THE STATE OF NEW HAMPSHIRE

BEFORE THE NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

PREPARED TESTIMONY OF WILLIAM H. SMAGULA

INVESTIGATION OF MERRIMACK STATION SCRUBBER PROJECT

AND COST RECOVERY

Docket No. DE 11-250

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I. INTRODUCTION

Q. Mr. Smagula, please state your name, position, employer and address.

A. My name is William H. Smagula. I am Director of Generation for Public Service Company of New Hampshire, ("PSNH" or the "Company"), a subsidiary of Northeast Utilities (NU). My business address is 780 North Commercial Street, P.O. Box 330, Manchester, New Hampshire 03105.

Q. Please provide a brief summary of your background.

A. I received a Bachelor of Science degree in Mechanical Engineering from the University of New Hampshire and a Master of Science degree in Mechanical Engineering from Northeastern University. I have worked for Public Service Company of New Hampshire and then Northeast Utilities since 1978. I am a Registered Professional Engineer in the states of New Hampshire, Connecticut and Massachusetts. My duties have included Manager of Generation Training for the PSNH system, Station Manager - Merrimack Station, Steam Production Manager - PSNH, Director Fossil Generation - The Connecticut Light and Power Company, and Director, Manage and Operate Services - Northeast Generation Services Company. In June 2001, I assumed the responsibilities of Director - PSNH Generation in New Hampshire.

Q. Please describe your responsibilities as Director - PSNH Generation.

A. In my present position as Director - PSNH Generation, I am responsible for the operation and maintenance of PSNH's generating stations. I have responsibility for three fossil-fired, steam electric generating stations, nine hydroelectric generating stations, two remote combustion turbine/diesel generator sites and most recently a new biomass-fueled boiler. PSNH Generation maintains a diversified fuel portfolio including gas, oil and coal-fired units as well as hydro and renewable biomass with a total generation capacity of approximately 1150 MW.

Q. Have you ever testified before this Commission?

A. Yes. I submitted testimony in support of the Company's request for temporary rates in this docket, and have testified in many previous Commission proceedings regarding the operation of PSNH's fossil-fired and hydroelectric generating plants.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide support for the Company's request under RSA 125-O:18 that the Commission find that costs associated with the Clean Air Project involving the design, construction and operation of the wet flue gas desulfurization system (the "Scrubber" or "FGD") at PSNH's Merrimack Station in Bow, New Hampshire were prudently incurred and are recoverable through the Company's Default Energy Service rate. My testimony is organized into the following sections: (1) Background on the Clean Air Project ("CAP"); (2) CAP Design and Construction; (3) Project Management and Philosophy, and; (4) Ongoing Operation of the Scrubber.

II. BACKGROUND ON THE CLEAN AIR PROJECT

Q. Was the construction of the Scrubber mandated by law?

A. Yes. In June 2006, the New Hampshire General Court enacted a law requiring PSNH to reduce mercury emissions on an annual basis by 80 percent of the aggregated mercury content of the coal burned at all of PSNH's coal-fired plants[1] no later than July 1, 2013. To achieve the statutorily-required mercury reduction, the law required PSNH to install a wet flue gas desulfurization system at Merrimack Station by July 1, 2013. The law is unique in that it requires the installation and operation of specific technology (a wet FGD system) at a specific site-- at Merrimack Station-- to achieve the mandated mercury emissions reductions. The law requiring this technology has generally been referred to as the Mercury Emissions Reduction law or, more colloquially, the Scrubber law (RSA 125-O:11 through 18).

Q. What was the purpose of the Scrubber law?

A. The stated purpose of the Scrubber law is set forth in a series of findings which include the following:

- "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

[1] Merrimack Station 1 and 2, Schiller Station 4, 5 and 6.

- "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 emission 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

- "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." RSA 125-O:11, IV

- "The installation of such technology is in the public interest of the citizens of New Hampshire and the customers of the affected sources." RSA 125-O:11,VI

Q. Have these legislative objectives been met by the Clean Air Project?

A. Yes. As described later in my testimony, the Scrubber has been operating and has significantly reduced mercury, sulfur, and other combustion gas emissions. In short, the CAP has been a success and is providing the benefits that the Legislature had envisioned not only to PSNH's customers but to all of the citizens of our state.

III. CLEAN AIR PROJECT DESIGN AND CONSTRUCTION

Q. When did the Clean Air Project begin?

A. As noted in the Company's September 2, 2008 report filed in DE 08-103 (and subsequently filed in this docket), activities to comply with the Scrubber law began as soon as the law was enacted in 2006. In the fall of 2007, the Company engaged Washington Group International (now URS) as the Project Program Manager for the

Clean Air Project. URS, working with PSNH, developed the overall FGD scope, design basis, and final cost estimate in 2008. This effort provided the technical basis for the Scrubber that was constructed.

Q. Please describe the Scrubber technology that was constructed.

A. The wet FGD process uses crushed limestone mixed with water to form limestone slurry that is sprayed into an absorber vessel. The flue gas from the boilers of both units is directed to the absorber where it mixes with the limestone slurry (calcium carbonate). Mercury and sulfur in the flue gas makes contact with the slurry and becomes absorbed into the limestone slurry solution. A portion of the water in the slurry solution is evaporated and is released to the atmosphere up the chimney while the remainder is removed as liquid blow down from the absorber vessel. The liquid blow down is used to form synthetic gypsum and a liquid effluent to be processed at the Project's waste water treatment facility. SO_2 from the flue gas reacts with the calcium carbonate and forms calcium sulfite. The calcium sulfite is oxidized with air to form calcium sulfate (synthetic gypsum). This gypsum is removed from the absorber, dewatered and filtered, and conveyed as a damp, granular material to an adjacent storage building prior to being sold to an area company to make drywall sheets. Liquid that is processed in the waste water treatment facility is cleaned and recycled for reuse. Any solidified elements from the waste water treatment system will be collected and transported to an appropriate licensed solid waste facility.

The FGD process is depicted graphically in Attachment WHS-01.

Q. Please describe the major components of the Scrubber Project.

A. The Clean Air Project is comprised of numerous components. First, there are four major elements or "islands" which comprise the core portion of the Project. These are the Scrubber Island which includes the FGD vessel and support systems; the Material Handling Island which includes limestone and gypsum system; Chimney Island comprised of a 445-foot high chimney; and a state-of-the-art Scrubber Waste Water Treatment Plant. These four islands were designed and built to be interconnected. In support of the operation of these four islands, numerous other Project elements are needed: duct work and booster fans, a service water pump house, a 115 KV hi-yard expansion and 115 KV to 4160v substation, a warehouse, as well as other equipment, and interconnection and support systems.

The Scrubber Island includes the limestone preparation equipment, absorber vessel, and gypsum dewatering systems with all auxiliary support equipment. Equipment elements and auxiliaries include: the limestone day silos and feed conveyors, ball mills, flue gas inlet duct to the absorber vessel, outlet breeching to the chimney, recycle pumps, oxidation air blowers, process tanks, gypsum dewatering equipment, electrical distribution rooms, and other support equipment. All interconnecting piping systems, electrical systems (instrumentation), and buildings are part of the complete system. The scope also includes all necessary instrumentation and a control system which is integrated with the two Merrimack Station units.

The Material Handling Island includes the limestone rail and truck unloading equipment, storage silos, reclaim system, transfer conveyors/towers, gypsum conveyors, and a gypsum storage building along with all auxiliary support equipment/systems. All water, air, and electrical systems and buildings are part of the complete system.

The Chimney Island includes a complete 445-foot concrete chimney outer shell and a fiberglass liner (flue) from the absorber outlet to the top of the chimney and all appurtenances such as aircraft lighting, lightning protection, elevator, and upper elevation work platforms.

The CAP Waste Water Treatment System (WWTS) is designed to treat waste water from the FGD process. The WWTS Island includes all treatment equipment and systems to comply with the discharge limits proposed by the NHDES in accordance with stringent state water quality standards. All interconnecting piping systems, electrical and control equipment and a building are part of the complete system.

Q. Please explain the U.S. Environmental Protection Agency's (EPA) Region I position regarding a modification to the existing station National Pollution Discharge Elimination System (NPDES) Permit to accommodate the Clean Air Project?

A. The EPA has long known of the Scrubber Project via direct communications with the PSNH personnel involved with a long overdue NPDES Draft Permit. Also, as PSNH and its consultants worked with the New Hampshire Department of Environmental Services regarding water treatment discharge permits, the EPA was further aware of the Scrubber. As has been the case in past efforts, satisfying the strict NHDES standards has typically

been the challenge with final adjustments or acceptance by the USEPA. However, that was not the case on this Project. Numerous representatives from PSNH and the NHDES met with the EPA in November of 2010 at which time the EPA clearly indicated they could not agree to grant PSNH an NPDES Permit modification or any other means to allow it to have an approved new site discharge, even if it met NHDES standards and approval. Rather the lead EPA officials indicated that "most clients usually go back and find a way …… if a permit modification is not granted". Thus PSNH had to "find a way" to get the CAP online and do so while sustaining the overall schedule. In this way, costs to customers could be minimized by avoiding millions of dollars in AFUDC expenses caused by schedule delays that would otherwise occur, and air quality could improve early in fulfillment of the underlying principles of RSA-125-O.

Thus it became fully evident that, without the ability to discharge a fully treated effluent, additional treatment was needed. An approach to proceed with added treatment technology had been conceptually ready to be deployed and PSNH proceeded to hire an engineering company with relevant experience to develop a plan promptly to procure and build a Secondary Waste Water Treatment System (SWWTS) to supplement the original or Primary Waste Water Treatment System (PWWTS). The SWWTS will take the treated effluent from the PWWTS and produce a clean water stream which is recycled into the station for reuse, with any remaining dry solids collected for disposal at a permitted landfill.

Until the SWWTS was fully functional, an interim means of removing treated water was developed which included bringing this liquid to any of a number of facilities after all the necessary permits and approvals were obtained.

It should also be noted that there is no change to the Merrimack River water being used by the Station. The existing station treatment pond was utilized as the source of make-up water for the Scrubber which provides use of 100 percent reused or recycled water for the FGD make-up water system.

In summary, no NPDES permit changes were needed for the Clean Air Project.

Q. Has the progress of the construction of the Scrubber been chronicled along the way?

A. Yes. The progress of the Scrubber's construction has been well documented in regular progress reports to the Commission on September 2, 2008, March 19, 2101, October 15, 2010, November 10, 2011, November 18, 2011 and March 22, 2012. Copies of these reports are on filed in this docket.

Q. Please explain what work remains to be done on the Scrubber's construction since the last Project report on March 22, 2012?

A. As of the end of March, any remaining tasks were identified that required equipment adjustments or final completion. This is typical of any large capital project and the work involved is typically referred to as remaining "punch list" items. Similar to someone building a new home, there are final touch-up and completion tasks such as paving, paint

touch-up, or fixing a valve that is not working properly, etc. In the context of the CAP, examples of these types of tasks include replacing certain equipment elements, final installation and adjustment of equipment, operational tuning of equipment, final paving, etc. Some of this work falls in the category of warranty repairs at no additional cost while other tasks are expected and planned work as part of the Project original scope.

The only remaining element of the Project to be placed into service is a few pieces of equipment that are associated with the Secondary Waste Water Treatment System. This is expected to have commissioning, testing, and performance demonstrations completed in June.

Upon completion of this step of placing the final element of the Project in service, the only remaining work will be punch list tasks and some final site clean-up. As you might expect, for a Project of this size, the punch list of items was large but is being steadily reduced. We currently expect all punch list items to be completed by the third quarter of 2012. The Project is currently considered 99% complete.

IV. PROJECT MANAGEMENT AND PHILOSOPHY

Q. What was the Company's overall management philosophy regarding management of the Clean Air Project?

A. The Company understood the importance and complexity of this Project from the onset. As a result, the Project Team developed what was referred to as a Culture of Preparedness which is essentially an overarching, proactive philosophy to ensure that all

aspects of the Project were carefully and deliberately managed with attention to current and future risk management, while striving to optimize efficiencies and productivity. A high priority was placed on establishing and sustaining the complex, integrated Project schedule and budget. This approach was applied to all Project-related work whether performed by internal or external parties.

Internally, all appropriate corporate departments were involved in the Project as needed to ensure thoroughness of review and proper attention to detail was sustained to meet appropriate expectations of the Company and customers. This included support from numerous departments: legal, procurement, contracts, insurance, accounting, design, engineering, environmental, and budgeting, among others.

Externally, the Company engaged appropriate expertise to best manage the technical work of the CAP with a focus on achieving the required outcome on emissions at the lowest cost and managing to a well-developed, integrated schedule. This included support from numerous companies on design, engineering, contracts, procurement, construction, commissioning, permitting, environmental, and legal, among other areas.

Q. Please describe the contracting process used by the Company to hire vendors to design and construct the Scrubber.

A. PSNH followed Northeast Utilities ("NU") Purchasing Manual Policies and Procedures, and the NU System Contract Administration Policy for Large Capital Construction Projects, in addition to general procurement requirements such as issuing Request for

Proposals (RFPs), formal bid evaluations of commercial and technical terms, contract negotiation strategies and management review. The CAP was segregated into multiple construction work packages that were prepared by URS. The specifications were submitted to suppliers for competitive bids using the NU/PSNH Procurement processes. URS and PSNH evaluated the bids and PSNH issued contracts / purchase orders (POs) to the successful bidders.

The decision to use an EPCM (Engineering/Procurement/Construction Management) contracting approach for the Project was reached only after consultation with industry experts familiar with the challenges of such a project and factoring in the existing industry marketplace. PSNH retained R.W. Beck to identify and evaluate alternative contracting strategies that PSNH could use in implementing the CAP. The contracting strategy utilized was chosen only after a careful assessment of all options.

Q. Who was responsible for overseeing the contracts?

A. The majority of the CAP contracts were managed by URS through its role as CAP Program Manager, subject to review, oversight and approval by PSNH. All contracts were issued by PSNH. These contracts consisted of the major or minor material / equipment purchases, major and minor services, and all other contracts needed to do the complete Project.

PSNH CAP management decided to directly manage a number of contracts. These included contracts issued early in the Project life cycle and those areas of work where

PSNH CAP management determined such an approach was within the Company's core competencies and area of expertise. PSNH was also able to take advantage of existing relationships with certain contractors. For example, preliminary site surveys and investigations were procured and managed by PSNH. The permanent FGD substation and the 115kV hi-yard expansion were also directly managed by NU/PSNH because PSNH and NU Transmission had expertise with site electrical transmission and distribution systems.

There were certain other tasks not assigned to URS. This included the installation of a Potential Adjustment Protection System inside the absorber vessel to prevent corrosion. This was engineered by Sargent & Lundy due to their depth of knowledge and experience in this area. In addition, contracts for the SWWTS were also separately managed by PSNH with engineering and construction support provided by Burns and McDonnell engineering due to their unique expertise and experience. The construction of the "Meeting Place" and E Warehouse buildings were also managed by PSNH, using local technical and construction firms. PSNH's efforts to directly manage aspects of the CAP resulted in overall CAP savings.

Q. Was there any third party management and technical oversight of the Clean Air Project?

A. Yes. In addition to oversight by Company employees, PSNH engaged R. W. Beck Inc. to provide an Independent Engineer's assessment of the Project, acting in a role often referred to as Owner's Engineer. The scope of the R. W. Beck independent reviews included engineering, procurement, construction, startup, commissioning, and

performance testing phases of the Clean Air Project. R. W. Beck prepared an Initial Report covering the period up to October 2009 with monthly site visits and reports issued thereafter. Copies of available reports are included as Attachment WHS-02.

Q. What is the total cost of the Scrubber Project?

A. The Company projects that the final costs will be no more than $422 million, but the final actual amount will not be known until the final tasks associated with the CAP are complete. As has been noted, a dwindling number of small tasks are still active. We also wish to point out that in other reports, the initial cost estimate of $457 Million has been reduced to $422 Million in 2011. The final cost continues to be projected to be no more than $422 Million which is consistent to published cost statements since later 2011.

Q. What is the process for recovery of those costs?

A. RSA 125-O:18 allows PSNH to recover all prudent costs of complying with the requirements of the Scrubber law. On April 10, 2012, the Commission approved a temporary Scrubber cost recovery rate at 0.98 cents per kWh. Once the Commission issues an order on the prudence of costs, PSNH will then request commencement of recovery via the traditional energy service ratemaking process. Mr. Baumann's testimony provides an estimate of the impact of full cost recovery of the Scrubber through PSNH's Energy Service rate.

Q. Did PSNH undertake efforts to manage the costs of the CAP?

A. Yes. PSNH aggressively managed the costs of the CAP from Project inception and throughout its execution. Effective cost management was achieved by the establishment of the Project budget and the implementation of a thorough cost monitoring and management process.

The selection of URS as the Program Manager was a positive action. PSNH was offered a veteran team which has proven to have been a strength of this Project. PSNH provided goals for the URS team which align with Project success such as cost and schedule management. This also aligns with customer value.

Another key NU/PSNH strategy to manage cost was to reduce cost uncertainty by locking in fixed priced contacts for key, large contracts. The Project team was able to refine expected Project costs through a request for proposal and bidding process for the selection of the Program Manager and then the major construction contracts. An overall contract strategy program laid the foundation for good Project management.

Other aspects of the project expenditure work included the continued development of sound specifications and robust competition for award of construction work and major equipment purchases. This planned, sequential approach provided greater accuracy in the cost and schedule management at each step of the engineering and construction schedules.

To break this effort down further, PSNH took the following actions to control CAP costs:

1. PSNH employed a Project concept of using a Program Manager (URS) to perform design and establish a well-defined specifications and the scope of work prior to the selection of equipment suppliers and construction contractor. This enabled refined bids and a basis for comparison between the program manager's estimate for the work and the bids from the qualified contractors. In October 2007, URS started work on the preliminary Project cost estimate to incorporate the updated design and scope of the CAP and current market conditions for materials, labor and equipment. To obtain current and accurate data for the preliminary Project cost estimate, URS issued budgetary Requests for Information and mini-specifications for the main CAP Islands.
2. The CAP construction strategy divided the core scope of work into specific segments or, "islands" such that each island (FGD, Chimney, WWT, and Material Handling) was the responsibility of an expert and experienced company.
3. The overall CAP contract strategy identified qualified contractors and bid the work to obtain fixed price contracts. PSNH management was able to obtain high accountability on contracts, strong performance guarantees and product warranties, and greater price certainty through risk transfer to the suppliers of goods and services.
4. PSNH held the selected contractors to tight schedules and provided close oversight of the work.
5. PSNH required URS to perform thorough analyses and justification of change requests and contract claims prior to approval.
6. PSNH back-charged contractors for work not done and enforced contractual penalties for schedule delays.
7. PSNH directly managed a number of the Project contracts due to the unique nature of the specific work, the availability of previously utilized or known specialty expertise and resources, and other factors. The work directly managed by PSNH included the SWWT system, the Meeting Place building and E warehouse construction, and electrical power supply scope.
8. Aggressive management of cost saving opportunities such as:
    a. enforcement of contract de-escalation provisions for work completed
    b. utilization of early payment provisions where discounts were available.
    c. minimization of AFUDC
    d. negotiation of insurance cost reductions
9. PSNH engaged Power Advocate to contribute its experience to the bidding documents and bidders list as well as to perform an independent review of the Project cost estimate to provide confidence in it compared to industry / other projects.
10. PSNH conducted periodic assessments and other reviews of the CAP, as well as the Power Advocate cost review, R.W. Beck oversight, and an independent external review by NU's Internal Audit Department.

Throughout the Project, CAP management used both PSNH's corporate accounting system and Project-specific cost tracking and reporting to closely monitor Project expenditures and cash flow against budget. From the early stages of the Project, PSNH established a Project budget and cash flow which was monitored by the CAP manager, director and others.

Q. Please comment on the craft labor used on this Project.

A. A review of craft labor options resulted in the conclusion that union building trades was the best group to build the Project because there would be adequate numbers of construction personnel with the necessary needed skills.

Q. How do the costs of the CAP compare with experience in the industry in the design and construction of Scrubber technology?

A. In 2008, PSNH engaged Power Advocate to analyze the $457 million budget of the CAP and compared it to industry experience. In June 2008, Power Advocate reported that the Merrimack CAP budget, when compared and normalized to some industry Scrubber Project benchmarks, is in line with the costs of similar projects. There were several factors that accounted for this conclusion. These factors are associated with the scope and complexity of the Merrimack CAP. When Power Advocate incorporated site and Project specific adjustments into the cost estimate to make an "apples to apples" comparison, the Merrimack CAP was in the range of comparable FGD projects. A copy of the Power Advocate report is included as Attachment WHS-3.

Furthermore, the initial report prepared for the Commission by Jacobs Consultancy also indicated an acknowledgement that initial, conceptual costs can vary from final cost estimates.

Q. Did PSNH institute any quality control programs associated with the Scrubber's construction?

A. Yes. As required by PSNH, URS implemented a Quality Assurance Program in support of the engineering, procurement, construction management and startup activities to be performed for completion of the CAP. The URS Quality Assurance program provided oversight of the major subcontractors with emphasis on each subcontractor's administration of their own quality programs to verify required levels of quality and productivity were maintained. Quality oversight companies were hired as needed to oversee specific technical activities of contractors or subcontractors. Applicable Codes and Standards were defined in the CAP drawings and specifications and were also listed in the material, equipment, and construction contract documents.

Q. Did the Commission conduct any audits of the Clean Air Project while it was underway?

A. Yes. In early 2010, the Commission engaged the services of Jacobs Consultancy (Jacobs) to monitor the progress of the CAP and to develop a due diligence report on the completed portions of the Project. Jacobs issued a number of periodic assessments of the CAP including a June 2011 Due Diligence review of the completed portion of the Project

and quarterly assessments in April 2011, July 2011, and October 2011. All of those Jacobs reports are part of the record in this proceeding per Commission Order 25,332.

Q. What did the Jacobs review entail?

A. Jacobs Consultancy completed a due diligence review of the Scrubber based on a four stage evaluation: (1) Project initiation, (2) investigation, data gathering, and fact-finding, (3) analysis, and (4) reporting. Jacobs focused its review on contracts, cost estimates, Project schedule, Project management approach, construction approach, and safety.

Q. Did Jacobs reach a conclusion as a result of its review?

A. Yes. According to Jacobs June 2011 "New Hampshire Clean Air Project Due Diligence on Completed Portion" (page 4):

> 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 [sic] 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.

Q. Did PSNH and URS make any changes as a result of the Jacobs recommendation?

A. Yes. Under oversight by PSNH, URS implemented a comprehensive new safety initiative that included involving and getting full support of the presidents of the major companies installing equipment, all site managers from all companies with active work, and foremen and craft workers as well as the officers of the New Hampshire Building Trades crafts. Also, stepped up efforts were made to have the group of on-site safety professionals increase efforts to enhance work site safety. This effort took place over many months and was sustained going forward. Positive results were obtained with lower incident rates during the remaining portion of the Project.

Q. Is Jacobs' work on the Clean Air Project ongoing?

A. Yes. Jacobs continues to evaluate the ongoing and remaining work as well as contract and work order status.

V. ONGOING OPERATION OF THE SCRUBBER

Q. Please describe the Scrubber's performance since it came online.

A. We are pleased to report exceptional success regarding the performance of the Scrubber in meeting its critical performance obligations and guarantees. PSNH has received results of the mercury reduction testing conducted in January and March 2012 by an independent third party in accordance with a rigorous stack testing protocol. These stack test results show that the Scrubber is reducing mercury emissions in the range of

approximately 97% to 98%.—well above the levels needed to comply with the New Hampshire Clean Air Act. This test data demonstrates the Scrubber's high effectiveness for mercury removal confirming its proper design and construction. Sulfur dioxide removal from boiler flue-gas is approximately 96%-98% -- well above the 90% sulfur dioxide removal objective in Merrimack Station's Temporary Permit issued by the New Hampshire Department of Environmental Services ("NHDES"). This level of sulfur dioxide removal was demonstrated and recorded via the NHDES and EPA-approved Continuous Emissions Monitoring Systems (CEMS) which measure sulfur dioxide into and out of the Scrubber absorber vessel. This result also reflects a well designed and constructed Project.

The treated liquid effluent from the Primary Waste Water Treatment System has also been subjected to testing by an independent third party. The results of this testing show that the liquid effluent meets all system guarantees. This is another extremely positive factor demonstrating that all equipment performance is fully meeting contractually specified requirements and that the system has been designed well, built properly, and is performing exceptionally well with the treated effluent meeting the rigorous standards required by the NHDES.

Q. What is the status of other performance obligations and guarantees?

A. All equipment installed must meet guarantees of performance in accordance with specified contractual requirements. For example, pumps must produce flows as specified, controls must work as required, and valves and piping must operate properly.

All equipment has some level of guarantee of proper operational ability and a warranty of some period of time. URS and PSNH are continuously monitoring equipment operation to ensure proper operation and adherence to contract obligations. Some equipment tuning activities have been incorporated in various punch list activities.

Q. Now that the Scrubber is constructed and online, please explain what type of ongoing costs are associated with its operation and maintenance?

A. Now that this equipment is in-service and under the control of PSNH, PSNH incurs costs to operate it. There are day-to-day costs related to equipment maintenance and operations. There are few maintenance activities due to its relatively new condition but there is some level of effort needed. Also, there are added costs when the equipment runs such as the use of limestone and other variable costs related to chemical usage and materials handling. These costs are not included in this review but rather will be the subject of the Company's annual reconciliation docket.

Q. Is there any remaining work to be completed on the Scrubber Project?

A. Yes. Punch list items are being steadily reduced in number but a number of tasks still remain throughout the Project. All these tasks should be completed in the coming months. Also, a few pieces of equipment associated with the SWWT System have yet to be put in service. This last portion of the Project to be placed in service is expected to be declared used and useful this month, and by the end of the third quarter of this year, the Company expects to finalize and close all contracts.

Q. Does this conclude your testimony?

A. Yes.