THE STATE OF NEW HAMPSHIRE
BEFORE THE
NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

Docket No. DE 11-250

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

Investigation of Merrimack Station Scrubber Costs and Cost Recovery

PREFILED TESTIMONY OF MICHAEL E. HACHEY ON BEHALF OF TRANSCANADA POWER MARKETING LTD. AND TRANSCANADA HYDRO NORTHEAST INC.

December 23, 2013

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Background and Qualifications

Q. Please state your name and business address.

A. My name is Michael E. Hachey. My business address is 110 Turnpike Road – Suite 300, Westborough, MA 01581-2863.

Q. Who is your current employer and what positions do you hold?

A. I am an officer of TransCanada Power Marketing Ltd. ("TCPM") and TransCanada Hydro Northeast Inc. (TCPM and TransCanada Hydro Northeast, together "TransCanada"). In my current position I am Vice President, Regulatory Affairs and Compliance.

Q. What is your background and what are your qualifications?

A. I have a Bachelor of Science in Electrical Engineering and a Master of Engineering Degree in Electric Power Engineering from Rensselaer Polytechnic Institute. I have over 34 years experience in the electric power industry, including 13 years with TransCanada Power Marketing. I was previously employed by New England Power Company for 21 years where I worked in various positions, including vice president of generation marketing. I have participated in proceedings before the New Hampshire Public Utilities Commission, the Federal Energy Regulatory Commission, and other state regulatory commissions. In my current position I am responsible for government and regulatory affairs for TransCanada in the Northeast U.S. and Eastern Canada, and property taxes.

Q. Please explain what TCPM does.

A. TCPM is a member of the New England Power Pool and transacts both on a bilateral basis and in the markets operated by ISO New England. TCPM is a competitive supplier of electricity in the Northeast United States, providing both default service and retail service in New England, New York and PJM. TCPM is an indirect wholly owned subsidiary of TransCanada Corporation, a leader in the responsible development and reliable operation of North American energy infrastructure, with a network of more than 36,500 miles of pipeline facilities and approximately 400 billion cubic feet of gas storage capacity. As a growing independent power producer, TransCanada owns, controls or is developing approximately 10,900 megawatts of power generation in Canada and the United States.

Purpose of Testimony

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to address the question of whether or not Public Service Company of New Hampshire's ("PSNH") investment in and actions with regard to the scrubber project at Merrimack Station were prudent.

Q. What is your understanding of the standard the Commission will use in evaluating whether PSNH was prudent?

A. It is my understanding that the Commission will look at the degree of care PSNH used in deciding to proceed with the Scrubber project through to its completion. Order No. 25,565, p. 20. In doing so it will evaluate what a reasonable person of requisite skill and experience,[1] a "highly trained specialist",[2] would have done under the circumstances. The Commission's analysis should be based on what is known or could reasonably have been known at the time of the conduct (Order No. 25,565, p. 20); "it is

[1] *Re Public Service Company of New Hampshire*, 83 NH PUC 54, 76 (1998).
[2] *Public Service Company of New Hampshire*, 87 NH PUC 876,886 (2002).

not to apply the perspective of hindsight, but rather to consider the actions in light of the conditions and circumstances as they existed at the time they were taken."[3]

Q. What issues do you intend to address in this prefiled direct testimony?

A. In this prefiled direct testimony, I address the following issues:

- Scrubber law and project estimates
- PSNH's knowledge regarding cost increases
- The importance of the relationship between projected natural gas and coal prices
- PSNH's fuel forecasts and assumptions
- Cost to go analysis
- Factors PSNH should have taken into account
- Options open to PSNH
- Conclusion

Scrubber Law and Project Estimates

Q. Are you familiar with the scrubber law that passed the New Hampshire Legislature in 2006?

A. Yes, I am. I have reviewed the law and some of the legislative history associated with the law. There are a few provisions in particular in the law that I wish to point out:

[3] Id.

- the statement in the purpose and findings section of the law indicating that the mercury reduction requirements represent a careful, thoughtful balancing of cost, benefits, and technological feasibility, 125-O:11, VIII;
- the requirement in the law that during ownership and operation by a regulated utility the scrubber costs must be recovered via the utility's default service charge, RSA 125-O:18;
- the provision that gives the plant owner the ability to request a variance from the mercury emissions reduction requirements which could include an alternative schedule or an alternative reduction requirement based on technological or economic infeasibility, RSA 125-O:17; and
- the provision that requires that the Public Utilities Commission review the prudence of the costs of the project before the owner may recover them in rates, RSA 125-O:18.

Q. Are you familiar with the estimates of what it was going to cost to build the scrubber that PSNH provided to the Legislature when it was considering the law in 2006?

A. Yes. It is clear from the legislative history, including the fiscal note on the bill itself, and from letters then DES Commissioner Michael Nolin sent to both the House and the Senate, that the estimate for the cost of the project, based on information provided by PSNH, was a not-to-exceed number of $250 million. See Attachments 1 and 2. See also PSNH response to DR TC 2-3 and what PSNH was telling officials about the legislation. Attachment 3. I believe this "not-to-exceed" number should be considered in the context of RSA 125-O:11, VIII, which was enacted in 2006 as part of the scrubber law, and which concluded that the law was the product of the careful and thoughtful balancing of the costs and benefits of the project.

Q. When did you first become interested in the law and why?

A. Although we were aware of the law when it passed, we began to pay serious attention when the costs of the project escalated from a not-to-exceed number of $250 million to $457 million.

Q. Why did TransCanada intervene in this docket?

A. TransCanada is concerned generally about there being a level playing field in each competitive market in which it participates, about avoiding additional unnecessary charges or costs being imposed on products we sell, and about price impacts on customers. When, a few years ago, PSNH started referring to "the upward pressure on the Energy Service ('ES') rate" which PSNH contended was caused by increased migration levels and certain fixed costs (such as the scrubber) only being born by default service customers, TransCanada became concerned that the "solution" would be to assess some portion of default service (e.g., its electricity generation) costs against customers who had migrated to competitive suppliers through a non-bypassable charge. PSNH sought a non-bypassable charge via Docket DE 10-160, and in other venues. TransCanada has been involved in several PUC dockets involving related issues, including DE 09-180, DE 10-121, DE 10-160, and this docket. I think it is fair to say that the prospect of a non-bypassable charge commanded our attention as a serious threat to our business.

Q. Have you reviewed the responses to discovery requests in this docket?

A. Yes.

Q. Based on your review of those responses do you know when PSNH first became aware that the cost of the project had escalated from a not-to-exceed number of $250 million to $457 million?

A. Yes. Attached is a copy of the response to data request TC 4-13 which indicates that at least as early as May of 2008 PSNH was aware of this dramatic increase. Attachment 4.

Q. When did PSNH first make this information available to the public?

A. It was in the 10-Q quarterly earnings report that Northeast Utilities, PSNH's parent company, filed with the Securities and Exchange Commission on August 7, 2008, several months after PSNH had become aware of this increase. A copy of the relevant portions of this report is attached. Attachment 5.

Q. PSNH has argued throughout this docket that the law was a mandate which it had no authority to avoid under any circumstances; do you have any comments on this argument?

A. Yes. In his September 2, 2008 letter to the PUC in DE 08-103 Gary Long ~~took credit for "spearheading" and "crafting" the scrubber law,[4] so clearly PSNH played a major role in drafting and then supporting the enactment of the law. It is not as if PSNH had no role in the development and passage of the law, which its argument about the scrubber construction being a mandate suggests; in fact PSNH by its own admission had a major role in the creation of its "mandate".~~ The law contains several provisions indicating that the Legislature did not institute a blind mandate which would require scrubber installment regardless of cost. First, the law contains the variance provision in

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[4] A copy of the complete filing with the PUC, including the letter, is attached. Attachment 6.

RSA 125-O:17, noted above, which gives the owner the ability to ask for a variance in the schedule or the reduction requirements. Second, the purpose clause refers to the careful and thoughtful balancing of the cost and benefits, and those cost estimates were based on information from PSNH that the project cost would not exceed $250 million (consider, for example, the fiscal note and letters from the DES Commission, Attachments 1 and 2, noted above). Finally, the law contains a specific provision for the future prudence review by the PUC. RSA 125-O:18. In my opinion it is absurd to suggest, as PSNH has throughout this docket, that RSA 125-O stands for the proposition that PSNH was required to build the project at any cost. For example, no one would argue that a two billion dollar scrubber met the purpose, intent, or language of RSA 125-O. See Order No. 25,445 in this docket, p. 25. To suggest that the law was a mandate to build the scrubber project at any cost is irresponsible, defies common sense, and flies in the face of prudent utility practice and the specific provisions in the law noted above. ~~PSNH understood and was well aware that the New Hampshire Legislature was relying on it to provide updated and accurate information~~, that it was not the Legislature's role to conduct an ongoing analysis relative to scrubber economics. PSNH as a regulated utility had a responsibility to monitor the relevant markets and raise concerns to the extent the scrubber project did not make sense and would potentially be a significant liability for its default service customers. #25,640

<u>PSNH's Knowledge Regarding Cost Increases</u>

Q. Can you briefly provide a timeline regarding PSNH's knowledge of cost estimates for the Merrimack Station Scrubber in the spring and summer of 2008?

A. Yes. It is apparent that at least as early as May of 2008 PSNH became aware that the estimate of the cost for the Scrubber had increased from $250 million to $457 million. PSNH Response to Data Request TC 4-13, Attachment 4. In July of 2008, PSNH presented the significant increase in scrubber cost to its Board of Trustees, but it did not make public note of the increase until its second quarter 2008 10-Q quarterly earnings report filed with the Securities and Exchange Commission on August 7, 2008. On August 22, 2008 the Commission sent a letter to PSNH opening DE 08-103, an investigation to review the status of PSNH's efforts to install scrubber technology, the costs of such technology; and the effect installation would have on energy service rates (previously referred to as the default service charge) for PSNH customers. That letter directed PSNH to file "a comprehensive status report on its installation plans, a detailed cost estimate for the project, an analysis of the anticipated effect of the project on energy service rates, 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." On September 2, 2008, PSNH made an informational filing with the New Hampshire Public Utilities Commission in response to the Commission's Request for a comprehensive status report on the Merrimack Station Scrubber Project.

Q. Do you know whether PSNH made presentations to the Legislative Oversight Committee on Electric Restructuring ("Oversight Committee") at least annually on the cost of the project?

A. Yes. It is my understanding that RSA 125-O:13, IX requires annual presentations to the Oversight Committee 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 the law, relative to achieving early reductions in mercury emissions, as well as installing and operating the scrubber technology including any updated cost information.

Q. Did PSNH make a presentation to the Oversight Committee in June of 2008?

A. Yes. PSNH representatives made a presentation to the Oversight Committee on June 18, 2008. See Attachments 7 and 8. At that meeting PSNH failed to tell the Oversight Committee about the dramatic increase in the cost of the project which, as noted above, PSNH knew about at least a month earlier.

Q. Did PSNH commission a study by PowerAdvocate on the project in the summer of 2008?

A. Yes. This report, a copy of which is included as Attachment 9, was an analysis of the project cost estimate for the scrubber project dated June 17, 2008. The Summary of this report indicates that the objectives of the analysis were to explain why the cost estimate was on the high end of the range for a complete FGD (flue-gas desulfurization) retrofit relative to similar projects and to discuss market forces behind capital construction project cost increases to better understand why the cost estimate had increased "to an excess of $350M." My review of this report indicates that it apparently relied upon an estimate of $355 million, not the total estimate of $457 million which PSNH had adopted in May 2008. The use of the higher estimate would have resulted in even less favorable conclusions.

Q. Did the PowerAdvocate Report raise additional issues regarding the anticipated costs associated with the Scrubber construction?

A. Yes. Even based on the lower cost estimate the report concluded that Merrimack Station's cost estimate was on the high end of cost per kilowatt hour range for a complete FGD retrofit relative to similar FGD retrofit projects. With respect to cost predictions, the report concludes that capital construction costs for new generation remained at historic levels with no clear understanding of whether or not a peak had been reached due to recent volatility of costs associated with the supply market. The report also indicates significant levels of uncertainty around projected carbon regulations and the effects of a tight labor market on the economics of scrubber investments. Finally, the authors conclude that there were no good and reliable indicators to follow for investment decisions.

Q. How do you think a prudent utility would have reacted to the PowerAdvocate Report?

A. I believe that a prudent utility would have had serious concerns and questions about whether this was the right time to proceed with the scrubber project, especially given other things going on in the market during the summer and early fall of 2008 noted in more detail below, as well as the magnitude of the project.

The Importance of the Relationship Between Projected Natural Gas and Coal Prices

Q. Did PSNH draw any conclusions regarding the economics of the scrubber in the summer of 2008?

A. Yes. Mr. Long and/or other PSNH representatives made presentations to the Northeast Utilities ("NU") Risk and Capital Committee on June 25, 2008, to the NU Board of Trustees on July 15, 2008, and to the PUC Staff and the OCA on July 30, 2008. Copies of the powerpoints used in those presentations are included as Attachments 10 and 11, Responses to Staff 2-2 and to TC 4-24. At all three presentations, PSNH drew conclusions regarding the economics of the scrubber project.

Q. What were some of the main points PSNH made in the presentations to the Risk and Capital Committee and the Board of Trustees?

A. Both the Risk and Capital Committee and Board of Trustees presentations were made by PSNH/NU employees and were headed by Gary Long. The presenters made it very clear that the relationship between the price of natural gas and the price of coal was critical to whether the project would be economic for ratepayers. They indicated that net ratepayer or customer cost, or what they equated with "net present value" (the 2008 present value of Merrimack Plant revenue requirements from 2012-2027 minus the 2008 present value of market energy plus 2008 present value of capacity payments from 2012-2027) was most sensitive to expected future natural gas and coal prices. The presenters went on to say that at assumed 2012 price levels, a spread of $5.29/mmbtu (escalating) between natural gas and coal over the course of the next 15 years would be "required to create customer benefits." In other words, the difference between natural gas prices and coal *had to be at least* $5.29/mmbtu to create value for ES or default service customers. Or viewed another way, if this spread was not met over that 15 year period (2012-2027) there was a significant risk that PSNH default service customers, who were the ones required by the law to pay for the scrubber, would pay more than the market rate for power.

In these two presentations the PSNH/NU employees also said that reductions in the natural gas/coal spread and increases in carbon costs would put pressure on base case capital cost estimates and on the ability to construct within the projection of $457 million.

Attachment 10, p. 15 of 50 and p. 38 of 50. On a slide titled "Historic Fuel Spreads" (p. 37 of 50 of Attachment 10) in the presentation to the Board of Trustees PSNH concluded that the historic gas/coal spread had averaged $3.19/mmbtu over the last 15 years, or substantially below the spread required to make the project economic and valuable to ratepayers. This slide included a chart showing gas, oil and coal prices going back to 1993.

Q. Did PSNH disclose the need for the escalating $5.29/MMBtu spread publicly?

A. No. From documents I have reviewed, that value was only disclosed to NU's Risk and Capital Committee and the Board of Trustees. There was no mention of the required spread in the report to the PUC in September of 2008 in DE 08-103, nor was there any mention in the presentation to the Staff and the OCA on July 30, 2008.

Q. Did PSNH present this same information regarding the natural gas/coal spread to Staff and the OCA?

A. Apparently not. Based on the information made available through discovery in this docket it appears that PSNH employees took the same slide on historic fuel spreads which I cited above, the one they had used in the presentation to the Board of Trustees just two weeks earlier, and made some significant changes to it before presenting it to regulators. The similarities and differences between the two slides are remarkable. The "regulator" version of the slide left out any reference to the importance of the $5.29 spread between the price of natural gas and coal, and essentially withheld critical information about the commodity prices that would be required for the project to "break even" and create customer benefits. PSNH also shortened the timeframe for the chart containing gas, oil and coal prices so that it only contained prices going back to 2001, rather than 1993. By doing this PSNH appears to have withheld from Staff and the OCA critical information about the 15 year history of the price spread between gas and oil and provided a shorter time frame that showed a spread that was favorable for the project, as compared with the historical average spread which was damaging and unfavorable to their position. Attachment 11, Response to TC 4-24. In the presentation to Staff and the OCA PSNH also indicated that then "current spreads" (presumably as of July 30, 2008) were more than $9/mmbtu, which, for the reasons noted below, did not coincide with information available regarding natural gas prices available at that time. Natural gas prices would have had to have been more than $13/mmbtu to support this conclusion, but as described below, prices in July 2008 were much lower.[5]

Q. Did PSNH put any of the information about the break-even level of $5.29/mmbtu or the historical average of the spread between gas and coal in the filing it made with the PUC in DE 08-103 on September 2, 2008?

A. No, it did not.

Q. What was the natural gas price assumption that PSNH used in these presentations?

A. The assumption PSNH used was a 2012 natural gas price of $11.00/mmbtu escalated at the rate of 2.5 % per annum off of the 2012 estimate.

~~**Q. Was this a reasonable assumption?**~~

~~A. No, it clearly was not for the reasons cited below.~~

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[5] Note that for all spreads described in this testimony, I have assumed a coal price of $4.82, which corresponds with PSNH's assumed coal prices. This means that the prime variable at issue with PSNH's analyses is the price of natural gas.

PSNH's Fuel Forecasts and Assumptions

Q. What were the main components of PSNH's economic analysis of the coal scrubber?

A. At its most basic, PSNH considered the difference between an alternative where their customers relied on NEPOOL market pricing versus the value, or cost, of Merrimack Station with the $457 million scrubber installed. The market pricing projection was obtained using natural gas pricing and a market heat rate. The Merrimack scrubber installation analysis accounted for revenue requirements of the scrubber and other capital expenses, fuel, operations and maintenance expenses, and capacity and energy revenues related to the station.

Q. Do you have any concerns about the methodology that PSNH employed?

A. Yes. As described in detail below, while I agree that the spread between natural gas and coal prices is vital to the scrubber economics analysis, ~~PSNH's underlying assumptions about prices were faulty and relied on an inappropriate methodology.~~

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Q. As a preliminary point, why was the price of natural gas the underpinning of PSNH's analysis regarding the economics of the coal scrubber?

A. The New England market price of electricity is heavily dependent on natural gas pricing and has been for some time, including the timeframe relevant to this prudency review, circa 2008 - 2009. In most hours natural gas-fired units have been for some time and are still the marginal units in NEPOOL dispatch; accordingly they set the market price. The competitive market for electricity would serve as the alternative for PSNH customers in the case where the scrubber was not constructed.

Q. According to PSNH, during what period would the escalating $5.29/MMBtu spread have to exist for the scrubber to be economic?

A. The escalating $5.29/MMBtu spread would have to exist continually from the outset of scrubber operation, which in 2008 was estimated to begin in 2012, through its 15 year depreciation, or until 2027.

Q. Did PSNH develop a fuel forecast that would produce the coal-gas price spread that it needed to economically justify the scrubber?

A. Yes. In its September 2, 2008 letter to the NH PUC in DE 08-103, PSNH described its natural gas forecast that had an initial price of $11/MMBtu and escalated annually at 2.5%:

> 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 of 2.5% per year for future years of the analysis.

PSNH September 2, 2008 Report, DE 08-103, p. 15, Attachment 6.

Q. What was the basis for the $11/MMBtu pricing used by PSNH?

A. PSNH relied on NYMEX futures prices. According to PSNH's answer to DR TC-03, Q-TC-009, Attachment 12:

> The 2012 price of $11/MMBtu for natural gas was selected by reviewing the NYMEX futures prices available in the summer of 2008. As shown on page 22 of the September 2, 2008 report to the NHPUC, the futures prices were $11/MMBtu in 2012.

Q. What is the nature of NYMEX future prices?

A. NYMEX natural gas futures contracts are a widely used benchmark for the price of the natural gas commodity in real time, but they do not provide a forecast of future natural gas prices. The price of each month's natural gas NYMEX contract is based on delivery to the Henry Hub in Louisiana.[6] NYMEX futures prices represent only a snapshot of where market participants are currently willing to transact. These are forward prices that could be locked in on a specific trading day. NYMEX, as an indicator of market price, is considered most robust in the near term, for example, the next 2 - 3 years, with trading after that being very thin and hence generally not considered indicative of market prices in future years. See Attachment 13. PSNH relied on a NYMEX snapshot in 2008 to predict natural gas prices from 2012 through 2027. ~~Such a reliance on NYMEX was plainly inappropriate.~~

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~~Q. Is there alternative data that PSNH could have relied upon?~~

~~A. Yes, there are natural gas forecasts which do predict future gas prices. A forecast is based on economic and engineering analysis of future supply and demand, regulatory and technological trends and typically contains some historical analysis as well.~~

Q. Was PSNH imprudent to rely on NYMEX futures to determine whether customers would receive net benefits from scrubber installation?

A. Yes. ~~Rather than rely upon gas forecasts, PSNH relied upon an inappropriate methodology for projecting gas prices out nearly 20 years to justify, and~~

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[6] The cost of the NYMEX commodity represents the majority of a business' natural gas expenditures. A second cost component is the cost of interstate pipeline transportation or "basis" which represents the cost differential between the cost of the NYMEX contract at the Henry Hub and a business' geographical location.

~~presumably recover, its expenditure and the rate of return on the investment.~~ Furthermore, PSNH apparently chose to ignore substantial information that was available at or about the time of its September 2, 2008 filing with the Commission in DE 08-103. ~~This additional information and analysis would have shown that its customers would~~ #25687 ~~likely not receive net benefits from scrubber installation, thus creating substantial cost risks for ES customers~~. This information included:

1) at the time of PSNH's September 2, 2008 letter to the PUC, NYMEX futures had fallen from their peak of $11 to $9, raising significant questions regarding the validity of their futures analysis which had essentially cherry-picked a NYMEX price point and run it out for 20 years;

2) PSNH was in possession of several reputable forecasts ~~which would have been more appropriate sources than NYMEX futures~~ and that conflicted with its projection of NYMEX futures;

3) the nation's economy was in significant disarray with the financial collapse of Lehman Brothers and overall concern about the economy, resulting in significant job losses, a dramatic downturn in economic activity, and a decrease in the demand for electricity; and

4) perhaps most important, the history of the natural gas market had shown a number of periods of short-lived price peaks with sharp drops following the peak, ~~making the peak during the summer of 2008 an unreliable starting price point for PSNH's long-term analysis~~.

Q. Did natural gas futures pricing support PSNH's view that the scrubber would provide net customer benefits?

A. No. Natural gas pricing needed to reach levels above $10/MMBtu for the entirety of the depreciation period of the scrubber, from 2012 through 2027, for the scrubber to provide net customer benefits. The $10/MMBtu value is reached by adding PSNH's coal cost, $4.82/MMBtu, to the coal-gas price differential needed to provide customer benefits, or $5.29/MMBtu. A gas price rise above $10/MMBtu that only lasted for several months – particularly if those months occurred before the scrubber even operated – would be meaningless to securing customer economic benefits.

In Attachment 14, I show the one year monthly average forward price for Tennessee Zone 6, which provides a good representation for New England delivered gas prices. As shown on the chart, forward prices high enough to meet PSNH's $5.29 coal-gas spread criteria existed for only a relatively brief window of time – roughly June and July of 2008.

Q. Why didn't the June and July prices validate PSNH's decision to construct the scrubber?

A. ~~First, in the Summer of 2008, the forwards were clearly at a peak value in a market that history shows experienced periodic peaks. It was completely inappropriate to base a $457 million decision on such a fleeting signal. PSNH made a large and risky bet thinking that it was not with its shareholders' money, but with its customers' money.~~

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Second, the primary benefit and use of market forwards (such as NYMEX) is the ability to "lock in" the pricing and actually ensure the value represented would be obtained. There is no evidence that PSNH has presented that shows they had any intention to do that and hedge their customers' exposure to their risky decision.

Third, by the time PSNH President and COO Gary Long filed his response to the NH PUC's Information Request on September 2, 2008, forward gas prices had already fallen below levels needed to justify the scrubber's economics. I saw no indication that PSNH ever told the NH PUC at this time or any time subsequently that the basis for their economic analysis was flawed or outdated. Further, as I stated previously, PSNH failed to disclose to the Commission that a price spread greater than $5.29/MMBTU between gas and coal was required to create customer benefits,

Q. After reviewing these materials, what conclusion do you reach about the PSNH analysis?

A. The conclusion I reach is that it appears PSNH developed an assumption of future gas prices for the sole purpose of economically justifying scrubber construction. This forecast was at odds with contemporaneous forecasts available to PSNH, as I describe in depth below. Further, the assumption PSNH used did not realistically reflect actual pricing seen in the market. As a result, PSNH proceeded with a project that imposed tremendous economic risk on its customers.

Q. Did the natural gas pricing for gas delivered into New England validate PSNH's desired forecast?

A. No. In the chart included as Attachment 15 I have displayed the 12-month running monthly average pricing for gas delivered to Massachusetts and Connecticut generators for two years prior to, and two years following PSNH's September 2, 2008 letter to the NH PUC. The $11/MMBtu value was never reached. In fact, following the brief price spike in 2008, gas pricing crashed down to the $5 level by the end of the two year period. This meant gas prices only slightly exceeded PSNH's coal cost, and were far removed from the required escalating differential of $5.29/MMBtu needed to economically justify scrubber construction.

Q. Did PSNH have actual forecasts available to it that contradicted the NYMEX-based analysis it presented to the NH PUC?

A. Yes. I am aware of four different forecasts available to PSNH as of September 2, 2008. These four forecasts were prepared by 1) Energy Ventures Analysis, Inc. (EVA); 2) Synapse Energy Economics, Inc. (Synapse); 3) the United States Department of Energy's Energy Information Agency (EIA); and 4) the Brattle Group (Brattle). The EVA forecast was obtained from PSNH following the PUC's order in response to TransCanada's Motion to Compel. See Attachment 16, PSNH supplemental response to DR TC 1-2. The Synapse forecast was prepared as part of the Avoided Energy Supply Costs in New England, 2007 Final Report, revised January 3, 2008. Attachment 17. The Synapse forecast "was sponsored by a group of electric utilities, gas utilities, and other efficiency program administrators", a group that included "Northeast Utilities (Connecticut Light and Power, Western Massachusetts Electric Company, Public Service Company of New Hampshire, and Yankee Gas). The EIA forecast was published in June, 2008. Attachment 18. The Brattle Group's forecast was published on January 1, 2008 for the Integrated Resource Plan for Connecticut, and was sponsored by Connecticut Light and Power (a PSNH affiliate), and the United Illuminating Company. Attachment 19. I have put the four forecasts together in a chart that is included as Attachment 20. None of these forecasts intersected with PSNH's internally developed view at any point during the forecast period.

Q. Did PSNH rely on any particular forecasts for its gas price estimate?

A. Apparently not, as their response to data request Deposition-004 says: "The referenced $11 per MMBtu price assumption was based on actual reported Natural Gas Prices for dispatch at PSNH generating units at the time the analysis was performed (2008), as prepared by the NU Fuel Purchasing Department, rather than any specific forecast." Attachment 21.

Q. In addition to PSNH's failure to rely on appropriate data in drawing its conclusions, are there other issues it appears to have ignored?

A. Yes. PSNH appears to have ignored supply-related information that contradicted their internal assessment of natural gas prices. The combinations of technological advancements in horizontal drilling and hydraulic fracturing have led to surges in U.S.–based natural gas production and significant increases in proven natural gas reserves. These techniques produce what has been termed "unconventional" natural gas.

Clear documentation existed as early as 2006 indicating that production of unconventional natural gas was exceeding production from conventional natural gas sources. A chart showing this was prepared by the U.S. Energy Information Agency in their Annual Energy Outlook that was published in June, 2008. Attachment 22. Further, an article written by David Yergin and Robert Ineson, published by the Wall Street Journal on November 30, 2009, Attachment 23, indicates that the potential of the unconventional gas supply "became clear around 2007". PSNH was making a $457 million decision that its upper level management had acknowledged internally was extremely sensitive to the relationship between natural gas and coal prices. A prudent company taking such a significant risk on behalf of ratepayers should have exhaustively researched natural gas supply developments and been aware of this looming issue. While PSNH assured the Legislature as late as March of 2009 that it had affirmed the pricing every step of the way to ensure it was in line with the marketplace, Attachment 24, page 18 of 31, Gary Long could not provide any documentation that anyone at NU or PSNH had analyzed the impact that the drop in natural gas prices would have on the scrubber project, Deposition at 86-90, Attachment 25, and there is no evidence that PSNH even looked into this issue.

Q. Does PSNH agree that it is appropriate to look at long term forecasts?

A. Apparently. In the deposition of Gary Long, PSNH's former President and Chief Operating Officer, he stated:

> Although we weren't in the gas business, we understood that you don't look at a short-term forecast and assume that's the way it's going to be forever.
> And so, yes, I did not track the hour-to-hour, day-to-day gas prices because that's not relevant to my role in the company. And future prices and forecasts are very volatile, as we see. They're constantly changing. And one has to be very cautious in taking what I call a "point forecast" over multiple years in the future and then, you know, not – and assuming that's the way it will be.

Transcript of September 16, 2013 deposition of Gary Long, pp. 88 – 89, Attachment 25.

In my view, the president and COO of PSNH fully understood the shortcomings of the analysis conducted by his personnel, yet recommended proceeding with construction of the scrubber despite the high likelihood it would not result in customer benefits and that it would in fact create a significant risk for ES ratepayers.

Cost to Go Analysis

Q. Have you attempted to independently assess the economics of the scrubber project to PSNH customers as viewed from 2008?

A. Yes. Based on information provided by PSNH in this proceeding, I have developed a "cost to go" analysis of the scrubber project as viewed from 2008. Attachment 26.

Q. What is a "cost to go" analysis?

A. In a cost to go analysis, expenses derived from past decisions are treated as sunk and considered irrelevant to the economics of the analysis. All forward looking costs are considered, such as capital investments, operations and maintenance expense, fuel costs and emissions allowance expense. In the case of the Merrimack scrubber, this analysis reveals whether PSNH's decision to go forward and construct the scrubber, then estimated to cost $457 million, was a prudent investment for their customers, or whether it should have retired the Merrimack facility and purchased power from the New England market.

Q. Doesn't this analysis amount to Monday morning quarterbacking?

A. No, not at all. The analysis works within the framework of information that was available to PSNH during 2008, which was the critical period for PSNH to have carefully assessed whether or not the scrubber would be "used and useful" and as a consequence economically beneficial to its customers. The analysis is also consistent with the prudence standard the Commission will use as I understand it as outlined above.

This was the critical period because this was when the dramatic escalation in the estimate of the cost of the project became known, this was just before PSNH began to

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enter into contracts that would end up costing ratepayers a significant amount of money, ~~and this was when significant changes in natural gas markets became evident.~~

Q. Can you summarize the results of your analysis?

A. Yes. We undertook to use many of PSNH's own assumptions and much of its data to view the scrubber decision from a mid-year 2008 vantage point to test whether the scrubber provided net financial benefits to customers over its 15 year depreciation schedule. We used PSNH's return on equity of 9.81 per cent, though one would ordinarily use a discounted rate based on the weighted cost of capital, which would have produced even higher net present value customer losses. The primary exception we took to PSNH's analysis was that we used three of the four gas forecasts I previously discussed, and readily available to PSNH, rather than use their internal view of $11 gas escalating at 2.5%. The net present value customer loss we found for the Synapse, EIA, and Brattle forecasts, respectively, were $153 Million, $270 Million, and $197 Million. See the spreadsheets in Attachment 26. In other words, all three forecasts, applied to PSNH's other assumptions, indicate a loss to customers of at least a $150 million in comparison with shutting down Merrimack Station and purchasing power on the competitive market.

Q. Which forecast did you eliminate?

A. We eliminated the EVA forecast from consideration because we only were provided EVA forecast values through 2018 by PSNH and we lacked any narrative explanation of how to extrapolate it through 2027.

Factors PSNH Should Have Taken into Account

Q. Based on your experience in the utility industry, your knowledge of what was going on in 2008, and your understanding of the prudence standard the Commission is to employ, what were the factors that a prudent utility should have taken into account in deciding whether to proceed with the project?

A. I believe that a prudent utility should have considered the following:

- projections or forecasts for the price of natural gas as compared with the price of coal;
- what the reasonably foreseeable environmental regulations were and the possible capital costs that they would require;
- what was happening and likely to happen with migration of customers, which would impact the remaining customers' ability to pay for the scrubber, under RSA 125-O:18;
- the fact that the costs of the project had increased by 80% in approximately two years; and
- the fact that there was a severe economic recession that began in September of 2008.

I also think that a prudent utility would have done a conservative estimate of the impact the scrubber project would have on the rates of default service customers and would have updated that estimate periodically. PSNH has provided no evidence to support that these analyses were done or were done responsibly or were ever updated. Additional analysis, if performed in the summer of 2008, would have demonstrated that the scrubber project resulted in significant future risks for ratepayers.

Q. Why was migration an issue PSNH should have taken into account?

A. Migration was an issue because the scrubber law passed in 2006 clearly and plainly stated that the costs of the scrubber could only be collected from default service customers. RSA 125-O:18. This meant that customers who migrated to the competitive market would not pay for the costs of the scrubber. In a number of instances PSNH representatives said that if customers did not want to pay for the scrubber they could obtain their power from competitive suppliers. Attachment 24, p. 19 of 31, Attachment 27, p. 33, and Attachment 28, p. 2. From testimony offered in other dockets it is clear that PSNH recognized in 2008 that migration was an issue. See Attachment 29. It was an important issue because the more customers migrated the fewer customers from whom the scrubber costs could be recovered and the more costs would increase for that dwindling base of customers. PSNH should have taken these issues into account as it updated the impact of the scrubber on default service customers. The circumstances clearly had the potential to take on all aspects of a classic death spiral. If there is any good news in this situation, it is that PSNH's customers and ratepayers were no longer "captive". Many of them have chosen to migrate in large numbers to the competitive markets for energy supply.

Q. What is the basis for your enunciation of what analyses a prudent utility would have undertaken?

A. The Merrimack scrubber involved a large capital investment decision – an expenditure of about $1000/kW – roughly the cost to build an entire new gas-fired combined cycle power plant. Unlike earlier periods in the region's utility history, PSNH faced an exit of customers in the event this large investment proved uneconomic.

Accordingly, before proceeding, PSNH needed to take exceptional measures to ensure the investment would make sense for its customers; otherwise, as PSNH clearly understood, customers would seek electricity via the competitive market. PSNH needed to make certain its decision to move forward was not based on its own results-driven market analysis, but rather was conservative, robust, and had a high likelihood of occurrence.

Q. Did PSNH take any of these decision making factors into account?

A. Not really. While PSNH officials did look at some cost projections for the price of natural gas, as I have noted above they did it in an inappropriate manner by relying on short term gas price futures (e.g., NYMEX) and did not take seriously the longer term forecast information that was readily available and that showed the questionable economics of the project.

Q. Did PSNH carefully analyze the potential impacts on ES ratepayers?

A. In my opinion the company did not do a careful analysis of these impacts and the analysis it did was based on faulty assumptions. PSNH postulated significantly understated estimates of the rate impact and risks to ratepayers and it failed to update the numbers. See Long testimony to Legislature in March of 2009, Attachment 27, p. 31; see also Response to Deposition-006, Attachment 30. Company officials indicated a number of times that the impact that the scrubber project would have on default service customers was going to be approximately .31 cents per kWh. For the reasons noted above, this was clearly misleading and not based on any reliable forecasts available at that time. They ignored the other factors, including reasonably foreseeable environmental regulations and

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related capital costs, the severe economic downturn, the impact of the migration of customers, and the dramatic increase in the cost of the project.

Options Open to PSNH

Q. From your analysis it is clear that it either was or should have been apparent to PSNH that the scrubber project was not going to be economic for its default service customers in 2008. If PSNH had recognized this what options were available to it?

A. PSNH could have sought the PUC's approval to sell the plant (see RSA 369-B:3-a; Order No. 25,546, p.8); it could have sought the PUC's approval to retire the plant (see RSA 369-B:3-a; Order No. 25,546, p.8); it could have agreed to study whether proceeding with the project still made sense ~~(for example, this could have included supporting rather than actively opposing SB 152, the Janeway bill, in 2009, or it could have included taking a different approach in DE 08-103 such as suggesting or supporting a more in depth study of the economics~~); it could have sought a variance in the schedule or an alternative reduction requirement based on technological or economic infeasibility (RSA 125-O:17); and it could have sought amendments to or a repeal of the law.

Q. Did PSNH seek any of these alternatives?

A. No. PSNH has asserted that it had no alternative to investment in the scrubber. PSNH's untenable position relies on the conclusion that regardless of the cost of the project it still *had* to go forward with the scrubber, which, as the Commission noted in Order No. 25,445, p. 25, defies common sense and violates the principle of statutory construction that one should avoid an illogical or absurd result when construing the language of a statute. ~~Furthermore, the company fought strenuously against the SB~~

~~152 legislation that would have required a study of the economics of the project.~~ Gary Long argued to the Legislature in March of 2009 that a vote to study the project was a vote to kill the project, presumably because he realized that a study would show that the economics of the project put default service customers at great risk and this would have led to the project being abandoned. See Attachment 27, p. 34.

Conclusion

Q. Do you think it was prudent for PSNH to proceed with the scrubber project?

A. No, I do not. I believe that their actions were imprudent. Gary Long told the Legislature in 2009: "But financially we have to be very, very conservative and we have to be very sure of what we're doing, because if we're reckless or if we're making bad decisions, it'll hurt, it'll come back on us." Attachment 27, Legislative history of SB 152, 2009 Legislative Session, p. 40. Unfortunately for default service customers PSNH was not conservative, it was reckless in disregarding the facts available to it. Moreover, PSNH failed to recognize and share with the Commission Staff, the OCA, the Commission and the Legislature critical information about the economics of the scrubber project. Based on all of the information made available in this docket it appears that PSNH did not review and consider appropriate forecasts and did not update information about natural gas and coal prices during a critical time in the development of the project. For these reasons the Commission should find PSNH to be imprudent and should disallow recovery of scrubber costs as noted below.

Q. What action do you think the Commission ought to take in this docket?

A. I believe that the Commission ought to find that PSNH was imprudent to have proceeded with the project. I believe PSNH should have realized this no later than September of 2008, at which point it should at a minimum have put a halt on any additional spending on the project until the economics could be further studied. I believe that the Commission should only let PSNH recover what it had spent on the project as of that date, which I understand to be $10 million based on the September 2, 2008 filing in DE 08-103.

Q. Does this conclude your testimony?

A. Yes.