving early reductions in mercury emissions and also installing and operating the scrubber technology including any updated cost information.*** The last report required shall be after the department has made a determination, under paragraph V, on the maximum sustainable rate of mercury emissions reductions ***by the scrubber technology.***

RSA 125-O:13 (emphases added).

There can be no mistake that in enacting the Scrubber Law the Legislature intended that scrubber technology ***shall*** be installed at Merrimack Station. Without installation of the scrubber, the entirety of RSA 125-O:13 is made ineffective, as the provisions contained therein all anticipate and are based upon the mandated scrubber installation. Since the "goal is to apply statutes in light of the legislature's intent in enacting them, and in light of the policy sought to be advanced by the entire statutory scheme," (*Dansereau, id.*), there can be no doubt regarding the meaning of the Scrubber Law.

The "necessary permits and approvals" referenced in RSA 125-O:13, I, do not include a proceeding under RSA 369-B:3-a. Examples of such "necessary permits and approvals" include zoning laws, building permits, Federal Aviation Administration approvals, environmental permits, and the like, all of which PSNH is in the process of obtaining in a timely manner. The mandate to install a scrubber, and the General Court's finding that such installation is in the public interest of PSNH's retail customers, does not dictate ***how*** the scrubber is installed, just that it ***must*** be installed. PSNH is still required to ensure that the scrubber design meets traditional safety, environmental, and other building standards. *Cf.*, RSA 674:30, which provides that a public utility "may petition the public utilities commission to be exempted from the operation of any local ordinance, code, or regulation enacted under this title [LXIV]." RSA 674:30, III. This statute continues "The public utilities commission, following a public hearing, ***may*** grant such an exemption if it decides that the present or proposed situation of the structure in question is reasonably necessary for the convenience or welfare of the public...." *Id.* Note that

the Legislature made such a grant of exemption permissive, by use of the word "may" instead of "shall" - - it is such determinations to which "regulatory agencies and bodies are encouraged to give due consideration to the general court's finding that the installation and operation of scrubber technology at Merrimack Station is in the public interest."

The nature and extent of the Commission's authority concerning the scrubber project is set forth in the Scrubber Law itself. RSA 125-O:18, "Cost Recovery" states in part, "If the owner is a regulated utility, the owner shall be allowed to recover all prudent costs of complying with the requirements of this subdivision in a manner approved by the public utilities commission." The section continues by specifying that during ownership and operation of Merrimack Station by PSNH, "such costs shall be recovered via the utility's default service charge." By this section, the General Court has clearly established the Commission's role and authority regarding the scrubber project. When the scrubber project is completed, the Commission has the authority to review the prudence of PSNH's design and installation of the scrubber. The Commission does not have the authority to second-guess the General Court's decision mandating the installation of the scrubber.

Until the scrubber project is finished, the General Court has reserved to itself the power and authority to oversee the project. This reservation of authority is found in RSA 125-O-13, IX:

> The owner shall report by June 30, 2007 and annually thereafter, to the legislative oversight committee on electric utility restructuring, established under RSA 374-F:5, and the chairpersons of the house science, technology and energy committee and the senate energy and economic development committee, on the progress and status of complying with the requirements of paragraphs I and III, relative to achieving early reductions in mercury emissions and also installing

> and operating the scrubber technology including any updated cost information. The last report required shall be after the department has made a determination, under paragraph V, on the maximum sustainable rate of mercury emissions reductions by the scrubber technology.

Such a reservation of authority by the General Court concerning the progress, status, and cost of complying with the Scrubber Law is yet another clear indication of the law's intent to negate the need for a RSA 369-B:3-a proceeding in this matter.

PSNH is confident that up to the initiation of the instant proceeding, it was diligently pursuing and complying with the legal mandates contained in 2006 N.H. Laws, Chapter 105, the Scrubber Law, by moving forward rapidly with the installation of scrubber technology at Merrimack Station. The legal mandates and requirements of the statute are set forth in plain and ordinary language, clearly expressing the legislature's intent and the policy sought to be advanced by the entire statutory scheme. This statutory scheme limits the powers and authority of the Commission concerning the installation of scrubber technology at Merrimack Station to a determination of the manner for the recovery of all prudent costs of complying with the requirements of this law.

PSNH urges the Commission to expeditiously act in this inquiry so that the Company may resume the commitment of capital and manpower necessary to install a wet flue gas desulphurization system ("scrubber technology," RSA 125-O:12, V) at its Merrimack Station as mandated by law.

Respectfully submitted this 2nd day of September, 2008.

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

By: _____

Robert A. Bersak
Assistant Secretary and Assistant General Counsel
Public Service Company of New Hampshire
780 N. Commercial Street
Manchester, NH 03101-1134

603-634-3355
Bersara@PSNH.com

CERTIFICATE OF SERVICE

I certify that on this date I caused the attached Memorandum of Law to be served pursuant to N.H. Code Admin. Rule Puc 203.11.

September 2, 2008

THE STATE OF NEW HAMPSHIRE
before the
PUBLIC UTILITIES COMMISSION

Public Service Company of New Hampshire
Merrimack Station Scrubber Project
Request for Information

Docket No. DE 08-103

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE'S MOTION FOR PROTECTIVE ORDER RE: BID AND CONTRACT INFORMATION

Pursuant to RSA 91-A:5,(IV)(Supp.) and N.H. Code Admin. Rules Puc § 203.08, Public Service Company of New Hampshire ("PSNH" or the "Company") hereby requests protective treatment for certain information requested in the Commission's Secretarial Letter of August 22, 2008. In that letter the Commission requested that PSNH supply, *inter alia,* "a comprehensive status report on its installation plans, a detailed cost estimate for the project, and an analysis of the effect on energy service rates if Merrimack Station were not in the mix of fossil and hydro facilities operated by PSNH." A portion of this information is confidential, commercial, or financial information exempted from public disclosure under RSA 91-A:5.

In support of its Motion for Protective Order, PSNH says the following:

1. In order to prepare a comprehensive status report and a detailed cost estimate for the project, PSNH must rely on the results of progress made to date in preparing the different portions of the scrubber project for the commencement of construction efforts. There are several "islands" of work which are being negotiated with bidders before a final contract is executed for each portion of the project. These areas of the project are still in various stages of bidding or negotiations with bidders, contractors and subcontractors. The bids offered have all been made under a strictly confidential request for proposal process in order to protect the information from public disclosure. Even final contract terms and designs have been designated by the bidders and contractors as proprietary and subject to confidentiality terms to be included in the final agreements. Conclusions and summaries of data can be

made publicly available; however, the specific data contains information that is confidential, commercial, or financial information which the Commission may protect from public disclosure under RSA 91-A:5, IV.

2. If this information were to be made public, the contractors' proprietary information would be available to their competitors damaging their future ability to bid competitively on other contracts. Many vendors may withdraw from this project altogether if they cannot rely on customary business practices which include maintaining the confidentiality of contract terms. PSNH may have difficulty in attracting potential contractors in the future if there is a perception that their bids or confidential contract terms will be publicly disclosed.

3. The Commission must use a balancing test in order to weigh the importance of creating an open record of this proceeding with the harm from disclosure of confidential, financial or competitive information. "Under administrative rule Puc 204.06, the Commission considers whether the information, if made public, would likely create a competitive disadvantage for the petitioner; whether the customer information is financially or commercially sensitive, or if released, would likely constitute an invasion of privacy for the customer; and whether the information is not general public knowledge and the company takes measures to prevent its' dissemination." *Re Northern Utilities, Inc.,* 87 NH PUC 321, 322, Docket No. DG 01-182, Order No. 23,970 (May 10, 2002). Contracts with suppliers and confidential bidding information are routinely granted confidential treatment by the Commission. *Unitil Energy Systems,* 91 NH PUC 145, 150 (2006).

4. The limited benefits of publicly disclosing the information requested in the status report on the project's detailed cost estimate do not outweigh the harm done by disclosing the information. The ability to finalize contracts with vendors for this project and future projects may be jeopardized.

WHEREFORE, PSNH respectfully requests the Commission to issue an order preventing the public disclosure of the detailed cost estimate for the project, and to order such further relief as may be just and equitable.

Respectfully submitted this 2nd day of September, 2008.

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

By: 

Robert A. Bersak
Assistant Secretary and Assistant General Counsel
Public Service Company of New Hampshire
780 N. Commercial Street
Manchester, NH 03101-1134

603-634-3355
Bersara@PSNH.com

CERTIFICATE OF SERVICE

I certify that on this date I caused the attached Motion for Protective Order to be served pursuant to N.H. Code Admin. Rule Puc 203.11.

September 2, 2008

ROBERT BERSAK
PUBLIC SVC OF NEW HAMPSHIRE
780 N COMMERCIAL ST
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MEREDITH A HATFIELD
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CONCORD NH 03301-2429

Docket #: 08-103-1 Printed: September 02, 2008

FILING INSTRUCTIONS: **PURSUANT TO N.H. ADMIN RULE PUC 203.02(a)(1)**

WITH THE EXCEPTION OF DISCOVERY, FILE 7 COPIES (INCLUDING COVER LETTER) WITH:

DEBRA A HOWLAND
EXEC DIRECTOR & SECRETARY
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

PURSUANT TO N.H. ADMIN RULE 203.09 (d), FILE DISCOVERY

DIRECTLY WITH THE FOLLOWING STAFF

RATHER THAN WITH THE EXECUTIVE DIRECTOR

LIBRARIAN
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

BULK MATERIALS:

Upon request, Staff may waive receipt of some of its multiple copies of bulk materials filed as data responses. Staff cannot waive other parties' right to receive bulk materials.

NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

AMANDA NOONAN
CONSUMER AFFAIRS DIRECTOR
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

Docket #:
Printed: 9/2/2008

DE 08-103

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Summary Cost Estimate
Merrimack Station Clean Air Project
(Cost in Actual Year $*)

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	Total - Prior to 2007	Total 2007	Actual Jan-Apr 2008	Estimated May-Dec 2008	Total 2008	Total 2009	Total 2010	Total 2011	Total 2012	Total 2013	Total (Proj)
NU Labor	71,567	318,675	206,306	772,508	978,814	1,207,955	1,402,400	1,670,000	1,060,000	0	6,709,411
Material	0	7,995	19,954	1,130,000	1,149,954	11,400,000	18,720,000	2,040,000	750,000	0	34,067,949
Contractor Labor											
Owner Costs	12,564	230,330	840,567	1,971,514	2,812,081	4,445,000	3,493,200	1,981,500	510,000	0	13,484,675
URS - Indirect Costs **	0	957,071	3,206,048	7,000,000	10,206,048	20,000,000	20,000,000	16,000,000	7,500,000	0	74,663,119
URS - FGD System	0	0	0	10,005,486	10,005,486	14,007,680	42,023,041	24,013,116	10,005,486	0	100,054,809
URS - Chimney System	0	0	0	1,308,330	1,308,330	6,541,650	3,924,990	0	1,308,330	0	13,083,300
URS - Material Handling System	0	0	0	4,482,875	4,482,875	7,172,600	20,621,225	8,069,175	4,482,875	0	44,828,750
URS - Wastewater Treatment System	0	0	0	1,500,000	1,500,000	1,200,000	8,100,000	2,700,000	1,500,000	0	15,000,000
URS - Balance of Plant	0	0	49,830	5,700,000	5,749,830	23,800,000	25,300,000	9,800,000	3,300,000	0	67,949,830
Subtotal Contractor Labor	12,564	1,187,401	4,096,445	31,968,205	36,064,650	77,166,930	123,462,456	62,563,791	28,606,691	0	329,064,483
Outside Services	728,889	228,755	274,340	495,400	769,740	245,000	250,000	155,000	120,000	0	2,497,384
Employee Expenses	2,874	9,733	11,510	25,000	36,510	10,000	10,000	10,000	5,000	0	84,117
Vehicles	0	34	0	100	100	100	100	100	100	0	534
Fees & Payments	0	0	0	10,000	10,000	2,995,000	5,340,000	3,265,000	1,155,000	0	12,765,000
Rents & Leases	0	0	10,222	7,560	17,782	12,984	0	0	0	0	30,766
Contingency	0	0	0	0	0	2,000,000	2,000,000	3,000,000	3,000,000	0	10,000,000
TOTAL DIRECT COSTS	815,893	1,752,593	4,618,778	34,408,773	39,027,551	95,037,969	151,184,956	72,703,891	34,696,791	0	395,219,644
Indirect Costs	8,343	37,992	13,919		797,493	1,078,865	1,317,743	1,425,315	883,915		5,549,665
AFUDC	47,677	72,468	81,800		1,501,387	5,198,903	13,076,033	22,332,952	14,222,339	0	56,451,760
TOTAL COST	871,913	1,863,053	4,714,497	34,408,773	41,326,431	101,315,736	165,578,732	96,462,159	49,803,046	0	457,221,069

* Includes Escalation
Estimated
Based on Substantial Completion 6-30-12

** URS - Indirect Costs (in millions) include Construction Services = $6.5, URS = $39.3, Growth = $4.4, Escalation = $23.0, Contingency = $14.7

	afudc Check				6.64%	5.69%	5.97%	6.54%	6.87%	6.87%	
Direct + Indirect	824,236	1,790,585	4,632,697	34,408,773	39,825,044	96,116,834	152,502,699	74,129,206	35,580,706	0	400,769,309
Cumulative		2,662,498	6,495,749	43,674,167	42,560,010	140,178,230	297,879,832	385,085,071	442,998,730	0	
AFUDC	47,677	72,468	4,632,697	34,408,773	1,501,387	5,198,903	13,076,033	22,332,952	14,222,339	0	56,451,760

CONFIDENTIAL

Public Service of New Hampshire

780 N. Commercial Street, Manchester, NH 03101

Public Service Company of New Hampshire
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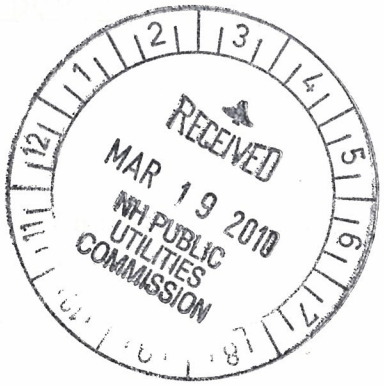
bersara@psnh.com

The Northeast Utilities System

Robert A. Bersak
Assistant Secretary and
Assistant General Counsel



March 19, 2010

Ms. Debra A. Howland
Executive Director and Secretary
New Hampshire Public Utilities Commission
21 Fruit Street, Suite 10
Concord, New Hampshire 03301

Re: ***Docket No. DE 08-103, Public Service Company of New Hampshire Merrimack Station Scrubber Project***

Dear Secretary Howland:

By Secretarial letter dated February 19, 2010, the Commission directed PSNH to provide copies of written materials provided to the General Court as part of the annual reporting requirement contained in RSA 125-O:13.

Per the Commission's direction, copies of the materials provided during the 2007, 2008, and 2009 RSA 125-O:13, IX reports are being provided herewith. PSNH believes that copies of all of these materials have previously been received by the Commission's Staff, Office of Consumer Advocate, and certain other parties in this proceeding.

Sincerely,

Robert A. Bersak
Assistant Secretary and
Assistant General Counsel

Attachments

cc: Service List

June 2009

Public Service Company of New Hampshire

Merrimack Station
Clean Air Project

Cost, Contract, Construction, and Schedule Update

Cost & Contract Information

1. **Total Project Cost Estimate** (no change from figure contained in Summer, 2008 filings with U.S. Securities and Exchange Commission and N.H. Public Utilities Commission) — **$457 million**

ITEM	*APPROXIMATE COST*
▪ **Portion of Estimated Total Project Cost resulting from Contracted Goods and Services**	$345 million
▪ **Portion of Estimated Total Project Cost from Investment Carrying Costs (Allowance for Funds Used During Construction [AFUDC])**	$55 million
▪ **Portion of Estimated Total Project Cost from Fees & Payments**	$8 million
▪ **Internal Labor Costs**	$7 million
▪ **Indirect Costs and Contingencies**	$42 million
TOTAL	**$457 MILLION**

2. **Status of Contracted Work**

Portion of Estimated Total Project Cost for Goods and Services under Contract as of this Date: *Approximately $256 million (about 75% of total estimated project contract costs)*

Major Contracts Executed and in Place include:

- *Program Manager Services (Engineering Design and Construction Management)*
- *Flue Gas Desulphurization System (Scrubber system)*
- *Material Handling System*
- *Site Preparation*
- *Chimney*
- *Wastewater Treatment Facility*
- *Foundation Installation & Misc*
- *Electric Power Distribution U/G*
- *Booster Fans and Motors*

Contracts Remaining:

- *No major contracts remain*
- *A number of minor contracts including ductwork, dampers and piping; plant control systems; continuous emissions monitoring system; etc.*

Contract Structure: *Majority of costs are controlled by fixed price contracts, reducing future escalation exposure.*

Construction

3. Status of Construction

Major Construction began on March 9, 2009 with the receipt of the Temporary Permit

Number of jobs created:

- *approximately 150 - 200 contractors on site at this time*
- *at peak construction, 300-400 jobs*

New Hampshire contractors and companies on site at present:

Contractors on site at this time include:

- *Carpenters*
- *Laborers*
- *Iron workers*
- *Operators*
- *Concrete finishers*
- *Pipe fitters*
- *Electrical workers*

(Representing members of the following unions: New Hampshire Local 668, Local 118, Local 7, Local 98, Local 3, Local 490. Local 131, Local 669, Local 609, Local 4 Massachusetts Local 127, Local 549, Local 687, Local 1485, Local 534, Local 1282, Local 70, Local 1, Local 107, Local 108, Local 243, Local 537, Local 387, Local 175)

New Hampshire companies on site at this time:

Over 30 NH companies are providing primary services to the project with over 25 additional support companies (including as shown below)

- *Aggregate Industries*
- *Ayer Electric*
- *Eastern Analytical, Inc*
- *George Cairns & Sons*
- *New Quality Fence Corp.*
- *North Branch Construction, Inc*
- *Redimix Concrete Inc.*
- *Scanada International Inc.*
- *TF Moran*
- *Weaver Brothers*

Schedule

4. **Status of Schedule**

Effective Date of Scrubber Law: June 8, 2006

Statutory Mandatory Project Completion Date: July 1, 2013

Current Estimated Project Completion Date: June, 2012

Estimated Benefits to Customers from Early Completion (June 2012):

- ***ECONOMIC***
  RSA 125-O:16 Economic Performance Incentives: Customers benefit from early emissions reduction credits that can be converted to fungible SO2 allowances

  AFUDC Carrying Costs: At end of project, AFUDC is high, so completing the work ahead of schedule can save millions of dollars.

- ***ENVIRONMENTAL***
  Estimated Additional Emissions Reductions Achieved with an Early Project Completion:
  - *Eliminates over 220 pounds of mercury;*
  - *Eliminates over 31,000 tons of SO2;*
  - *Provides additional reduction to particulate emissions.*

Note: *These early completion benefits to customers are contingent upon the estimated early project completion date. Any delays in the project, whether from technical, regulatory, or judicial causes, will reduce these projected benefits.*

Clean Air Project Permit Overview

Below is a list of the majority of permits obtained to date.

Federal

FEDERAL AVIATION ADMINISTRATION (FAA):

- Chimney
- Temporary Cranes

ENVIRONMENTAL PROTECTION AGENCY (EPA):

- Storm Water Discharge – Notice of Intent

State

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NH DES):

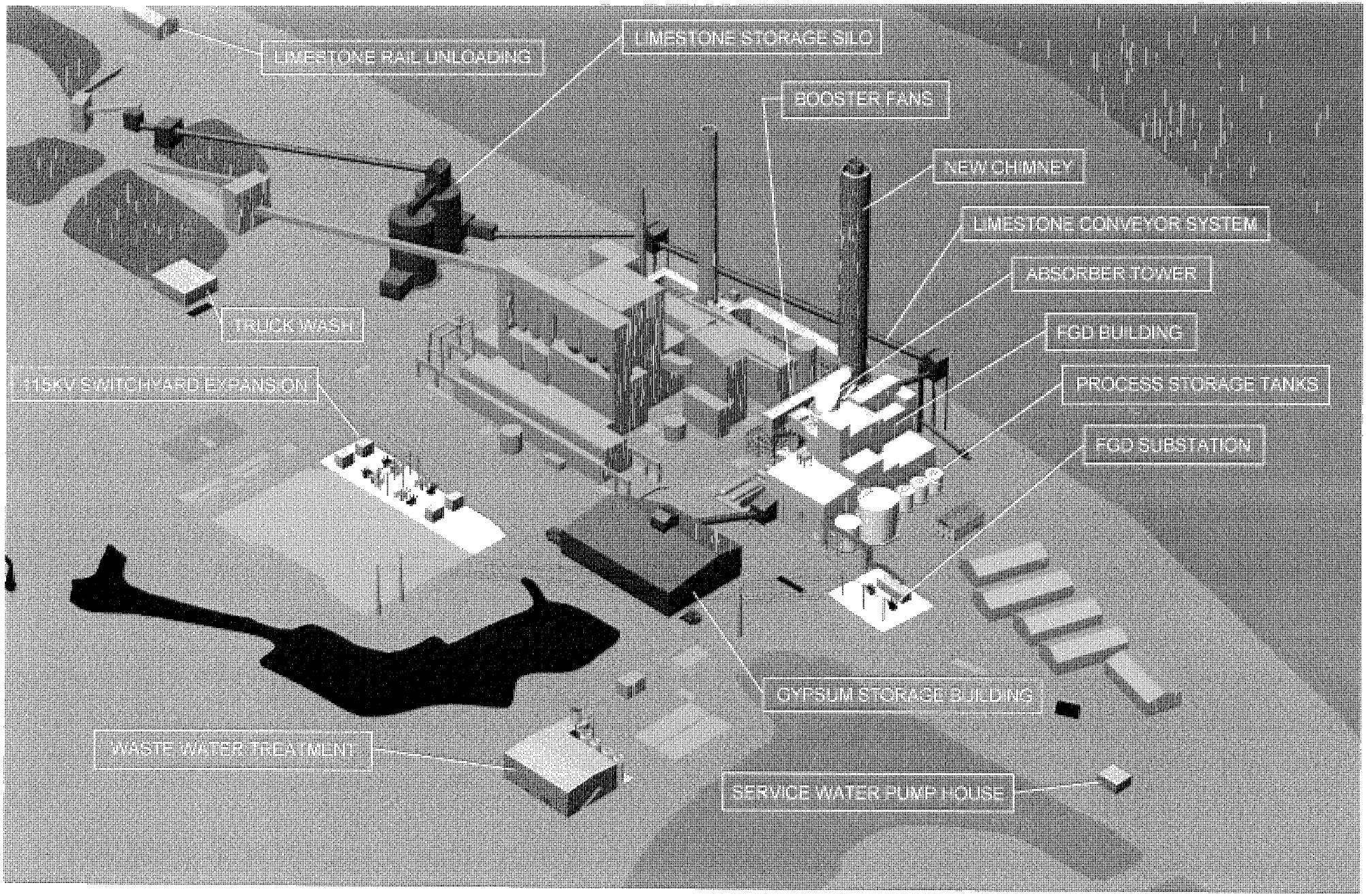
- Air Permit
- Styrene Air Permit (Chimney Liner Fabrication)
- Phase 1 Alteration of Terrain Permit
- Phase 2 Alteration of Terrain Permit
- Asbestos Demolition/Renovation Notification
- Approval of Construction of Guard Station Septic System
- Exemption for Vested Rights Shoreland Protection
- Approval of North Septic System
- Wetlands Permit/Dept. of Army Corp. of Engineers / Dredge and Fill Permit
- Approval of South Septic System (CMA)

Local

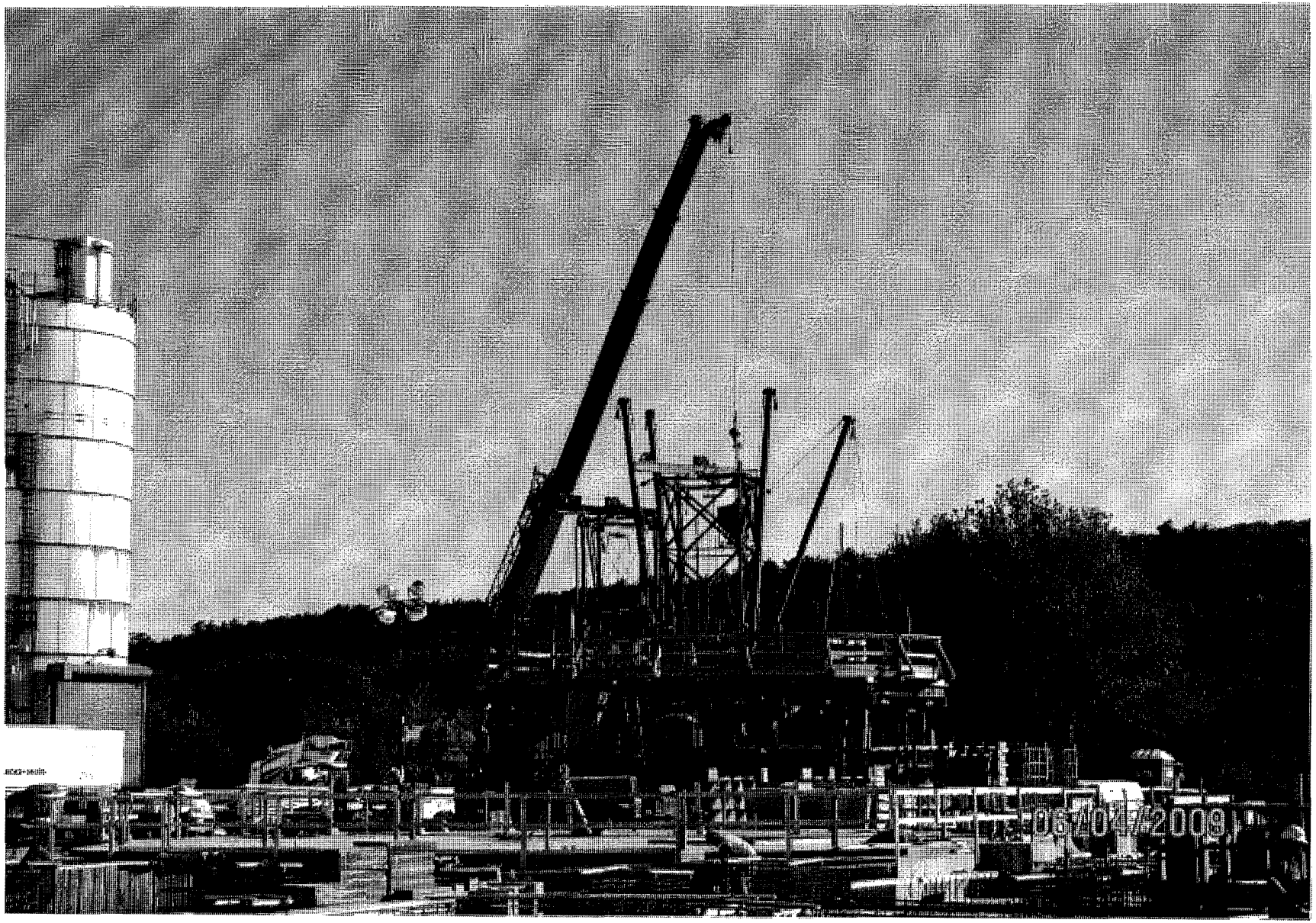
TOWN OF BOW:

- Phase 1: Site Plan Review 203-08; Wetlands CUP 410-08; Aquifer Protection Conditional Use Permit (CUP) – 411-08
- Phase 2: Site Plan Review 203-08; Wetlands CUP 410-08; Aquifer Protection CUP – 411-08
- Construction/Building Permits:
  - Chimney Foundation
  - Absorber Vessel Foundation
  - Scrubber Bottom Mat Foundation
  - FRP Building Foundation
  - Chimney Shell
  - Scrubber Top Mat
  - Guardhouses and Attendee Booths
  - Application for Driveway Permit
  - Chimney Building Structure
  - Installation of Construction and Storage Trailers
- Demolition Permits: Unit 1 Original out Buildings, Plant Entrance and Guard Office
- Special Exceptions and Variances:
  - #106-08 Special Exception – Gypsum Storage Bldg.
  - #107-08 Special Exception – WWT.
  - #106-09 Special Exception - FRP Bldg.
  - #108-08 Limestone Silo (1) Variance; and Silo (2) Variance
  - #109-08 Wet FGD Bldg Variance

PUBLIC SE ICE OF NEW HAMPSHIRE
MERRIMACK CLEAN AIR PROJECT

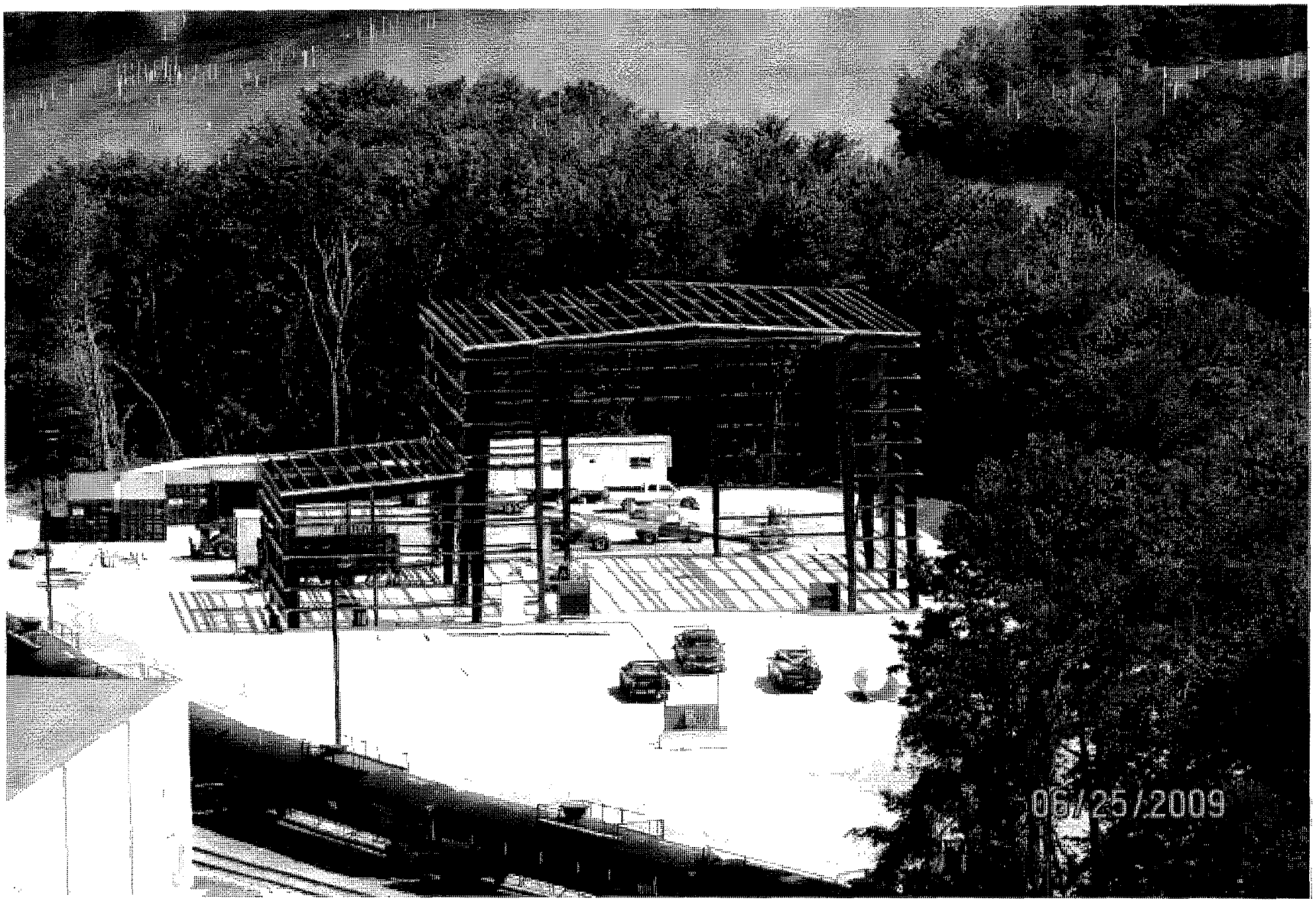


June 4, 2009 Start of Concrete Placement on Chimney Shell



Chimney Shell as of June 25, 2009

Stack Liner Fabrication Area



Major Foundations for the FGD Building including the Absorber Vessel

Merrimack Station

Unit 2

Activated Carbon Injection - Overview and Status

- Sorbent Injection Trial Results and background
- DOE Project Excerpts

Merrimack Unit 2 - Sorbent Injection Trial to Reduce Mercury Emissions Jan-05

Test Results as presented by Sorbent Technologies (STC) November 2005

Method	Initial Summary of Results - Nov 05	Revised Summary or Results- Jan 05	Change in Mercury Emissions Reduction	
SCEM (semi continuous emissions monitoring)	29%	29%	No change	
OHM (Ontario-Hydro method)	43%	11%	-32%	note 3
Method 324 (EPA alternative method)	25%	26%	1%	

Notes-

1. Changes were a result of the QA/QC (quality assurance/quality control) process required and completed by NHDES.
2. Three measurement testing methods were used. Both the OHM and Method 324 were stack/duct testing methods sub-contracted by STC.
3. A number of analysis and reference errors by sub-contractor completing the OHM method were identified by NHDES.

   This correction resulted in significantly less mercury removal calculated by this method.

The corrected data shows mercury removal during the trial was 20%+/-10%

Evaluation of Control Strategies to Effectively Meet 70 –90% Mercury Reduction

PSNH Merrimack Station
Site Project Kickoff Meeting

August 24, 2006

Jean Bustard, Tom Campbell - ADA-ES, Inc.
Bill Smagula, Paul Raichle, Laurel Brown - PSNH

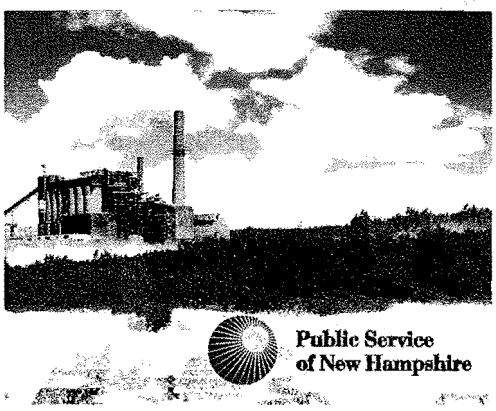
DOE/NETL Project Manager: Andrew O'Palko

Merrimack Unit 2

MK2: 335 MW

Coal: Eastern Bit and Venezuelan Blend
~50/50 split
1.0 – 1.3% sulfur
(1.2%S is current target)

Cyclone Boiler
SCR
C-ESP



ADA-ES

Project Goals

- Evaluate the capability of SO_3 tolerant sorbents to achieve 70 to 90% mercury removal
- Evaluate the effect of co-benefits from SO_3 mitigation on mercury control, and the balance of plant benefits from lowered flue gas temperatures of increased plant efficiency and overall reduced emissions
- Evaluate the impact of sorbent injection on ash disposal
- Support the education and transfer of information and results to local and state interests groups

ADA-ES

DOE Areas of Interest

- Testing with a cyclone boiler
  - *Limited testing data from Sorbent Technologies available from Summer 2005*
- High flue gas temperatures (330 - 350°F)
- Smaller SCA ESPs
- New SO_3 tolerant activated carbons
- Effect of different coal blends on mercury removal
- New technologies??? (Mobetec/MinPlus)

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Project Tasks

1. Pre-Test Planning
2. Design for site-specific needs and install equipment
3. Field testing
   - Sorbent Screening Tests
   - SO_3 Co-Benefits Analysis
   - Baseline testing
   - Parametric testing
   - Choose Long-Term Test Parameters
   - Long-term testing
4. Coal, Ash, and By-Product Sample Evaluation
5. Technology Transfer
6. Management and Reporting

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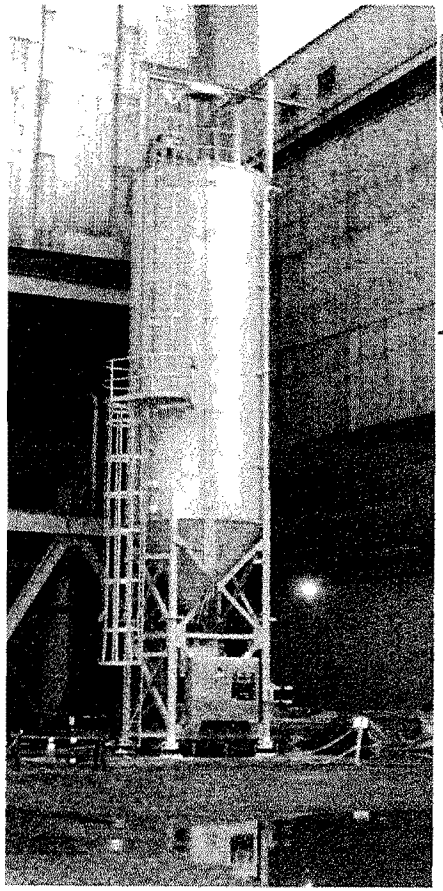
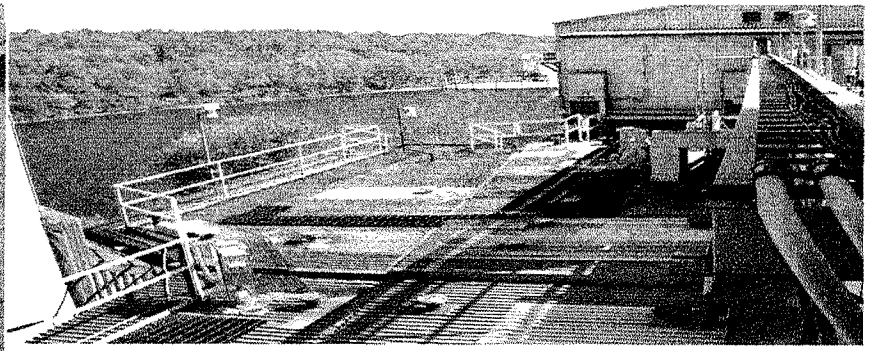
Evaluation of Sorbent Injection for Mercury Control





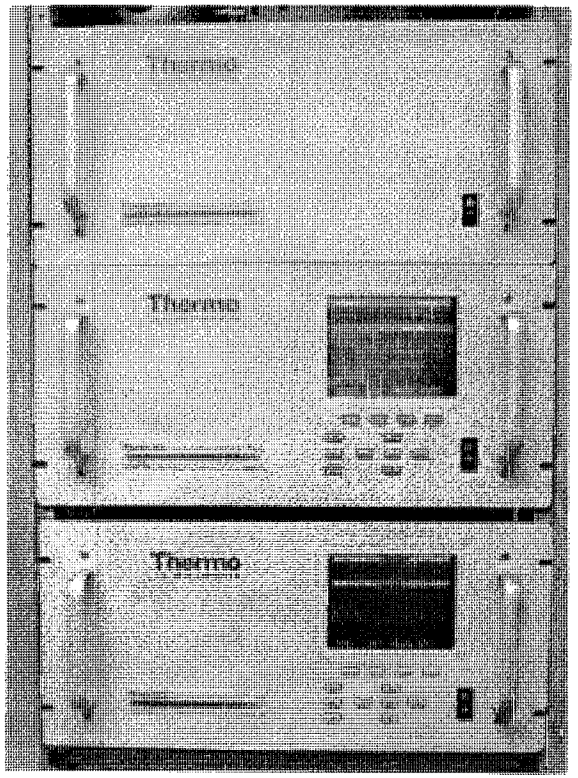
NETL
NATIONAL ENERGY TECHNOLOGY LABORATORY

Public Service of New Hampshire

The Northeast Utilities System

Project Review 2007

June 26, 2007



DOE Cooperative Agreement DE-FC26-06NT42780
DOE/NETL Project Manager: Andrew O'Palko

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Mercury Control Evaluations: ACI Timeline

Pilot Testing

1991 **EPRI**: Comanche

1995 **EPRI:** Hudson
DOE/EPRI: Comanche

EPRI: Boswell, Sherco, Pleasant Prairie
Nanticoke, Miller, Coal Creek, Others
DOE/EPRI: Valley, Powerton

2001 **DOE Phase I:** Pleasant Prairie, Gaston, Salem Harbor, Brayton Point)

EPRI: Abbott, Laskin, Stanton, Coal Creek
DOE Gaston

Full-Scale Testing

2004 **DOE Phase II:** Holcomb, Stanton, Yates, Meramec, Leland Olds, Laramie River, St. Clair, Buck, Monroe, Antelope Valley, Conesville, Independence, Big Brown, Council Bluffs,Louisa, Dave Johnston, Portland, Lee, Miami Fort

2006 **Industry:** Multiple
DOE CCPI: Presque Isle

2008 **DOE Phase III:** Hardin, Hawthorn, Mill Creek, Limestone, Merrimack **Commercial:** 10+

DOE: No funding for 2008

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Mercury Control Evaluation: PSNH Merrimack

2006

DOE Phase III Award: Merrimack

Kick Off Meeting, Test Plan
Equipment Procurement

Baseline: October
Co-Benefit: October - November
Parametric: November

2007

Parametric: January - March

Balance of Plant: March
PAC Silo Install: May - June

Long Term Test: June

2008

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Why Merrimack?

- Cyclone Boiler: relatively small fleet
  - Different Combustion Process
  - Different Ash Characteristics
- SCR: Flue gas characteristics
- High Flue Gas Temperatures
- Dual Particulate Collection Devices: ESPs

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Laboratory/Pilot Scale Studies

- Performance of Powdered Activated Carbon (PAC) influenced by the flue gas characteristics
  - APC Configuration
  - Coal Type
    - Halogen content (Cl, Br, other)
    - Sulfur content (SO_3)
  - Flue Gas Temperature
  - SO_3
    - From coal
    - SCR
    - Flue gas conditioning

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Baseline Results

- Hg varies (range was 5 to 10 µg/m^3 from Aug 06 through Jan 07)
- No removal across the ESP
  - Based on CEM, STM
  - Low Hg levels in ash analysis (10 ppb)
- OH within 20% of Baseline CEM and STM results
- On and off site analysis of STM traps correlate well with inlet CEM
- >80% Oxidation of Mercury

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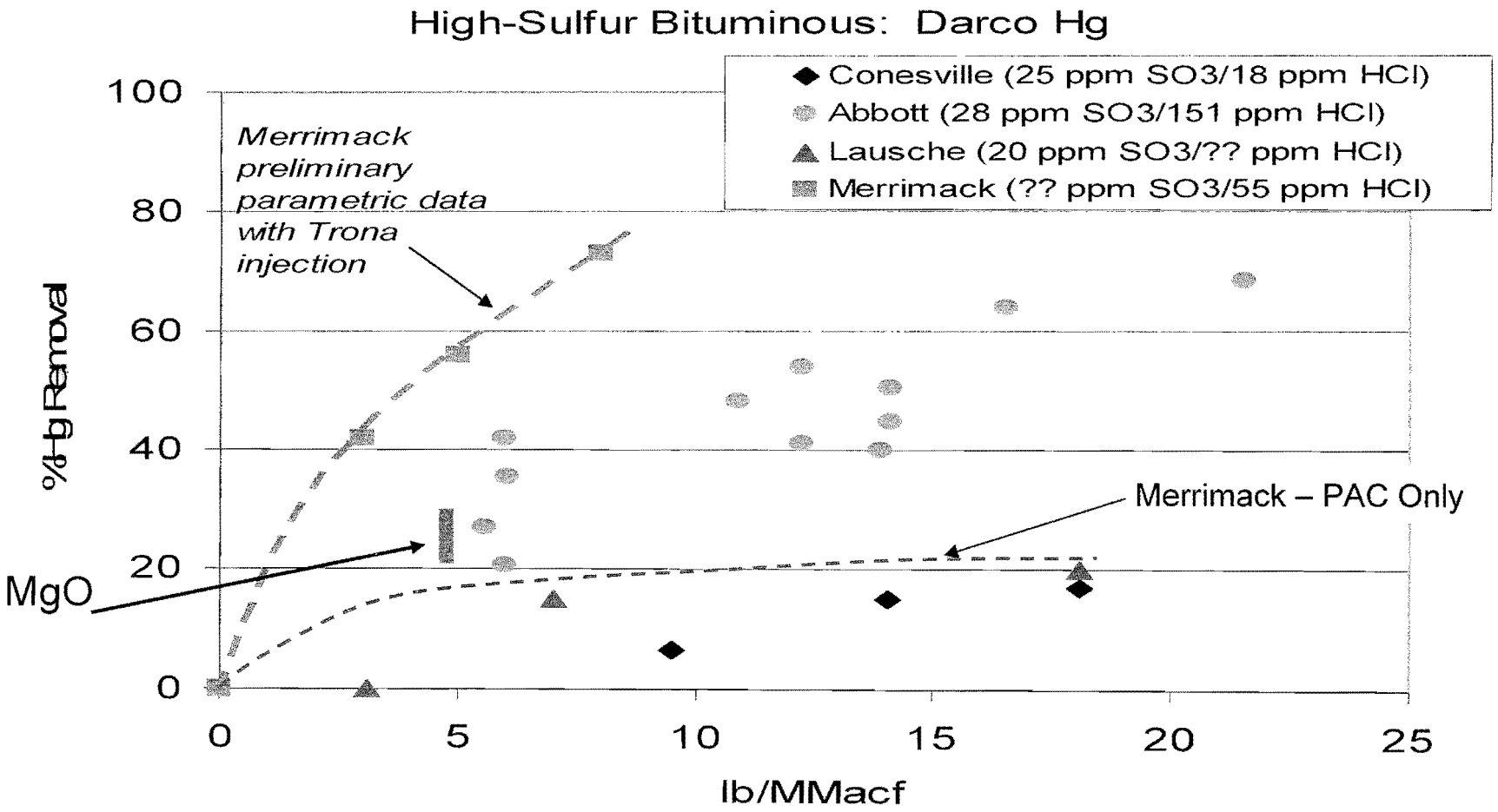
Parametric Test Results



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Issues Remaining for Merrimack

- Ash Disposal
  - Plant has set up a schedule to dispose of the ash from the Original and Supplemental ESP hoppers separately
- NSR triggers – PM: 25ton/yr - ~7lb/hr – 98% ESP eff.
- Balance of Plant
  - Long term effects

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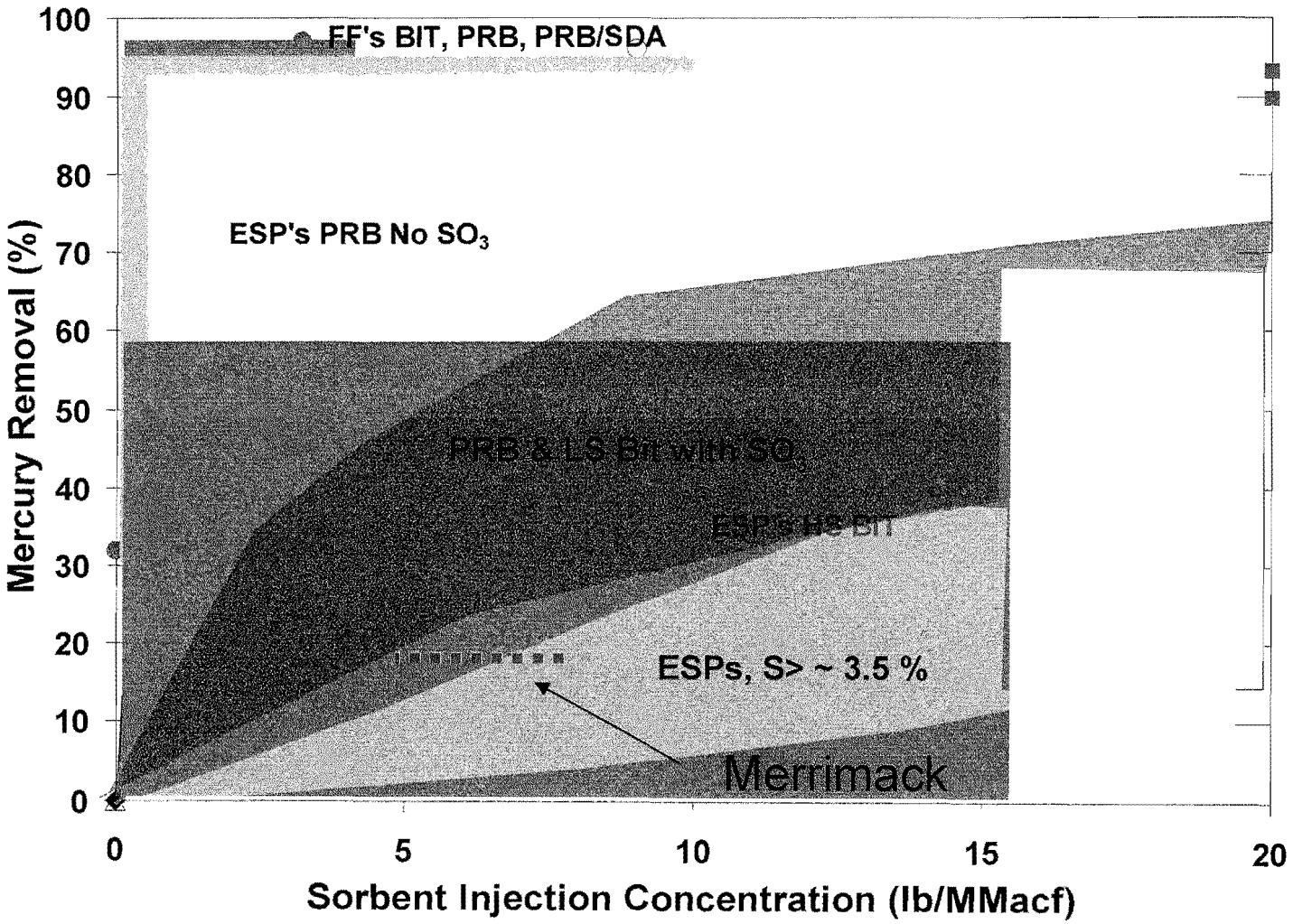
Mercury Reduction Trends with ACI on FF's and ESPs



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Ongoing Testing

- PAC Performance Enhancements
  - Fine PAC
  - Specialty Carbons and Blends
  - Co-Injection with Alkali Materials
  - Injection Location
- Balance of Plant Issues
  - Additional TOXECON II testing
  - Long Term testing of PAC injection upstream of an APH
  - Additional testing of Adsorbents for SO_3 control
  - General Specifications for TOXECON system designs

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Ongoing Testing

- Ameren's Labadie Power Plant
  - PRB coal
  - ESP
  - SO_3 FGC
- PSNH Merrimack Power Plant
  - E. Bit Coal + Offshore Supply
  - SCR + ESP
- RMP Hardin Generating Station
  - PRB Coal
  - SCR + Dry Scrubber + FF
- We Energies Presque Isle
  - PRB Coal
  - HS ESP + TOXECON

ADA-ES

Questions?

Jean Bustard or Tom Campbell
ADA-ES, Inc.
(303) 734-1727
jeanb@adaes.com
tomc@adaes.com

ADA-ES

PSNH Legislative Update- June 18, 2008*

Update relative to the reduction of mercury emissions at PSNH Coal Fired power plants as outlined in HB1673.

As required by HB 1673 (RSA 125-O:13 Compliance- Paragraph IX) PSNH shall report by June 30, 2007 to the legislative oversight committee on electric utility restructuring, and the chairpersons of the house science, technology and energy committee and the senate energy and economic development committee, on the progress and status of:

1) Achieving early reductions in mercury emissions:

DOE Mercury Reduction Project at Merrimack Unit 2

- **Program Schedule Fall 06 – Spring 08**
  - Completed Parametric Testing Nov 2006
  - Completed Long Term Testing April 1, 2008
  - Used various combinations of sorbents to assess effectiveness
  - Varied rates of injections
  - Varied location of injection points
- **Long term Test Evaluations**
  - Long term test – Fall 2007 thru March 2008
  - Equipment performance
  - Balance of Plant Issues
  - Mercury Removal Performance
- **Measurement tools and methods**
  - Completed sorbent trap measurements
  - Installed and monitored Hg CEMs
- **Results of Parametric tests**
  - Initial injection plan 10 – 30%
  - Enhanced injection resulted in a wide variation of results
  - Sustainable results will depend on the ability to resolve balance of plant issues

2) Installing and operating the scrubber technology:

CLEAN AIR PROJECT UPDATE

- **Engineering**
  - Projects defined in 5 major components
  - Specifications developed for 4 key components
- **Commercial and Purchasing**
  - Program Manager Hired Sept 2007
  - Scrubber Island and Chimney proposals are in negotiations
  - Vendor Proposals requested and received for Wastewater Treatment Facility and Material Handling System
- **Review, Permits and Approvals**
  - NHDES – May 12 presentation
  - Temporary Permit expected October 2008
  - Town of Bow –Local permitting
  - Regional Planning Commission
- **Site work**
  - Existing oil tank removed
  - Site surveys and studies completed
  - Warehouse construction underway
  - On-site engineering facilities completed
- **Schedule and Costs**
  - Tie-ins: MK#1 Fall 2012, MK#2 Spring 2013
  - Project Costs will be updated with review of major equipment bids

*year corrected to reflect June 2008 update

PSNH Legislative Update- June 26, 2007

Update relative to the reduction of mercury emissions at PSNH Coal Fired power plants as outlined in HB1673.

As required by HB 1673 (RSA 125-O:13 Compliance- Paragraph IX) PSNH shall report by June 30, 2007 to the legislative oversight committee on electric utility restructuring, and the chairpersons of the house science, technology and energy committee and the senate energy and economic development committee, on the progress and status of:

1) Achieving early reductions in mercury emissions:

DOE Mercury Reduction Project at Merrimack Unit 2

- **Parametric Testing**
  - September – November 2006
  - Used temporary equipment set-ups
  - Used various combinations of sorbents to assess effectiveness
  - Varied rates of injections
  - Varied location of injection points
- **Optimum plan for long term test**
  - Engineered and purchased equipment for long-term test and post DOE use
  - Installed and commissioned new equipment
  - Long term test – June to November 2007
- **Measurement tools and methods**
  - Completed sorbent trap measurements
  - Installed and monitored Hg CEMs
  - Identified testing methods for long-term test including new EPA methods
- **Results of Parametric tests**
  - Initial injection plan 10 – 30%
  - Enhanced injection plan scattering of individual points between 30 – 60%
  - Sustainable results to be determined during long-term test

2) Installing and operating the scrubber technology:

CLEAN AIR PROJECT UPDATE

- **Engineering**
  - Specifications developed for key components
  - Possible Site plan layouts developed
  - Equipment options identified
  - Vendor lists and contacts established
  - Industry impact of high number of scrubber installations analyzed
- **Commercial and Purchasing**
  - Contract Strategy determined and approved
  - Program Manager Specification written
  - Program Manager out to Bid
- **Permits and Approvals**
  - Temporary Air Permit Application submitted to NHDES-ARD June 7, 2007
  - Town of Bow presentations and submittals underway
  - Company financing approvals initiated
- **Site work**
  - Existing oil tank removal completed
  - Site surveys completed
  - South Yard studies completed

Clean Air Project
Merrimack Station

March 31, 2010
NH Public Utilities Commission
Docket 08-103 Informational Session

Public Service of New Hampshire
The Northeast Utilities System

Agenda

Clean Air Project
Merrimack Station

- Introductions
- Project Overview
  - Purpose of the Clean Air Project
  - How the Technology Works
  - Project Status
  - Contracts Summary
  - Budget
  - Schedule
  - Jobs
  - Project Benefits
- Photos
- Discussion

Introductions

Clean Air Project
Merrimack Station

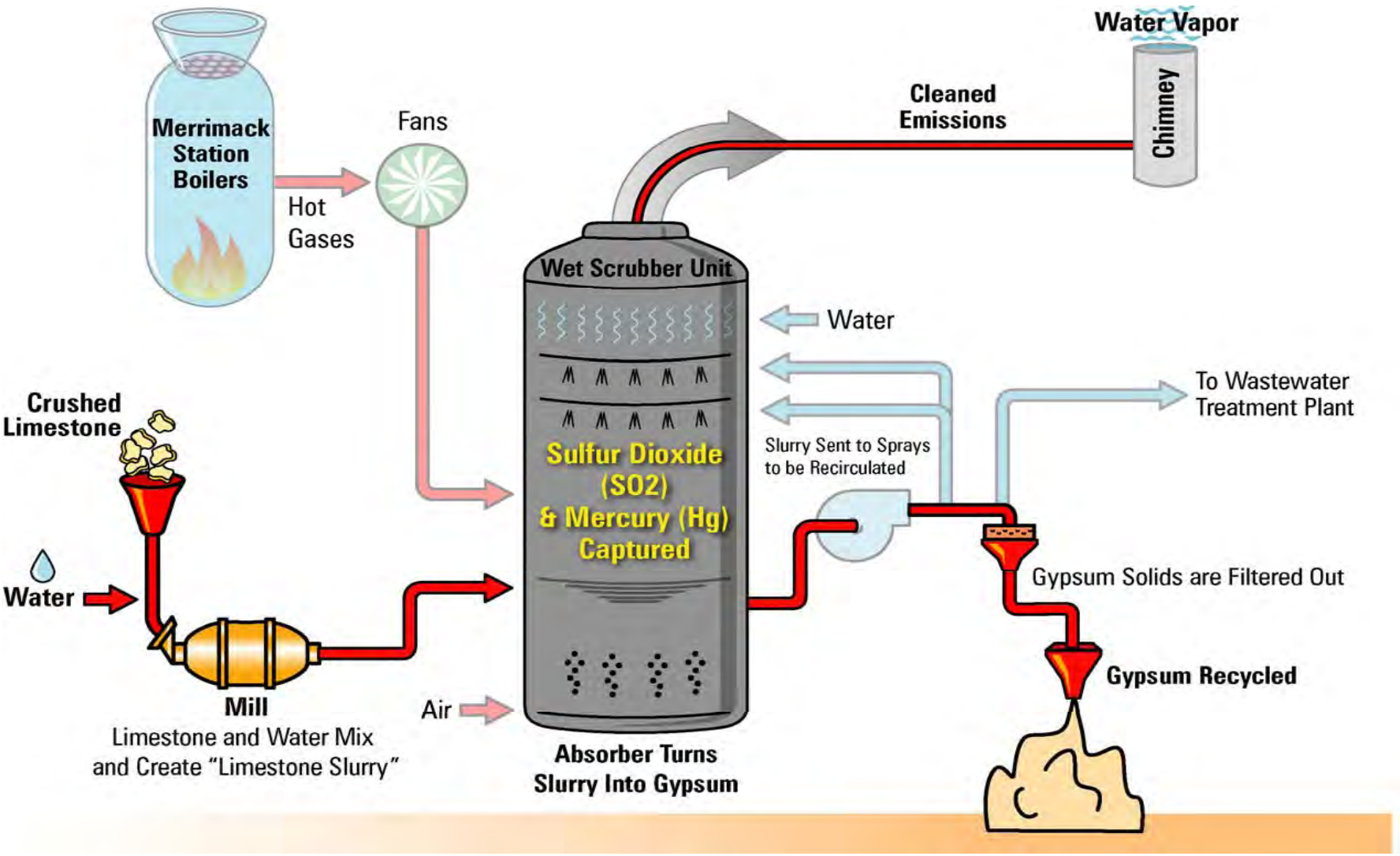
- Bill Smagula, Director - PSNH Generation
- Lynn Tillotson, Technical Business Manager
- Steve Hall, Rate & Regulatory Services Manager

Purpose of the Clean Air Project

Clean Air Project
Merrimack Station

- Comply with the State law (RSA:125-O:11-18) that requires the installation of the wet flue gas desulfurization technology at Merrimack Station by July 1, 2013
- Achieve significant reductions in mercury and sulfur dioxide emissions
  - 80% Mercury
  - 90% SO_2

How the Wet Flue Gas Desulfurization Technology Works



Project Status

Clean Air Project
Merrimack Station

PSNH is 2/3's through the six-year project:

- Engineering is almost complete
- Over $300 Million and over 85 contracts committed
- Construction is in full swing
- Over 300,000 man-hours expended to date

Contracts Summary

Clean Air Project
Merrimack Station

	$ Millions
Major Supplier Contracts	$165.6
• Scrubber	
• Material Handling (Limestone, Gypsum)	
• Waste Water Treatment	
• Chimney	
Large General Contracts	$ 97.1
• Foundations	
• Duct Work and Installation (3)	
• Site Work (8)	
• Project Management	
Specialty and Service Contracts	$ 33.6
• Electrical, Sound, Cranes, Fans, Emissions Monitors, Insulation, Legal, Etc.	
OVER 85 CONTRACTS – IN PLACE TO DATE:	**$306.3 MILLION**

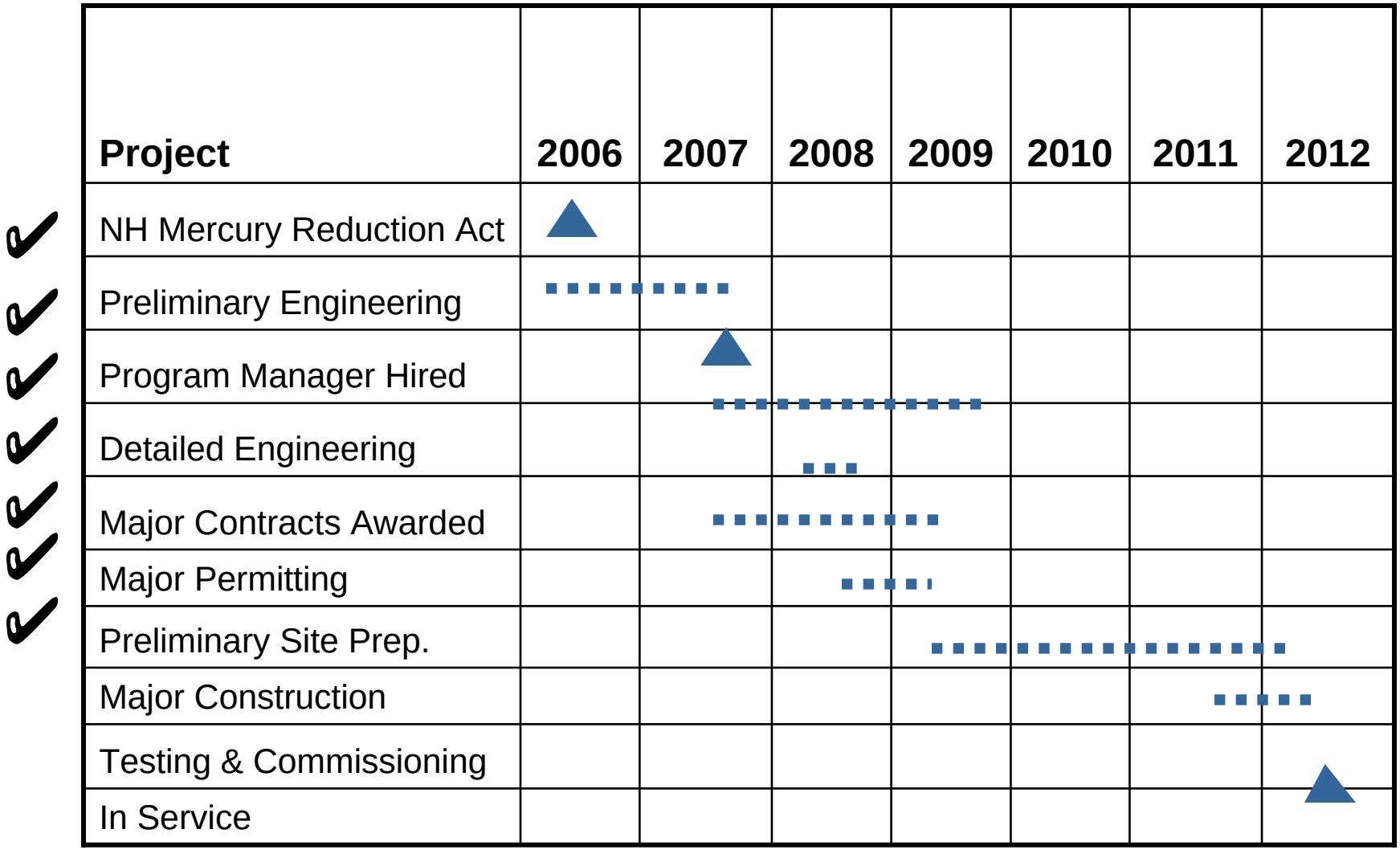
Approximately five contracts remain to be issued over the next few months totaling about $35 Million.

Budget ($ in Millions)

Clean Air Project
Merrimack Station

	Thru 2007	2008	2009	2010	2011	2012	2013
Cost By Year		24.8	119.3	148.6	99.0	59.2	3.4
Cumulative Cost	2.7	27.5	146.8	295.4	394.4	453.6	457.0

Schedule
Merrimack Station Clean Air Project



Jobs

Clean Air Project
Merrimack Station

- Clean Air Project – Currently Active On-Site:
  - 31 companies
  - 215 craft workers
  - 75 supervisory and support personnel
  - Over 300,000 man-hours expended to date
- Merrimack Station
  - 110 employees
  - Annual outages temporarily increase work force twice a year
  - Merrimack Station uses over 100 local businesses for labor and materials
- New Hampshire Economy
  - CAP has spurred local economy: suppliers, small businesses, housing, restaurants, etc.
  - Local suppliers: concrete, site work, labor, equipment rentals, security, fuel, tools, parts, food, etc.

Project Benefits

Clean Air Project
Merrimack Station

Reduced Emissions

- Mercury – 80% reduction or better
  - Capture about 220 pounds of mercury/year
- Sulfur – 90% reduction or better
  - Capture about 31,000 tons of SO_2/year
- Provides additional reduction to particulate emissions

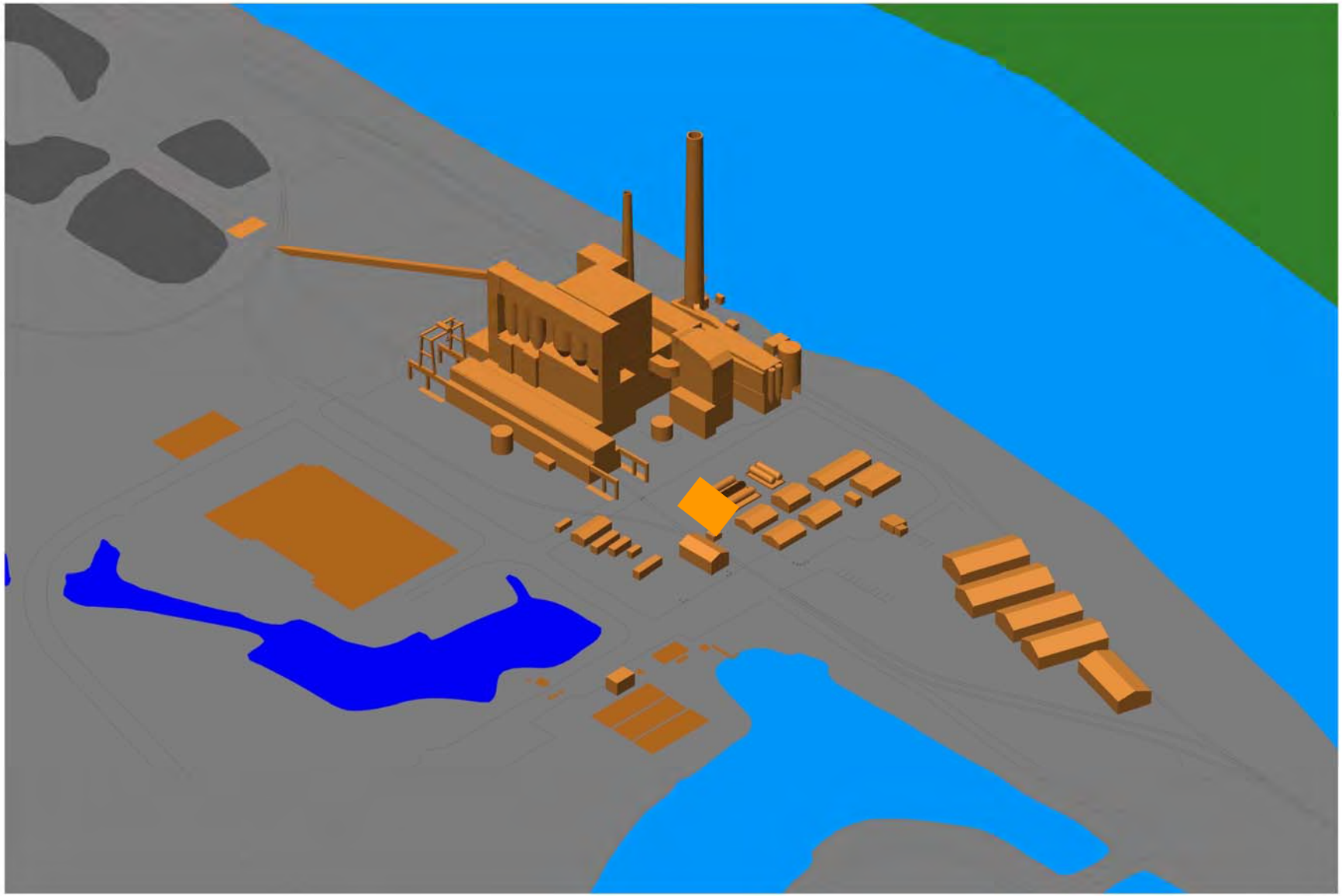
Early Completion = Early Emissions Reduction

- Scheduled to be done by July 1, 2012 (one year early)

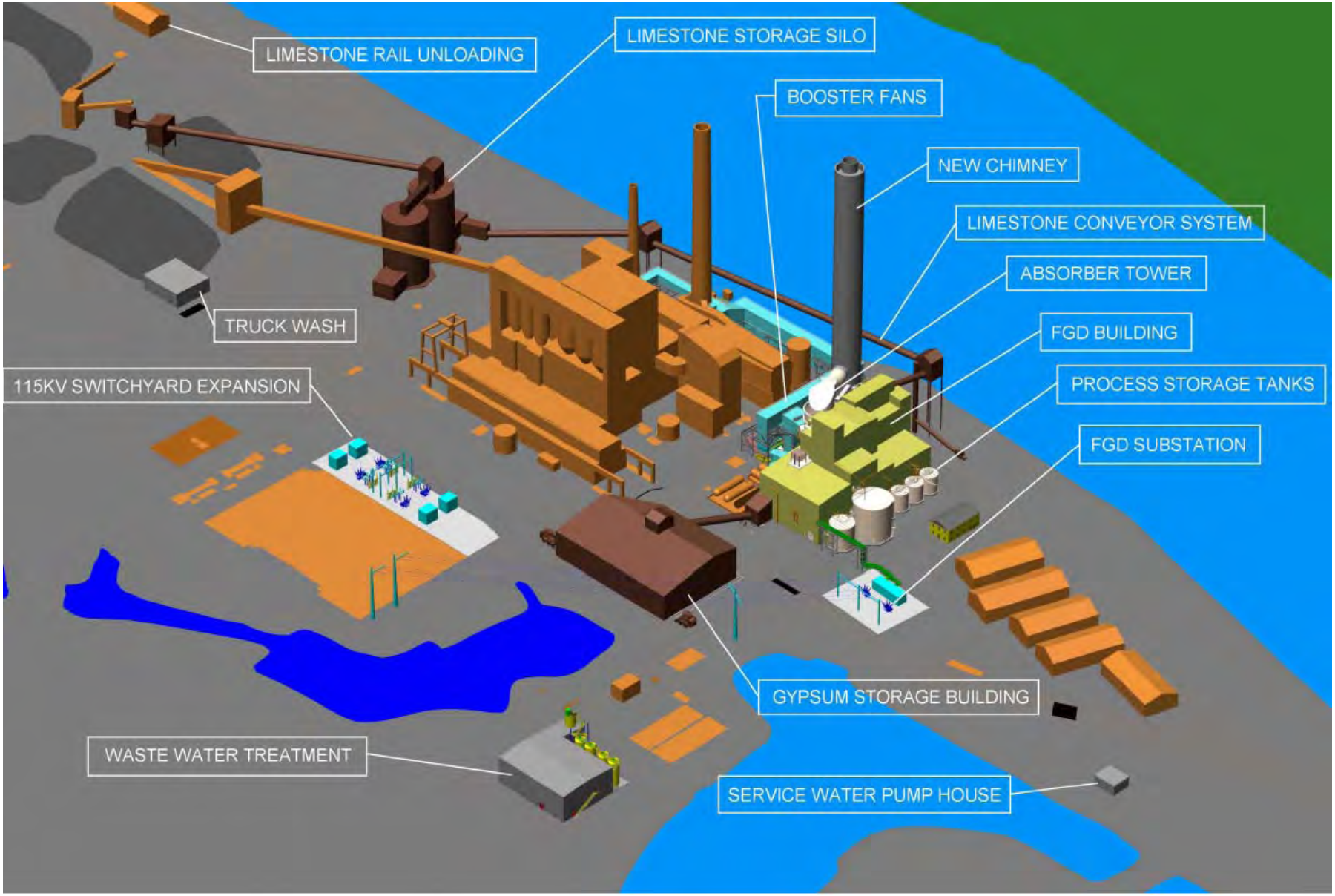
Direct Economic Benefit of Project Workforce: $50 Million, 400+ jobs

Reliable Energy, from one of the lowest emission coal plants, as a bridge to the Future

Merrimack Station: 2008



Merrimack Station: 2012




12/02/2008


03/24/2009


03/31/2009


05/21/2009


05/29/2009


06/05/2009


06/12/2009


06/18/2009


06/25/2009


10/01/2009


Genie
10/05/2009


11/11/2009


11/11/2009


10/09/2009


11/18/2009


02/13/2010


03/19/2010


CAT
15/09/2009


11/18/2009


GROVE
11/24/2009


03/19/2010


03/24/2010


06/18/2009


24/09/2009


11/24/2009


03/19/2010


02/13/2010


03/19/2010


03/06/2010

Perspective Sketch

Merrimack Station Clean Air Project

Bow, New Hampshire

Public Service of New Hampshire

The Northeast Utilities System

TFM Design

Landscape Architects

Public Service of New Hampshire

780 N. Commercial Street, Manchester, NH 03101

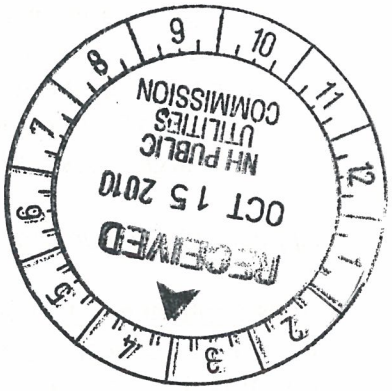
Public Service Company of New Hampshire
P. O. Box 330
Manchester, NH 03105-0330
(603) 634-3355
fax (603) 634-2438

bersara@psnh.com

A Northeast Utilities Company

Robert A. Bersak
Assistant Secretary and
Assistant General Counsel

October 15, 2010



Ms. Debra A. Howland
Executive Director and Secretary
New Hampshire Public Utilities Commission
21 S. Fruit Street
Concord, New Hampshire 03301

Re: ***Docket No. DE 08-103***
Public Service Company of New Hampshire
Merrimack Station Scrubber Project
Request for Information

Dear Secretary Howland:

Pursuant to the Commission's Secretarial Letter, dated September 29, 2010, Public Service Company of New Hampshire ("PSNH" or the "Company") provides the attached updated Report regarding the Company's "Clean Air Project" - - the legislatively mandated installation of wet flue gas desulphurization technology ("scrubber" technology) at Merrimack Station.[1]

The Commission's request for an update on the Clean Air Project comes at an appropriate time. PSNH recently announced that the construction phase of the Clean Air Project has reached the milestone of being 75% complete.[2] Based upon this achievement, PSNH estimates that the scrubber will be complete and operating by July, 2012, one year ahead of the statutory deadline.

In addition, the price estimate of the scrubber system has been reduced to $430 million from $457 million. The savings is the result of the high productivity of the workforce, favorable weather conditions that helped avoid delays, and certain commodity cost reductions. The early completion will provide for cleaner air sooner and lower costs to customers.

---

[1] By Secretarial Letter dated October 13, 2010, the Commission graciously granted PSNH's request to delay the due date of this filing until today. PSNH appreciates the Commission's consideration.

[2] A copy of PSNH's October 7, 2010 press release is attached.

The Commission began this docket regarding the status of PSNH's Clean Air Project by issuance of a Secretarial Letter dated August 22, 2008. The Clean Air Project is mandated by RSA 125-O:11 through 18 (the state's "Mercury Emissions Program") to achieve significant reductions in mercury emissions. The New Hampshire Supreme Court has noted:

> To comply with the Mercury Emissions Program, PSNH must install the scrubber technology and have it operational at Merrimack Station by July 1, 2013. See RSA 125-O:11, I. Meeting "this requirement," however, "is contingent upon obtaining all necessary permits and approvals" from the pertinent regulatory agencies. RSA 125-O:13, I. PSNH must report to the legislature annually regarding its installation of the scrubber technology, including " any updated cost information." RSA 125-O:13, IX. Under RSA 125-O:18, PSNH "shall recover all prudent costs" of installing the scrubber technology "in a manner approved by the [PUC]." Recovery of these costs "shall be ... via ... [PSNH's] default service charge." RSA 125-O:18.

Appeal of Stonyfield Farm, Inc., 159 N.H. 227, 229 (2009).

In its September 29, 2010, Secretarial letter, the Commission has directed PSNH to file updated information concerning the status of the Clean Air Project. The Commission's letter notes that this directive is part of its process of "monitoring PSNH's costs of construction of the scrubber technology at Merrimack Station…[and]…the prudence of PSNH's actions during the construction of the scrubber, including whether it avails itself of the variance procedure under RSA 125-O:17 in the event of escalating costs," citing to Order No. 24,979 dated June 19, 2009.[3] The attached Report provides the updated information requested by the Commission.

---

[3] In *Stonyfield*, decided two months after Commission Order No. 24,979, the Supreme Court unequivocally noted the legal mandate placed upon PSNH to install scrubber technology at Merrimack Station, as well as the requirement that PSNH shall recover all prudent costs of that installation. The Commission has on several occasions referenced RSA 125-O:17 as providing PSNH with an opportunity to seek relief from the legal mandate to install the scrubber. PSNH disagrees with that interpretation of the law. Under RSA 125-O:17, PSNH may "request a variance from the *mercury emissions reduction requirements*" (emphasis added) of the Mercury Emissions Program, not a wholesale exemption from the mandate to install scrubber technology. The New Hampshire Department of Environmental Services, in its Temporary Permit No. TP-0008 issued to PSNH to allow construction of the scrubber, identifies the "mercury reduction requirement" of the Mercury Emissions Program law as what the Legislature codified in RSA 125-O:13, II: "Total mercury emissions from the affected sources shall be at least 80 percent less on an annual basis than the baseline mercury input, as defined in RSA 125-O:12, III, beginning on July 1, 2013." *See*, Table 4, TP-0008, Item Nos. 13, 15, 17, 18. As noted in Table 4, TP-0008, Item No. 19, RSA 125-O:17 only allows PSNH to seek under the prescribed circumstances either an alternative compliance schedule or an alternative reduction requirement. There is neither provision nor authority for PSNH to seek, or for the Department of Environmental Services to grant, a variance from the public interest determinations and express mandates enacted into law requiring installation of scrubber technology by PSNH. Indeed, the express RSA 125-O:13,I mandate stating, "The owner shall install and have operational scrubber technology to control mercury emissions at Merrimack Units 1 and 2 no later than July 1, 2013" is not even included by DES in its listing of "operational and emissions limitations" that PSNH is subject to.

If you have any questions regarding this matter, please feel free to contact me.

Sincerely,

Robert A. Bersak
Assistant Secretary and
Assistant General Counsel

cc: Office of Consumer Advocate
Service List

SERVICE LIST - EMAIL ADDRESSES - DOCKET RELATED

Pursuant to N.H. Admin Rule Puc 203.11 (a) (1): Serve an electronic copy on each person identified on the service list.

Executive.Director@puc.nh.gov
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desbiam@psnh.com
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suzanne.amidon@puc.nh.gov
tom.frantz@puc.nh.gov

Docket #: 08-103-1 Printed: October 15, 2010

FILING INSTRUCTIONS:

a) **Pursuant to N.H. Admin Rule Puc 203.02 (a), with the exception of Discovery, file 7 copies, as well as an electronic copy, of all documents including cover letter with:**

DEBRA A HOWLAND
EXEC DIRECTOR & SECRETARY
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

b) **Serve an electronic copy with each person identified on the Commission's service list and with the Office of Consumer Advocate.**

c) **Serve a written copy on each person on the service list not able to receive electronic mail.**

THE STATE OF NEW HAMPSHIRE
before the
PUBLIC UTILITIES COMMISSION

Public Service Company of New Hampshire
Merrimack Station Scrubber Project
Request for Information

Docket No. DE 08-103

Report

October 15, 2010

By Secretarial Letter dated September 29, 2010, the Commission directed Public Service Company of New Hampshire ("PSNH" or the "Company") to file updated information concerning the status of the "Clean Air Project" - - the legislatively mandated installation of wet flue gas desulphurization ("FGD") technology ("scrubber" technology) by PSNH at Merrimack Station. In particular, the Commission directed PSNH to address:

I. A comprehensive status report on its installation progress;

II. A detailed cost estimate for the Project (including costs incurred and committed);

III. An analysis of the anticipated effect of the Project on the energy service rates;

IV. An analysis of the effect on energy service rates if Merrimack Station were not in the mix of fossil and hydro facilities operated by PSNH; and

V. The current state of the electric power markets, PSNH's forecast of power market prices, and how the scrubber Project conforms to PSNH's Least Cost Integrated Resource Plan.

This Report is intended to comply with the Commission's directive.

I. SCRUBBER INSTALLATION PROGRESS

This report provides an update to the Company's September 2, 2008, report on the Clean Air Project. It focuses on certain key actions which will provide appropriate guide posts for the progress of the Project.

Since responding to the Commission's original 2008 information request, PSNH has made extraordinary progress in the construction of the Project in accordance with the legislative mandate to put the scrubber into operation "as soon as possible" (RSA 125-O:11,I), with the

support and assistance of the New Hampshire Department of Environmental Services ("NHDES"). NHDES issued Temporary Permit TP-0008 for the Project on March 9, 2009. That permit was the primary prerequisite for construction activities on the site. All major contracts had been executed prior to that time, enabling PSNH to begin construction immediately upon issuance of the permit. Since that time, with safety always the top priority, PSNH staff and URS, PSNH's program manager, have succeeded in orchestrating the work of many contracts and hundreds of workers. Through September 2010, over 700,000 Project contractor man-hours have been dedicated to this work, *with no lost time accidents on the site*. At this time, Project construction is approximately 75% complete, well ahead of the statutory schedule that the legislature determined to be in the public interest.

Overall the Project has progressed extremely well with timely execution beginning with design, engineering, and procurement, and transitioning to field engineering and construction activities over the two-year period from October 2008 to date. Field engineering and construction work is now in full swing with approximately 480 people working on the Project, of which over 350 are building trades craftsmen.

In this report, we will continue with the chronology of major actions from where the 2008 Report ended (September 2008).

A. Activities Performed in the Fourth Quarter, 2008

Quarter 4: Contracts for the four major islands--the scrubber, chimney, waste water treatment facility, and material handling system--were finalized, executed, and released for engineering during this period. A number of smaller contracts were also executed, such as those for the installation of an FGD construction substation and site preparation work. Other critical contracts for the Project were either out for bid or in negotiations. A substantial amount of engineering work was completed by URS. Also, many permits were applied for and obtained from the Town of Bow, NHDES and other regulatory bodies. These permits authorized a number of planned activities, including the demolition of small buildings and preparation for future foundations, contractor parking, temporary office trailers, and material lay down areas. Site preparatory work was planned in order to proceed expeditiously with actual construction upon receipt of the Temporary Air Permit from NHDES and other necessary permits. As with any complex construction project, the permitting effort would be an ongoing one, requiring frequent communications with various agencies.

A variety of other approvals were sought and obtained from the Town of Bow relating to site work. Area towns were notified and adjacent towns were fully briefed on the Project. Public outreach and information sessions were held with a number of organizations such as the Southern New Hampshire Planning Commission and towns including the Town of Pembroke and the Town of Hooksett, among others.

B. Activities Performed During 2009

Quarter 1: Significant engineering activity continued in early 2009 with URS providing a high volume of design and technical support for the Project. This information was critically

needed in order to provide the Town of Bow and other local and State agencies with sufficient technical information required by various approval processes for authorization to proceed with work. The most significant permit was received on March 9 when the Temporary Air Permit (TP-0008) was received from the NHDES Air Resources Division. This permit provided the authorization for actual construction of the Project to proceed.

Additional contracts were executed for activities such as smaller foundations, third party quality control, and inspection and testing. Site traffic patterns and construction strategies were finalized which identified the best locations for things such as Project office trailers, work force gates, work force parking, and material lay down areas. This work was essential to accommodate the large number of contractors who would be employed in Project construction, and to ensure a safe environment, amid the anticipated multi-pronged construction effort that would be fully underway later in the year.

Numerous contractors mobilized and established site office trailers and began the hiring of local supervisors and building trades craftsmen.

Quarter 2: Engineering procurement and contract work continued with the issuance of additional purchase orders for items such as booster fans and motors, electrical switch gear and substation equipment.

Numerous meetings were held with the Town of Bow Planning Board in order to receive approvals to construct various buildings and ensure that the plans complied with town ordinance and building code requirements. Major equipment suppliers prepared for initiation of heavier construction later in the year with foundation work and site preparation continuing as the major areas of emphasis. This site work included the installation of numerous underground electrical and piping systems in order to ensure clear access paths by late spring to the work zone for vehicles and heavy equipment. Permits were received from the NHDES Water Division for additional Alteration of Terrain activity as well as from the Air Resources Division for fabrication on-site of large fiberglass reinforced plastic piping for the chimney liner.

Construction work force on-site rose to approximately 150 people during this period.

Large spread-mat foundations were completed for the Scrubber Island. These 8-foot thick foundations were built in a timely fashion to support the critical path schedule.

On June 30, PSNH provided an update on the Project to the Legislative Oversight Committee on Electric Utility Restructuring as well as the chairpersons of the House Science, Technology, and Energy Committee and the Senate Energy and Economic Development Committee. This update included a review of the status of the Clean Air Project engineering, contracts, permits and approvals, site work, schedule, and costs, as well as the U.S. Department of Energy Carbon-Injection Test Program.

Quarter 3: Procurement efforts continued in the summer with a focus on items such as motor control centers, continuous emission monitors, structural steel procurement, duct work

fabrication, uninterruptible power source, expansion joints, cable bus, and many other relatively small contracts.

The engineering staff with URS began to decrease as the peak engineering periods were completed. Construction activities continued to grow with the work force exceeding 175.

Periodic discussions were held with the building trades representatives, URS, and PSNH in order to ensure that there was an open line of communication to discuss work and safety practices, work scope, and staffing plans. This open exchange provided a good forum for questions and answers and open discussions on any issues of interest to the parties present. Building trades generally were represented by one or more personnel from their unions. Contractors were also present in order to provide prompt answers to any questions raised. These meetings consolidated positive relations and provided clarity of work assignments with resulting good productivity from the building trades craftsmen.

The Scrubber contractor had prepared work zones for fabrication of the large absorber vessel. This vessel, which is approximately 50 feet wide and 110 feet tall, is the project component in which boiler exit gasses react with the prescribed water/limestone mixture to remove mercury and sulfur. This large vessel was to be built in place in segments and took approximately one year to complete.

Quarter 4: Numerous contracts were issued during the latter part of 2009 including duct work and steel erection, project distributed control system, and gas duct isolation dampers, among other things.

Engineering activities continued to be brisk although ramping down as construction work and field staffing ramped up. Subsurface and foundation work continued in support of various aspects of the Project, while construction began on the Scrubber building steel framing with work continuing on the absorber vessel rings for eventual installation on the Scrubber absorber.

The internal chimney liner installation was completed as required for future connection to the flue gas absorber vessel.

All major contractors were active on-site with preparation and construction work occurring in the Scrubber area, chimney area, fabrication, and limestone conveyor towers. Numerous other contractors were on-site to support the balance of the Project work.

C. Activities Performed During 2010

Quarter 1: Contract bidding activity continued with issuance of additional contracts.

Various additional building permits were received from the Town of Bow for items such as structural and architectural design of various buildings and conveyor systems, foundations, and building electrical work.

The limestone conveyor system and support towers were structurally and mechanically completed.

Contract work force on-site grew to more than 200 with approximately 200,000 man-hours expended on the Project through this period.

Approximately 50 purchase orders and contracts were active with values totaling more than $275 million.

The overall Project schedule continued to be on track or slightly ahead of schedule which confirmed our confidence in achieving Project completion one year early. Cost management of the Project remained positive, with no projected overruns envisioned.

On March 31, per the Commission's directive, PSNH provided an information update to the New Hampshire Public Utilities Commission staff, Office of Consumer Advocate representatives, and other interested parties. This presentation reviewed PSNH's legal obligation to construct and operate the Scrubber system, and the Legislature's public interest determination, under RSA 125-O:11-18, the Project construction and contract status, overall budget by year, schedule, jobs provided by the Project, and substantial economic value to New Hampshire during an economic recession, as well as the significant environmental benefits of early completion.

Quarter 2: A variety of smaller contracts were awarded in mid-2010 for items such as painting and coatings and balance of plant electrical work. Various equipment tests in factories and at fabrication facilities were successfully carried out as a critical part of URS's overall quality control management program, allowing equipment delivery to the job site to proceed smoothly.

Various local permits were obtained as necessary for activities such as mechanical erection, electrical, structural and architectural design of remaining buildings.

Site work continued for various underground utility installations needed for ongoing work by the Phase II site preparation contractor. The 115 KV yard expansion work began to tie into the permanent new substation to power the Project with testing projected in quarter 3.

Continued erection of the absorber rings proceeded while other rings were being fabricated in adjacent areas to expedite the overall construction schedule. URS's engineering activities and associated work force were reduced to approximately 20% of peak staffing in 2009. Remaining personnel worked on small new assignments as well as design modifications, typical scope requirements, ensuring proper documentation and filing of all information and construction as-built drawing recordings.

The new Unit 1 and Unit 2 combined chimney was completed, and is awaiting testing. Completion of the chimney was critical in that adjacent site work could now proceed without the necessary safety precautions that were in place during chimney construction.

On June 29, PSNH provided its annual update on the Project to the Legislative Oversight Committee on Electric Utility Restructuring, the chairpersons of the House Science, Technology and Energy Committee, and the Senate Energy and Economic Development Committee. This update included a review of the status of the Clean Air Project engineering, contracts, permits and approvals, site work, schedule, and costs.

Quarter 3: The Project's three booster fans were installed on foundations so that duct work could proceed. These fans are in a congested construction zone adjacent to the absorber vessel scrubber structural building and chimney.

The Project celebrated a 500,000 man-hour achievement with no lost time accidents. A safety luncheon was held for the work force to congratulate them on this remarkable achievement. As with all PSNH Generation activities, worker safety has been, and will continue to be, a top priority.

Contracts were awarded for site clean-up and for finalization, start-up electrical testing.

Large construction activities continued with erection of the absorber vessel and its tie-in to the chimney, structural completion of the Scrubber island, and material handling enclosure to make the overall Project weather-tight for indoor piping, electrical, and other work during the winter period. Similar objectives were achieved for the Wastewater Treatment Building, the Gypsum Stackout Building, and other work zones where significant interior work will proceed during the upcoming winter weather period.

The 115KV substation and the station high-yard expansion were completed and were made available for testing.

The two limestone storage silos were structurally completed allowing for internal equipment installation.

The Scrubber absorber vessel shell was completed in preparation for final connection to the chimney and inlet flue gas duct work.

The work force on-site as of the date of this report totals approximately 480 people, over 350 of whom are building trades craft people. At this point of the Project, all necessary construction permits from State, Federal, and local agencies have been received.

II. COST ESTIMATE

PSNH recently announced that the Clean Air Project cost estimate has been reduced from $457 million to $430 million based on current and projected costs. This cost reduction is based primarily on better than planned work force productivity and work quality which was further enhanced due to excellent weather for most of 2010. Also, certain global market based commodities, such as steel alloy materials, have dropped in price. This new cost projection is based on a detailed analysis of work completed and work remaining; contract

commercial, technical and field status; and current knowledge of all remaining activities. With some engineering and procurement risks eliminated at this stage of the work, coupled with good project management which has avoided added expenditures, PSNH is highly confident of this new estimate.

To date, purchase orders and contracts have been issued with values totaling $317.2 million. Approximately 46 additional, comparatively small purchase orders and contracts are currently envisioned to be released over the next few months with total values of about $6-8 million.

The remaining effort for 2010, 2011, and 2012 will focus on critical schedule supporting tasks. The expenditure level for 2010 is currently projected to be approximately $151.5 million and $77.8 million is currently estimated for 2011.

III. ENERGY SERVICE RATE CHANGE

PSNH anticipates that the Clean Air Project will be operational in mid-2012. That initial year of operation, 2012, will see the ES rate increase effective July 1, 2012, reflecting the Project being used and useful in providing utility service to PSNH's retail customers. (See RSA 378:30-a).

Based upon our best estimates of project cost, timing, accounting and regulatory matters, and the assumptions set forth below, we forecast the overall average impact on ES rates from the Project for the first full 12 months of service to be $0.011/kWh. The first year of operation will see the highest cost impact as the book value of the project will be at its highest level, and will decline over the depreciated life of the project. The overall comparative average increase to ES rates for the three years following the initial year of service are as noted below:

Year 1	July 2012 – June 2013	$0.011 per kWh (initial year of service)
Year 2	July 2013 – June 2014	0.011
Year 3	July 2014 – June 2015	0.010
Year 4	July 2015 – June 2016	0.009

The primary assumptions used as inputs to the revenue requirements analysis include:

Capital costs: $430 million

Capital structure: approximately 48%/52% debt to equity ratio.

Assumed Return on Equity: 9.81% (PSNH's currently allowed ROE on generation)

In-service date: July 1, 2012

Deferred taxes: PSNH has assumed that 100% of the project costs would be eligible for liberalized (accelerated) tax depreciation, creating deferred taxes. These deferred taxes were applied against the rate base value of the project, as an overall reduction to rate base, and therefore have reduced the overall return in these calculations.

Forecasted data: PSNH's most recent 5 year forecast (2011 – 2015) was used as a starting point for our analysis. This forecast deck was updated to reflect the most recent costs associated with all of the products embedded in providing full requirements service as well as use of the latest sales data. The following assumptions were also used:

	2012	2013	2014	2015
Peak Energy* ($/MWh)				
NYMEX	54.46	56.70	58.93	61.70
EVA	64.73	67.31	70.28	73.83
Off-Peak Energy* ($/MWh)				
NYMEX	42.06	43.58	46.57	48.57
EVA	50.08	51.88	55.70	58.28
New England Delivered Natural Gas* ($/MMbtu)				
NYMEX	5.50	5.69	5.85	6.03
EVA	6.56	6.77	6.99	7.22
Capacity ($/kW-month)**	3.00	2.73	2.78	2.84
MA Class I REC Prices ($/MWh)	20.00	20.51	21.02	21.56
SO_2 ($/ton)	215.00	110.00	110.00	110.00
No_x ($/ton year round)	50.00	25.00	25.00	25.00
RGGI ($/MWh)	2.00	2.00	2.00	2.00

Notes:

* ES model uses a blend NYMEX and EVA

** Includes a peak energy rent of $0.22/kw-month

These estimates reflect recent changes in the energy and environmental marketplace and are higher than those forecasted by PSNH two years ago. There are two primary drivers for this increase. First, ES sales levels have dropped significantly over the past two years, from an

annual level of over 8 million MWh to 5½ million MWh, due to the weakened economy, conservation efforts, and customer migration to competitive suppliers. This drop in sales accounts for at least $0.003 per kWh of the increase. Secondly, the avoided costs associated with SO_2 emissions reductions have decreased significantly over the past 2 years, consistent with the decrease in the price of SO_2 allowances. The avoided costs value of reduced SO_2 emissions was approximately $30 million per year two years ago and is now approximately $3 million per year. This change in SO_2 emissions reduction value also accounts for at least $0.003 per kWh of the increase.

IV. ENERGY SERVICE RATE CHANGE WITHOUT MERRIMACK STATION

Two ES financial scenarios were run comparing Base Case (with Merrimack Station) to Change Case (without Merrimack Station). The comparison values are through the year 2015.

BASE CASE

Summary of Forecasted Energy Service Cost	2011 (Note 1)	2012	2013	2014	2015
Fossil energy costs	$ 145,689	$ 168,553	$ 150,070	$ 161,564	$ 170,333
F/H O&M, depreciation & taxes	152,339	163,884	170,294	178,565	170,072
Return on rate base	43,187	69,468	92,983	92,317	90,908
ISO-NE ancillary	6,624	25	(1,065)	(1,067)	(1,123)
Capacity	13,806	12,803	11,886	11,686	10,807
NH RPS	10,808	12,248	13,764	15,828	17,349
RGGI costs	3,707	7,744	6,680	7,207	7,560
Vermont Yankee	7,602	1,837	-	-	-
IPP costs	28,836	31,354	33,254	34,999	34,392
Purchases and sales (Note 2)	56,830	37,172	72,105	67,124	68,366
2009 ES Over/Under Recovery	(1,482)	(70)	(1)	-	-
Total Forecasted Energy Service Cost	$ 467,946	$ 505,018	$ 549,970	$ 568,223	$ 568,664
Forecasted Retail MWH Sales	5,389,252	5,449,842	5,481,127	5,544,882	5,616,530
Forecasted Energy Service Rate - cents Per KWH	8.68	9.27	10.03	10.25	10.12

Note 1 - As filed 9/21/10 Docket DE No. 10-257
Note 2 - Purchases and Sales reflect credit adjustments for Rental Revenue, HQ Revenue, and Domestic Manufacturing Deduction Credits.

CHANGE CASE
Summary of Forecasted Energy Service Cost

	2011 (Note 1)	2012	2013	2014	2015
Fossil energy costs	$ 145,689	$ 98,218	$ 35,532	$ 35,375	$ 37,374
F/H O&M, depreciation & taxes	152,339	159,749	139,569	145,883	142,105
Return on rate base	43,187	69,158	91,290	88,838	85,912
ISO-NE ancillary	6,624	(2,874)	(6,574)	(7,455)	(8,123)
Capacity	13,806	20,455	24,946	25,462	25,680
NH RPS	10,808	12,248	13,764	15,828	17,349
RGGI costs	3,707	4,483	1,178	1,166	1,243
Vermont Yankee	7,602	1,837	-	-	-
IPP costs	28,836	31,354	33,254	34,999	34,392
Purchases and sales (Note 2)	56,830	119,031	225,078	242,098	259,049
2009 ES Over/Under Recovery	(1,482)	(70)	(1)	-	-
Total Forecasted Energy Service Cost	$ 467,946	$ 513,589	$ 558,036	$ 582,194	$ 594,981
Forecasted Retail MWH Sales	5,389,252	5,449,842	5,481,127	5,544,882	5,616,530
Forecasted Energy Service Rate - cents Per KWH	8.68	9.42	10.18	10.50	10.59
BASE CASE cents per KWH	8.68	9.27	10.03	10.25	10.12
Change from Base Case cents per KWH	-	0.15	0.15	0.25	0.47

Note 1 - As filed 9/21/10 Docket DE No. 10-257
Note 2 - Purchases and Sales reflect credit adjustments for Rental Revenue, HQ Revenue, and Domestic Manufacturing Deduction Credits.

The primary assumptions used as inputs to this analysis include:

Forecasted data: consistent with the assumptions noted in Section III, above.

Capital costs: all embedded capital costs and the related depreciation and property taxes are contained in both the Base Case and Change Case. These costs would be recoverable from customers regardless of the hypothetical assumptions applied to the without Merrimack Station Change Case.

This analysis indicates that if Merrimack Station was not in the mix of fossil and hydro facilities operated by PSNH, energy service rates would be higher.

V. THE CURRENT STATE OF THE ELECTRIC POWER MARKETS, PSNH'S FORECAST OF POWER MARKET PRICES, AND HOW THE SCRUBBER PROJECT CONFORMS TO PSNH'S LEAST COST INTEGRATED RESOURCE PLAN.

A. The Current State of the Electric Power Markets

To comply with requirements of the Federal Energy Regulatory Commission, ISO-New England prepares periodic reports regarding key statistics for the region's wholesale electric power markets. Its quarterly reports for 2010 are publically available from the ISO-NE website at:

http://www.iso-ne.com/markets/mkt_anlys_rpts/qtrly_mktops_rpts/

Each year, ISO-NE also reviews the performance, competitiveness and efficiency of the region's wholesale electricity markets. ISO-NE's May, 2010, report is available at:

http://www.iso-ne.com/markets/mkt_anlys_rpts/annl_mkt_rpts/index.html

B. PSNH's Forecast of Power Market Prices

PSNH does not forecast market prices for power. However, the assumptions PSNH used in its analyses of Energy Service rates in Sections III and IV, were detailed in Section III.

C. How the Scrubber Project Conforms to PSNH's Least Cost Integrated Resource Plan

PSNH must comply with applicable laws, regulations, and administrative orders. RSA 374:41 allows the Commission to direct the Attorney General to immediately begin an action in the name of the state praying for appropriate relief whenever a public utility is failing or omitting, or about to fail or omit, to do anything required of it by law. The mandate to install scrubber technology imposed by law in RSA Chapter 125-O is express and unequivocal, and PSNH has a duty to comply. Hence, as a matter of law, the Company's Clean Air Project must be deemed consistent with the energy policy set forth in RSA 378:37, which forms the basis for each utility's biennial least cost plan.

The Clean Air Project's installation of scrubber technology was in fact included in PSNH's most recently approved Least Cost Integrated Resource Plan, which was reviewed and accepted by the Commission in Docket No. DE 07-108. Indeed, the scrubber was the first matter highlighted in that Plan, appearing as the first bulleted paragraph on the first page of that Plan's Executive Summary. The scrubber was discussed at length in that Plan's Section XII, "Assessment of the Plan's Long- and Short-Term Environmental, Economic, Energy Price, and Energy Supply Impact on the State."

On September 30, 2010, PSNH submitted an updated Least Cost Integrated Resource Plan. Discussion of the scrubber installation mandate was similarly discussed therein. In addition to its inclusion in the Plan's Executive Summary, the Clean Air Project was included in the Plan's "Assessment of Supply Resources," "Fuel Procurement Strategies," "Assessment of Plan Integration and Impact on State Compliance with the Clean Air Act Amendments of 1990," and "Assessment of the Plan's Long- and Short-Term Environmental, Economic, Energy Price, and Energy Supply Impact on the State."

PSNH PRESS RELEASE

Public Service of New Hampshire
The Northeast Utilities System

Clean Air Project
Merrimack Station

PSNH News

Press Release

Contact: Martin Murray, Senior Corporate News Representative
(603) 634-2228, murrame@psnh.com

Release: 10-1001

For Immediate Release:

Clean Air Project Progress Report - 75 Percent Complete

Mercury Reduction System Ahead of Schedule and Below Budget

BOW, NH, October 7, 2010***The "scrubber" at Merrimack Station -- which will significantly reduce PSNH's mercury and sulfur emissions -- will be finished one year earlier than required by law, and will be completed under budget. A productive workforce and favorable weather conditions have led to a savings of both time and money.

"The project is progressing exceptionally well," noted Bill Smagula, PSNH Director of Generation. "We are currently in the major construction phase, with about 350 skilled craft workers on site. The building trades workforce is very productive, and the quality of work is exceptional. That has been one of the big reasons that we have revised our overall project cost estimate downward and set a new, earlier, completion date."

"Considering our struggling economy and the high level of unemployment facing the state's construction industry, this project has come at a critical time for many New Hampshire working families," said Joe Casey, president of the NH Building Trades Council. "This project is an excellent example of the professionalism of the state's building trades, and how our partnership with PSNH has resulted in a project that is on time, under budget and of the highest quality."

According to Smagula, the Clean Air Project will be complete and operating by July, 2012, one year ahead of the deadline set out by the State. The price estimate of the scrubber system has been reduced to $430 million from $457 million. The savings is the result of the high productivity of the workforce, favorable weather conditions that helped avoid delays, and certain commodity cost reductions. The early completion will provide for cleaner air sooner and lower costs to customers.

The installation of a "wet flue gas desulfurization system" at Merrimack Station was mandated by the State of New Hampshire in 2006 (RSA 125-O:11) and is aimed at reducing emissions of mercury and other pollutants. The scrubber will remove more than 80 percent of the mercury and more than 90 percent of sulfur emissions from the flue gases of the coal-fired power plant.

About Public Service of New Hampshire: *PSNH is New Hampshire's largest electric utility, generating and distributing clean electricity for more than 490,000 homes and businesses in an environmentally friendly manner.*

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JACOBS Consultancy

New Hampshire Clean Air Project
April 2011 Quarterly Report

Prepared For
New Hampshire Public Utilities Commission

June 15, 2011

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New Hampshire Public Utilities Commission

For Jacobs Consultancy

Frank DiPalma

June 15, 2011

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1 Executive Summary

1.1 Background and Scope

The New Hampshire Public Utilities Commission (Commission) on January 26, 2010, contracted Jacobs Consultancy to monitor the progress of the Public Service of New Hampshire Clean Air Project at Merrimack Power Station. Public Service of New Hampshire (PSNH) is installing a wet scrubber at its Merrimack Power Station to comply with state environmental requirements. Completion of the New Hampshire Clean Air Project is scheduled to occur in 2012 at a recently revised cost of $430M[1].

In 2002, the State of New Hampshire passed the New Hampshire Clean Power Act to address four pollutant emissions, sulfur dioxide (SO_2), nitrogen oxide (NOx), mercury (Hg), and carbon dioxide (CO_2). In 2005, Senate Bill 128 was introduced requiring mercury emissions be reduced at the Merrimack Power Station plant to 24 pounds per year through a technology identified as activated carbon injection. In 2006, The New Hampshire Clean Power Act was amended to require reduced mercury emissions by 80 percent using wet flue-gas desulphurization technology at the Merrimack Power Station no later than July 1, 2013.

Since the inception of the Clean Power Act, PSNH had begun working with engineering firms to determine appropriate technologies to meet the regulatory requirements, eventually settling on wet flue-gas desulphurization (FGD). In order to determine preliminary costs, specifications were prepared for the required major equipment and work areas. In addition to the wet FGD system, other supporting systems or "islands," as they became to be known, were materials handling for receiving and delivery of the limestone and handling the gypsum byproduct, a chimney for discharge of the scrubbed flue gas to the atmosphere, and effluent treatment to process the blow-down water from the FGD process.

Jacobs Consultancy's scope of work is twofold:

[1] The reduced cost estimate was due to higher productivity than estimated, lower than anticipated commodity costs, and favorable weather conditions during the major construction period in 2008 through 2010. To some extent, these savings were offset by required additions including: an enhancement to the primary waste water system, a secondary water treatment system and the potential adjustment protection system.

1) Due diligence on completed portion of the project.
2) Monitoring of the ongoing portion of the project.

The Due Diligence Report, completed in June 2011, addressed portions of the New Hampshire Clean Air Project already completed. That report covered items such as technology selected, accuracy of estimate, cost and schedule with major deviations noted and detailed, and PSNH project controls.

This quarterly report focuses on monitoring of the ongoing project and tracking progress of the scrubber project noting deviations from budget and schedule and highlighting major accomplishments. The report also reflects the results of Jacobs Consultancy's on-site inspection conducted on May 17, 2011, and attendance at PSNH's quarterly project status meeting.

1.2 Conclusion

- Safety performance remains poor and a concerted effort to increase emphasis on safety should be initiated.
- The overall project is reported to be on schedule with anticipated July 2012 completion date.
- All of the major contracts report, except for the wastewater treatment and the balance of plant electrical, have an earned complete of over 90 percent.
- The projected costs for the Clean Air Project were unchanged at $430 million. This cost figure includes contingency and reserve funds.

1.3 Recommendation

- Place additional experienced safety professionals, one dedicated to each of the four major islands, working closely with the contractors to keep the emphasis on employees to finish the project safely.

2 Overall Project Status

In this section, we discuss the overall project status and the progress during the past quarter. We will use the planned complete and the amount budgeted versus the earned complete percentage and the amount spent, to determine the project performance. We will also discuss safety performance, environmental, permitting and any emerging issues.

2.1 Project Percent Complete

PSNH has stated the overall project was 80 percent complete as of January 2011, and 82 percent complete as of April 2011. These assessments are based on completion of the entire project scope. The calculation mechanism is based on direct costs and excludes contingency.

The project is moving from a construction effort into the start-up effort with the majority of the major contract work complete.

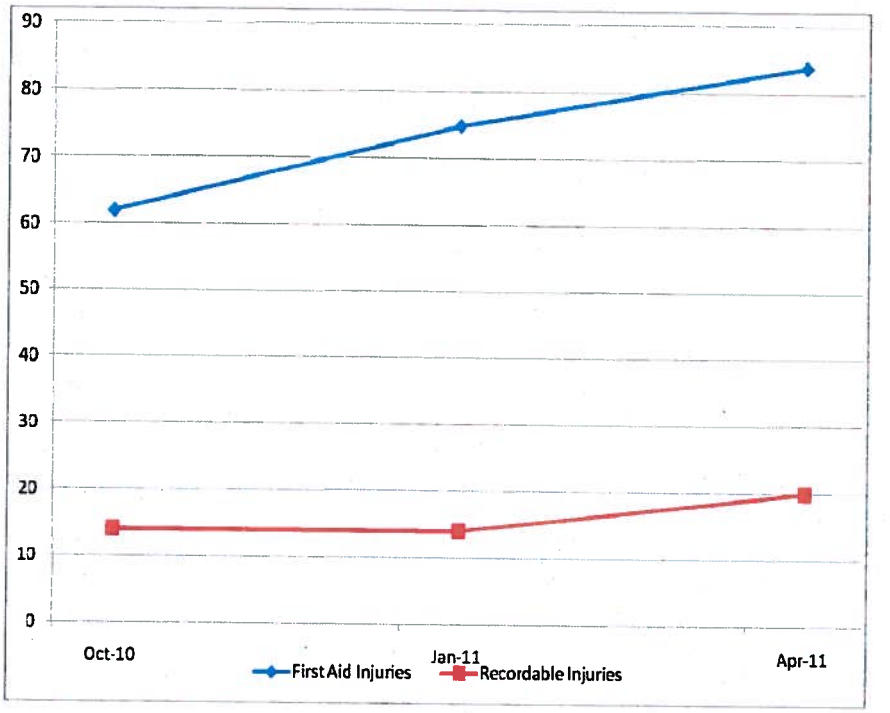
2.2 Safety

There were nine first aid-six recordable injuries, and zero lost-time accidents during the last quarter (refer to Table 1 Injuries). The project reached 1,098,030 person-hours without a lost time accident. PSNH and URS were presented recognition plaques for achieving 1,000,000 safe work hours without a Lost Time Injury by Old Republic Insurance.

Table 1 Injuries

	Jan-11	Apr-11	Difference	Percentage Changed
First Aid Injuries	75	84	9	11%
Recordable Injuries	14	20	6	30%
Lost Time Injuries	0	0	0	0%

Figure 1 Injuries Trend



- The last quarter first aid and recordable incidences accounted for 14 percent of the total incidents since the beginning of the project.
- The project safety performance has continued to be poor. The last quarter safety results were actually worse than the previous, which is both disturbing and unexpected (refer to Figure 1 Injuries Trend). The major construction efforts have passed and the on-site staff is steadily decreasing yet, recordable incidents are increasing. The last stages of a project are normally when there must be a concerted effort to maintain emphasis on safety. The workers, for the most part, have been on the project a long time and often get in a hurry to finish and move on so management must continue repeating the safety theme. There needs to be a renewed safety emphasis for the remainder of the project.
- As Jacobs stated in the Due Diligence Report, when there is a relatively high level of recordable incidents, there is an indication of laxity towards safety and eventually there will be an incident resulting in a serious injury. The last quarter results point even more so towards this possibility.
- Jacobs recommends placing additional experienced safety professionals, one dedicated to each of the four major islands, working closely with the contractors to keep the

pressure on the employees to finish the project safely.

2.3 Environmental and Permitting

A. Bow Planning Board

- Received planning board approval for the Limestone Truck Delivery Facility architectural and aesthetic standards.

B. Construction Permits

- Received building permit for the Limestone Truck Delivery Facility foundations.
- Received code review approval for the proposed firewater booster pump electrical power supply configuration.

3 Major Project Contracts

In this section, we discuss the project major contracts and their progress during the past quarter. We will use the planned complete percentage versus the earned complete percentage to determine the performance status of each contract. [2]

3.1 Program Manager

URS Corporation reported their portion of the overall project, including engineering and procurement services, has a planned percent complete of 96.4 and an earned percent completed of 95, which was an increase of two percent and three percent respectively over the previous quarter (refer to Figure 2 Program Manager Overall Project Completion). The overall construction progress has a reported planned percent complete of 93.4 and an earned percent completed of 91, which was an increase of four percent and five percent, respectively over the previous quarter (refer to Figure 2 Program Manager Overall Construction Performance).

[2] The planned complete is the amount that is budgeted for the time period and the earned complete is the amount actually spent for the same time period.

Figure 2 Program Manager Overall Project Completion

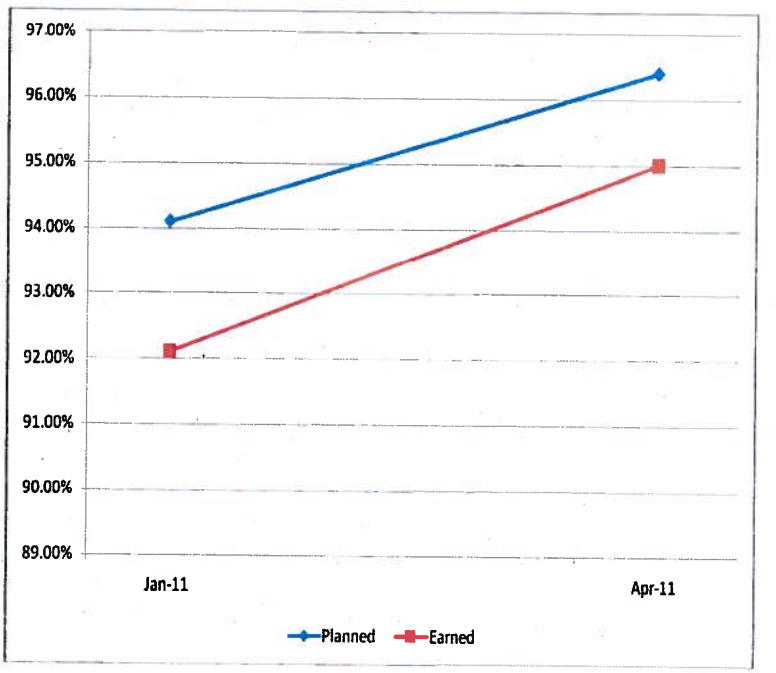
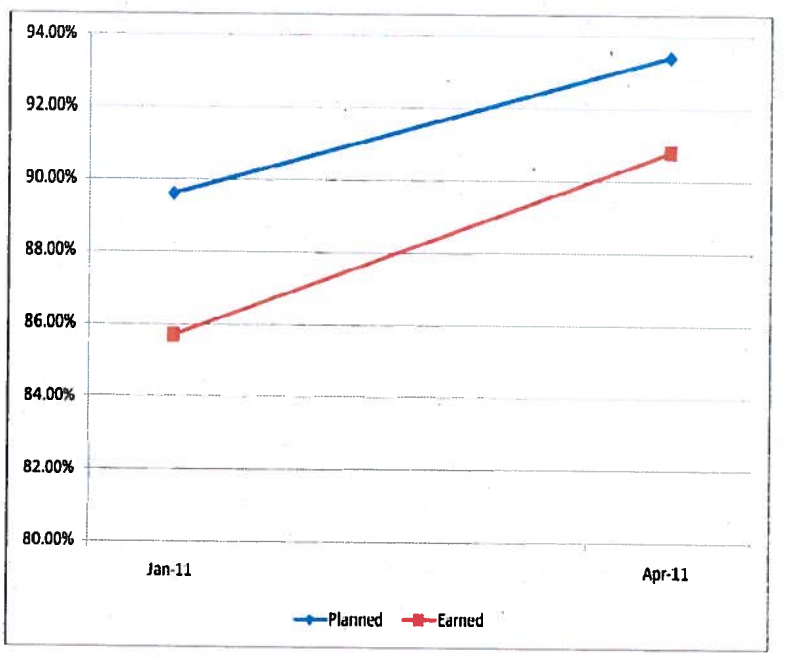


Figure 3 Program Manager Overall Construction Performance



During this quarter the contractor was able to complete:

- Issued the Site Finalization Phase 2 inquiry package for final PSNH review prior to RFP issue.
- Awarded the Limestone Truck Delivery Facility foundations contract and issued a notice to proceed for construction.
- Finalized calcium and magnesium concentrations in waste stream and reviewed compressed air supply in support of Supplemental Wastewater Treatment design.
- Used Merrimack Unit 1 and Unit 2 outage period for final walk down of existing plant electrical interface for Distributed Control System, Burner Management System and Continuous Emissions Monitoring System wiring terminations.
- Awarded Distributed Control System package to Emerson for the Enhanced Mercury and Arsenic Wastewater Treatment System.
- Issued design requirements to start-up for the Limestone Truck Delivery Facility system Distributed Control System data-link interface.
- Issued final Continuous Emissions Monitoring System Monitoring Plan, Relative Accuracy Test Audit Protocol and disposition of prior New Hampshire Department of Environmental Services comments to PSNH for formal submittal to New Hampshire Department of Environmental Services.

Planned activities for the next month are:

- Coordinate and support start-up activities between the island contractors.
- Assist in walk downs of island contractors' turnover packages.
- Assist Siemens Environmental Systems and Services with the filling of the absorber vessel.
- Bump and run miscellaneous motors and equipment for Siemens Environmental Systems and Services.
- Assist Siemens-Water Treatment with coordination of turnovers.

- Bump and run booster fan motors.
- Issue system turnover to PSNH schedule.
- Complete Material Handling Operator and Maintenance Training Program in May.

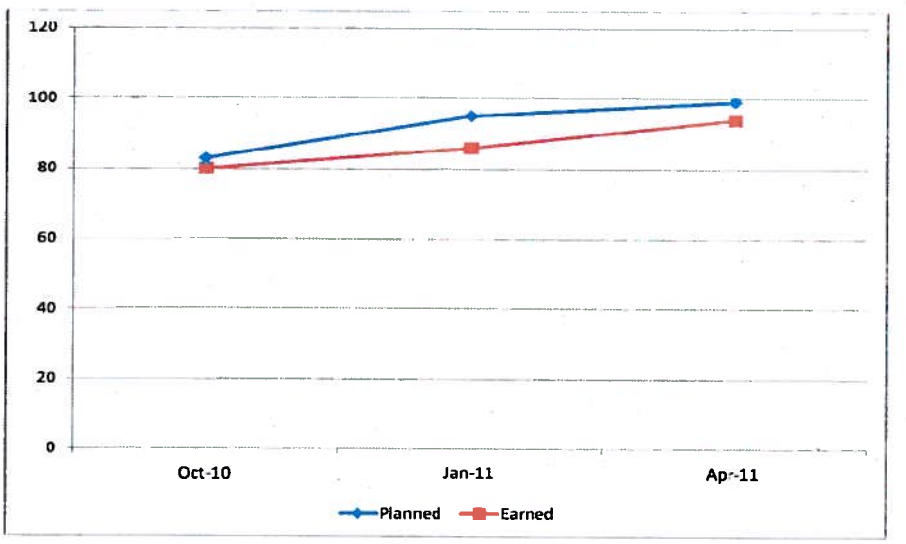
Specific item to monitor next quarter:

- Siemens Environmental Systems and Services Pre-Operational checkout schedule.

3.2 FGD Island

The contractor, Siemens, reported their portion of the overall project has a planned percent complete of 99 and an earned percent completed of 94, which was an increase of four percent and nine percent, respectively over the previous quarter (refer to Figure 4 FGD Performance).

Figure 4 FGD Performance



During this quarter the contractor completed:

- Installing structural steel around the field erected tanks.
- Installing roofing and siding around the field erected tanks.
- Installing the absorber awning.
- Testing and blow downs of the instrument air system.

Planned activities for the next month are:

- Complete cleaning absorber and fill.
- Continue internal coating installation of the Absorber Hold Tank and start external painting.
- Complete installing piping in all areas.
- Continue to walk down systems for Construction Turn Over. Sixteen are forecasted for May.
- Complete 12 systems operational testing in May.

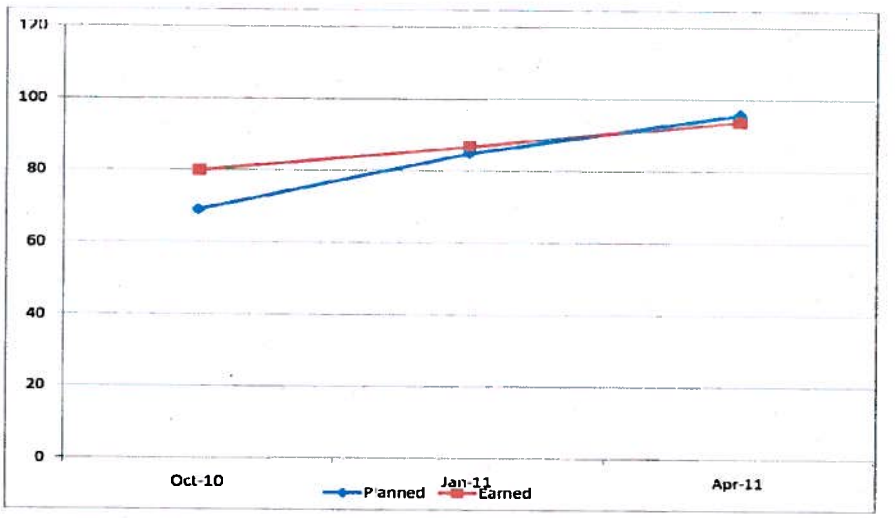
Specific items to monitor next quarter:

- Main areas behind schedule include FGD tanks, electrical pulls and terminations, and construction system turnovers, and preoperational checkouts.
- Siemens Environmental Systems and Services will be adding additional manpower to enhance turnaround on loop checks.

3.3 Material Handling Systems

The contractor, Dearborn Midwest, reported their portion of the overall project has a planned percent complete of 96 and an earned percent completed of 94, which was an increase of eleven percent and seven percent, respectively over the previous quarter (refer to Figure 5 Material Handling Performance).

Figure 5 Material Handling Performance



During this quarter the contractor completed:

- Installing teepees and setting shelving and convey or frames in both Limestone Silos.
- Terminating cable from the Gypsum Storage Building and L-5 conveyor to the FGD electrical room.
- Installing the rotary plows for both conveyors and aligning them to the shelving.
- Installing conduit for conveyors 3A and 3B.
- Pulling cable to Transfer Tower #1 Motor Control Center.

Planned activities for the next month are:

- Complete running miscellaneous conveyor equipment without material.
- Complete punch listing of the Limestone Silo concrete work.
- Run in the rotary plows.
- Perform integrated test for conveyor operation.

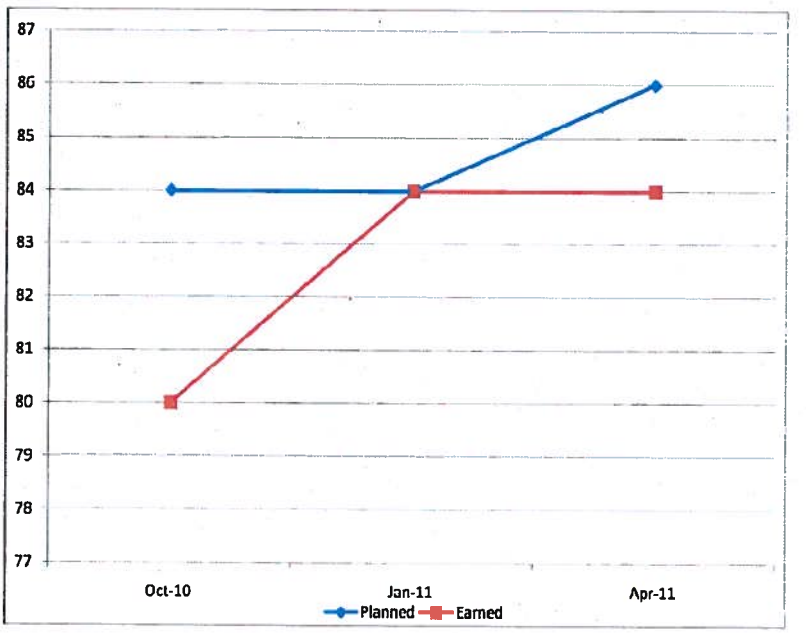
Specific item to monitor next quarter:

- Resolve final offer for the premature deteriorating paint finish of conveyor idlers.

3.4 Waste Water Treatment

The contractors, Siemens-Water Technology and Northern Peabody, reported their portion of the overall project has a planned percent complete of 86 and an earned percent completed of 84, which was an increase of two percent and zero percent, respectively over the previous quarter (refer to Figure 6 Wastewater Treatment Performance).

Figure 6 Waste Water Treatment Performance



During this quarter the contractor completed:

- Instrument Air System

Planned activities for the next month are:

- Complete remaining system walk downs.
- Continue start-up of systems with water.
- Complete all system related work.

Specific items to monitor next quarter:

- System design interface issues associated with Supplemental Wastewater Treatment

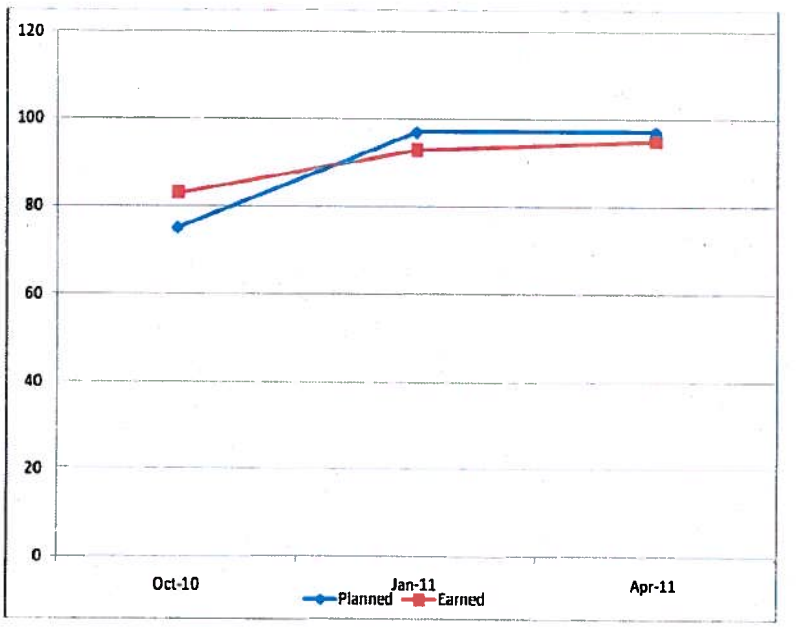
System.

- Enhanced Mercury/Arsenic System completion date/start-up plan.

3.5 Ductwork and Structural Steel Erection

The contractor, Merrill Iron and Steel Inc., reported their portion of the overall project has a planned percent complete of 97 and an earned percent completed of 95, which was an increase of zero percent and two percent, respectively over the previous quarter (referred to figure 7 Ductwork and Structural Steel Performance).

Figure 7 Ductwork and Structural Steel Performance



During this quarter the contractor completed:

- Erecting the truck wash building block wall, dry wall, and fireproofing.
- Booster fan utility bridge steel.
- Installing siding on the booster fan enclosure.
- Installing roofing on the booster fan enclosure.
- Installing fans and louvers on remaining buildings.

Planned activities for the next month are:

- Complete siding and roofing punch list items.
- Complete the Truck Wash building painting.
- Complete insulating the ductwork and expansion joints.
- Demobilize from site until U1 tie-in outage pre-work scope.

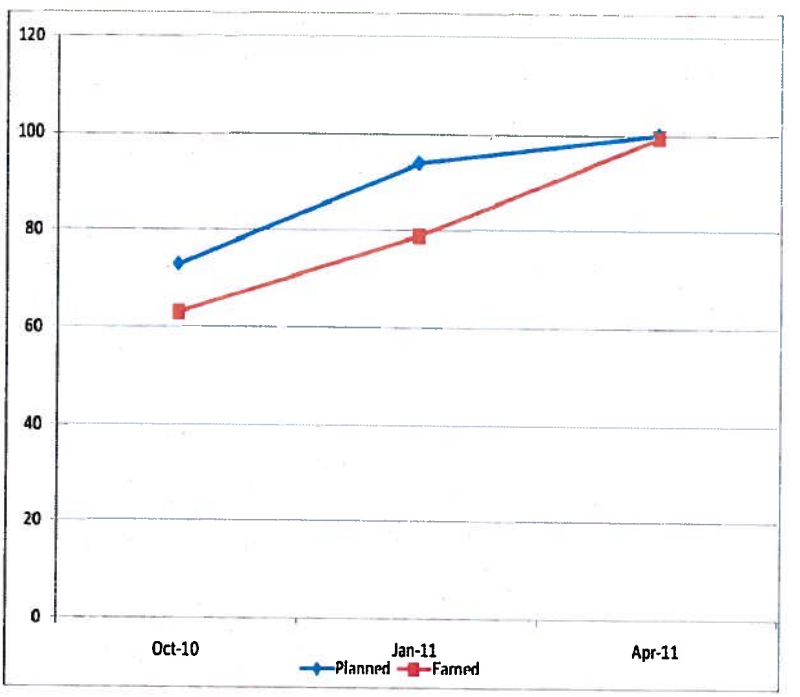
Specific items to monitor next quarter:

- Continue to refine the tie-in outage schedules for the Unit 1 and 2 Fall outages.
- Complete building architectural and heating, ventilation, and air conditioning work.

3.6 Balance of Plant Mechanical

The contractor, AZCO Inc., reported their portion of the overall project has a planned percent complete of 100 and an earned percent complete of 99.5, which was an increase of 6 percent and 21 percent, respectively over the previous quarter (refer to Figure 8 Balance of Plant Mechanical Performance).

Figure 8 Balance of Plant Mechanical Performance



During this quarter the contractor completed:

- Installing the booster fan lube oil piping.
- Flushing the booster fan lube oil piping and released the Construction turnover.
- Installing the air filter for the FGD building system.
- Installing the acid and caustic unloading station with safety shower at the existing plant.
- Pipe installation to the Truck Wash equipment.
- Installing and testing the quench-water pipe.
- Installing instrument air in the booster fan area.

Planned activities for the next month are:

- Continue Turnover of Truck Wash equipment.
- Complete installation of the Quench System associated piping.
- Complete Turnover of the Quench and Instrument Air Systems.

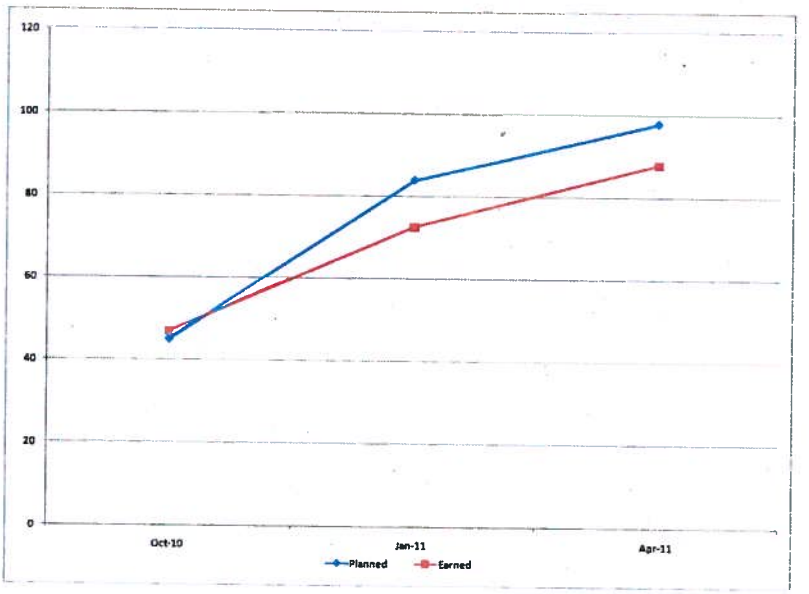
Specific item to monitor next quarter:

- Complete the Construction Turnover of the booster fans.

3.7 Balance of Plant Electrical

The contractor, E. S. Boulos Co., reported their portion of the overall project has a planned percent complete of 98 and an earned percent completed of 88, which was an increase of 14 percent and 18 percent, respectively over the previous quarter (refer to Figure 9 Balance of Plant Electrical Performance).

Figure 9 Balance of Plant Electrical Performance



During this quarter the contractor completed:

- Installing cable tray in the booster fan enclosure and utility bridge.
- Installing conduit and tray from the plant control room to the duct support steel and in the fan enclosure.
- Cable pulls and terminations for the booster fans.

Planned activities for the next month are:

- Complete all work to the booster fans.
- Continue to pull cable from the FGD to the existing Unit 1 and 2 equipment and control room.
- Remove the scaffolding in the Electrical Equipment room at Elevation 232.

Specific item to monitor next quarter:

- Installation of cable to support booster fan April Construction Turnover (CTO)

3.8 SECONDARY WASTE WATER TREATMENT

The Secondary Wastewater Treatment System was felt necessary by PSNH as a result of EPA actions concerning the timeliness of the NPDES Permit process. The installation of the Secondary Wastewater Treatment System will reduce the volume of the liquid waste to a manageable 0-5 gpm; and potentially has a beneficial re-use for fly-ash dust control or in other station processes.

A team of PSNH, Burns and McDonald, CAP Engineering, NU Purchasing and Legal was formed to obtain specifications and cost information. So far, PSNH has accomplished:

- Obtained competitive equipment pricing.
- Released engineering and long lead-time materials in early January 2011 once vendor selection and firm pricing were available.
- Developed a schedule to seek an in service date of late 2011 to support start-up.

Jacobs will initiate monitoring this addition to plant in subsequent quarterly reports.

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New Hampshire Clean Air Project
July 2011 Quarterly Report

Prepared For
New Hampshire Public Utilities Commission

September 20, 2011

JACOBS Consultancy

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July 2011 Quarterly Report

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New Hampshire Public Utilities Commission

For Jacobs Consultancy

Frank DiPalma

September 20, 2011

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1 Executive Summary

1.1 Background and Scope

The New Hampshire Public Utilities Commission (Commission), on January 26, 2010, contracted Jacobs Consultancy (Jacobs) to monitor the progress of the Public Service of New Hampshire Clean Air Project at Merrimack Power Station. Public Service of New Hampshire (PSNH) is installing a wet scrubber at its Merrimack Power Station to comply with state environmental requirements. Completion of the New Hampshire Clean Air Project is scheduled to occur in 2012 at a recently revised cost of $430M[1].

In 2002, the State of New Hampshire passed the New Hampshire Clean Power Act to address four pollutant emissions, sulfur dioxide (SO_2), nitrogen oxide (NOx), mercury (Hg), and carbon dioxide (CO_2). In 2005, Senate Bill 128 was introduced requiring mercury emissions be reduced at the Merrimack Power Station plant to 24 pounds per year through a technology identified as activated carbon injection. In 2006, The New Hampshire Clean Power Act was amended to require reduced mercury emissions by 80 percent using wet flue-gas desulphurization technology at the Merrimack Power Station no later than July 1, 2013.

Since the inception of the Clean Power Act, PSNH had begun working with engineering firms to determine appropriate technologies to meet the regulatory requirements, eventually settling on wet flue-gas desulphurization (FGD). In order to determine preliminary costs, specifications were prepared for the required major equipment and work areas. In addition to the wet FGD system, other supporting systems or "islands," as they became to be known, were materials handling for receiving and delivery of the limestone, and handling the gypsum byproduct, a chimney for discharge of the scrubbed flue gas to the atmosphere, and effluent treatment to process the blow-down water from the FGD process.

Jacobs Consultancy's scope of work is twofold:

[1] The reduced cost estimate was due to higher productivity than estimated, lower than anticipated commodity costs, and favorable weather conditions during the major construction period in 2008 through 2010. To some extent, these savings were offset by required additions including: an enhancement to the primary waste water system, a secondary water treatment system, and the potential adjustment protection system.

1) Due diligence on completed portion of the project.

2) Monitoring of the ongoing portion of the project.

The Due Diligence Report, completed in June 2011, addressed portions of the New Hampshire Clean Air Project already completed. That report covered items such as technology selected, accuracy of estimate, cost, and schedule with major deviations noted and detailed, and PSNH project controls.

This second quarterly report covering May-July 2011 focuses on monitoring of the ongoing project and tracking progress of the scrubber project noting deviations from budget and schedule and highlighting major accomplishments. The report also reflects the results of Jacobs' on-site inspection conducted on August 17, 2011, and attendance at PSNH's quarterly project status meeting.

1.2 Conclusions

- The overall project reported to be on schedule with anticipated July 2012 completion date.
- The projected costs for the Clean Air Project were unchanged at $430 million. This cost figure includes contingency and reserve funds.
- While URS Corporation (URS) and PSNH have made efforts to improve safety, the performance remains poor.

1.3 Recommendation

- Continue the concerted effort to increase emphasis on safety.

2 Overall Project Status

In this section, we discuss the overall project status and the progress during the past quarter. We will use the planned complete and the amount budgeted versus the earned complete percentage and the amount spent to determine the project performance. We will also discuss safety performance, environmental, permitting, and any emerging issues.

2.1 Project Percent Complete

PSNH has stated the overall project was 82 percent complete as of April 2011, and 86 percent complete as of July 2011. These assessments are based on completion of the entire Clean Air Project scope. The calculation mechanism is based on direct costs and excludes contingency funds. Through on our review of the supplied documents and on-site field observations, we believe PSNH assessment of percent complete maybe on the conservative side.

The project has moved from a construction effort into the start-up effort with the majority of the major contract work now complete.

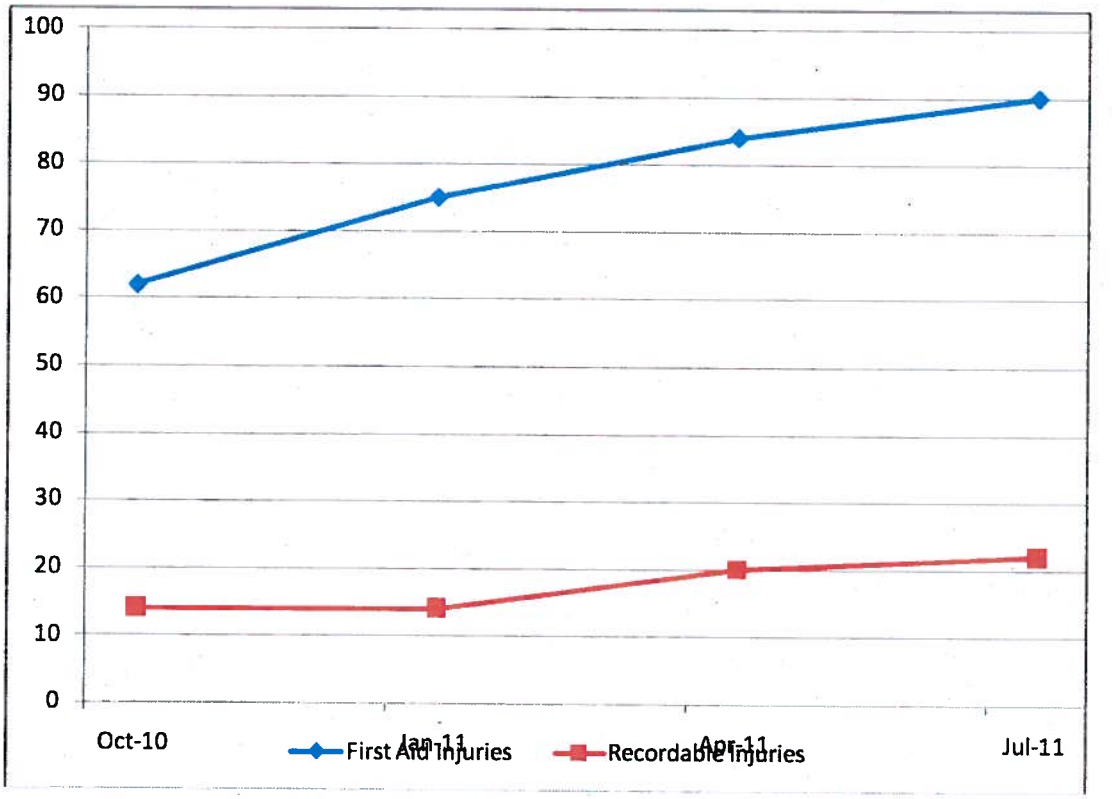
2.2 Safety

There were six first aid, two recordable injuries, and zero lost-time accidents during the last quarter as shown in Table 1 - Injuries. The project reached 1,202,527 person-hours without a lost-time accident. URS was presented their corporate recognition plaque for achieving 1,000,000 safe-work hours without a lost time injury.

Table 1 - Injuries

	Jan-11	Apr-11	July-11	Difference	Percentage Changed
First Aid Injuries	75	84	90	6	7%
Recordable Injuries	14	20	22	2	9%
Lost Time Injuries	0	0	0	0	0%

Figure 1 - Injuries Trend



- The last quarter first aid and recordable incidences accounted for seven percent of the total incidents since the beginning of the project.
- The project safety performance has continued to be poor, but has improved slightly from the last quarter. During the first two months, there were zero recordable accidents and three first-aid incidents, but in the last months, there were two recordable accidents and three first-aid injuries that occurred.
- PSNH and URS have put an emphasis on safety and now have developed the following safety initiatives:

    - Weekly management safety walkthroughs conducted with all major Clean Air Project contractors. All observations noted in the walkthroughs addressed by contractors.
    - Management Safety Steering Committee with URS, PSNH, Siemens Environmental Systems and Services, AZCO, ES Boulos, and Dearborn Midwest Conveyor Co. site management participating once per month.

- Monthly all-hands meeting with all craft to discuss safety issues, statistics, and upcoming events

2.3 Environmental and Permitting

A. Construction Permits

- Received an extension of the Temporary Air Permit, until September 30, 2012.
- Issued and received the structural and architectural building permit for the limestone truck delivery system conveyors.
- Siemens Environmental Systems and Services and Siemens Water Technologies have initiated discussions with the Bow Building Inspector to obtain Occupancy Permits for their respective buildings.
- Issued electrical building permit application for limestone truck unloading system conveyors.

3 Major Project Contracts

In this section, we discuss the project major contracts and their progress during the past quarter. All construction accomplishment performed during the past quarter will be presented in the appropriate island section. Since the project has moved from the construction phase and into the turn-over/start-up phase, we will review any outstanding item that needs to be accomplished and key project milestones.

3.1 Program Manager

URS conducted an Outage Readiness Review to assess accomplishments made by the project team regarding elements of work required to assure a successful outage. Preparation includes material procurement, work package preparation, outage infrastructure, scope definition, schedule development, and technical document completion.

The Outage Readiness Review Checklist indicated that Merrimack Units 1 and 2 Clean Air Project is 90.32 percent prepared to start the outage tie-in. During the Outage Readiness Review six items were identified as not complete and are as follows:

1. Outage duration and schedule approved.
2. Crane and rigging plan complete and coordinated with plant outage manager.
3. All risk identified — contingency plans developed.
4. Totally integrated outage schedule complete.
5. Integrated plant outage schedule published.
6. All craft specialty training completed (i.e. crane operator).

During the review, action items were recorded and are being addressed in weekly meetings to ensure outage readiness.

During this quarter the contractor was able to complete:

- Issued preliminary Site Finalization Phase 2 bid evaluation for PSNH review, secondary questions to bidders, and conducted bid review meeting.
- Issued and began review of proposals for Performance Testing Inquiry.
- Finalized the booster fan differential relay design modifications with PSNH.

- Finalized the design of the service water redundant filter and piping.
- Completed the design of the selective catalytic reduction/force draft fan limit switch interface with the Boiler Management System.

Planned activities for the next month are:

- Perform test runs on booster fans with revised CT design.
- Verify closure of Punch List items.
- Integrated Testing with complete Flue-Gas Desulfurization and Material Handling Systems.
- Continuous Emission Monitoring Systems training.

Specific item to monitor next quarter:

- None

3.2 FGD Island

During this quarter the contractor completed:

- Coating the interior of the shop fabricated tanks.
- Installation of the hold tank agitators.
- Coating the hold tank and painting the remaining tank exteriors.
- Performing system walk downs.
- Turned over six systems to start-up this month.
- Installing the valves on the fire protection risers in the stairways.
- Ball Mill motor runs.
- Ran Ball Mills empty on main motor.
- Filled the Absorber Vessel.
- Commissioned the oxidation air compressors.
- Commissioned the recycle pumps.
- Commissioned the sump pumps and agitators.
- Commissioned the Ball Mills and Reagent Prep System.
- Commissioned the vacuum pumps and belt filters.

Planned activities for the next month are:

- Complete flashing the Oxidation Air Blower Room sound attenuation panels.
- Install the Fire Water Booster Pump building foundation and set the pump.
- Complete fire proofing installation.
- Complete installing the west building wall louvers.
- Complete testing of the rotary plows.
- Achieve mechanical completion.

Specific items to monitor next quarter:

- Main areas behind schedule include FGD tanks, electrical pulls and terminations, and construction system turnovers, and preoperational checkouts.
- Siemens Environmental Systems and Services will be adding additional manpower to enhance turnaround on loop checks.

3.3 Material Handling Systems

During this quarter the contractor completed:

- Limestone storage silo exterior concrete repair.
- Loaded limestone to the storage silos from rail cars.
- Performed final integrated test on the limestone unloading system.
- Commissioning of process field bus automation communication technology to a digital control system.
- Flushed service water and air lines.

Planned activities for the next month are:

- Start to erect the limestone truck unloading system.

Specific item to monitor next quarter:

- None

3.4 Waste Water Treatment

During this quarter the contractor completed:

- .The steel for the Enhanced Mercury and Arsenic Reduction System platform and placed the concrete floor slabs.
- System hydrostatic tests.
- Start to anchor the fiberglass tanks.
- Start to install agitator blades and coat them.
- Filled hydrated lime tanks and commissioned the hydrated lime system.
- Commissioned Clarifier Rakes.
- System turnover to start-up for base scope.
- The steel for the Enhanced Mercury and Arsenic Reduction System platform monorail steel and received the fiberglass tank.
- Anchoring the fiberglass tanks and installing and coating agitator blades.
- Commissioned the sumps and agitators, hydrated lime system, reaction tanks, sludge system, filters, treated waste water, and chemical feed systems.

Planned activities for the next month are:

- Prefabricate pipe, install curbs, and receive/set equipment for Enhanced Mercury and Arsenic Reduction System.
- Achieve mechanical completion.
- Continue exercising system and prepare for wet lay-up of base system.

Specific items to monitor next quarter:

- System design interface issues associated with Supplemental Wastewater Treatment System.
- Enhanced Mercury/Arsenic System completion date/start-up plan.

3.5 Ductwork and Structural Steel Erection

During this quarter the contractor completed:

- Completed insulating the dampers and expansion joints.
- Painted the block wall in the truck wash and doorframes in other areas.
- Submitted tie-in outage schedules with an option to reduce the Unit 1 tie-in schedule.

Planned activities for the next month are:

- None

Specific items to monitor next quarter:

- None

3.6 Balance of Plant Mechanical

During this quarter the contractor completed:

- Installation of the Quench Engine diesel tank overflow alarm.
- Start-up support for the booster fans with final alignment and coupling installation.
- Commissioned variable inlet vane dampers.
- Commissioned duct dampers and seal air fans.
- Installing the Quench Engine fuel and exhaust pipe.
- Installing the booster fan lube oil piping.
- The construction turnover of the truck wash, Continuous Emission Monitoring System, and Boiler Management Systems.

Planned activities for the next month are:

- None

Specific item to monitor next quarter:

- None

3.7 Balance of Plant Electrical

During this quarter the contractor completed:

- The pulling of the cables from the duct area to existing Plant Control Room.
- Released the digital control system and uninterruptible power supply in the Plant Control Room.
- Released the Continuous Emission Monitoring System equipment to start-up.
- Commissioned Damper electrical feeders.

Planned activities for the next month are:

- None

Specific item to monitor next quarter:

- None

As the project moves towards tie-in with the Merrimack units PSNH and URS, personnel are conducting system checkouts and walk downs to provide a list of items (punch list) that needs to be accomplished. The punch list is divided into categories of items based on criticality for start-up with "A" items being the most critical. As noted in the figure below, PSNH is addressing the most critical items in a timely manner.

Table 2 - Punch List as of July 31, 2011

Items	Total	Open	Last 7 Days	Last 30 Days	Total Reported	Total Verified
A	549	20	3	29	529	343
B	617	69	4	92	548	192
C	471	272	12	66	199	13
D	56	34	0	12	22	6
Total	**1693**	**395**	**19**	**199**	**1298**	**554**

While the projects missed some of their target dates in the beginning of the quarter, they have been able to make-up delays and are accomplishing milestones on or near the target date.

Table 3 - Key Project Milestones

Milestone	Responsibility	Target Date	Forecast / Actual Completion Date
Final Set Lime Slurry Storage Tanks A & B	SWT	4/28/2011	6/30/2011 A
Complete Preoperational Checkout : Absorber	SESS	5/13/2011	6/24/2011 A
Paint/ Coatings Absorber Hold Tanks CBI	SESS	5/16/2011	6/16/2011 A
Initial Ops. Testing ABS: Absorber	SESS	5/24/2011	6/24/2011 A
Flush Low/High Pressure Lube Oil System - A	SESS	5/20/2011	6/27/2011 A
A & B Limestone Feed Available To Day Silos	SESS	6/15/2011	6/21/2011 A
Apply Clarifier Coatings	SWT	4/25/2011	6/17/2011 A
Complete Cable Pulls and Terms for Building Equipment	SESS	4/8/2011	7/11/2011 A
Mechanical Completion - Service Water	SWT	4/29/2011	7/28/2011 A
P re-Commissioning complete and ready for testing	SESS	6/112011	7/15/2011 A
WWT Island Mechanical Completion	SWT	6/1/2011	8/1/2011
Final Set Sludge Tanks	SWT	7/812011	7/13/2011 A
A & B Limestone Feed to Ball Mill	SESS	7/11/2011	7/212011 A
Mercury/Arsenic reduction Vessels - Fabrication	SWT	71142011	7/14/2011 A
A & B Ball Mill Test Run In (with 30% ball charge)	SESS	7114/2011	7113/2011 A
Mechanical Completion - Lime Slurry Feed	SWT	7/15/2011	7/26/2011 A
A & B Test/Run Dewatering System	SESS	7/25/2011	7/26/2011 A
A:& B Install Filter Cloth on Vacuum filters	SESS	7/27/2011	9/13/2011
Drain Absorber Vessel	SESS	7/28/2011	8/4/2011
FGD Island Mechanical Completion	SWT	7/2842011	81412011
DCS FAT Support at Emerson	SWT	8/1312011	8/19/2011
Fire Pump Start Up & Testing	SESS	8/23/2011	8/23/2011
Complete Integrated toting	URS	8/31/2011	8/31/2011
MK-1 Tie-in Outage Start	PSNH	9/6/2011	9/6/2011
MK-1 Electrical Tie-in complete	ESB	9/14/2011	9/14/2011
MK-1 Ductwork Tie-in complete	AZCO/MIS	9/24/2011	9/24/2011
MK -2 Tie-in Outage Start	PSNH	10/13/2011	10/13/2011
MK-2 Unit Electrical Tie-in complete	ESB	10/26/2011	10/26/2011
MK-2 Unit Ductwork Tie-in complete	AZCO/MIS	11/3/2011	11/3/2011
Complete MK1 Tie-in CEM Performance tests	URS	11/4/2011	11/4/2011
EMARS Mechanical Completion	SWT	11/30/2011	11/23/2011
Complete MK2 Tie-in CEM Performance tests	URS	12/5/2011	12/52011
Perform U1 & U2 FGD Performance Test	SESS	1/20/2012	1/20/2012
Perform VVVVT Performance Test	SWT	3/13/2012	3/13/2012
PROJECT COMPLETE	URS	4/1/2012	4/1/2012

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Frank DiPalma

December 22, 2011

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1 Executive Summary

1.1 Background and Scope

The New Hampshire Public Utilities Commission (Commission), on January 26, 2010, contracted Jacobs Consultancy (Jacobs) to monitor the progress of the Public Service of New Hampshire (PSNH) Clean Air Project at Merrimack Power Station. PSNH is installing a wet scrubber at its Merrimack Power Station to comply with state environmental requirements. The forecast project completion cost was originally $457M. In the fall of 2010, this forecast cost was revised downward to $430M. As of September 30, 2011, the project forecast cost was further revised downward to $422M. Completion of the PSNH Clean Air Project is scheduled to occur in 2012 at a recently revised cost of $422M[1].

In 2002, the State of New Hampshire passed the New Hampshire Clean Power Act to address four pollutant emissions, sulfur dioxide (SO_2), nitrogen oxide (NOx), mercury (Hg), and carbon dioxide (CO_2). In 2005, Senate Bill 128 was introduced requiring mercury emissions be reduced at the Merrimack Power Station plant to 24 pounds per year through a technology identified as activated carbon injection. In 2006, The New Hampshire Clean Power Act was amended to require reduced mercury emissions by 80 percent using wet flue-gas desulphurization technology at the Merrimack Power Station no later than July 1, 2013.

Since the inception of the Clean Power Act, PSNH had begun working with engineering firms to determine appropriate technologies to meet the regulatory requirements, eventually settling on wet flue-gas desulphurization (FGD). In order to determine preliminary costs, specifications were prepared for the required major equipment and work areas. In addition to the wet FGD system, other supporting systems or "islands," as they became to be known, were materials handling for receiving and delivery of the limestone, and handling the gypsum byproduct, a chimney for discharge of the scrubbed flue gas to the atmosphere, and effluent treatment to process the blow-down water from the FGD process.

[1] The reduced cost estimate was due to higher productivity than estimated, lower than anticipated commodity costs, and favorable weather conditions during the major construction period in 2008 through 2010. To some extent, these savings were offset by required additions including: an enhancement to the primary waste water system, a secondary water treatment system, the electrical potential adjustment protection system for the scrubber absorber vessel, and the booster fans recirculation systems.

Jacobs Consultancy's scope of work is twofold:

1) Due diligence on completed portion of the project.
2) Monitoring of the ongoing portion of the project.

The Due Diligence Report, completed in June 2011, addressed portions of the PSNH Clean Air Project already completed. That report covered items such as technology selected, accuracy of estimate, cost, and schedule with major deviations noted and detailed, and PSNH project controls.

This third quarterly report covering August-October 2011 focuses on monitoring of the ongoing project and tracking progress of the scrubber project noting deviations from budget and schedule and highlighting major accomplishments. The report also reflects the results of Jacobs' on-site inspection conducted on November 16, 2011, and attendance at PSNH's quarterly project status meeting.

1.2 SUMMARY OF PROJECT'S IN-SERVICE STATUS

- Unit 1 initiated a very successful start-up on Saturday, September 24, 2011. Concurrently, the Clean Air Project systems were prepared for operations. At 3:18PM on Sunday, September 25, 2011, the unit was phased on-line, was providing power to the grid, and was released to the Independent System Operator-New England (ISO-NE) for dispatch. At about 10:00 PM on Sunday, the unit obtained full load operations.
- Upon scrubber start-up, the flue gas from Unit 1 was passed through the absorber vessel where it came into contact with the limestone reagent slurry. This contact provided means for a chemical reaction between the limestone reagent and the emissions compounds in the flue gas, specifically the sulfur, producing calcium sulfate, which is synthetic gypsum. The synthetic gypsum has commercial value, most notably as raw material for the filler in wall board, and will be sold.
- The new Continuous Emissions Monitoring (CEM) system indicated the scrubber was achieving initial SO_2 reductions of 90% or higher with Unit 1 on-line.
- As noted in Revised Statutes Annotated (RSA) 125-O:15, the statutory mandate the required the installation of the scrubber to reduce mercury emissions, the mercury

quantities in the units' emissions are so small that the measurement tools that have been presently developed as part of the CEM systems are not capable of reliably providing accurate, repeatable results. Presently, pursuant to RSA 125-O:15, the mercury emissions are to be determined by manual stack testing. This testing is planned to be performed in late 2011.

- Following two days of observation and successful operation the scrubber system was officially deemed to be in-service and "used and useful in the generation of electricity" on September 28, 2011.
- Unit 2 was undergoing an outage for tie-in purposes at the end of October and was to be tied to the scrubber in mid-November. (Note – as of the quarterly review meeting on November 16, Unit 2 was tied-in to the scrubber and fully operational)

1.3 CONCLUSIONS

- The overall project is reported to be on schedule with anticipated July 2012 completion date. Based on the very successful, early start-up of both units to the scrubber systems, the Clean Air Project should most definitely meet this start-up date.
- The projected costs for the Clean Air Project were revised downward to $422 million on September 30, 2011. This cost figure includes contingency and reserve funds.
- URS Corporation (URS) and PSNH have made efforts to improve safety; however the overall project safety performance has been less than favorable. For the most recent quarter, there were fewer safety incidences than in previous quarters, but one has to wonder if this is due to increased safety awareness or fewer craft personnel on the site.

1.4 RECOMMENDATION

- Continue the concerted effort to increase emphasis on safety. Project close out is typically a time when personnel lose focus on safety and become more focused on leaving the site. Increased vigilance is in order through the complete close out of the project.

2 Overall Project Status

In this section, we discuss the overall project status and the progress during the past quarter. We will use the planned complete and the amount budgeted versus the earned complete

percentage and the amount spent to determine the project performance. We will also discuss safety performance, environmental, permitting, and any emerging issues.

2.1 Project Percent Complete

PSNH has stated the overall project was 86 percent complete as of July 2011, and 89.5 percent complete as of October 2011. These assessments are based on completion of the entire Clean Air Project scope. The calculation mechanism is based on direct costs and excludes contingency funds. Through on our review of the supplied documents and on-site field observations, we believe PSNH assessment of percent complete maybe on the conservative side.

The project has moved from a check out and start-up effort to an operational one. The majority of the major contract work, other than the secondary waste water facility, is now complete with punch list items remaining.

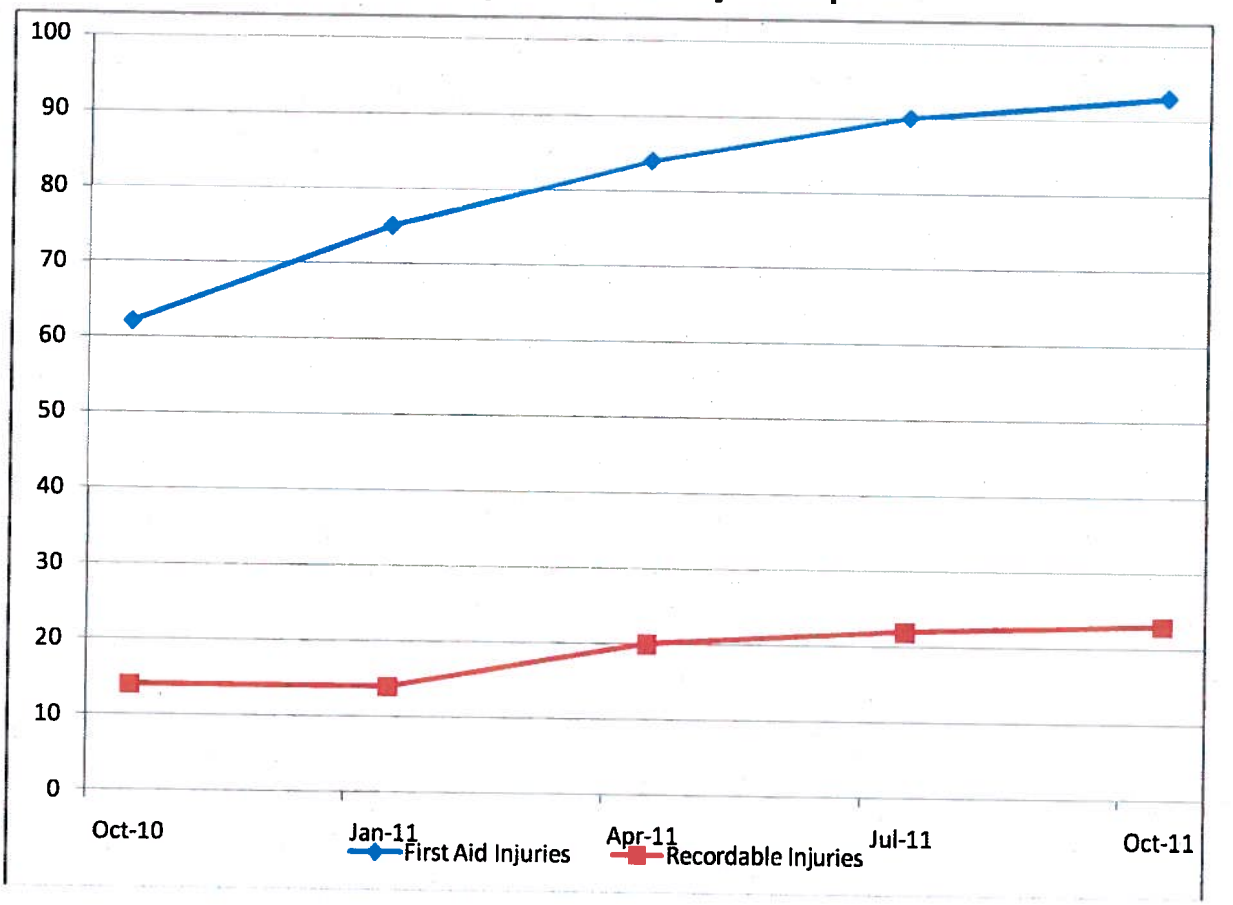
2.2 Safety

Table 1 - Injuries shows the cumulative first aid injuries, recordable injuries, and lost time accidents since project inception. Between July and October 2011, there were three first aid injuries and one recordable injury, and zero lost-time accidents. The project has reached 1,277, 831 person-hours without a lost-time accident.

Table 1 - Injuries

	Jan-11	Apr-11	July-11	October-11	Difference	Percentage Changed
First Aid Injuries	75	84	90	93	3	3%
Recordable Injuries	14	20	22	23	1	4%
Lost Time Injuries	0	0	0	0	0	0%

Figure 1 - Injuries - Since Project Inception



- The last quarter first aid and recordable incidences accounted for three percent of the total incidents since the beginning of the project.
- The project safety performance has been poor, but has improved slightly as the project comes to a close. Hopefully, the drop in injuries is attributable to the increased effort by all involved. However, some of the improvement comes from a rapidly decreasing work force.

2.3 Environmental and Permitting

A. Environmental

- During November, the CEM systems will have a Relative Accuracy Test Audit (RATA)
- Beginning in December, the scrubber system will have an extensive performance test

performed

B. Construction Permits

- Working with the Town of Bow Planning Board for a building permit for the Soda Ash Silo installation
- Dearborn Midwest Conveyor Co., the Materials Handling System supplier, has resubmitted the electrical building permit application for the limestone truck unloading system conveyors to address the 3rd party review comments.

3 Major Project Contracts

In this section, we discuss the project major contracts and their progress during the past quarter. All construction accomplishment performed during the past quarter will be presented in the appropriate island section. Since the project has moved from the construction phase and into the turn-over/start-up phase, we will review any outstanding items that need to be accomplished and key project milestones.

3.1 Program Manager

URS activity for the past quarter has been centered on supporting the check out and start-up functions. The activities were:

- Continued working on plant system turnover packages in support of operations
- Coordinated tie-in sequencing
- Continued working with PSNH and other contractors on resolving the punch list items
- Met with New Hampshire Department of Environmental Services to review CEM systems RATA protocol
- Prepared design for the installation of recirculation ductwork and dampers around the booster fans
- Performed review of vendor submittals for the water softening scope for the Wastewater Treatment System in support of the Secondary Wastewater Treatment System
- Continued investigation of the service water system operation and development of potential modifications to enhance operation
- Supported PSNH in review and analysis of operating the scrubber at 12,000 ppm Chlorine

Planned activities for the next month are:

- Continue submitting system turnover packages to PSNH
- Continue to work with island contractors to resolve punch list items
- Continue engineering support for the installation completion of the recirculation ductwork and dampers for the booster fans
- Assist in sizing the seal air fan for the mansafe dampers at the booster fans
- Provide support as needed for the truckwash commissioning
- Develop recommendations on limiting service water system pressure
- Support scrubber system performance testing which is schedule to being in late 2011

Specific item to monitor next quarter:

- None

3.2 FGD Island

During this quarter the contractor completed:

- Achieved mechanical completion of the scrubber system
- Received occupancy permits for the scrubber buildings
- Very successfully began operation of the scrubber system
- Worked on punch list items and performed painting and clean up of the scrubber building
- Completed the installation of the filter presses and produced gypsum
- Completed fireproofing in the scrubber building

Planned activities for the next month are:

- Work to complete the punchlist
- Continue painting and building clean up
- Tune the scrubber system equipment for two unit operation
- Support the RATA test
- Participate in the system performance tests

Specific items to monitor next quarter:

- None

3.3 Material Handling Systems

During this quarter the contractor completed:

- The Material Handling System was put into operation and supplied the limestone to the scrubber system
- There was some level of difficulty in the operation of the feeders that remove the limestone from the silos
- Completed installation of the truck unloading feeder

Planned activities for the next month are:

- Perform an evaluation and possible testing of the silo unloading systems to determine the source of the feed operation problems
- Develop a plan and recommendations for possible modifications to the silo unloading feeders

Specific item to monitor next quarter:

- The evaluation of the silo unloaders and recommendations for modifications

3.4 Waste Water Treatment

During this quarter the contractor completed:

- Received occupancy permit for building
- Completed construction testing of the Enhanced Mercury and Arsenic Reduction System (EMARS) piping systems
- Performed checkout of the EMARS
- Began flowing water through the system
- Began installation of the Soda Ash Silo foundation

Planned activities for the next month are:

- Complete the installation of the Soda Ash system
- Operate the base water treatment system
- Complete commissioning the EMARS

Specific items to monitor next quarter:

- Continue evaluating and determining system design interface issues associated with Supplemental Wastewater Treatment System.

3.5 SECONDARY WASTEWATER TREATMENT

During this quarter, the contractor completed:

- Continued construction of the Secondary Wastewater Treatment System

Planned activities for the next month:

- Continue construction of the system
- Prepare check out and start up activities
- Continue coordination efforts and interface issues with the base Wastewater Treatment System

3.6 Ductwork and Structural Steel Erection

During this quarter the contractor completed:

- Completed installation of ductwork and performed tie-in of Unit 1 with the scrubber
- Worked on installing the recirculation ductwork and dampers for the booster fans

Planned activities for the next month are:

- Complete tie-in of Unit 2 to the scrubber
- Continue installation of the booster fan recirculation systems

Specific items to monitor next quarter:

- None

3.7 Balance of Plant Mechanical

During this quarter the contractor completed:

- Operation of the booster fans - There is a need to improve control response of the booster fans. PSNH stated this was identified as a potential issue early on in the project and it was determined to wait and see if the control actually was an issue at start-up. It has become an issue. Subsequently, it was decided to install recirculation systems of the fans, consisting of ductwork and dampers. This alternative was selected in lieu of installing more expensive Variable Frequency Drives (VFD) to the fan motors which would result in variable speed operation. While more expensive, the VFD system is a more efficient system
- Truck scale foundation was completed
- Trench modifications were completed near the ammonia tank farm and begun near the truck wash

Planned activities for the next month are:

- Complete the asphalt roads
- Continue truck scale foundation
- Complete installation of a redundant service water strainer
- Commission the truck wash system

Specific item to monitor next quarter:

- None

3.8 Balance of Plant Electrical

During this quarter the contractor completed:

- Completed Unit 2 tie-in work

Planned activities for the next month are:

- Complete cable tray covers and building seal work

Specific item to monitor next quarter:

- None

As the project moves towards tie-in with the Merrimack units, PSNH and URS personnel are conducting system checkouts and walk downs to provide a list of items (punch list) that need to be accomplished. The punch list is divided into categories of items based on criticality for start-up with "A" items being the most critical. As noted in Table 2 below, PSNH is addressing the most critical items in a timely manner.

Table 2 - Punch List as of October 31, 2011

Items	Total	Open	Closed Last 7 Days	Closed Last 30 Days	Total Reported	Total Verified
A	589	13	4	41	576	531
B	690	50	21	35	640	578
C	535	68	13	35	476	300
D	54	32	1	1	22	20
Total	**1868**	**163**	**29**	**112**	**1705**	**1429**

- While some target dates were missed in the beginning of the quarter, they have been able to make-up delays and are accomplishing milestones on or near the target date. As of quarterly review meeting, the punch list consisted of 0 Category A items and 7 Category B items.

Table 3 - Key Project Milestones

Milestone	Responsibility	Target Date	Forecast / Actual Completion Date
MK-2 Tie-In Outage Start	PSNH	10/13/2011	10/12/2011 A
MK-2 Unit Electrical Tie-In complete	ESB	10/26/2011	10/26/2011 A
MK-2 Unit Ductwork Tie-In complete	AZCO/MIS	11/3/2011	11/8/2011
U1 Booster fan recirculation work complete	AZCO/MIS	11/10/2011	11/9/2011
U1 Booster fan recirculation work complete	AZCO/MIS	11/10/2011	11/9/2011
MK-1 Cold Air Fan testing	URS	11/11/2011	11/10/2011
MK-2 Cold Air Fan testing	URS	11/12/2011	11/12/2011
Complete MK1 Tie-in RATA testing	URS	11/4/2011	11/15/2011
EMARS Mechanical Completion	SWT	11/30/2011	11/23/2011
Complete MK2 Tie-in CEM Performance	URS	12/5/2011	12/5/2011
Perform U1 & U2 FGD Performance Test	SESS	1/20/2012	12/12/2011
Perform WWT Performance Test	SWT	3/13/2012	3/13/2012

WWT Island Substantial Completion	URS	4/1/2012	4/1/2012

JACOBS Consultancy

REDACTED

New Hampshire Clean Air Project
Due Diligence on Completed Portion

Prepared For
New Hampshire Public Utilities Commission

June 2011

New Hampshire Clean Air Project
Due Diligence on
Completed Portion Report

Prepared For

New Hampshire Public Utilities Commission

For Jacobs Consultancy,

Frank S. DiPalma

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June 2011

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1 Executive Summary

Background and Scope

The New Hampshire Public Utilities Commission (Commission) retained Jacobs Consultancy to monitor the progress of the Public Service of New Hampshire Clean Air Project at Merrimack Power Station. Public Service of New Hampshire (PSNH) is installing a wet scrubber at its Merrimack Power Station to comply with state environmental requirements. The New Hampshire Clean Air Project completion is planned to occur in 2012 at a recently reduced estimated cost of $430M. Jacobs Consultancy's scope of work is twofold: first, to complete a due diligence review on the completed portion of the project and second, to monitor the project through completion.

In 2002, the State of New Hampshire passed the New Hampshire Clean Power Act to address four pollutant emissions, sulfur dioxide (SO_2), nitrogen oxide (NOx), mercury (Hg), and carbon dioxide (CO_2). In 2005, Senate Bill - 128 was introduced requiring mercury emissions be reduced at the Merrimack Power Station plant to 24 pounds per year through a technology identified as activated carbon injection. In 2006, The New Hampshire Clean Power Act was amended to require reduced mercury emissions by 80% using wet flue-gas desulphurization technology at the Merrimack Power Station no later than July 1, 2013.

Since the inception of the Clean Power Act, PSNH had begun working with engineering firms to determine appropriate technologies to meet the regulatory requirements, eventually settling on wet flue-gas desulphurization (FGD). In order to determine preliminary costs, specifications were prepared for the required major equipment and work areas. In addition to the wet FGD system, other supporting systems or "islands", as they became to be known, were materials handling for receiving and delivery of the limestone and handling the gypsum byproduct, a chimney for discharge of the scrubbed flue gas to the atmosphere, and effluent treatment to process the blow-down water from the FGD process. Through a bidding process, eventually Siemens Environmental Systems and Services was selected to supply the FGD system. The selection was based on both price and mercury removal warranties.

Approach and Assessments

Jacobs Consultancy completed its due diligence review using a process consisting of four stages:

1) Project Initiation – involved the initial conference call/meetings with the Commission and PSNH to provide a thorough understanding of the Commission's expectations, as well as an orientation to the PSNH Clean Air Project.
2) Investigation, Data Gathering and Fact-Finding – a detailed review to opine if the appropriate controls, systems, and processes were in place and if PSNH properly executed its plans. This process includes collecting data and metrics, conducting interviews with PSNH personnel, and identifying current key processes, policies, practices, and procedures. Because of pending litigation against PSNH, extensive delays associated with document confidentiality were encountered in obtaining and securing data through the discovery process. In addition, the amount of discovery reviewed was extensive amounting to almost 3,000 pages.
3) Analysis – made use of both quantitative and qualitative assessment techniques. Quantitative assessments are based on the information gathered through our review of documents and qualitative assessments are based on the information gathered during interviews.
4) Reporting – includes periodic project updates and status reports in addition to the Draft and Final reports. We report our results in terms of findings, conclusions, and, if warranted, recommendations to the Commission.

In conducting our due diligence assessment PSNH's Clean Air Project at Merrimack Power Station, we focused on a number of discrete assessments:

Large Project Review Process - PSNH procurement, risk review, approval, and contracting strategy process are well developed for reviewing projects of this size. In addition to numerous Northeast Utilities' internal assessments, risk mitigation factor considerations and approvals, PSNH sought to seek the most appropriate contracting strategy. It did so by conducting an FGD installation cost comparison, and a study to understand market conditions and their impact on large construction projects.

Cost Estimates - Large projects typically go through a series of project estimate stages, depending on the level of information available and cost estimate parameters. As projects move from conceptual design through detailed engineering design and pre-construction design to construction, estimates become better defined and refined. PSNH's process for developing the project estimate chain follows this sequence with the initial conceptual estimate, the detailed Clean Air Project estimate, and the current estimate. The initial estimate of $250M, developed by Sargent and Lundy, was based on existing FGD designs and installations, did not contain any specific mercury or sulfur dioxide guarantees, PSNH costs, or site-specific needs. The Clean Air Project estimate of $457M was developed by PSNH with the support of the program manager, URS. This detailed estimate contained an actual proposal price with mercury and sulfur dioxide guarantees, all PSNH costs including AFDC, as well as specific-site needs. Jacobs was able to reconcile the 2006 conceptual estimate and the 2008 detailed Clean Air Project estimates by taking into account the factors cited above, as well as the impact of extensive inflationary pressure on certain commodities and materials, which occurred during that period. Since the Clean Air Project estimate in 2008, there have been several itemized reductions and additions, and as a result, the current estimate for the project is now $430M.

Project Schedule - While the statutory obligation completion date of the mandated Clean Air Project is mid 2013, the detailed 2008-project schedule projected an in-service date of mid 2012. When Jacobs reviewed the schedule and verified actual construction, it was evident the completion date shown in the schedule was both reasonable and attainable.

Project Management Approach - Along with providing its own internal oversight, PSNH made use of two leading engineering firms to help manage the project. URS Corporation (URS) was employed as program manager and R.W. Beck as independent engineer. As the program manager, URS performs the engineering, procurement, and construction management role; and as independent engineer, R.W. Beck provides an independent third-party oversight of the engineering, procurement, and construction functions. PSNH's oversight role, as clearly defined in its Clean Air Project Manual, consists of three essential elements: 1) project manager contract management, 2) project schedule control, and 3) project cost control. These established safeguards for project overview and control are ensuring the Clean Air Project is controlled and managed effectively.

Construction Approach – Even with the series of contract safeguards previously described, actual construction is not necessarily assured to proceed smoothly. There are critical elements ranging from how the project is divided, to the interaction among independently constructed portions of the project – in this case the four islands. In addition, knowing the physical congestion present at Merrimack Power Station, safety assurance is critical. Given the size and complexity of the Merrimack project, the construction approach has functioned as planned. The various contractors have worked well together and produced a project that has been on schedule and within budget.

Safety – The safety performance has not been good. A common indicator for safety for the construction industry is Recordable Incident Rate (RIR), which is an indication of recordable incidents per 200,000 hours worked. While there are multiple databases against which safety performance can be compared, the RIR for the Merrimack Clean Air Project has fallen above (worse) the URS set target of 0.9 and well above the Construction Industry Institute average of 0.64.

Conclusion

The project has been a well-defined and documented effort. The PSNH team did a thorough analysis of the requirements up-front, availing themselves of various industry specialists to strengthen their findings. They followed rigid corporate procedures to ensure compliance with regulatory and prudent business requirements. The selection process for a program manger was an exhaustive and fruitful procedure followed by equally exhaustive processes for selecting equipment suppliers and contractors. PSNH has strong processes in place to effectively control the project and it appears both the schedule and final project cost estimate are attainable.

In Jacobs Consultancy's opinion, the overall Clean Air Project development, execution, and control are a success, with the exception of the poor safety performance. Consequently, Jacobs is making the following recommendation.

Recommendation

It is recommended both PSNH and URS management place renewed emphasis on safety for the remainder of the project and additional trained safety professionals be assigned to the project. In Jacobs' experience, the best arrangement would be for a safety professional to be assigned exclusively to one of the four islands working closely with each lead contractor and their sub-contractors.

2 Background

This initial report section discusses Jacobs Consultancy's scope of work and how we methodically approached it through our four-stage process. We also provide an overview of how the report is organized. In addition, we address the New Hampshire Clean Power Act and the technology Public Service of New Hampshire (PSNH) had to utilize in an effort to control the mercury content and sulfur emissions of the coal burned at the Merrimack Power Station.

2.1 Jacobs' Role

The New Hampshire Public Utilities Commission (Commission) on January 26, 2010, contracted Jacobs Consultancy to monitor the progress of the Public Service of New Hampshire Clean Air Project at Merrimack Power Station. PSNH is installing a wet scrubber at its Merrimack Power Station to comply with state environmental requirements. Planning of the New Hampshire Clean Air Project completion is scheduled to occur in 2012 at a recently revised cost of $430M.

Jacobs Consultancy's scope of work is twofold:

1) Due diligence on completed portion of the project.
2) Monitoring of the ongoing portion of the project.

The due diligence report is intended to cover items such as technology selected, accuracy of cost estimates, cost and project schedule with major deviations noted and detailed, and PSNH project controls. While the quarterly monitoring of the ongoing project reports will track progress of the scrubber project noting deviations from budget and schedule and highlighting major accomplishments. This report addresses portions of the New Hampshire Clean Air Project already completed.

2.2 Jacobs' Approach

Jacobs Consultancy employed a workflow process to accomplish the investigation in an efficient and concurrent approach that uncovers key issues concerning the Clean Air Project. Our team

conducted this review using a process that consisted of four principal stages: 1) Project Initiation, 2) Investigation, Data Gathering and Fact-finding, 3) Analysis, and 4) Reporting.

Project Initiation Stage

This stage involved the initial conference call/meetings with the Commission and PSNH and was intended to provide us with a thorough understanding of the Commission's expectations, as well as introductions, logistics, and Clean Area Project orientation at PSNH.

Investigation, Data Gathering, and Fact-Finding Stage

Based on the detailed work plan and schedule as mutually determined in the Project Initiation Stage, we began the detailed review of PSNH to opine if essentials such as the appropriate project controls, systems, and processes were in place, and if PSNH properly executed its plans relative to the scrubber installation. This process includes:

- Collecting data and metrics, including pre-filed testimony. The amount of data collected and reviewed was extensive and amounted to almost 3,000 pages. A list of our document requests is contained in Section 8.1 in the Appendix.
- Conducting interviews with PSNH personnel.
- Identifying current key processes, policies, practices, and procedures for the functional areas.
- Providing ongoing communications and project status as mutually determined with the Department.

Because of pending litigation against PSNH, we encountered extensive delays associated with document confidentiality. Specifically, in obtaining and securing data through the discovery process.

Analysis Stage

Our analysis made use of quantitative and qualitative assessment techniques:

- **Quantitative Assessments** - based on the information gathered through our review of documents.

- **Qualitative Assessments** - based on the information gathered during interviews with knowledgeable individuals and the professional experience of our consulting team.

Reporting Stage

This is an ongoing process consisting of periodic project updates and status reports in addition to the Draft and Final reports. The status reports include a summary of completed activities, observations and findings, project issues, and project budget status in the format approved by the Commission.

Following the completion of the analysis stage, we will report our results in terms of findings, conclusions, and if warranted, recommendations to the Commission.

- **Findings**—represent facts supporting strengths, weaknesses, opportunities, and threats that can be directly tied to documents, interviews, or observations.
- **Conclusions**— summarize and represent our assessment of the related findings and our opinion regarding proposed opportunities for improvements associated with a specific topic. Our conclusions may lead to recommendations.

2.3 Report Organization

The Executive Summary provides an overview of our report's key findings and conclusion.

The body of our report is divided into five sections, generally along functional lines. The five sections are Large Project Review and Contracting Strategy, Cost Estimates, Project Schedule, Project Management Approach and Construction Approach. Each section contains an overall assessment, background, and analysis of specific topics. Overall assessments are narrative statements of conclusion that provides a summary of our general perception of the function or topic. In the various sections, we address 17 specific topics. For each specific topic, we present our analysis in the form of findings and conclusions as appropriate.

In the report's Appendix, we have included Jacobs' document requests, acronyms, industry terms and a description of the various project contracts required.

2.4 What Law Required PSNH to Do

In July 2002, the state of New Hampshire passed the New Hampshire Clean Power Act (NHCPA), also known as the Multiple Pollutant Reduction Program; RSA 125-O. NHCPA addressed four pollutant emissions: sulfur dioxide (SO_2), nitrogen oxide (NOx), mercury (Hg), and carbon dioxide (CO_2). This Act, amended in June 2006, specifically required PSNH to reduce mercury emissions by 80% using wet flue-gas desulphurization (FGD) technology. The Act also limited the SO_2 credits available to PSNH.

2.5 Technology Employed

PSNH had to reduce 80% of the aggregated mercury content of the coal burned at the Merrimack Units 1 and 2 and Schiller Units 4, 5 and 6; and as a co-benefit, expected a 90% reduction in sulfur emissions. To accomplish these objectives, the law required the best-known commercially available technology, a wet flue-gas desulphurization (FGD) system installed at the plant no later than July 1, 2013. The NHCPA also mandated a reduction in the sulfur dioxide (SO_2) credits available to Merrimack Station to comply with Federal Acid Rain requirements.

For several years before House Bill 1673 passed in May 2006, the subject of mercury removal had been an ongoing issue at the PSNH facilities. In January 2005, Senate Bill - 128 was introduced, requiring mercury emissions be reduced at the Merrimack plant to 24 pounds per year. Senate Bill -128 identified Activated Carbon Injection (ACI) as the technology employed to achieve this level of mercury removal.

While ACI technology had long been utilized in the Waste-to-Energy industry to remove mercury, it was unknown if it would remove mercury to the level being proposed by Senate Bill - 128. During the summer of 2005, the units at Merrimack underwent testing using a well-developed and extensive test protocol. The results showed that ACI would not meet the stringent requirements proposed by Senate Bill 128[1].

[1] DR 025 Janus Report Part 1

Since ACI failed to show promise of meeting the mercury removal mandate, and the fact House Bill -1673 stipulated the technology be wet FGD, PSNH began working with several engineering firms to determine the potential of the FGD technology meeting the requirement and to determine preliminary costs[2]. Specifications were prepared for the major equipment that would be needed – the FGD system being the primary one. The other associated equipment installation work areas or "islands", as they became to be known, were essentially supporting systems for the FGD. The islands identified were the materials handling for receiving and delivery of the limestone and handling gypsum byproduct, a chimney for discharge of the scrubbed flue gas to the atmosphere, and effluent treatment to process the blow-down water from the FGD process. The work area islands are further described in Section 4.2. The technologies selected for these ancillary systems are commonly utilized processes and the type of technology is not an issue; the only unproven technology for the intended purpose was the FGD system itself. While wet FGD systems have been in operation for decades for sulfur removal, the Merrimack plant FGD requirement was the first in the United States to mandate mercury removal as a function and require a guarantee for the percent removed.

PSNH and URS Corporation (URS), the program manager, prepared a comprehensive specification for the process and issued it for bid from reputable FGD system suppliers. PSNH received bids from three of the most respected names in the FGD industry, who offered similar equipment in their proposals consisting of the type commonly used for sulfur removal with enhancements to reduce the mercury emitted. Only one of the bidders, Siemens Environmental Systems and Services (SESS) was willing to guarantee the mandated mercury removal percentage, and SESS had the lowest evaluated cost and the highest overall evaluation[3], and consequently was selected by PSNH. In their evaluation, PSNH did a commendable job evaluating the technology and the supplier, and initiated the practical enhancements needed to ensure success for the system. PSNH, in Jacobs' opinion, chose the proper technology for the Merrimack installation, but this opinion is based on the assumption the technology will prove out after thorough testing and evaluation.

[2] The decision to utilize wet FGD technology is further discussed in Section 4.1 - Initial Conceptual Estimate.
[3] DR 025 Janus Report Part 2

2.6 Findings

- New Hampshire law requires a reduction of 80% in mercury from coal fired power generation facilities of PSNH.
- In 2005, PSNH tested ACI technology for mercury reduction with unsatisfactory results.
- New Hampshire Department of Environmental Services determined wet flue-gas desulphurization is the best-known commercially available technology for mercury reduction.
- New Hampshire law requires the installation and operation of scrubber technology by July 1, 2013, at the Merrimack Power Station.
- Three viable wet FGD proposals were received; however, only one of the bidders, Siemens Environmental Systems and Services, was willing to guarantee the mandated mercury removal percentage.

2.7 Conclusions

PSNH did a thorough investigation of similar FGD installations and was able to confirm the technology decision mandated by the legislation. Through the competitive bidding process, only one supplier, Siemens Environmental Systems and Services – the supplier eventually selected, was willing to guarantee the level of mercury removal. In Jacobs' opinion, PSNH chose the proper technology for the Merrimack installation, but this opinion is based on the assumption the technology will prove out after thorough testing and evaluation.

3 Large Project Review and Contracting Strategy

In this section, we discuss Northeast Utilities' (NU)/PSNH procurement, risk review, approval, and contracting strategy process. We also comment on the contracting strategy study performed by R.W. Beck and its findings and conclusions. Further, we comment on the study performed by Power Advocate, Inc. related to market conditions associated with capital construction projects and retrofit scrubber projects.

3.1 Large Project Review Process

The Clean Air Project, at a cost of $457M, clearly qualifies as a large project; and was therefore subjected to NU's Large Project Review Process.

Northeast Utilities (NU) has a well-developed process for reviewing large projects. This process has several review committees that must signoff before NU Purchasing will release any RFP. The following described is the threshold and process for large project procurement:

All NU project procurements, that exceed $5M for a project, are subject to the Large Project Review Process and review by their Risk Management Council[4]. The objectives of Large Project Review Process[5] are to conduct risk analysis, ensure prudence/due diligence, provide lowest total cost and manage "What If" scenarios. To meet these objectives the process encompasses:

Contract Risk Mitigation

- Identify Project Risk
- Develop Risk Mitigation Strategy for RFP Development and Contract Negotiations
- Corporate Acknowledgement of Risk

[4] DR JC-023 NU Purchasing Policy Manual
[5] DR JC-023 ERMC Large Project Process

Ensure Prudence/Due Diligence

- Documentation of Detailed Evaluations and Negotiations
- Documentation of RMC Concurrence
- Provide for Lowest Total Cost of Ownership

Cost/Benefit of Risk Mitigation

- Provide For Clear Understanding of Roles and Responsibilities of Core Project Team and Support Departments
- Manage "What If" scenarios from a Cost, Execution, and Legal Perspective

NU's Large Project Review Process allows for a structured and consistent approach to contracting for projects. It standardizes the signoff and approval process and reporting requirements. It also establishes the participation of the core team, risk management, and executive risk management panel. If the procurement exceeds $25M an Executive Risk Management Council (ERMC) review is also required.

Prior to the approval of any purchase order valued at $10M or more, associated with existing projects, the NU director of purchasing will confirm the Risk and Capital Committee has reviewed the purchase order and the NU chief executive officer (CEO) has approved the expenditure.

Risk and Capital Committee and Executive Risk Management Council[6]

The Risk and Capital Committee (RaCC) of Northeast Utilities, together with its subsidiaries, has the responsibility for ensuring NU is prudently managing its principal enterprise-wide risks. Specifically the RaCC will:

- Provide oversight for the development and implementation of Enterprise Risk Management (ERM) and the NU Risk Management Policy (Risk Policy).
- Provide oversight for the risk assessments prepared in accordance with the Risk Policy.
- Review and assess the risks associated with strategic projects and/or proposals and policy and investment decisions that expose NU to material financial, strategic, operational, or reputation risk.

- Review key risk topics that could materially affect the Company.
- Review the NU business and functional area risk and financial assessments of capital projects undertaken in accordance with the RaCC Project Approval Policy and Procedures (RPRP) and make recommendations to the Company's CEO for approval, if required.

Starting in December 2007, the project team presented quarterly reviews of the clean-air project at the Merrimack Power Station to the RaCC. These presentations include a status of the project to date and a review of the financial cost. The quarterly review also detailed the accomplished items in each of the preceding quarters. The presentations also included a list of risk events, horizons, likelihood of occurrence, expected cost exposure, and mitigation plans.

3.2 Contracting Strategies [7]

During 2006, PSNH retained R.W. Beck to provide contract strategy consulting engineering services associated with implementation of the Merrimack project. In order to develop the contract strategy, R.W. Beck took into account:

- Realities of the current market for scrubber projects.
- Influence of current market conditions on contracting options.

Using the R.W. Beck draft study results, NU Contracting and PSNH project leadership reviewed four different contracting options and issued request for qualifications (RFQ) to selected contractors and FGD vendors. Subsequently, a decision was made to have the FGD original equipment manufacturers (OEM's) complete the same RFQ as the potential Engineer/Procure/Construct (EPC) or Engineering/Procurement/Construction Management (EPCM) firms that were under consideration for work in the other islands. From the RFQ results, it was clear OEMs, as a group, were not interested in increasing their scope of work beyond the "Scrubber Island."

[6] DR-JC-023 Risk and Capital Committee Charter
[7] DR JC-034 Contract Strategy Report

The four options PSNH Contracting considered were:

- **Turnkey EPC Contract – Fixed Price Proposal**

  None of the respondents were executing a competitively bid scrubber retrofit project. Only one qualified turnkey contractor[8] indicated a willingness to provide a proposal on a fixed price basis, and that contractor confirmed fixed price would likely be the most expensive contracting option for PSNH.

- **Turnkey EPC Contract – Fixed Price After "Open Book"**

  Only one qualified turnkey contractor was currently executing scrubber retrofit projects on a Fixed Price After Open Book[9], turnkey contract basis; and only that contractor indicated a willingness to provide a proposal for the project on this basis.

- **Alliance EPC Contract – Contractor and PSNH Share the Risk**

  An Alliance Contract approach is where risks are shared between the contractor and the owner. Two qualified contractors are executing projects on this basis. Both these contractors indicated a willingness to perform the project using this contracting approach.

- **EPCM Contract**

  The EPCM Contract approach has been executed in a number of scrubber retrofit projects, and all the qualified respondents indicated a willingness to perform the project using this contracting approach, although two of them were less interested under this type of contract because of the significantly lower profit potential compared with other contract types.

R.W. Beck recommended the EPCM contract was the best approach for the Merrimack project. This approach addresses the project's objectives as follows:

[8] Turnkey contract: a single EPC contractor that provides a complete project "wrap" including other subcontracts, i.e., scrubber island, material handling, stack, construction labor etc.
[9] Open Book is a method of procurement that allows each party to have access to the project cost information.

- Cost risks are limited:
  - Fixed price supply and erect contracts for the scrubber island and the stack.
  - Fixed price design and material supply contracts for the material handling systems and the wastewater treatment. In addition, it may be possible to supply these systems on a supply and erect basis.
  - Detailed engineering and design up to 80% complete before awarding major construction subcontracts. This is a critical advantage of the EPCM approach. The EPCM approach allows bid packages for the construction subcontracts to be complete and obtain the most competitive bids from local and regional contractors. The EPCM approach also allows the contractor and the owner to design a construction contracting plan that will support the project's need for well-trained and highly skilled labor, while also supporting the project's need for a predictable schedule without the possibility of labor disruptions.
  - Allows for an award fee or other incentives to the contractor when appropriate.
- Enables performance and delivery guarantees and liquidated damages with the major equipment suppliers.
- Separate owner's engineer provides project oversight, compensating for PSNH's limited staff.
- Project change orders can be addressed quickly and at minimum cost.

3.3 Power Advocate Study [10]

PSNH hired Power Advocate, Inc. in July 2008 to conduct a thorough review of the market conditions associated with capital construction projects and retrofit scrubber projects. The study, updated in March 2009, specifically sought to:

[10] DR JC-031 Power Advocate Report

- Assist in a review of URS' cost estimate to determine its reasonability by accurately comparing the cost of this project with other wet scrubber projects through a normalization of the dollars per kilowatt cost.
- Consider the project's risk mitigation strategy in conjunction with the overall cost control technique in order to develop a comprehensive project cost management assessment.
- Take into account the considerable opportunities for PSNH to capitalize on current favorable market conditions with the un-awarded project subcontracts.

This report evaluated the unique site-specific factors including engineering, Balance of Plant[11] (BOP), Flue Gas Desulphurization (FGD), and Material Handling considerations as well as how they affect the overall project cost.

By analyzing the unique or project specific attributes and applying adjustments for site specific and unique factors, Power Advocate was able to normalize the scope of Merrimack's project with other wet scrubber projects. This approach allowed for the more realistic "apples to apples" comparison. The table below shows the factors considered as a potential impact to the cost of the project.

Table 1 - Site-specific Analysis Components

Site-specific Component	Significant Impact?
Mercury Scrubber	Yes
Asymmetrical Units to Single Absorber	Yes
Station Site Constraints	Yes
All-Subcontract Construction Basis	Yes
Foundations	No
Limited Highway Access	No
Pressurized Cyclone Boiler	Yes

Each of the factors with significant impact potential was normalized based on the following logic:

[11] Balance of Plant is the sum of all equipment for safe operation as well as the technical coordination of all concerned parts of a power plant.

Mercury Scrubber

Merrimack's project is designed specifically for Hg removal with an added benefit of further reducing SO_2 emissions. Most WFGD scrubbers in use today and under construction are designed primarily for SO_2 capture. The design differences for this type of approach include additional Hg oxidation controls/consideration, increased surface area of absorber bed and increased contact time with flue gas to allow for full reaction. This scrubber technology conforms to the requirements mandated by the passing of House Bill 1673-FN, an act passed by the State of New Hampshire for the reduction of mercury emissions in May 2006.

Asymmetrical Units Combining into a Single Scrubber

This is the largest design difference between Merrimack Station's absorber and majority of similar sized systems in the industry. Since Unit 2 has over twice the power of Unit 1, the flows and capacities of the duct and induced draft system are different. In addition, there are design aspects of balancing unequal flows into the same duct channel setting this project apart from many others.

Station Site Constraints

Merrimack Station is located on the Merrimack River in central New Hampshire. The eastern edge of the main plant is bounded by the river and there are several railroad spurs cutting north south across the station's footprint. In addition, the material handling design extends from the coal yard to the north, down the east side of the power block to the absorber building to the southeast. This would require construction of components for the material handling and other systems to occur directly above a rail spur.

All-Subcontract Construction Basis

The Clean Air Project is being constructed without any direct labor hired from the Engineer Procure Construct Manager (EPCM). All aspects of the project are being completed in Contract Packages utilizing a General President's Project Maintenance Agreement (GPPMA),[12] or

[12] The General Presidents' Project Maintenance Agreement is designed to provide skilled, highly trained craft people to contractors who perform continuing supplemental maintenance work at industrial sites throughout the United States, using a nationally negotiated collective bargaining agreement designed to provide many cost saving provisions to the owner community.

National Maintenance Agreement (NMA)[13] primarily with local union personnel. This approach simplifies management for PSNH, but increases the likelihood of markups associated with multiple layers of subcontractors. However, PSNH feels this approach provides higher accountability on contracts, stronger product guarantees, and better warranties, all of which help mitigate extra cost risks.

Pressurized Cyclone Boiler

Both coal combustion units at Merrimack Station are of the pressurized cyclone type. This type of combustor can produce higher temperatures and flows than similar pulverized coal combustors. Due to these operating characteristics, further engineering is required to ensure proper long term operation.

Each of these factors contributes to the uniqueness of the project when compared to a more standard wet FGD system. When these attributes are summarized and used to levelize the per-kilowatt cost, the Power Advocate Study concluded the Merrimack Station's Clean Air Project costs are reasonably in line with other projects of similar size and scope.

3.4 Findings

- NU/PSNH has a well developed process for Large Project Review.
- All project procurements over $5M are subject to the NU/PSNH large procurement process.
- Both the Risk Management Council and the Executive Risk Management Council reviewed the Merrimack Station's Clean Air Project.
- PSNH contracted R.W. Beck to identify and recommend contracting strategies.
- R.W. Beck recommended the EPCM contracting approach.
- PSNH contracted Power Advocate Inc. to assist in a review of PSNH/URS project cost estimate to determine its reasonability.
- Power Advocate Inc. found the project cost estimate to be in line with other scrubber projects after normalization.

[13] The NMAPC administers the National Maintenance Agreement (NMA), which is a collective bargaining agreement utilized by over 3,500 industrial contractors employing the members of fourteen participating building trades international unions throughout the United States.

3.5 Conclusions

The process for approval and monitoring of the Merrimack Station's Clean Air Project is well developed and contains check and balances to ensure all risk and mitigation factors are considered. PSNH was prudent to contract for support in developing their contract strategy and reviewing project cost estimates, which were jointly developed with URS, the program manager.

4 Cost Estimates

In our experience, utilities typically go through a series of project estimate stages depending on the level of information available and cost estimate parameters. As projects move from conceptual design through detailed engineering design and pre-construction design to construction, estimates become better defined and refined. Cost estimates will change in response to changes in the design concept, changes in scope, more detailed material cost estimates and build sequence modifications that can affect the total cost, in some cases appreciably. In this section, we discuss PSNH's process for developing the project estimate chain over time and review, in particular, the initial conceptual estimate, the detailed Clean Air Project estimate, and close with an estimate comparison along with a discussion of estimate change-agent impacts.

4.1 Initial Conceptual Estimate[14]

In 2004, PSNH contracted with Burns and McDonald for a feasibility study, which identified three possible alternatives for addressing future air quality requirements at Merrimack Station. In 2005, PSNH continued to pursue mercury control options as part of the ongoing compliance with New Hampshire's four pollutant bill, RSA 125-O, also known as the New Hampshire Clean Power Act (NHCPA). Specific to mercury emissions, based on initial testing of activated carbon injection (ACI), it was clear ACI would not provide sufficient mercury control to satisfy the goals of NH legislators and stakeholders. Encouraged by early indications from some scrubber manufacturers of possible mercury capture capability, PSNH proceeded to acquire experienced engineering assistance.

Based upon the feasibility study, a specification for engineering services was prepared consistent with all indications that New Hampshire would require significant mercury capture. The specification not only addressed mercury emission capture, but also the request to assess an overall multi-pollutant strategy recognizing New Hampshire's four pollutant requirements. The following referenced excerpt is from Section III of PSNH's specification, which deals with the broad review of multi-pollutant control strategy at Merrimack Station. Specifically, in Section III, the first item requests optimizing a scrubber for sulfur emissions reduction. The second item

[14] DR 025 Janus Report Part I

requested determining the mercury capture associated with a scrubber, including guarantees, and determine other controls that could be required to provide the additional, incremental mercury capture above the scrubber to a total capture of 90 and 95%. At the time of this specification, information suggested conventional wet scrubbers were achieving a capture rate in the range of 70 - 85% mercury, under certain conditions[15].

Once the Burns and McDonald feasibility study and specification for engineering services was completed, PSNH in 2005 contracted Sargent and Lundy (S&L) to develop an early conceptual estimate for a FGD at Merrimack Station to satisfy legislative and stakeholders' discussions. The first costs provided by S&L relied on past installations of FGDs and certain Merrimack Station conditions. During the first conceptual pricing of a scrubber system, PSNH found FGD suppliers were open to discussions, but still unwilling to provide mercury reduction guarantees and equipment pricing with associated guarantees. S&L's cost estimate was developed working in an expedited time frame and with no vendor guarantees in writing. Based on the available information, S&L issued an initial conceptual estimate of $250M for the installation of an FGD system at Merrimack Station. The estimate contained one very significant caveat, "No specific mercury guarantee was included in S&L pricing since it was not available at this time from suppliers[16]."

4.2 Clean Air Project Estimate Contracts

Contracting Strategy[17]

As previously discussed in Section 3, Large Project Review Process and Contracting Strategy PSNH management desired high accountability on contracts, strong performance guarantees and product warranties, and greater price certainty through risk transfer to the suppliers of goods and services. Consequently, they determined the best available industry expertise and insight were necessary in order to decide the appropriate contracting strategy for the Merrimack project.

[15] DR 037 Mercury Reduction
[16] DR 037 Mercury Reduction
[17] DR 034 Contract Strategy Report

On July 25, 2006, PSNH issued the "Specification for Contract Strategy Consulting for a Wet Flue-Gas Desulphurization Project" and, in September 2006, contracted with R.W. Beck to provide contracting strategy consulting services. R.W. Beck was asked to identify options and recommend the contracting strategy and the final structure for project oversight by PSNH. As previously described in Section 3.1 - Contracting Strategies, R.W. Beck recommended the EPCM contract is the best approach for the project.

The results of R.W. Beck's analysis were presented to the RMC and the ERMC, and PSNH management sought authorization to issue a request for proposal (RFP) for Program Management Services and a RFP for the Scrubber Island EPC contractor.

Program Manager Bid [18]

During late April 2007, bidding documents for the Project Program Manager continued to be developed. Request for Proposal RFX 00147-2007, "Clean Air Project, Merrimack Station Program Management" was issued on May 16, 2007.

PSNH assembled an internal cross-functional team to evaluate the bids. The evaluation team consisted of the Merrimack Station Plant Manager, the Merrimack Clean Air Project Manager, and Project Engineer, as well as representatives from Purchasing, NU, and PSNH Legal.
On July 2, 2007, bids were received from the following four contractors:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- Washington Group International — later was acquired by URS

Contract Award

On September 21, 2007, PSNH entered into a contract with Washington Group International (later URS). The Northeast Utilities' RaCC reviewed and approved the Project Program Manager selection and recommended increasing the initial funding to $10M and commitment authority to $45M. PSNH approved and released the purchase order on September 27, 2007.

[18] DR 025 Janus Report Part I

In early May of 2008, URS submitted the revised Target Price Project Cost Estimate to PSNH.

An overview of URS final estimate is shown below:

Table 2 - Target Price Project Cost Estimate

PSNH/URS Item Description	PSNH/URS June 2008 Estimate (Millions $)
Program Manager	39.3
FGD Island	100.0
Chimney Island	13.1
WWT Island	15.0
Materials Handling Island	44.8
URS Engineered Equipment	26.1
URS Balance of Plant	61.0
URS Escalation	23.0
URS Growth and Contingency	19.1
Contingency	10.0
TOTAL	**351.4**

This estimate includes the work and associated costs managed by URS, but exclude NU/PSNH's costs. These costs include:

- Work scope retained by NU/PSNH.
- Owner's costs including NU labor, indirect, project financing costs, insurance, etc.

The estimates for the NU/PSNH cost were:

Table 3 – Owners' Cost

PSNH Item Description	PSNH Estimate (Millions $)
Electric Power Supply	15
E-Warehouse	1
Office/Training Building	1.5
NU Labor	7
Indirect Costs	8
AFUDC	56
Insurance (OCIP and Builders Risk)	12
Miscellaneous	5
Total	**105.5**

The combined estimate for the total cost of the Merrimack project was $457M[19].

In June 2008, the project schedule confirmed an in-service date of mid 2012 based upon key island proposals. Early completion was encouraged by the NHCPA.

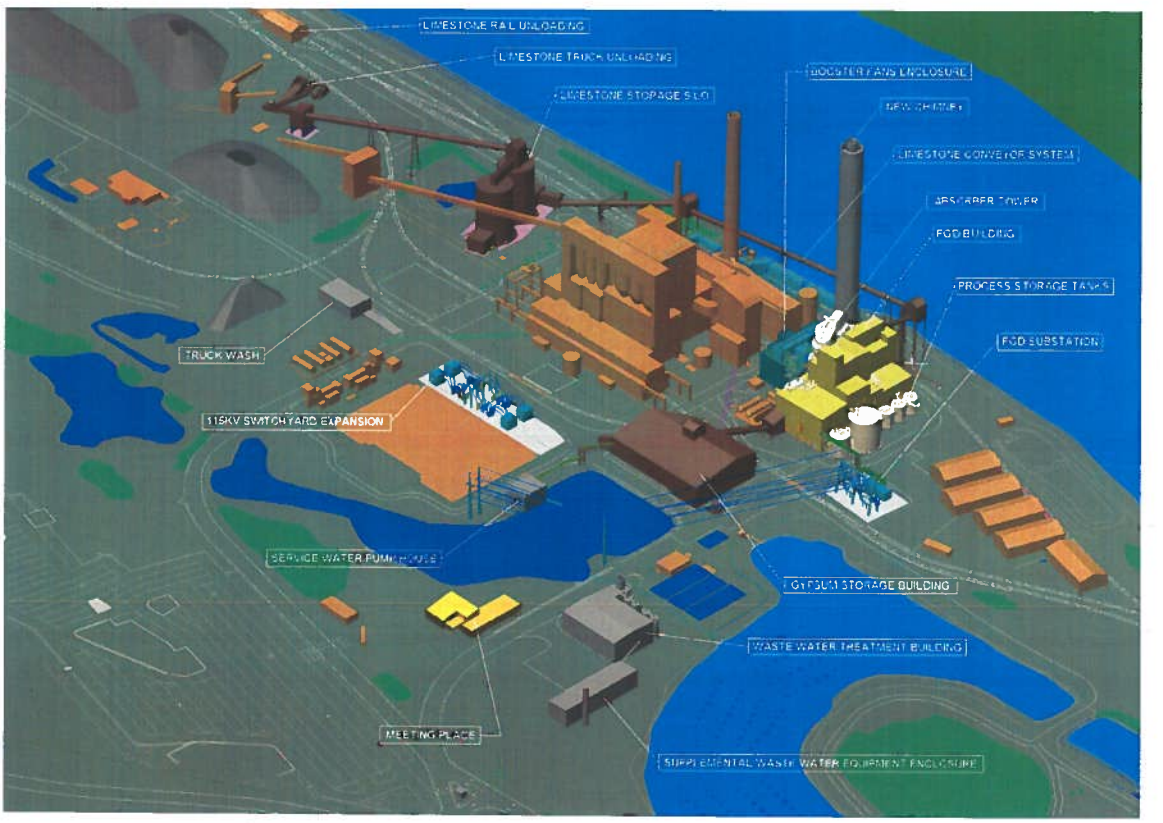
As previously described in Section 3.2 - Power Advocate Study, PSNH engaged Power Advocate to assist the clean air project team review of the revised cost estimate. The Power Advocate Study concluded the Merrimack Project Cost Estimate was in the range of comparable FGD projects considering its scope and complexity and other site-specific factors.

The Clean Air Project at Merrimack Power Station was presented to NU corporate management for capital project review and approval at an estimated cost of $457M. Management recommended approval of the project by the NU Chairman and CEO and final approval of NU Board of Trustees was required. PSNH Senior Management obtained NU corporate management approval of an advanced in-service date for the project of mid 2012. On July 14, 2008, NU Board of Trustees approved the $457M for Merrimack Clean Air Project Estimate.

[19] DR 010 Increase between the estimates of URS

Clean Air Project Component Description[20]

The work areas or islands include a Scrubber Island, the Material Handling Island, the Chimney, and the Wastewater Treatment System. URS, the Program Manager, responsibilities include the design and oversight of the construction of the foundations based on criteria supplied by the systems supplier. Other significant Merrimack project contracts managed by URS relate to construction work, major material/equipment purchases, and major services contracts. Preliminary site surveys and investigations were procured and managed by PSNH. The permanent FGD substation and the 115 kV switchyard expansion were also directly managed by PSNH/NU with close coordination with the PSNH Clean Air Project Team, URS, and the affected contractors. PSNH determined this approach was advantageous since PSNH and NU Transmission and PSNH Energy Delivery had greater expertise. The project islands are depicted in the rendering below:



[20] DR 025 Janus Report Part II

A brief description of each island follows:

Scrubber Island

The Scrubber (FGD) Island includes the limestone preparation, absorber, and gypsum-dewatering systems with all auxiliary support equipment from the day silo inlet, absorber vessel outlet breeching to the chimney, recycle pumps, oxidation air blowers, process tanks, dewatering equipment and an electrical distribution room. All interconnecting piping systems, electrical system downstream of switchgear and motor control centers (MCCs), and buildings are part of the complete system.

Material Handling Island

The Material Handling Island includes the limestone rail and truck unloading, reclaim, transfer conveyors/towers, bents, gypsum conveyors, bents, and stack-out systems and building along with all auxiliary support equipment/systems. All dust suppression, water, air, electrical system downstream of switchgear and MCC buildings are part of the complete system.

Chimney

The Chimney Island includes the complete chimney outer shell and fiberglass liner (flue) from the absorber outlet (breeching inlet) and all appurtenances such as aircraft lighting, lighting protection, elevator and elevator platforms, and electrical supply.

Wastewater Treatment System

The Wastewater Treatment System Island includes all treatment equipment and systems to comply with the discharge limits established by the New Hampshire Department of Environmental Services and the United State Environmental Protection Agency requirements. The existing treatment pond was utilized as the source of make-up water for the scrubber, which provides for the use of 100% reused or recycled water for the FGD system. All interconnecting piping systems, electrical system downstream of switchgear and MCCs, and buildings are part of the complete system.

In order to accomplish the large variety of work required to complete the Clean Air Project, PSNH and its Program Manager had to prepare 17 RFPs and award 18 major contracts.

Section 8 – Appendix, item 8.4 is a summary of the major contracts that have been awarded in connection with the equipment and physical work required for the Clean Air Project.

4.3 Current Estimate

On October 7, 2010, PSNH revised the Clean Air Project estimate to $430M. The reduction was due to higher productivity than estimated, lower than anticipated commodity costs, and favorable weather conditions during the major construction period in 2008 through 2010. The combination of these factors resulted in a lower cost estimate. To some extent, these savings were offset by required additions. These additions included an enhancement to the primary waste water system, a secondary water treatment system and the potential adjustment protection system. Please refer to Section 8 – Appendix, item 8.4 for details regarding the purpose and cost of these systems[21].

4.4 Estimate Comparison

In this section, we will analyze the differences between the initial conceptual estimate and the final URS estimate to determine if the variances are within expected tolerances.

When comparing estimates, we must be aware an estimate is "an approximate judgment or calculation, as of the value, amount, time, size, or weight of something[22]." It is important we understand the bases for each estimate and changes from one estimate to the next.

The original 2005 study done by S&L was conceptual based on current industry standards at the time and did not contain any guarantees for mercury. The estimate also excluded AFUDC, and cost of removal and relocation of existing facilities was included only for the known scope[23].

Other S&L assumptions were[24]:

[21] DR 025 Janus Report Part I
[22] As defined by Dictionary.com
[23] DR 009 S&L estimate of 2006
[24] DR 026 Estimate Comparisons

- Single duct from MK-1 and MK-2 (365 tons including support steel).
- Fourteen thousand (14,000) square feet gypsum storage building.
- Hooded conveyors system.
- Basis for Rail Road car unloader was bottom dump.
- Basis for silo discharge was basic hopper arrangement.

The URS 2007 estimate was based on a more detailed study using site-specific needs and included guarantees and project specific Allowance for Funds Used during Construction (AFUDC). It also built upon S&L assumptions and determined that several enhancements were needed:

- Designed separate ducts for MK-1 and MK-2 (1935 tons including support steel).
- Nearly doubling the size of the gypsum storage building to 26,600 square feet.
- Totally enclosed conveyor galleries.
- Basis for Rail Road car unloader was rotary dump.
- Basis for silo discharge was rotary plow dischargers due to winter conditions.
- Included a limestone emergency silo fill bucket elevator and receiving hopper.
- Larger absorber tank.
- Additional tray level.

To determine if the increase in the project between the conceptual and final estimate is reasonable, Jacobs made a side-by-side comparison looking at major work effort, owner's cost, escalation, contingency, and AFUDC as shown in the table below[25].

[25] DR 026 Estimate Comparisons

Table 4 - Estimate Cost Comparison

Item	PSNH/URS Item Description	PSNH/URS June 2008 Estimate (Millions $)	PSNH/S&L 2006 Estimate (Millions $)
1	Program Manager	39.3	18.1
2	FGD Island	100.0	75.0
3	Chimney Island	13.1	13.1
4	WWT Island	15.0	11.0
5	Materials Handling Island	44.8	21.8
6	URS Engineered Equipment	26.1	9.5
7	URS Balance of Plant	61.0	38.3
8	URS Escalation	23.0	0.0
9	URS Growth and Contingency	19.1	11.6
10	Electrical power Supply	14.9	6.3
11	New Yellow Building	1.5	0.0
12	E-Warehouse	1.0	0.0
13	NU Labor	6.7	35.2
14	NU Costs 1	15.4	0
15	NU Costs (Miscellaneous) 1	4.1	0
17	NU Indirect Costs 1	5.5	0
18	AFUDC 1	56.5	0
16	Contingency	10.0	10.0
	TOTAL	**457.0**	**250.0**
	1 included in 13		

Because of the two-year time difference between estimates, a number of project related costs experienced significant escalation. Jacobs' Engineering Estimating Group estimated that during this time period, prices for certain materials and commodities escalated between 45 and 60%. This extraordinary increase was reflected in the price of certain types of equipment. Overall, the impact of this price escalation on the entire project is estimated to be an increase of 20%. When we apply this 20% factor to the S&L estimate, the cost variance between the estimates is reduced from 82% to 52%.

Table 5 - Normalized Estimate Cost Comparison

Item	PSNH/URS Item Description	PSNH/URS June 2008 Estimate (Millions $)	PSNH/S&L 2006 Estimate (Millions $)
1	Program Manager	39.3	21.7
2	FGD Island	100.0	90.0
3	Chimney Island	13.1	15.7
4	WWT Island	15.0	13.2
5	Materials Handling Island	44.8	26.2
6	URS Engineered Equipment	26.1	11.4
7	URS Balance of Plant	61.0	46.0
8	URS Escalation	23.0	0.0
9	URS Growth and Contingency	19.1	13.9
10	Electrical power Supply	14.9	7.6
11	New Yellow Building	1.5	0.0
12	E-Warehouse	1.0	0.0
13	NU Labor	6.7	42.2
14	NU Costs 1	15.4	0.0
15	NU Costs (Miscellaneous) 1	4.1	0.0
17	NU Indirect Costs 1	5.5	0.0
18	AFUDC 1	56.5	0.0
16	Contingency	10.0	12.0
	TOTAL	**457.0**	**300**
	1 included in 13		

When PSNH retained work of $83.5M is added to the S&L estimate, the cost variance between the estimates is reduced to 15.4%. While we cannot determine a specific monetary value for the additional non-NU/PSNH items URS included in their estimate, it is easy to envision their value would approach the remaining 13% cost variance figure[26].

In October 2010, PSNH revised the project estimate to $430M due to productivity gains that reduced escalation reserves by $16M and contingency by $11M. In January 2011, the budget was further reduced by $22M. This reduction reduced escalation reserves by $4M and contingency by $18M. When these reductions are factored into the URS estimate, the cost

[26] DR 010 Increase between the estimates of URS

variance is reduced to 6%. Several contract additions were added to cover secondary water treatment, cathodic protection and enhance treatment for the primary water treatment without changing the final estimate of $430M[27].

4.5 Findings

- Sargent and Lundy was contracted to develop a conceptual estimate based on existing FGD designs and installations.
- The Sargent and Lundy 2006 estimate of $250M did not contain any specific mercury guarantee and was not site-specific.
- AFUDC and other NU/PSNH costs were not included in Sargent and Lundy 2006 estimate.
- In May 2008, URS Final Clean Air Project Estimate of $457M was submitted to PSNH.
- Both the Power Advocate Study and Jacobs Consultancy have been able to reconcile the differences between the $457M and $250M project cost estimates.
- During the course of the project, PSNH has been able to recognize savings due to higher productivity and lower commodity costs revising the Clean Air Project estimate to $430M.
- To some extent, the $27M cost differential reflects both PSNH and URS's ability to effectively control project costs.

4.6 Conclusions

The process PSNH followed in developing the estimates for the Clean Air Project started with the feasibility study, followed by development of engineering specifications, which combined became the basis for development a preliminary estimate. This estimate was followed by a detailed Clean Air Project Estimate, which included a number of items excluded from the initial estimate. Based on the various adjustments to the initial estimate, Jacobs Consultancy has been able to reconcile the original Sargent and Lundy project estimate within 1% the actual projected costs.

[27] DR 040 CAP Cost Summary Jan-April 2011

5 Project Schedule

5.1 Initial

When Jacobs was first engaged in this assignment, a project schedule published in June of 2008 for the Merrimack Clean Air Project was presented[28]. The schedule was very detailed incorporating input from all of the entities that make up the total project. The schedule provided details of all information about the project from design through construction and commissioning.

While the completion of the clean-air project mandated by House Bill -1673 was mid 2013, the detailed schedule confirmed an in-service date of mid 2012. When Jacobs' personnel reviewed the schedule and then toured the site to see the state of the construction, it was evident the completion date shown in the schedule was both reasonable and realistic.

5.2 Current

In the time frame, that Jacobs' personnel have been regularly monitoring the project, the schedule has been updated to reflect actual progress. The revised schedule is equally as detailed as the initial one. Based on a review and a recent site inspection by the Jacobs team, it appears the schedule correctly represents the project. The current schedule represents a very comfortable project completion timeline, with adequate time allowed for construction completion, even for the facilities and systems added to the scope as the project progressed. The schedule also represents adequate time for checkout, start-up, and commissioning for the systems involved, and if the schedule is followed, the project should result in a fully operable system on or before the stated date of mid 2012.

Based on information presented in the January 2011 Quarterly Executive Review Meeting, URS reported their portion of the project was approximately 92% complete. This percent completion estimate does not include the entire project scope and costs. For example, since URS is not responsible for the substation, 115 KV switchyard expansion, AFUDC, etc. these costs are not included in their project completion projection. Through the end of January 2011, the cumulative

[28] DR 002 MER Detailed Schedule

total project expenditures, including both URS and PSNH retained work, was reported to be $302,771,489, which is approximately 80% of the latest overall project budget.

5.3 Findings

- The project schedule is detailed and is reviewed regularly.
- As of January 31, 2011, URS project progress on their scope of work was reported to be at approximately 92% complete, while PSNH reported overall project completion is 80%.
- In June 2008, the project schedule projected an in-service date of mid 2012, a year earlier than the legislative mandate.
- The mid 2012 project completion date represents a reasonable target date for commissioning and start-up of the clean air project initiative.

5.4 Conclusions

The current schedule start-up date for the New Hampshire Clean Air Project at the Merrimack Station is mid 2012 and based on Jacobs Consultancy's onsite observations is a realistic projection.

6 Project Management Approach

Utilities often contract out the management of large capital intensive projects. For the Merrimack Project, PSNH made use of two leading engineering firms to manage the project, with strong internal oversight. In this section, we examine the roles played by URS, as program manager, and R.W. Beck, as independent oversight engineering, for the project as well as to discuss PSNH's internal project controls.

6.1 URS' Role

Emissions from the PSNH plants, including Merrimack, have been the subject of multiple discussions for years, with a collaborative agreement reached among several entities in November 2001. With all of the scrutiny and interest in this subject, PSNH, over the span of several years, took an intelligent path, that being engaging respected, competent engineering firms in the quest for the right project for Merrimack. They engaged Burns & McDonnell and Sargent & Lundy in their early studies. These firms are very experienced in power plant engineering and in wet scrubber technology. The two firms were most helpful in establishing a path forward for the Merrimack plant.

In May 2007, a Request for Proposal for a Program Manager was issued for the Clean Air Project at Merrimack Station. Proposals were received from four firms, all well experienced in projects of this type and size. The firms were:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- Washington Group (later becomes URS)
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**

After a thorough evaluation on September 24[29], 2007, URS was awarded the contract to manage the Merrimack project. URS, as the program manager (PM), was to function in an Engineering, Procurement, and Construction Management (EPCM) role. Accordingly, they are

[29] DR 025 Janus Report Part 1

responsible to PSNH management to ensure that all aspects of the project proceed as the owners management team has mandated. As the PM, URS performs the following functions:

- Engineering:
  - Develop design criteria and basis
  - Prepare specifications for equipment and construction services
  - Prepare general drawings for the project
  - Assist in evaluation of proposals
- Procurement
  - Prepare bid documents for major equipment packages
  - Prepare bid packages for Balance of Plant (BOP) equipment
  - Prepare bid packages for BOP construction services
  - Coordinate evaluation of bids
  - Lead vendor presentation meetings
- Construction Management
  - Assist in evaluation of bids
  - Provide day-to-day supervision of all onsite contractors
  - Monitor progress of contractors against schedules and budgets
  - Oversee the project safety program
  - Prepare periodic project progress reports
  - Coordinate commissioning, start-up and training
  - Coordinate, closeout and demobilization of the project site

To fulfill the role as program manager, URS established a typical project organization for this type project. They assigned a project manager whose initial functions centered on managing the home office engineering disciplines as the project scope was developed. The project manager is assigned personnel as needed in the various disciplines, including support functions as the needs arose. As the design progressed and the construction activities on the project began in earnest, the project manager's role focused more in the field. To assist in managing the construction activities, a construction manager, who reports to the project manager, was assigned to handle the day-to-day construction activities. Reporting to the construction manager are various superintendents who provide the intimate coordination and monitoring required for a well-run project.

URS has accepted their role as program manager; and with the exception of the safety area, has done a good job ensuring the project meets PSHN's expectations, the project schedule, and budget. With the noted exception, they have fulfilled the role for which they were engaged. We will discuss safety in detail in Section 7 - Construction.

6.2 R.W. Beck's Role[30]

PSNH released a RFP for an Independent Engineering Service contract in September 2009, and R.W. Beck was selected as the vendor. The vendor's contract provides an independent third-party oversight of the engineering, procurement, and construction of the Clean Air Project. The specific services provided by the independent engineering group are:

To conduct on a monthly basis:

- Review of the final design for general compliance with contract guarantees.
- Review the progress of design for compliance with milestone schedule.
- Review the progress of the procurement specifications and procurement contracts.
- Review reports for general suitability regarding start-up and performance.
- Review proposed work plans and quality control procedures.
- Conduct monthly onsite visits for observation of the work in progress.
- Consulting with project participants in advance of scheduled major inspections' tests or start of important work phases.
- Review the activities of the project to ensure that appropriate due diligence was performed, appropriate alternatives were considered and decisions and actions were prudent.
- Review change orders to construction contract.
- Provide independent assessment of:

[30] DR JC-035 RW Beck oversight role

- Performance guarantees specified in the contact
- Initial operation of the project
- Substantial completion of the project
- Completion of the construction contract

- Prepare monthly independent engineer's report. The report includes, but is not limited to:
  - Introduction
  - Summary of monthly review
    - Execution of the work plan
    - Review the actual / projected costs of the project and compare them to the Target Budget. Review the actual / projected schedule of the project and compare them to the Target Schedule.
  - Recommendations / Conclusions
- R.W. Beck will perform the following tasks during the startup and testing phase of the project.
  - Review performance testing procedures.
  - Witness selected performance tests.
  - Review contractor's test report.
- Verifying project completion.
  - Monitor successful completion of key open issues.
  - Conduct final site visit to verify punch list items have been completed
- Provide follow-up services and regulatory support as needed.

6.3 Project Controls [31]

The approach to project control is documented in the Clean Air Project manual and consists of the following three distinct areas:

- Program Manager Contract Management
- Project Schedule Reporting
- Project Cost Reporting

Program Manager Contract Management [32]

Contract management is accomplished though the use of change notices and change orders and processed as outlined in Section 10.6 of the Project Execution Plan and Attachment K of the PXP, PEP-314 Change Control[33].

Change Orders must be approved by PSNH and URS management and are processed in accordance with Article 6 of the Contract. Major changes in the Scope of Work, the division of responsibility, the project schedule, or circumstances addressed in the Contract can necessitate change orders. These changes may be, but are not limited to:

- Design basis or design concept changes.
- Site conditions beyond those presented in the Project Design Manual and existing site, survey reports.
- PSNH permit obligations.

Client authorization and approval of Contract Change Orders must be obtained prior to implementation and written authorization to proceed is required for client initiated or client requested changes regardless of contract type.

Change order control was implemented by use of a system of Work Change Requests and amendments to the Contract.

[31] DR 001 Project Manual
[32] DR 013 Description of the project controls and software used to manage the project

Work Change Requests are a required process needed before any scope change or any contractor can implement cost change. This requires a full scope, cost, and justification presentation by URS to PSNH for approval prior to any such work proceeding.

Project Schedule Reporting

URS developed and maintains the integrated Project Schedule in accordance with the requirements of Article 1.4 of Appendix I to the Agreement and has submitted periodic updates as described below.

The Project Schedule is a Critical Path Method (CPM) precedence diagram using Primavera Project Planner software produced by Primavera Systems and includes PSNH obligations and deliverables' receipt as milestone activities. URS provides PSNH information regarding project work operations, sequence of the work, breakdown of the work into individual activities with estimated durations, labor and material estimates, and weekly or monthly schedule updates as required.

The Project Schedule status is reviewed weekly and is updated monthly throughout the project, unless otherwise requested by PSNH, except during unit outages when updates are required on a daily basis. The Planning Unit for the Project Schedule activities is one "day", except during outages when the planning unit is one "hour."

All schedules are subject to PSNH's review and approval, but do not reduce or affect URS's responsibility for completing the work under its contract in accordance with applicable schedule requirements.

Project Cost Reporting

The project costs are reported and controlled at various levels against the PSNH project Code of Accounts. A resource analyst maintains the Project Cost Summary and the monthly actual costs are recorded early the following month. The project manager reviews the actual costs, compares them to the projected costs and revises future cost projections as necessary.

[33] DR 001 Project Execution Plan Part II

URS is responsible for developing and maintaining a project cost monitoring and control program. This monitoring is by island and URS provides PSNH a monthly list of contractors' personnel charging time to the project including hours charged.

Material and engineered equipment costs are reported in the Monthly Progress Report. The cost reporting identifies the budget, commitments, actual, and forecast costs. Subcontract costs are also reported in the Monthly Progress Report.

6.4 Findings

- URS is the program manager responsible for Engineering, Procurement, and Construction Management of the project.
- PSNH contracted R.W. Beck to give an independent engineering overview of the project.
- PSNH has a documented approach to project control as defined in the Clean Air Project Manual.
- Project control process consist of three essential elements:
    1) Project manager contract management
    2) Project schedule control
    3) Project cost control
- Project costs are reported and reviewed on a monthly basis.

6.5 Conclusions

PSNH established safeguards for projects overview and controls to ensure that the Clean Air Project is controlled and managed effectively. These safeguards rely on outside engineering expertise and a well-structure process that monitor change order, scheduling, and cost.

7 Construction Approach

Even with the series of contract safeguards previously described, actual construction is not necessarily assured to proceed smoothly. There are critical elements ranging from how the project is divided to the interaction among independently constructed portions of the project; in this case, there are four islands to assure the overall project designs and concepts are upheld. In addition, given the physical congestion present in such a work site, safety assurance is critical. In this section, we address the decision to undertake the work in four islands, how contractor and project manager coordination was handled, and how safety performance is monitored and shortfalls mitigated.

7.1 Four Islands

There are several approaches that can be implemented in a construction project similar to the Merrimack Station Project. Whether one is managing the project themselves or has engaged a PM, as is the case for the Merrimack Project, the alternatives relative to approach the construction remain essentially the same. Here are three available alternatives:

Detailed design, procure, and manage the construction.

- In the first approach, the engineer prepares the detailed design for the project, determines the processes to be used, performs all of the calculations required, prepares the detailed drawings and specifications for the equipment and specifications, and provides engineering oversight and assistance during construction, commissioning, and start-up. The equipment and system suppliers provide design information, such as process requirements and support information. The engineer uses this information in preparing the detailed design drawings. In this approach, the procurement process is very detailed as every part of the project is individually addressed by the PM's procurement group. Once the equipment and systems are selected, the PM must obtain contractors for the total project, which may require multiple contractors, to address the specialty equipment type and systems prevalent in a large, complex system such as a scrubber.

- In the second approach, the engineer prepares less design; in essence, the engineer describes the project arrangement and process criteria. The suppliers prepare the design and procure the equipment for their systems and can either construct their equipment, known as Supply and Erect, or the PM can handle the construction similar to the first approach. The engineer will perform a less detailed design relative to the major equipment and systems since the suppliers are preparing some designs for their scope. The supplier commonly supplies the commodity items, such as structural steel, piping, and electrical cable for the systems within its scope. The PM must provide engineering, procurement, and construction management for the remaining items for the system. They will be responsible for foundation, buildings, controls, and electrical supply to the supplier terminal points throughout the site. The engineering, procurement, and construction management effort is less than the first approach, but nonetheless a substantial undertaking, which requires a sizeable project team.
- The third approach is to divide the project into major systems and procure the systems on a lump-sum turnkey basis. The supplier for a major system is responsible for the total design, procurement, and construction management for its scope. This is the approach chosen for the Merrimack Project. The suppliers are responsible for what is within their boundaries. By shifting these responsibilities to the suppliers, this minimizes the number of personnel required by the PM for engineering, procurement, and construction management. However, this approach requires the PM have highly competent, experienced personnel assigned to the project to monitor and direct the suppliers for compliance with the project specifications and requirements.

With the assistance of R.W. Beck, the third approach is what PSNH chose for the Merrimack Project[34]. PSNH decided the project would be broken into four major islands for implementation. The islands were identified as the scrubber, the materials handling, the chimney, and the wastewater treatment. The advantage of this approach was it provides a high level of cost certainty to a project. This aspect, combined with the incentive contract awarded to URS, gave PSNH comfort the project would be performed for the projected budget estimate or at a reduced amount. One disadvantage to this selected approach is the owner can lose a degree of control over desired details for their project if these are not clearly described in the bidding documents for the islands. This becomes a responsibility of the PM once the owner has

[34] DR 034 Contract Strategy Report

identified these requirements and has presented them to the PM. In Jacobs' opinion, PSNH clearly described the details of the project.

In the approach chosen for the Merrimack Clean Air Project, there is a balance of plant design and interconnection issues that need to be handled. URS, as PM, is expected to manage these issues, and in Jacobs' opinion, has done an acceptable job in this area.

7.2 Coordination

Selecting the island approach makes the coordination efforts to some extent more streamlined. Each of the island contractors is responsible for all aspects within its scope. PSNH and URS did an excellent job in defining the scopes for the island contractors, and URS is fulfilling their responsibilities to manage the various island contractors. In addition to the four major island contracts, URS is handling BOP construction coordination issues. Section 8.4 in the Appendix contains a description of the major contracts required for the project. Since URS performed the design and procurement for these systems, in addition to coordinating their construction and the four islands, the coordination of the entire site construction interfaced well. Large and complex projects the size and complexity of the Merrimack Project requires significant attention to coordination, which is a prime responsibility of the PM. Further, when a project such as this is being performed in an operating plant, with a very congested site throughout the year, coordination of the various construction activities becomes paramount. Initially in the project, PSNH assigned personnel with intimate plant knowledge and overall involved the plant operation personnel. Due to the close involvement of PSNH, in this aspect, the PM capabilities of URS, and the selection of competent contractors, the coordination of this challenging project has been well managed.

7.3 Safety

Current Safety Performance

Safety on all construction projects is paramount. On any project ensuring a safe work environment is challenging; the larger a project becomes and the more spread out the workforces are, the more challenging it becomes. When a project is in an existing plant, where

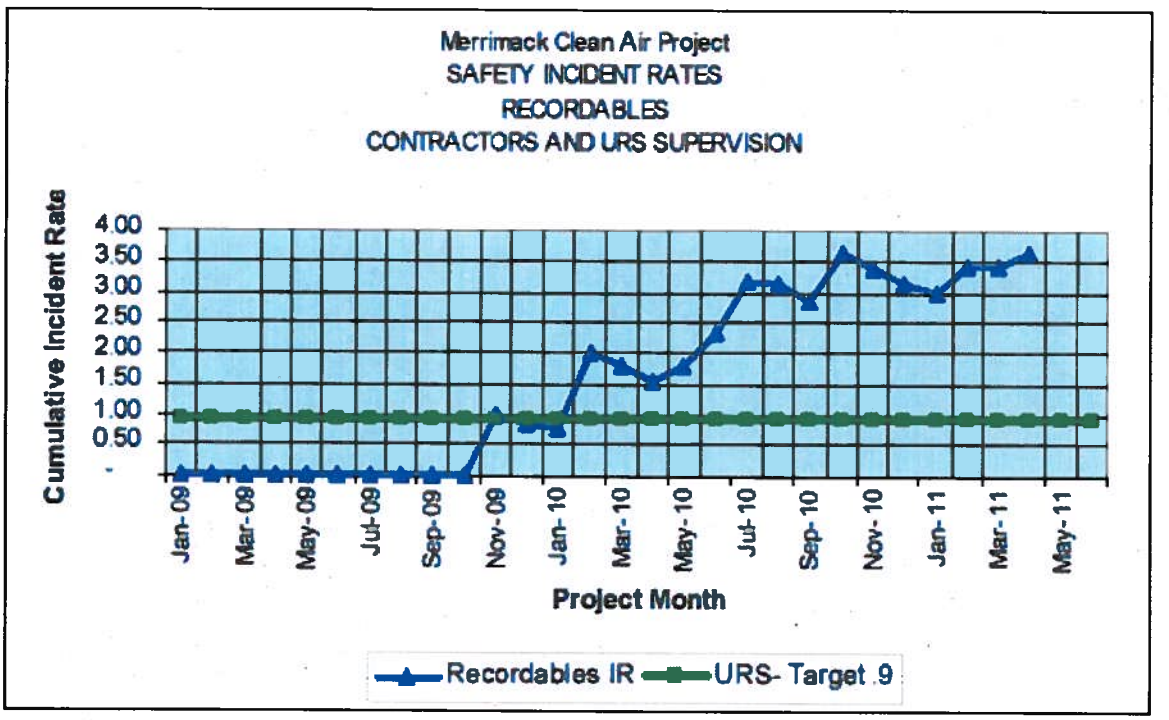
operations must continue and the new systems must be built and incorporated as the plant operates, safety related issues are further compounded. The Merrimack Clean Air Project has all the above mentioned factors; in addition to being a complicated project, the plant is located in the North where the winters can be severe. Considering this, the project becomes a challenge from a safety standpoint and demands that those responsible for safety be extremely diligent in performing their daily task.

For projects where there is a Program Manger (PM) engaged, as in this case, the main responsibility for the safety program is typically assigned to them. While the owner PSNH has a role, it is essential to pass the corporate expectations to the PM and require them to be the entity responsible for the function of the safety program. This is appropriate, because for a safety program to function well it must be promulgated, monitored, and closely supervised. The PM has the responsibility for constant contact and supervision of the sub-contractors in order to observe opportunities and enforce safety procedures. It is incumbent on the PM to assign the proper number of professionally trained safety personnel to ensure the entire workforce is working safely. The safety program that will work in a small Greenfield project will not necessarily work for a large, congested project such as the Merrimack Project. An experienced PM organization like URS knows what is expected and knows the number of safety personnel and qualifications required.

However, it does not appear safety has been the primary focus for the Merrimack Project. There have been a disturbing number of recordable incidents since the time a significant number of construction personnel have been working at the Merrimack Station. While the difficult work related circumstances listed above may have contributed to the high Recordable Incident Rate (RIR)[35], the incident rate continued to rise as the weather improved, consequently appearing the problems were not due to bad weather. This trend can clearly be seen in Figure 1, Recordable Incident Rate, which describes the recordable incident rate for 2009 through April of 2011.

[35] Recordable incident rate is defined as the number of recordable incidents per 200,000 hours worked.

Figure 1 Recordable Incident Rate[36]



One must conclude the management of the sub-contractors is not fully committed to safety. In addition, while it is the PM's responsibility to ensure environmental and worker safety, it is also their responsibility to ensure safe worker performance, personnel transition, or replacement of the offending sub-contractor.

Performance Benchmarks

One can compare safety performance against multiple statistical databases. Two notable databases are the Construction Industry Institute (CII) and the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor.

Most large contractors, including URS and Jacobs Engineering, belong to the CII. CII monitors member projects for multiple aspects such as productivity, schedule, cost, and most importantly safety. CII has a comprehensive safety monitoring and training capability. For the calendar year 2009, the last year for which the annual safety report was compiled, CII member companies had a RIR on their major projects of 0.64, while the BLS statistics show a

[36] Source for chart is the May URS Merrimack Clean Air Project Status Report

significantly higher RIR of 4.3. BLS statistics reflect the compilation of all construction activities under the purview of the Occupational Safety and Health Administration (OSHA). Consequently, BLS statistics reflect the safety performance of all contractors of appreciable size, but they are not a reflection of the safety performance that the highly reputable contractors deliver or the results that major corporations like PSNH expect.

Safety Performance Targets and Concerns

Until recently, URS, as a member of the CII, has been using the CII standards as the benchmark for injury trending. For the Merrimack Clean Air Project, URS set a target of 0.90 for the project RIR, which is somewhat puzzling since is it considerably higher than the CII average. However, the 0.90 still serves as an indication the type safety results the project expected to achieve. Even with the higher than average RIR target, the actual safety performance has not met the target. As can be seen from Figure 1, the RIR performance reported at the January 2011 Quarterly Executive Review Meeting, held on February 16, 2011, was 2.96 for the total project, or more than three times worse than targeted performance. The RIR performance reported that at the April 2011 Quarterly Review Meeting, on May 18, 2011, was 3.64, over four times worse than targeted.

URS has definitely been aware of the poor safety performance and on several occasions had meetings with the sub-contractor's senior management, but there has not been a significant improvement in the information reported to Jacobs. Senior management cannot mandate safety. An effective safety program can be planned and promulgated in plans and corporate procedures, but the only successful method to affect the plan is to present the plan on a daily basis to the workers, in their language, their culture, and by their immediate supervision in a face-to-face environment. It would appear this is not done effectively in the Merrimack Project.

Fortunately, the incidents occurring on this project are relatively minor, such as foreign objects in eyes, scratches, sprains, and pinches. However, minor incidents when not stopped can lead to the conclusion the workers are okay and inadvertently the minor cases become major. It is surprising, for the number of reportable incidents the Merrimack Project has, and is continuing to experience, even though there have been no lost-time incidents.

From the safety performance perspective of this project, it seems URS and the sub-contractors do not have safety performance as a paramount concern, and do not have either, enough or properly trained safety professionals assigned. Safety performance for the Clean Air Project has not been successful for PSNH.

7.4 Findings

- The project was contracted on a lump sum-turnkey basis and awarded in four major islands in addition to the balance of plant (BOP) work.
- As Project Manager, URS is fulfilling their responsibilities to manage the various island contractors.
- Monthly and quarterly project reports have continually indicated poor safety performance when compared to CII standards.
- PSNH and URS are well aware of the deteriorating safety performance.

7.5 Conclusions

Given the size and complexity of the Merrimack Clean Air Project, the construction approach has functioned as planned. The various contractors have worked well together and produced a project that has been on schedule and within budget. Safety performance has been poor, falling below the target set by URS and well below the CII average.

7.6 Recommendations

It is recommended both PSNH and URS management place renewed emphasis on safety for the remainder of the project and additional trained safety professionals be assigned to the project. In Jacobs' experience, the best arrangement would be for a safety professional to be assigned exclusively to one of the four islands working closely with each lead contractor and their sub-contractors.

8 Appendix

8.1 Data Request

Item	Description	Date Requested	Priority
1	Please provide a project execution manual that describes procedures on how to design, bid, contract and manage the project.	4/16//10	1
2	Please provide a schedule by discipline from start to finish for the entire project.	4/16/10	1
3	Please provide major RFPs and contracts on the completed portions of the project.	4/16/10	1
4	Please provide an original, detailed estimate for the entire project.	4/16//10	1
5	Please provide an updated, detailed estimate for the entire project.	4/16//10	1
6	Please provide the cost reports on the completed portions of the project.	4/16/10	1
7	Please provide the high-voltage plan and analysis that describes the justification and need for the additional switchyard.	4/16/10	1
8	Please describe the reasons for the increase between the estimates of S&L dated 2006 and URS Washington dated 5/08 for the following items: • Engineered Equipment Balance • Subcontracts FGD System • Subcontracts Material Handling • Subcontracts Waste Water Treatment Subcontracts RE Unloading Pit: • Growth • Indirect cost totals • Design engineering & home office support • Escalation	8/19/10	1
9	Copy of S&L estimate of 2006.	8/19/10	1
10	Please describe the reasons for the increase between the estimates of URS Washington dated 5/08 and Final CAP Cost Estimate 6/16/08.	8/19/10	1

Item	Description	Date Requested	Priority
11	Please provide an organization chart, which identifies the Clean Air project leadership, and support roles.	8/19/10	1
12	Please provide position descriptions that define the respective role/responsibilities in the Clean Air project for those identified in Item 11 (above).	8/19/10	2
13	Please provide a description of the project controls and software used to manage the project.	8/19/10	2
14	Identify any key performance indicators (KPIs) or measures developed to help manage the project. For those KPIs utilized, please provide results from project inception to date.	8/19/10	2
15	Please provide copies of any internal audits performed regarding the efficacy of the project's estimate and/or controls.	8/19/10	2
16	Provide the date that the current major project management oversight process at NU was formalized.	11/03/10	1
17	Provide the RFP, which resulted in the Sergeant and Lundy project estimate.	11/03/10	1
18	Provide all reports given to or provided by the Risk and Capital Committee (RACK).	11/03/10	1
19	Describe the project through a timeline starting with Sergeant and Lundy's estimate to the present date. Please include all supporting materials.	11/03/10	1
20	Provide both the August 2010 PowerPoint presentation, as well as the September 8, 2010 write-up, presented to the New Hampshire Commission.	11/03/10	1
21	All reports provided or presented to the NU BOARD OF Trustees concerning the PSNH Clean-Air Project.	11/03/10	1
22	Contractor bid evaluation sheet that resulted in URS's selection.	11/03/10	1
23	[NU's charters for the Risk and Capital Committee (RaCC) and the Executive Review Steering Committee.	11/03/10	1
24	Prints or drawings of the existing Merrimack Power Station (pre-scrubber), the Sergeant and Lundy picture, and the URS rendering.	11/03/10	2
25	The Janus Report, which summarizes the entire project from inception to the present date, once available.	11/03/10	2

Item	Description	Date Requested	Priority
26	Compare Sergeant and Lundy and URS design changes for each Construction Island (scrubber, E-warehouse, electric power supply, new yellow building) listing items that appear in URS estimate, but are not, or are different in the Sergeant and Lundy estimate. For each item identified describe in detail why it was needed quantifying the additional cost impact.	11/03/10	1
27	Provide the URS monthly PowerPoint progress reports for 2010 and all subsequent reports until project completion.	11/03/10	2
28	Provide the URS weekly action item lists for October 2010 and all such reports until project completion.	11/03/10	2
29	Provide the current Project Manager's spreadsheet reports describing project costs for the Merrimack Station Clean-Air Project. Report titles include - Total Summary, Resource Summary by Month, Main Scrubber System, Electric Power Supply, and Construct New Yellow Building. Also, please provide subsequent reports until project completion.	11/03/10	2
30	Quarterly update report, which describes incentive goal obtainment by URS.	11/03/10	2
31	Report produced by Power Advocate, which describes the cost of various comparable scrubber projects.	11/03/10	1
32	In connection with the potential absorber vessel material issue, please provide a description of work or research study letter quote awarded to Sergeant and Lundy.	11/03/10	2
33	Provide a document describing the information shared with contract employees regarding quality of workmanship based on lessons learned from other scrubber installations. Also, please confirm our understanding this information was presented by the Director-Generation.	11/03/10	2
34	Copy of the Contract Strategy Report prepared by R.W. Beck.	11/03/10	1
35	Describe the role intended for R.W. Beck in providing project oversight. Please provide all of the monthly reports that R.W. Beck has prepared for John McDonald. Also, please provide subsequent reports until project completion.	11/03/10	2
36	Copy of the public presentation made by the Director-Generation during the summer of 2010.	11/03/10	2

Item	Description	Date Requested	Priority
37	Reference DR 17 page 3 Section III item 2 "Determine mercury capture, including guarantees of scrubbing system. Determine any other controls that would be required to meet 90% and 95% mercury capture." Please explain the difference from DR 26 item 2 "1.) No specific mercury or SO3 guarantee required with S&L."	1/7/10	1
38	During our interview with PSNH personnel the following differences between S&L and URS estimates were identified: • Two limestone bins • Limestone rotary plow – deep well excavation • Two separate ducts, one for each unit • Larger absorber tank • Larger gypsum building and equipment • Additional tray level • DMT 15 addition to keep oxide mercury • Bromine added to coal belt increase chlorine • S&L 250m not based on 85% removal • Removed buildings and built new warehouse • Build new conference building • Additional foundation work • Service water - recycles used water • Switchyard expansion and added two lines in high yard per ISO-New England requirements • Truck unloading for limestone • Truck wash station to reduce traffic; can use trucks to haul both ways • Two day bins • S&L had only one conveyor for gypsum; now three • Added truck unloading (town wanted it inside) • Owner cost increase • Fan enclosure • Unit 1 flue gas will flow to Unit 2 stack to operate when scrubber is off • Site prep Please give an estimated cost variance for each item.		1
39	Provide the S&L analysis report of the absorber tower metal corrosion.	3/17/11	1

Item	Description	Date Requested	Priority
40	Please describe and explain the shift of funds from future years to 2011.	3/17/11	1
41	Please provide a hard copy of the Janus report.	3/17/11	1

8.2 Acronyms

ACI	Activated Carbon Injection
AFUDC	Allowance for Funds Used during Construction
BOP	Balance of Plant
CAP	Clean Air Project
CII	Construction Industry Institute
CO_2	Carbon Dioxide
CPM	Critical Path Method
EPCM	Engineering, Procurement, and Construction Management
ERMC	Executive Risk Management Council
FGD	Flue-gas desulphurization
GPPMA	General President's Project Maintenance Agreement
Hg	Mercury
NHCPA	New Hampshire Clean Power Act
NMA	National Maintenance Agreement
NOx	Nitrogen Oxide
NTX	Not-to-Exceed
NU	Northeast Utilities
OEM	Original Equipment Manufacturers
PO	Purchase Order
PM	Program Manger
PSNH	Public Service of New Hampshire
RaCC	Risk and Capital Committee
RFP	Request for Proposal
RFQ	Request for Qualifications
RIR	Recordable Incident Rate
RMC	Risk Management Council
S&L	Sargent and Lundy
SO_2	Sulfur Dioxide
SO_3.	Sulfur Trioxide

8.3 Industry Terms

Balance of Plant: Is the sum of all equipment for safe operation as well as the technical coordination of all concerned parts of a power plant.

Turnkey Contract: A single EPC contractor that provides a complete project "wrap" including other subcontracts; i.e., Scrubber Island, material handling, stack, construction labor etc.

Flue-Gas Desulphurization: Technology used to remove sulfur dioxide (SO_2) from the exhaust flue gases of fossil fuel power plants.

Activated Carbon Injection: System from which powdered activated carbon is pneumatically injected into the flue gas ductwork of a coal fired power plant or industrial boiler.

8.4 Contracts

Scrubber (FGD) Island Contractor Bid

In January 2008, the Program Manager issued a RFP for turnkey services for the supply and installation of the Scrubber Island. The scope included engineering, supply, construction, and testing for the FGD system, including the limestone silos through gypsum dewatering with all mechanical and electrical installation, and all architectural/structural work above the foundations. The RFP was issued to the following potential bidders:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- Siemens Environmental Systems & Services (SESS)

Contract negotiations with SESS resulted in a final contract price of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** with acceptable terms and conditions on all legal, commercial, and risk management issues. PSNH executed the full contract with SESS on October 20, 2008. On

October 31, 2008, PSNH opened a Purchase Order (PO) with a Not-to-Exceed (NTX) amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** for the FGD island work.

Island Procurement Strategy

In January 2008, the PSNH Clean Air Project team made a presentation to the RMC requesting authorization to issue RFPs for supply and installation of the following "islands":

- Chimney
- Material Handling System
- Wastewater Treatment System

The scope of work for each of these proposed RFPs included:

- Chimney - supply and installation of the chimney shell and fiber reinforced plastic flue liner.
- Material Handling System - supply and installation of the limestone rail unloading system, limestone storage silo and conveyor transfer system, as well as the gypsum conveyor transfer and storage building.
- Wastewater Treatment System - supply and installation of the FGD wastewater treatment system, including all equipment, piping, tankage, electrical and instrument and control systems.

PSNH established pricing format to be firm, lump sum pricing to the greatest extent possible.

The NU/PSNH Large Project Procedure previously described in Section 3 was followed throughout the contract letting process. The RMC approved release of all three RFPs and the ERMC approval for release of the RFP for the Material Handling System on March 25, 2008. The ERMC approval was required since the Material Handling System was greater than $25M.

Material Handling Contractor Bid

Request for Proposal 29834-15-6-714-SC was issued on March 26, 2008, for the supply and installation of the Material Handling System. The RFP was issued to the following potential bidders:

- Dearborn Midwest Conveyor Co. (DMW)
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**

Negotiations with DMW resulted in acceptable terms and conditions on all legal, commercial, and risk management issues. On December 19, 2008, NU executed a contract with DMW for **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** and on January 26, 2009, PSNH opened a PO with a NTX amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** the material handling contract.

Chimney Contractor Bid

Request for Proposal 29834-13-6-901-SC was issued on January 30, 2008, for the supply and installation of the reinforced concrete chimney. The RFP was issued to the following potential bidders:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- Hamon Custodis
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**

Negotiations with Hamon Custodis resulted in a final contract price of $12,614,364, with acceptable terms and conditions on all legal, commercial, and risk management issues. On December 9, 2008, NU executed the full contract with Hamon Custodis and on December 16, 2008, PSNH opened a PO with a NTX amount of $13,200,000 for the chimney contract.

Wastewater Treatment System Contractor

RFP 29834-21-6-403-SC was issued on February 27, 2008, for the supply and installation of the wastewater treatment system. The RFP was issued to the following potential bidders:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- Siemens Water Technologies (Siemens)

On December 5, 2008, NU executed a contract with Siemens for **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** and on December 16, 2008, PSNH opened a PO with a NTX amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** for the WWTS contract.

Phase I Site Preparation (Pre-Construction) Contractor Bid

PSNH was authorized by the RMC in July 2008 to issue the RFP for Phase I Pre-Construction Site Preparation. The scope of work included site development for the craft parking lot, fabrication, and lay-down areas, temporary power, and miscellaneous temporary buildings and foundations. The estimated value of the work was $8M. The contract was intended to be a lump sum with unit pricing for additions and deletions.

On August 8, 2008, RFP 29384-12-6-001-SC was issued for Phase I Site Preparation to the following bidders:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- George Cairns & Sons, Inc. (Cairns)
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**

The Phase I Site Preparation Contract for $6,352,240 was awarded to Cairns on October 31, 2008, and PO 02246117, effective November 17, 2008, with a NTX amount of $7,300,000 was issued.

Booster Fans & Motors Contractor Bid

The RMC in August 2008 authorized PSNH to issue a RFQ for the supply of booster fans and motors. The estimated value of this contract was $5,133,730, which was executed on a lump sum fixed price basis.

The following firms identified as qualified bidders are shown below:

- FlaktWoods Americas Operations
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**

A contract for **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** was awarded to FlaktWoods for Booster Fans and Motors on February 2, 2009. The amount included a fixed amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** plus an estimated **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** for freight and PO 02247380 was issued on February 2, 2009, with a NTX amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**. Additionally, PO 02248788 for long term spares was also issued in the amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**, plus freight.

Phase II Site Preparation Contractor (Construction) Bid

NU issued RFQ No. 29384-12-6-002-SC, on March 6, 2009, for Site Preparation Phase II Construction Work to the following prospective bidders:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- Daniel O'Connell's Sons (O'Connell)
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**

Phase II Site Preparation work scope included, among other items:

- Installation of underground storm drains system.
- Demolition of the existing "yellow" building.
- Relocation of the existing north-south road (west of the station).
- Relocation of the utility trench.
- Installation of underground process piping.

On June 8, 2009, the Phase II Contract for $3,775,687 was awarded to Daniel O'Connell's Sons Inc. (O'Connell). NU opened PO 2249996 on June 10, 2009, with a NTX amount of $4,900,000.

Construction Services Contractor Bid

Request for Proposal 29834-13-6-550-SC was issued on November 25, 2008, to the following pre-qualified bidders for the construction services contract:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- CCB Inc. (CCB)
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- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**

The scope of work included ongoing general site services, maintenance services, operations and maintenance services, miscellaneous constructions activities as directed by the owner and provision of Construction Power, Water Distribution, and Sanitary Systems. The selected contractor would be paid on a time and material basis.

The Construction Services contract for $1,500,590 was awarded to CCB in February 2009, and PSNH opened PO 02247576 on March 4, 2009, with a NTX amount of $4,500,000.

Concrete Foundation Installation Contractor Bid

On November 24, 2008, the Project requested and received RMC authorization to issue the RFP for Foundation Installation. The scope of this work was excavation and installation of foundations with an estimated value of $15M. The following contractors were identified as qualified bidders through a pre-qualification submittal process that included a review of safety records. The contract was pricing was structured to be a lump sum for foundations that were already designed and unit prices for estimated quantities based on the degree of complexity for foundations that would be designed in the future.

Request for Proposal 29834-12-8-001-SC was issued on December 2, 2008, to the following pre-qualified bidders:

- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
- Francis Harvey & Sons Inc. (Harvey)
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
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- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
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The scope of work included provision of foundations for the following:

- Chimney
- Absorber Vessel
- Booster Fans (one for MK1 and two for MK2)
- FGD Building
- Ball Mills (FGD Building)
- FGD Building Tanks
- Gypsum Storage Enclosure, including exterior slab
- FGD Service Water House
- Two Limestone Storage Silos
- Duct Supporters

- Truck Wash Building
- Utility Bridge from FGD Substation to FGD Building
- Ash Silos- Relocation
- Limestone Conveyor Transfer Towers
- Limestone Receiving Chute
- Gypsum Conveyor Belts
- Limestone Bucket Elevator and Emergency Reclaim Dozer Trap

On February 4, 2009, the Concrete Foundations Installation Contract for $9,998,703 was awarded to Francis Harvey & Sons and NU opened PO 022474589 with an NTX amount of $11,000,000 on February 6, 2009. The final contract amount was revised from the initial evaluation estimate based on information received after the evaluation was completed. The adjustment in pricing lowered the estimate from $10,538,496 to $9,998,703 as the initial amount of the contract.

Permanent FGD Substation Contractor Bid

RFX-00213-2008 was issued to nine prospective bidders on July 15, 2008. This RFX was issued by NU/PSNH without URS involvement. PSNH had greater experience with substations of this type including PSNH's experience at the Northern Wood Power Project at Schiller Station.

The scope of work included engineering, design, development of protection and control settings, procurement of materials, and the installation, testing, and commissioning of a complete 115 kV — 4.16 kV two-transformer substation. The RFX requested lump sum pricing.

The RFX estimate was $4M; therefore, prior RMC authorization was not requested. Three bids, all over $5M, were received from the following bidders:

- Eaton Electric (Eaton)
- **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**
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On December 26, 2008, Eaton was awarded a contract for $5,709,158 and PO 02246779 was issued for $6,380,000, including 10% contingency.

Balance of Plant Mechanical Contractor Bid

On September 9, 2009, authorization was sought and received from the RMC to issue the RFP for Balance of Plant (BOP) Mechanical Equipment / Piping Installation, mechanical work that was not logically scoped into the other "island" packages, including non-ductwork insulation. The contract was anticipated to be a lump sum for completed design with unit prices for additional scope. Nine prospective bidders were pre-qualified based on their submittals, review of their safety records and their membership in local building trades. Prospective evaluative criteria and weighting as well as a summary of contract risks and mitigation measures were presented to the RMC.

On November 25, 2009, RFP 29384-15-6-531 was issued to eight prospective bidders including:

- AZCO, Industrial Construction & Fabrication (AZCO)
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Following further negotiations, on March 25, 2010, PSNH opened a PO with AZCO for the BOP mechanical work with a NTX amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL.**

Balance of Plant Electrical Contractor Bid

On September 9, 2009, PSNH sought authorization and received approval from the RMC to issue the RFP for balance of plant Electrical Power, electrical work that was not logically scoped into the other "island" packages, including the digital control system and continuous emissions

monitoring system installation. The contract was planned to be lump sum for completed design with unit prices for additional scope.

PSNH / URS pre-qualified ten prospective bidders based on their submittals, review of their safety records, and their membership in local building trades. PSNH / URS developed prospective evaluative criteria and weighting as well as a summary of contract risks and mitigation measures, which were presented to the RMC.

On December 15, 2009, RFP 29384-17-6-754 was issued to eight prospective bidders including:

- E.S. Boulos (Boulos)
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On April 23 2010, PSNH issued a PO to Boulos for the BOP electrical work with a lump sum total of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** (including OCIP and base scope revisions) and a NTX amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**.

Ductwork Fabricator Bid

On April 27, 2009, authorization was sought and granted by the RMC to issue the RFP for Ductwork Fabrication. The scope of work included furnish, fabricating, and delivering steel ductwork. The estimated value of the contract was $8.3M. The contract was intended to be lump sum for those designs that were complete and unit pricing for estimated quantities for future designs. Award was anticipated for July 2009. Delivery of ductwork was planned to start in February 2010 and be complete in July 2010. Liquidated damages would be applied to meeting the delivery schedule.

On April 29, 2009, RFQ 29834-13-6-513, Ductwork Fabrication was issued to the following pre-qualified prospective bidders:

- Merrill Iron & Steel, Inc. (Merrill)
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On August 5, 2009, PO 02250987 was opened for Merrill Iron and Steel, Inc. for Ductwork Fabrication. NU entered into a contract with Merrill for $3,516,017, which included $550,000 for future work authorization, plus $12,000 for a letter of credit option. The NTX amount was $4,000,000.

Ductwork and Structural Steel Erector Bid

On August 5, 2009, CA Project Management requested and received RMC authorization to issue the RFP for Ductwork and Structural Steel Erection. The scope of work included erection of the ductwork and structural steel to be fabricated and delivered by Merrill (see above discussion). The estimated value of this work was approximately $18.54M. The contract was intended to be lump sum for complete designs and with unit prices and estimated quantities for future designs.

The following were pre-qualified as prospective bidders:

- Merrill Iron & Steel Inc. (Merrill)
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Contract Award

PO 02252748 was issued to Merrill Iron and Steel, Inc. for Ductwork and Structural Steel Erection. PSNH entered into a contract with Merrill for $12,873,777, including adjustments based upon information received after the bid evaluation was completed. The NTX PO opened on December 24, 2009 had a value of $16,000,000.

Enhanced Primary Waste Water Treatment System — Contract Addition[37]

On March 16 2010, URS issued an RFP to four bidders for an Enhanced Wastewater Treatment System to provide for polishing treatment of mercury and arsenic downstream of the Wastewater Treatment System, which was being built by Siemens. This system was required to meet the rigorous emission limits of the water discharge permit limitations imposed by the NHDES.

Siemens Water Technologies / Northern Peabody Inc. (Siemens) and **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** submitted proposals. The procurement team evaluated the Siemens and **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** proposals with final evaluation scores of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** and **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**, respectively. Siemens' bid was considered to have a proven technology, and the evaluated cost plus recommended options was reasonable.

URS recommended to the PSNH CA Project Team that Siemens be awarded the Enhanced Wastewater Treatment System contract work for **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**, plus **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** for future work authorization, if needed. The resultant authorized value of **BEGIN CONFIDENTIAL [**

] **END CONFIDENTIAL** was added to the existing Siemens Wastewater Treatment System contract with a NTX value of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL**.

Potential Adjustment Protection System — Contract Addition[38]

In mid 2010, PSNH became aware of a potential problem with the A-2205 material used in the absorber tank. High Alloy Stainless Steels have been used for FGD reaction vessels as an industry standard for years and A-2205 is the material most commonly used. In very limited cases, A-2205 materials have not stood up to certain corrosion mechanisms.

PSNH obtained more knowledge of the problem by speaking to utilities that had experienced the problem and engineering firms which have specific and current knowledge and expertise on this topic. It was determined the Sargent and Lundy (S&L) had the most firsthand knowledge of this issue and a PO was issued on November 9, 2010.

After a full analysis of our absorber tank and a review of all industry knowledge, it was concluded that a Potential Adjustment Protection System is the most effective way to ensure corrosion protection. Potential Adjustment Protection systems have been successfully used in many industries for this type of problem. Corrosion Service is an industry leader and they can provide corrosion protection guarantees. Sole sourcing was used for the specialized design and supply of equipment (tank internals and external controls) and a PO was issued in January 2011.

Secondary Waste Water Treatment

PSNH decided pursue the supplemental WWTS option and hired Burns & McDonald (B&M) on November 17, 2010, to provide technical assistance based on their unique knowledge and expertise. Burns & McDonald was engaged to provide engineering and construction oversight under the pre-existing contract arrangement with NU/PSNH due to their experience with the only other similar system in the United States.

[37] DR 040 Operating Permit Overview
[38] DR 039 S&L A2205 Report

Burns & McDonald's analysis of the Clean Air Project WWTS and effluent concluded the installation of a brine concentrator, crystallizer would reduce the liquid waste stream to between zero to five gpm, which may allow for re-use and an additional crystallizer, and dewatering device will be installed to insure zero discharge.

On January 12, 2011, the RMC reviewed the procurement strategy and the plans for the release of RFPs for equipment and construction for the Supplemental WWTS. The RMC approved immediate release of the equipment RFP and the release of the construction RFP later in the spring 2011.

In January 2011, Clean Air Project management revised the project budget to include $20.2M for the supplemental WWTS. The overall project budget did not increase since Clean Air Project management utilized funds from reserve and contingency accounts. PSNH elected to manage the Supplemental WWTS work directly under a separate PSNH Work Order. On January 20, 2011, the RMC reviewed evaluations of the equipment supply bids received from Aquatech and **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** under RFP-00014- 02011.

Discussions were held with both bidders to further clarify scope of work, schedule and guarantees; both bidders provided best and final offers.

Due to long delivery and the equipment being of foreign manufacture PSNH eliminated **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** and continued negotiations with Aquatech.

On February 3, 2011, a PO in the NTX amount of **BEGIN CONFIDENTIAL [ ] END CONFIDENTIAL** was opened with Aquatech. This included a provision for potential future options, design development and shipping as well as a contingency provision allowance.