

**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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1 **Background and Qualifications**

2 **Q. Please state your name and business address.**

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

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

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

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

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

21 **Q. Please explain what TCPM does.**

22 A. TCPM is a member of the New England Power Pool and transacts both on
23 a bilateral basis and in the markets operated by ISO New England. TCPM is a

1 competitive supplier of electricity in the Northeast United States, providing both default
2 service and retail service in New England, New York and PJM. TCPM is an indirect
3 wholly owned subsidiary of TransCanada Corporation, a leader in the responsible
4 development and reliable operation of North American energy infrastructure, with a
5 network of more than 36,500 miles of pipeline facilities and approximately 400 billion
6 cubic feet of gas storage capacity. As a growing independent power producer,
7 TransCanada owns, controls or is developing approximately 10,900 megawatts of power
8 generation in Canada and the United States.

9 **Purpose of Testimony**

10 **Q. What is the purpose of your testimony?**

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

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

16 A. It is my understanding that the Commission will look at the degree of care
17 PSNH used in deciding to proceed with the Scrubber project through to its completion.
18 Order No. 25,565, p. 20. In doing so it will evaluate what a reasonable person of
19 requisite skill and experience,¹ a "highly trained specialist",² would have done under the
20 circumstances. The Commission's analysis should be based on what is known or could
21 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).

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

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

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

- 5 • Scrubber law and project estimates
- 6 • PSNH’s knowledge regarding cost increases
- 7 • The importance of the relationship between projected natural
8 gas and coal prices
- 9 • PSNH’s fuel forecasts and assumptions
- 10 • Cost to go analysis
- 11 • Factors PSNH should have taken into account
- 12 • Options open to PSNH
- 13 • Conclusion

14

15 **Scrubber Law and Project Estimates**

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

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

³ Id.

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

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

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

1 law, and which concluded that the law was the product of the careful and thoughtful
2 balancing of the costs and benefits of the project.

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

4 A. Although we were aware of the law when it passed, we began to pay
5 serious attention when the costs of the project escalated from a not-to-exceed number of
6 \$250 million to \$457 million.

7 **Q. Why did TransCanada intervene in this docket?**

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

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

23 A. Yes.

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

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

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

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

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

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

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

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

20 **PSNH's Knowledge Regarding Cost Increases**

21 **Q. Can you briefly provide a timeline regarding PSNH's knowledge of**
22 **cost estimates for the Merrimack Station Scrubber in the spring and summer of**
23 **2008?**

1 A. Yes. It is apparent that at least as early as May of 2008 PSNH became
2 aware that the estimate of the cost for the Scrubber had increased from \$250 million to
3 \$457 million. PSNH Response to Data Request TC 4-13, Attachment 4. In July of 2008,
4 PSNH presented the significant increase in scrubber cost to its Board of Trustees, but it
5 did not make public note of the increase until its second quarter 2008 10-Q quarterly
6 earnings report filed with the Securities and Exchange Commission on August 7, 2008.
7 On August 22, 2008 the Commission sent a letter to PSNH opening DE 08-103, an
8 investigation to review the status of PSNH's efforts to install scrubber technology, the
9 costs of such technology; and the effect installation would have on energy service rates
10 (previously referred to as the default service charge) for PSNH customers. That letter
11 directed PSNH to file "a comprehensive status report on its installation plans, a detailed
12 cost estimate for the project, an analysis of the anticipated effect of the project on energy
13 service rates, and an analysis of the effect on energy service rates if Merrimack Station
14 were not in the mix of fossil and hydro facilities operated by PSNH." On September 2,
15 2008, PSNH made an informational filing with the New Hampshire Public Utilities
16 Commission in response to the Commission's Request for a comprehensive status report
17 on the Merrimack Station Scrubber Project.

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

21 A. Yes. It is my understanding that RSA 125-O:13, IX requires annual
22 presentations to the Oversight Committee and the chairpersons of the House Science,
23 Technology and Energy committee and the Senate Energy and Economic Development

1 committee, on the progress and status of complying with the requirements of the law,
2 relative to achieving early reductions in mercury emissions, as well as installing and
3 operating the scrubber technology including any updated cost information.

4 **Q. Did PSNH make a presentation to the Oversight Committee in June of**
5 **2008?**

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

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

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

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

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

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

13 A. I believe that a prudent utility would have had serious concerns and
14 questions about whether this was the right time to proceed with the scrubber project,
15 especially given other things going on in the market during the summer and early fall of
16 2008 noted in more detail below, as well as the magnitude of the project.

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

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

21 A. Yes. Mr. Long and/or other PSNH representatives made presentations to
22 the Northeast Utilities ("NU") Risk and Capital Committee on June 25, 2008, to the NU
23 Board of Trustees on July 15, 2008, and to the PUC Staff and the OCA on July 30, 2008.
24 Copies of the powerpoints used in those presentations are included as Attachments 10

1 and 11, Responses to Staff 2-2 and to TC 4-24. At all three presentations, PSNH drew
2 conclusions regarding the economics of the scrubber project.

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

5 A. Both the Risk and Capital Committee and Board of Trustees presentations
6 were made by PSNH/NU employees and were headed by Gary Long. The presenters
7 made it very clear that the relationship between the price of natural gas and the price of
8 coal was critical to whether the project would be economic for ratepayers. They
9 indicated that net ratepayer or customer cost, or what they equated with "net present
10 value" (the 2008 present value of Merrimack Plant revenue requirements from 2012-2027
11 minus the 2008 present value of market energy plus 2008 present value of capacity
12 payments from 2012-2027) was most sensitive to expected future natural gas and coal
13 prices. The presenters went on to say that at assumed 2012 price levels, a spread of
14 \$5.29/mmbtu (escalating) between natural gas and coal over the course of the next 15
15 years would be "required to create customer benefits." In other words, the difference
16 between natural gas prices and coal *had to be at least* \$5.29/mmbtu to create value for ES
17 or default service customers. Or viewed another way, if this spread was not met over that
18 15 year period (2012-2027) there was a significant risk that PSNH default service
19 customers, who were the ones required by the law to pay for the scrubber, would pay
20 more than the market rate for power.

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

1 Attachment 10, p. 15 of 50 and p. 38 of 50. On a slide titled "Historic Fuel Spreads" (p.
2 37 of 50 of Attachment 10) in the presentation to the Board of Trustees PSNH concluded
3 that the historic gas/coal spread had averaged \$3.19/mmbtu over the last 15 years, or
4 substantially below the spread required to make the project economic and valuable to
5 ratepayers. This slide included a chart showing gas, oil and coal prices going back to
6 1993.

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

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

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

15 A. Apparently not. Based on the information made available through
16 discovery in this docket it appears that PSNH employees took the same slide on historic
17 fuel spreads which I cited above, the one they had used in the presentation to the Board of
18 Trustees just two weeks earlier, and made some significant changes to it before
19 presenting it to regulators. The similarities and differences between the two slides are
20 remarkable. The "regulator" version of the slide left out any reference to the importance
21 of the \$5.29 spread between the price of natural gas and coal, and essentially withheld
22 critical information about the commodity prices that would be required for the project to
23 "break even" and create customer benefits. PSNH also shortened the timeframe for the

1 chart containing gas, oil and coal prices so that it only contained prices going back to
2 2001, rather than 1993. By doing this PSNH appears to have withheld from Staff and the
3 OCA critical information about the 15 year history of the price spread between gas and
4 oil and provided a shorter time frame that showed a spread that was favorable for the
5 project, as compared with the historical average spread which was damaging and
6 unfavorable to their position. Attachment 11, Response to TC 4-24. In the presentation
7 to Staff and the OCA PSNH also indicated that then "current spreads" (presumably as of
8 July 30, 2008) were more than \$9/mmbtu, which, for the reasons noted below, did not
9 coincide with information available regarding natural gas prices available at that time.
10 Natural gas prices would have had to have been more than \$13/mmbtu to support this
11 conclusion, but as described below, prices in July 2008 were much lower.⁵

12 **Q. Did PSNH put any of the information about the break-even level of**
13 **\$5.29/mmbtu or the historical average of the spread between gas and coal in the**
14 **filing it made with the PUC in DE 08-103 on September 2, 2008?**

15 A. No, it did not.

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

18 A. The assumption PSNH used was a 2012 natural gas price of
19 \$11.00/mmbtu escalated at the rate of 2.5 % per annum off of the 2012 estimate.

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

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

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.

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PSNH's Fuel Forecasts and Assumptions

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

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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.

12

13

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

14

15

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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.

18

19

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?

20

21

22

23

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 prudence 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

1 market price. The competitive market for electricity would serve as the alternative for
2 PSNH customers in the case where the scrubber was not constructed.

3 **Q. According to PSNH, during what period would the escalating**
4 **\$5.29/MMBtu spread have to exist for the scrubber to be economic?**

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

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

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

13 In the market purchase and combined cycle natural gas scenarios, a year
14 2012 price of \$11 per MMBtu was used as the first year price of natural
15 gas. This value was escalated at a rate of 2.5% per year for future years of
16 the analysis.

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

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

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

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

25 **Q. What is the nature of NYMEX future prices?**

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

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

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

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

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

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.

1 presumably recover, its expenditure and the rate of return on the investment.

2 Furthermore, PSNH apparently chose to ignore substantial information that was available

3 at or about the time of its September 2, 2008 filing with the Commission in DE 08-103.

4 This additional information and analysis would have shown that its customers would

5 likely not receive net benefits from scrubber installation, thus creating substantial cost

6 risks for ES customers. This information included:

7 1) at the time of PSNH's September 2, 2008 letter to the PUC, NYMEX futures

8 had fallen from their peak of \$11 to \$9, raising significant questions regarding the

9 validity of their futures analysis which had essentially cherry-picked a NYMEX

10 price point and run it out for 20 years;

11 2) PSNH was in possession of several reputable forecasts which would have been

12 more appropriate sources than NYMEX futures and that conflicted with its

13 projection of NYMEX futures;

14 3) the nation's economy was in significant disarray with the financial collapse of

15 Lehman Brothers and overall concern about the economy, resulting in significant

16 job losses, a dramatic downturn in economic activity, and a decrease in the

17 demand for electricity; and

18 4) perhaps most important, the history of the natural gas market had shown a

19 number of periods of short-lived price peaks with sharp drops following the peak,

20 making the peak during the summer of 2008 an unreliable starting price point for

21 PSNH's long-term analysis.

22 **Q. Did natural gas futures pricing support PSNH's view that the**

23 **scrubber would provide net customer benefits?**

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

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

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

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

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

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

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

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

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

18 A. No. In the chart included as Attachment 15 I have displayed the 12-month
19 running monthly average pricing for gas delivered to Massachusetts and Connecticut
20 generators for two years prior to, and two years following PSNH's September 2, 2008
21 letter to the NH PUC. The \$11/MMBtu value was never reached. In fact, following the
22 brief price spike in 2008, gas pricing crashed down to the \$5 level by the end of the two
23 year period. This meant gas prices only slightly exceeded PSNH's coal cost, and were

1 far removed from the required escalating differential of \$5.29/MMBtu needed to
2 economically justify scrubber construction.

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

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

23

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

2 A. Apparently not, as their response to data request Deposition-004 says:

3 “The referenced \$11 per MMBtu price assumption was based on actual reported Natural
4 Gas Prices for dispatch at PSNH generating units at the time the analysis was performed
5 (2008), as prepared by the NU Fuel Purchasing Department, rather than any specific
6 forecast.” Attachment 21.

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

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

15 Clear documentation existed as early as 2006 indicating that production of
16 unconventional natural gas was exceeding production from conventional natural gas
17 sources. A chart showing this was prepared by the U.S. Energy Information Agency in
18 their Annual Energy Outlook that was published in June, 2008. Attachment 22. Further,
19 an article written by David Yergin and Robert Ineson, published by the Wall Street
20 Journal on November 30, 2009, Attachment 23, indicates that the potential of the
21 unconventional gas supply “became clear around 2007”. PSNH was making a \$457
22 million decision that its upper level management had acknowledged internally was
23 extremely sensitive to the relationship between natural gas and coal prices. A prudent

1 company taking such a significant risk on behalf of ratepayers should have exhaustively
2 researched natural gas supply developments and been aware of this looming issue. While
3 PSNH assured the Legislature as late as March of 2009 that it had affirmed the pricing
4 every step of the way to ensure it was in line with the marketplace, Attachment 24, page
5 18 of 31, Gary Long could not provide any documentation that anyone at NU or PSNH
6 had analyzed the impact that the drop in natural gas prices would have on the scrubber
7 project, Deposition at 86-90, Attachment 25, and there is no evidence that PSNH even
8 looked into this issue.

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

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

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

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

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

25

26

27

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

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

3 **Q. Can you summarize the results of your analysis?**

4 A. Yes. We undertook to use many of PSNH's own assumptions and much
5 of its data to view the scrubber decision from a mid-year 2008 vantage point to test
6 whether the scrubber provided net financial benefits to customers over its 15 year
7 depreciation schedule. We used PSNH's return on equity of 9.81 per cent, though one
8 would ordinarily use a discounted rate based on the weighted cost of capital, which
9 would have produced even higher net present value customer losses. The primary
10 exception we took to PSNH's analysis was that we used three of the four gas forecasts I
11 previously discussed, and readily available to PSNH, rather than use their internal view
12 of \$11 gas escalating at 2.5%. The net present value customer loss we found for the
13 Synapse, EIA, and Brattle forecasts, respectively, were \$153 Million, \$270 Million, and
14 \$197 Million. See the spreadsheets in Attachment 26. In other words, all three forecasts,
15 applied to PSNH's other assumptions, indicate a loss to customers of at least a \$150
16 million in comparison with shutting down Merrimack Station and purchasing power on
17 the competitive market.

18 **Q. Which forecast did you eliminate?**

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

22

23

1 **Factors PSNH Should Have Taken into Account**

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

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

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

18 I also think that a prudent utility would have done a conservative estimate of the impact

19 the scrubber project would have on the rates of default service customers and would have

20 updated that estimate periodically. PSNH has provided no evidence to support that these

21 analyses were done or were done responsibly or were ever updated. Additional analysis,

22 if performed in the summer of 2008, would have demonstrated that the scrubber project

23 resulted in significant future risks for ratepayers.

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

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

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

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

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

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

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

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

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

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

3 **Options Open to PSNH**

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

8 A. PSNH could have sought the PUC's approval to sell the plant (see RSA
9 369-B:3-a; Order No. 25,546, p.8); it could have sought the PUC's approval to retire the
10 plant (see RSA 369-B:3-a; Order No. 25,546, p.8); it could have agreed to study whether
11 proceeding with the project still made sense (for example, this could have included
12 supporting rather than actively opposing SB 152, the Janeway bill, in 2009, or it could
13 have included taking a different approach in DE 08-103 such as suggesting or supporting
14 a more in depth study of the economics); it could have sought a variance in the schedule
15 or an alternative reduction requirement based on technological or economic infeasibility
16 (RSA 125-O:17); and it could have sought amendments to or a repeal of the law.

17 **Q. Did PSNH seek any of these alternatives?**

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

1 152 legislation that would have required a study of the economics of the project. Gary
2 Long argued to the Legislature in March of 2009 that a vote to study the project was a
3 vote to kill the project, presumably because he realized that a study would show that the
4 economics of the project put default service customers at great risk and this would have
5 led to the project being abandoned. See Attachment 27, p. 34.

6 **Conclusion**

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

9 **A.** No, I do not. I believe that their actions were imprudent. Gary Long told
10 the Legislature in 2009: "But financially we have to be very, very conservative and we
11 have to be very sure of what we're doing, because if we're reckless or if we're making
12 bad decisions, it'll hurt, it'll come back on us." Attachment 27, Legislative history of SB
13 152, 2009 Legislative Session, p. 40. Unfortunately for default service customers PSNH
14 was not conservative, it was reckless in disregarding the facts available to it. Moreover,
15 PSNH failed to recognize and share with the Commission Staff, the OCA, the
16 Commission and the Legislature critical information about the economics of the scrubber
17 project. Based on all of the information made available in this docket it appears that
18 PSNH did not review and consider appropriate forecasts and did not update information
19 about natural gas and coal prices during a critical time in the development of the project.
20 For these reasons the Commission should find PSNH to be imprudent and should
21 disallow recovery of scrubber costs as noted below.

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

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

10 **Q. Does this conclude your testimony?**

11 A. Yes.

12

ATTACHMENTS

1. Fiscal Note on HB 1673 from 2006 Legislative Session
2. Commissioner Nolin letters to House and Senate re HB 1673
3. Select Pages from Response to Data Request ("DR") TransCanada ("TC")
2-3
4. Response to DR TC 4-13
5. Portion of Northeast Utilities August 7, 2008 10-Q filing with Securities
and Exchange Commission
6. DE 03-108 – September 2, 2008 letter from Gary Long and PSNH report
to PUC – link: <http://www.puc.state.nh.us/Regulatory/Docketbk/2008/08-103.htm> - September 2, 2008 entry in docket
7. November 1, 2008 Annual Report of the Electric Utility Restructuring
Legislative Oversight Committee
8. Response to DR Staff 1-12
9. Response to DR TC 4-17
10. Response to DR Staff 2-2
11. Response to DR TC 4-24
12. Response to DR TC 3-9
13. Chart of NYMEX Futures Contracts
14. Chart – one year average forward strip for Tennessee Zone 6
15. Chart – 12 month running monthly average pricing for gas delivered to
MA and CN generators
16. Energy Ventures Analysis – response to TC 1-2
17. Synapse Energy Economics, Inc. analysis – link: http://www.synapse-energy.com/cgi-bin/synapsePublications.pl?filter_type=Topic&filter_option=Price+Forecasting&advanced=false
18. EIA Analysis - link: [http://www.eia.gov/oiaf/aeo/pdf/0383\(2008\).pdf](http://www.eia.gov/oiaf/aeo/pdf/0383(2008).pdf)

- 1 19. Brattle Group Analysis – response to DR Deposition 002 – link:
2 <http://www.ctenergy.org/pdf/REVIRP.pdf>
3
- 4 20. Chart comparing four analyses
5
- 6 21. Response to DR Deposition-004
7
- 8 22. US EIA Chart – June 2008
9
- 10 23. Yergin and Ineson WSJ Article – November 30, 2009
11
- 12 24. Response to TC 3-14 (Long powerpoint to Legislature – March 2009)
13
- 14 25. Transcript of Deposition of Gary Long in this docket – September 16,
15 2013 – link: [http://www.puc.state.nh.us/Regulatory/Docketbk/2011/11-](http://www.puc.state.nh.us/Regulatory/Docketbk/2011/11-250.html)
16 [250.html](http://www.puc.state.nh.us/Regulatory/Docketbk/2011/11-250.html) - October 11, 2013 entry in docket
17
- 18 26. Cost to go analysis spreadsheets
19
- 20 27. Legislative history of SB 152, 2009 Legislative Session.
21
- 22 28. PSNH AE Newsletter – February 2009
23
- 24 29. Migration documents – DE 10-261 Transcript excerpt – DE 10-160
25 Prefiled testimony excerpt
26
- 27 30. Response to DR Deposition-006
28