Witness: Richard L. Levitan, William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
Original question: Re Section 1 of Modeling System Overview: Fuels Monthly Forwards Pricing Models

What adjustments did LAI make to NYH prices for No. 2 Oil and RFO to account for the differences between costs of delivery to the Newington Station and NYH? Please also provide copies of the most recent RFO and No. 2 Oil supply contracts for Newington. Figure 1 Figure 2 Figure 3

Follow-up question received from Staff on May 27, 2011: With regards to the response to LAI-MOD-01-6, Staff is not asking Levitan for standing or active RFO or No. 2 contracts here. Instead, Staff is looking for copies of the Conoco Phillips and Sprague Energy supply contracts.

Response:
PSNH is supplementing the previous response to include contracts and pricing agreements for RFO (#6 oil) and No. 2 oil. Please refer to the attached pages 2-14 which contains the last #6 oil purchase agreement PSNH entered into with ConocoPhillips in early 2009. Page 15 of the attachment refers to the purchase order PSNH has with Sprague Energy for the delivery of #2 oil and page 16 contains the current pricing sheet for #2 oil, effective April 29, 2011.

The attachments are being filed with the Executive Director reserving PSNH 's opportunity to file a motion for protective order with respect to these portions of fuel contacts.

Witness: William H. Smagula
Request from: New Hampshire Public Utilities Commission Staff

Question:
Ref. Staff 2-1. In Staffs follow-up question, dated May 27, 2011, on the Company's response to Staff 2-1, Staff requested that the Company provide a copy of the most recent natural gas supply contract for Newington. The Company's response, dated June 2,2011, however, only included a copy of a natural gas purchase order submitted by PSNH to Emera Energy Services Inc. Please provide the master purchase agreement between Emera and PSNH plus all attachments including those that specify the pricing of the commodity purchased from Emera. Please also provide copies of all:

(i) confirmation notices sent by Emera regarding natural gas to be delivered to Newington in calendar year 2010; and

(ii) invoices sent by Emera regarding natural gas delivered to Newington in calendar year 2010.

Response:
The response to Staff-02, Q-Staff-001-SP01 provided the header information for the purchase order with Emera for the purchase of natural gas. As a follow-up to that response, the revised attachment provides the standard Northeast Utilities terms and conditions for the purchase order, shown on page 3 of the attachment. In addition, beginning on page 4 of the attachment is the North American Energy Standards Board (NAESB) base contract for sale and purchase of natural gas. This is an industry standard base contract that the daily nominations are based on. There are no additional attachments that specify the pricing terms associated with the contract.

(i and ii) The 2010 natural gas confirmation statements and invoices for fuel delivery to Newington received by PSNH's fuel buyer at the time the purchase was made are being provided to NHPUC Staff and OCA on a CD due to the voluminous nature of the data requested. Because this material is commercially sensitive and/or proprietary and confidential, it is being provided only to NHPUC Staff and OCA under NH Code Admin Rule PUC 203.08 (d). A motion for protective order will be filed prior to the hearing.

Filed on:
Public Service Company of New Hampshire
Docket No. DE 10-261

Data Request STAFF-04
Dated: 12/13/2011
Q-STAFF-012
Page 1 of 2

Witness: Richard L. Levitan
Request from: New Hampshire Public Utilities Commission Staff

Question:
Ref. LAI Rebuttal, page 24. Please provide all support for the assertion that the 2010 summer Newington Station basis spreads were unusually large.

Response:
After the 2010 Emera invoice data was made available, LAI requested and obtained natural gas purchase invoices from PSNH for 2006 through March 2011. LAI then calculated average monthly basis spreads ($/MMBtu) from Dracut for the five years (2006 to 2010) with full data, shown in the confidential attachment.

The average basis monthly and seasonal (March-December) spreads in the prior years were generally significantly smaller. The March-December season average basis spread for 2006 to 2009 is BEGIN CONFIDENTIAL [[redacted]] END CONFIDENTIAL of the average for 2010. The April-October summer season average basis spread for 2006-2009 is BEGIN CONFIDENTIAL [[redacted]] END CONFIDENTIAL of the average for 2010. One exception is that the average July 2008 basis spread was larger than the average July 2010 basis spread, but this is most likely due to the extremely high natural gas prices in July 2008, which averaged about $12.64/MMBtu at Dracut. As a relative (Invoice/Dracut – 1) basis, the average July 2008 basis was less than BEGIN CONFIDENTIAL [[redacted]] END CONFIDENTIAL of the average July 2010 basis.

The information contained in the document included in this response is highly confidential. A hard copy of the attachment is being supplied to Staff and the OCA pursuant to the general confidentiality agreement between PSNH and the OCA. Should the OCA intend to include this information in any future discovery requests, testimony or any other communication or document in this proceeding, please inform PSNH in advance. PSNH will file a motion for confidential treatment before the commencement of hearings on the merits, pursuant to Puc §203.08 (d), We trust the information will be kept confidential pursuant to Puc § 203.08(e).

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Monthly Average Dracut -- Invoice Price Basis Spreads, 2006 to 2010

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mar-Dec	Apr-Oct
2006				[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]				[redacted]	[redacted]
2007						[redacted]	[redacted]	[redacted]				[redacted]		
2008			[redacted]	[redacted]			[redacted]	[redacted]						
2009						[redacted]	[redacted]	[redacted]		[redacted]	[redacted]			
2010	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]			
Avg., 2006-2010														
Avg., 2006-2009														
(Ave. 2006-2009) / (Ave. 2010)														

Witness: Richard L. Levitan
Request from: New Hampshire Public Utilities Commission Staff

Question:
Ref. LAI Rebuttal, page 24. Please provide all support for the assertion that the 2010 summer Newington Station basis spreads were unusually large.

January 23, 2012 follow up request from Staff: Please provide the Emera invoice data used to calculate the average monthly basis spreads and update that data through December 31, 2011.

Response:

Original Response: After the 2010 Emera invoice data was made available, LAI requested and obtained natural gas purchase invoices from PSNH for 2006 through March 2011. LAI then calculated average monthly basis spreads ($/MMBtu) from Dracut for the five years (2006 to 2010) with full data, shown in the confidential attachment.

The average basis monthly and seasonal (March-December) spreads in the prior years were generally significantly smaller. The March-December season average basis spread for 2006 to 2009 is BEGIN CONFIDENTIAL [[redacted]] END CONFIDENTIAL of the average for 2010. The April-October summer season average basis spread for 2006-2009 is BEGIN CONFIDENTIAL [[redacted] END CONFIDENTIAL of the average for 2010. One exception is that the average July 2008 basis spread was larger than the average July 2010 basis spread, but this is most likely due to the extremely high natural gas prices in July 2008, which averaged about $12.64/MMBtu at Dracut. As a relative (Invoice/Dracut – 1) basis, the average July 2008 basis was less than BEGIN CONFIDENTIAL [[redacted]] END CONFIDENTIAL of the average July 2010 basis.

Supplemental Response: PSNH objects to the January 23, 2012 follow up request to the extent it seeks information through the end of 2011 for Newington Station. PSNH's Least Cost Integrated Resource Plan, which was submitted to the Commission on September 30, 2010, was premised on PSNH's operations as of the date the Plan was completed. As a result, the request for information on Newington Station basis spreads through December 31, 2011 is not reasonably calculated to lead to the discovery of information that would be admissible in this proceeding. Notwithstanding this objection, PSNH responds as follows:

Attached to the response are the monthly invoices from Emera for 2006 through 2011 and a revised table with the Monthly Average Dracut to Newington -- Invoice Price Basis Spreads, 2006 to 2011. This table has been updated to include minor data corrections that were found as well as an update to include 2011 basis spreads. As a result of the data input corrections, the original text response is being revised as well.

The average basis monthly and seasonal (March-December) spreads in the prior years were generally significantly smaller. The March-December season average basis spread for 2006 to 2009 is BEGIN CONFIDENTIAL [[redacted]] END CONFIDENTIAL of the average for 2010. The April-October summer season average basis spread for 2006-2009 is BEGIN CONFIDENTIAL [[redacted]] END CONFIDENTIAL of the average for 2010. One exception is that the average July 2008 basis spread was larger than the average July 2010 basis spread, but this is most likely due to the extremely high natural gas prices in July 2008, which averaged about $12.64/MMBtu at Dracut.
Click here to show Attachments

The information contained in the document included in this response is highly confidential. A hard copy of the attachment is being supplied to Staff and the OCA pursuant to the general confidentiality agreement

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Monthly Average Dracut -- Invoice Price Basis Spreads, 2006 to 2011

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2006				[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]			
2007						[redacted]	[redacted]	[redacted]				[redacted]
2008			[redacted]	[redacted]			[redacted]	[redacted]				[redacted]
2009						[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]
2010	[redacted]	[redacted]	[redacted]		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
2011	[redacted]	[redacted]	[redacted]			[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Ave., 2006-2011
Ave., 2006-2010
Ave., 2006-2009
(Ave., 2006-2009) / (Ave. 2010)

Yellow highlighted fields indicate revised data values from the original filed response

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Mar-Dec	Apr-Oct
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

Public Service Company of New Hampshire
Docket No. DE 10-261

Data Request OCA-01
Dated: 02/25/2011
Q-OCA-062

Witness: Terrance J. Large
Request from: Office of Consumer Advocate

Question:
On page 186 of Appendix G Newington CUO Study, Section A.2. Approach is the sentence: "The CUO study is based on historical and projected financial and operating data provided by PSNH ." Please provide a copy of the information provided by PSNH.

Response:
Due to the extremely voluminous nature of the data requested, PSNH is providing a CD to OCA with all of the data provided to Levitan & Associates Inc for purposes of conducting the Newington CUO study. Pursuant to Puc 203.08(d), PSNH has a good faith basis for seeking confidential treatment of the information contained in the CD. PSNH intends to submit a motion for confidential treatment regarding such documents at or before the commencement of the hearing in such proceedings. Choose one and delete extraneous text:

* Bulk material provided to NHPUC only.

* Bulk material provided only to requesting party.

Newington Station Continued Unit Operation Study
Levitan Data Requests

Current and projected (if any planned changes) Newington operating characteristics:

Maximum operating capacity by season or month (MW)
400.2 MW all year

Minimum operating capacity (MW)
60 MW (Heat rate 16,560 btu/kwh) 100 MW (Heat Rate 12,500 btu/kwh)

Maximum spinning reserve capability (MW)
150 MW (5MW/minute X 30 minutes)

1. UCAP capacity (MW)
See PSNH NT UCAP-FCA_cleared_or_qual_cap.xls

Planned maintenance schedule (dates) by year
Plan on 2 weeks per year, **BEGIN CONFIDENTIAL [**
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Expected forced outage rate (%)
2.5%

Variable O&M (VOM) cost on oil ($/MWh)
Variable O&M (VOM) cost on gas ($/MWh)
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Fuel Type	Fuel Additive	Fuel Handle	Fuel Unload	Ash/Slag Dispose	Maint. Cost	Oper. Adj.	Sum of Adders
	$/MWh	$/MWh	$/MWh	$/MWh	$/MWh		$/MWh
Oil							
Gas							

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Fixed O&M (FOM) cost ($/yr or month)
$5,800,000/yr

2. Inflation rate (%/yr) used to project future VOM and FOM costs
No escalation on Variable O&M. We have not seen an increase in costs in several years.
1.0% on Fixed O&M – Newington Station works to maintain level O&M costs in the future, so 1.0% is a conservative inflator to use.

Cold start cost ($) and/or start fuel (MWh)
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Hot start cost ($) and/or start fuel (MWh)
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Cold start time (hours)
12 hours

Minimum time (hours) to qualify as a cold start
96 hours

Hot start time (hours)
4 hours

Minimum run time (hours)
6 hours

Minimum down time (hours)
4 hours

Ramp rate (MW/minute)
3 MW/minute between 60 and 400 MW, 5 MW/minute between 150 and 390 MW which is coincident with the unit's AGC capability

Average Heat rate on oil (MMBtu/MWh)
$y=-2E\text{-}5x^3 + .0167x^2 + 5.439x + 614.16$
400 MW: 10,793 MMBtu/MWh
300 MW: 10,915 MMBtu/MWh
200 MW: 11,020 MMBtu/MWh
150 MW: 11,756 MMBtu/MWh
100 MW: 13,860 MMBtu/MWh
60MW: 16,560 MMBtu/MWh

Average Heat rate on gas (MMBtu/MWh)
10,750 Btu/kwh @ 320 MW (gas only)

Limits on fuel blending/switching (if any) -
When firing on oil only, the boiler is able to achieve full load capacity at 400 MW and would consume nearly 17,000 barrels of oil per day. PSNH has on-site storage capacity for over 40 days of full load operation.

When firing on natural gas only, the unit is able to achieve 80 percent of full load capacity, or 320 MW and would consume 86,000 deca-therms of natural gas per 24 hour day. The high pressure gas line lateral located on site is more than adequate to supply the required volume of gas.

When firing a combination of natural gas and oil and using the maximum volume of gas (equivalent to 80 percent of full load) with the remainder of the total being oil, the unit is able to achieve 90 percent of full load capacity, or 360 MW. To operate at full load capacity using gas and oil combination, the natural gas input is limited to a maximum of 50 percent of the total heat input to avoid operational and maintenance problems.

SO2 emission rate on oil (lb/MMBtu)
Oil @ 400.2 MW = 1.05 lbs/MMBtu
Oil @ 150 MW = 1.15 lbs/MMBtu

NOx emission rate on oil (lb/MMBtu)
Oil @ 400.2 MW = 0.23 lbs/MMBtu
Oil @ 150 MW = 0.18 lbs/MMBtu
Oil and Gas @ 375 MW = 0.18 lbs/MMBtu

NOx emission rate on gas (lb/MMBtu)
Natural Gas @ 310 MW = 0.12 lbs/MMBtu
Natural Gas @ 150 MW = 0.07 lbs/MMBtu

EPA limit or company policy on maximum sulfur content of oil (by year)
PSNH is currently limited to 2% sulfur by EPA and NH DES
On the horizon, there are new regional haze rules (BART) and the limit will likely be changed to a minimum of 1%, which is consistent with the oil PSNH has been burning for the past couple of years.

WACC to use in NPV discounting.
6.522% (net of tax)
This is based on PSNH's capital structure and cost of debt and equity as approved in PSNH recent distribution rate case settlement agreement.
Common Equity 52.4%, Long-term Debt 45.73%, Short-term Debt 1.87%
Cost of Equity 9.67% (net of tax), Cost of Long-term Debt 5.263%, Cost of Short-term Debt 2.1%

Historical operating performance of Newington for the past 10 years (2000-2010), in Excel or Access format:
Forced outages (MW by date/hour)
See NT_Outages_2000_2010.xls

Maintenance outages (by date/hour)
See NT_Outages_2000_2010.xls

3. (all of the following excel files that contain historical hourly data)

DAM energy sales (MWh by date/hour)
See NT DA&RT Gen&SS-MR.xls

RTM energy sales (MWh by date/hour)
See NT DA&RT Gen&SS-MR.xls

Self-generation (MWh by date/hour)
See NT DA&RT Gen&SS-MR.xls (Self schedule on DA data tab, RT Must Run on RT data tabs)

Uplift payments ($ by date/hour)
See PSNH NT NCPC - Uplift.xls

Spinning reserve capacity sales (MW by date/hour)
See PSNH NT RT Spinning Reserves.xls

AGC capacity sales (MW by date/hour)
See NT Regulation.xls

Fuel use by type (MWh by date/hour)
See Newington Fuel for Gen Annual Reports.xls – annual data 2002-2009

Cost of Residual Fuel Oil delivered to Newington
See Newington Fuel for Gen Annual Reports.xls – annual data 2002-2009

End of historical information to be confirmed for release

Basis adder payable to marketer or third party on PNGTS
Not transparent. However, see response to Algonquin inquiry (two down).

Description of any constraint on PNGTS affecting gas availability to Newington, including imbalance resolution cost, penalty, ratable-take requirement
There are procedural constraints, but they have not been enforced.

4. Algonquin Citygates benchmark prices on days when natural gas was used
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Brief description of day-ahead and intra-day gas scheduling flexibility during the heating season, November through March, versus non-heating season **BEGIN CONFIDENTIAL [**

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5. Any internal or external studies that quantify the price of risk built into daily or monthly exercisable call options
At the end of the quarter Pat Smith receives market data which includes price volatility data. This data is the data we use to value call/put options.
See Volsheet-2010-06-29.xls

Any reports or studies of recent and planned maintenance or upgrade projects
Use $500K annually on capital improvements to maintain reliability and availability

Any prior short-term or long-term studies that have been conducted for Newington
See PSNH NT CUO Study Draft document – this is a very rough draft at this point, but it should provide you with some of our thinking on the approach for the study.

5 Historical PSNH customer and load data for the past 10 years, in Excel or Access format:
Monthly customer count by class
See PSNH Customer Data.xls

Hourly load by customer class
See PSNH Hourly Energy Service Cust Load.xls

Public Service Company of New Hampshire
Docket No. DE 10-261

Witness: Terrance J. Large
Request from: New Hampshire Public Utilities Commission Staff

Question:
Ref. LAI Rebuttal, page 28. Please provide the Newington-related hot start times, minimum run time, start costs, and heat rates included in the GE MAPS database underlying the CRA study. Please also provide the same data used by LAI to conduct both the initial and revised CUO studies.

Response:
The referenced sentence referred to LAI's assumption that CRA's data on Newington Station's operational parameters contained in the GE MAPS database would not be as accurate as the data that LAI obtained from PSNH for the CUO study. The confidential attachment 1 provided compares the Newington-related hot start times, minimum run time, start costs, and heat rates used in the CRA and LAI analyses. In addition, attachment 1 compares cold start time (referenced in LAI Rebuttal, p. 28) and minimum down time.

LAI calculated the constant dollar start cost per start inferred to be the GE MAPS input value by dividing CRA's report of annual start costs by the annual number of starts for both simulation cases (Base and NPT). Because the per start cost is constant for all years modeled for both cases, it may be inferred that CRA used a constant dollars per start input assumption rather than using inputs of 2FO and natural gas, and that CRA did not distinguish between cold and hot start costs.

Many other operational parameters used in the LAI model (e.g., ramp rates, natural gas usage limitations by energy output level, variable O&M costs, fuel basis and handling spreads, emission rates) may also differ between the PSNH data and the GE MAPS database.

The information contained in the document included in this response is highly confidential. A hard copy of the attachment is being supplied to Staff and the OCA pursuant to the general confidentiality agreement between PSNH and the OCA. Should the OCA intend to include this information in any future discovery requests, testimony or any other communication or document in this proceeding, please inform PSNH in advance. PSNH will file a motion for confidential treatment before the commencement of hearings on the merits, pursuant to Puc §203.08 (d), We trust the information will be kept confidential pursuant to Puc § 203.08(e).

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Docket DE 10-261
Least Cost Integrated Resource Plan
Data Request STAFF-04
Dated: 12/23/2011
Q-STAFF-023

Attachment 1

Parameter	CRA Study	LAI Initial	LAI Revised
Hot Start Time (hours)	[redacted]	[redacted]	[redacted]
Minimum Run Time (hours)	[redacted]	[redacted]	[redacted]
Minimum Down Time (hours)	[redacted]	[redacted]	[redacted]
Start Costs per Cold Start	[redacted]	[redacted]	[redacted]
Start Costs per Hot Start	[redacted]	[redacted]	[redacted]
Heat Rates -- RFO (Btu/kWh)		[redacted]	
400 MW	N/A	[redacted]	[redacted]
300 MW	N/A	[redacted]	[redacted]
200 MW	N/A	[redacted]	[redacted]
150 MW	N/A	[redacted]	[redacted]
100 MW	N/A	[redacted]	[redacted]
60 MW	N/A	[redacted]	[redacted]
Heat Rates -- NG (Btu/kWh)		[redacted]	[redacted]
400 MW (in blend w/RFO)	N/A	[redacted]	[redacted]
300 MW	N/A	[redacted]	[redacted]
200 MW	N/A	[redacted]	[redacted]
150 MW	N/A	[redacted]	[redacted]
100 MW	N/A	[redacted]	[redacted]
60 MW	N/A	[redacted]	[redacted]

Notes:

[1] LAI assumes that CRA used the same constant dollar cost per start for both cold and hot starts since the calculated average start cost was identical for all case-year simulation results. Dollar costs are likely 2009 dollars, used for reporting results.

[2] The LAI Initial model used coefficients for a third degree polynomial equation to calculate heat rates. The equation approximated the heat rates at the load levels shown.

Witness: Richard L. Levitan
Request from: New Hampshire Public Utilities Commission Staff

Question:
Original question: Re Section 3 of Modeling System Overview: Fuels Price Short-term and Long-term Stochastic Parameters Statistical Procedure

Please provide an example of what you mean by the "short term daily mean-reversion rate" parameter.

Follow-up question received from Staff on May 27, 2011: Please provide Staff the confidential, non-redacted versions of LAI-MOD-01-12, 01-21, and 01-22

Response:
PSNH is resubmitting to Staff the unredacted copies of responses to LAI-MOD-01, Q-STAFF--01-012, LAI-MOD-01, Q-STAFF--01-021, LAI-MOD-01, Q-STAFF--01-022, and LAI-MOD-01, Q-STAFF--01-029 on a CD.

Pursuant to Puc 203.08(d), PSNH has a good faith basis for seeking confidential treatment of the information contained on the CDs. PSNH intends to submit a motion for confidential treatment regarding such information at or before the commencement of the hearing in such proceedings.

** The requested information is being filed under the Motion for Protective Order dated April 8, 2011.

Witness: Richard L. Levitan
Request from: New Hampshire Public Utilities Commission Staff

Question:
Re Section 3 of Modeling System Overview: Fuels Price Short-term and Long-term Stochastic Parameters Statistical Procedure

Please provide an example of what you mean by the "short term daily mean -reversion rate" parameter.

Response:
Please see the attached response.

To keep the example as simple as possible, consider a single factor mean reversion model, which only has short-term (ST) mean reversion and volatility parameters. While the full model also includes a long-term (LT) volatility parameter, that generalization does not affect the ST equation that represents relative spot price deviations from the equilibrium price of that time period.

The ST mean reversion equation for any of the fuel price variables is:

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where: x = ln(S/L), the relative deviation of spot price, S, from the LT equilibrium (mean) price, L alpha = ST mean reversion rate sigmaS = ST volatility rate dt = time step (= 1 day) dz = ST factor random draw from a standard normal (0, 1) distribution i = scenario i t = time period (day)
s = season (month)

Here, we simplify by substituting the LT equilibrium price level equation by a constant mean, m:

y(t) = m

where: y(t) = ln(L(t))

We obtain the spot price as:

S(t) = exp(x(t) + y(t))

In this example, we use the ST mean reversion (alpha) and volatility (sigma) parameters for natural gas in January. As shown in Staff 1-79c, Attachment 1, the natural gas ST equation's mean reversion rate for January is 0.2669 per day and the volatility rate is 0.1371 per day. Notice that the statistically estimated volatility rate for January is larger than for other months, and that winter months have higher volatility rates than summer months. The winter season monthly mean reversion rates are also generally higher than for summer months.

Assume for this example that the January forward price in a certain year is $6.00/MMBtu, and that the stochastic process starts on January 2 of that year. Using the forward price as the expected price throughout January sets m = 1.7918 = ln(6.00).

Further assume that the initial spot price on January 1, S(0), is slightly above the equilibrium price, at $6.40/MMBtu. This gives an initial deviation, x(0), of 0.0645 (rounding this and all following logarithms to 4 decimal places).

First consider a case where the random draw for day 1 is zero, equivalent to a non-stochastic mean-reverting process. Then,

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The spot price, S(1) = 6.29 = exp(0.0473 + 1.7918). By continually updating x(t) for the following days, the value of x decays exponentially towards zero, and S reverts to the equilibrium L price. On January 3 the spot price is 6.21, and on January 4 the spot price is 6.15.

Now consider a case with random draws from a standard normal distribution. You can do this in Excel by using the nested functions, =NORMSINV(RAND()). RAND() draws a uniform random value from the 0-1 interval. NORMSINV() converts a value in the 0-1 interval into a standard normal distribution value. Assume that the random draw on January 2 is 0.27. Then,

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and S(1) = 6.53. In this case, the spot price on day 1 increases due to the positive random term more than offsetting the predictable mean reversion term.

Consider the opposite (antithetic) random draw, −0.27. Now,

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and S(1) = 6.06, less than the 6.29 price on day 1 without a random shock.

The LT price level equation, left out of this example, has the effect of creating a moving target of equilibrium values. The ST mean reversion equation demonstrated here chases after that randomly moving equilibrium value. The much lower LT volatility rate means that there is relatively little random fluctuation in L compared to S on a daily interval. But because the equation for L is a random walk process rather than a reversion to a long-term mean, L can drift quite far above or below the initial equilibrium path given by the forward curve.

Witness: Richard L. Levitan
Request from: New Hampshire Public Utilities Commission Staff

Question:
Re to Section 3 of Modeling System Overview: Fuels Price Short-term and Long-term Stochastic Parameters Statistical Procedure

Please provide an example of what you mean by the “Long-run daily volatility rate” parameter.

Response:
Please see the attached response.

The phrase "long-run daily volatility rate" is equivalent to "long-term volatility rate" as described in response to Questions 18 and 19. The "long-term" or "long-run" volatility rate is a constant (not time-varying) parameter in the model. It is referred to as a "daily" volatility rate because it's annual rate was converted into a daily rate to match the daily frequency of including new random draws in the updating process for the long-term (LT) equation.

The LT equation is a standard geometric Brownian motion or random walk with drift equation,

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where:

y = ln(L) = logarithm of the LT equilibrium price, L

mu = drift (predictable change) rate

sigmaL = LT volatility rate

dzL = LT stochastic factor random draw from a standard normal (0, 1) distribution t

= time period

dt = daily time increment

The predictable trend or "drift" in the LT equilibrium price is given by the initial equilibrium LT (forward) price curve, LE:

ye(t) = ln(LE(t))

mu(t) = ye(t) – ye(t-1)

Using natural gas in the example, sigmaL = 0.0088 per day, as shown in Staff 1-79c, Attachment 3. Because the expected LE fuel price is flat within each month, mu is only non- zero between the last day of one month and the first day of the next month. Consider an example where t and t-1 are both in the same month. If the equilibrium price for the scenario in period t-1 is $5.50, its log is 1.7047. Then for a random draw from the standard normal distribution of 0.30, the equilibrium price on day t is $5.5145:

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L(t) = 5.5145 = exp(1.7074)

If the random draw had been the mirror image negative value −0.30, then the equilibrium price would have been $5.4855.

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L(t) = 5.4855 = exp(1.7074)

The average of the two scenario values for L(t), $5.5145 and $5.4855, is almost exactly $5.50, the same as on the preceding day. The final step is to calibrate all scenario values so their mean value exactly equals the initial expected (forward) price. This slight adjustment accounts for what is known as the "log bias" term of the geometric random walk model and sample random draws that do not exactly match the assumed standard normal distribution.

Witness: Richard L. Levitan
Request from: New Hampshire Public Utilities Commission Staff

Question:
Re Section 6 of Modeling System Overview: Energy Hourly Prices Simulation Model

LAI states that "TOU by month energy prices in each scenario are dependent on the stochastic natural gas prices, forward energy and natural gas prices, and a SHR elasticity parameter, which plays the role of adjusting the base SHR down (up), depending on whether the statistical estimate of the elasticity is less (greater) than one."

Please explain in detail (using a step-by-step approach) how stochastic natural gas prices, forward energy and natural gas prices, and a SHR elasticity parameter are used to develop the TOU monthly energy prices. That is, describe all calculations and explain the purpose of the SHR elasticity parameter. In addition, explain in detail how hourly energy prices are calculated from TOU monthly energy prices using historical simulation.

Response:
Please see the attached response.

The method for simulating DA and RT hourly energy prices as a function of forward DA energy prices, stochastic fuel prices, and historical hourly energy price shapes has the following steps.

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The purpose of the MHR elasticity exponent in the Step 4 equation is to allow for the theoretically-expected and empirically-observed non-proportional relationship between the level of natural gas prices and the level of energy prices. The statistically-estimated MHR parameter values are less than 1.0 in most months and blocks. An elasticity exponent less than 1.0 says that when the natural gas price increases (decreases) by X%, energy prices increase (decrease) less than X%. An increase (decrease) in natural gas prices will decrease (increase) the spark spread instead of keeping it constant. Since stochastic natural gas prices in the model vary both above and below the initial forward price, the net effect of using this nonlinear MHR exponent in comparison to using a linearly proportional change in energy price based on a constant MHR curve over time is relatively small.

Witness: Terrance J. Large
Request from: Office of Consumer Advocate

Question:
Attached to the Response to Staff 01-047 is a "Proposed Addendum to Determine the Real Option Value of the Newington Station" from Levitan to PSNH dated June 23, 2010.

a. The letter references an Original Proposal dated April 26, 2010 and a second proposal of June 20, 2010. Please provide copies of those 2 proposals.

b In the second paragraph of the letter is the statement: "Notably, we will not make any structural modifications to the valuation technique that addresses the potential impact of the proposed HQ HDVC transmission line to southern New Hampshire, nor will we consider PSNH's portfolio attributable to interaction effects between Newington and other generation assets." Please provide copies of all documents Leviton provided to PSNH or that PSNH provided to Leviton related to these issues that are dated prior to June 23, 2010.

c. On page 3 of that document under Task 1-Qualitative Analysis of Economic and Reliability Value is a bullet under "We will review and evaluate" which reads: "Potential repowering of Newington in order to take advantage of existing electrical and natural gas interconnections, oil tankage and conversion capability to low sulfur diesel, community support, and other infrastructure capability." Please provide copies of all analyses Levitan conducted regarding potential repowering.

d. Page 8 of that document under Data Inputs Required contains a bullet which reads: "Any prior short-term or long-term studies that have been conducted for Newington." Please provide copies of all such documents which were provided to Levitan.

Response:
a. Please see attached files.

b. Please see attached email communication between PSNH and Levitan.

c. Levitan did not conduct any analyses related to potential repowering of Newington Station.

d. Please see the response to OCA-01, Q-OCA-062 and TS-01, Q-TECH-004.

Data Request OCA-02
Dated: 04/29[redacted]
Q-OCA-024 [redacted]
Attachment Redacted Version

[redacted]

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LEVITAN & ASSOCIATES, INC.
MARKET DESIGN, ECONOMICS AND POWER SYSTEMS

June 20, 2010

Erica L. Menard, Supervisor- Business Planning & Performance Analysis
David W. Packard, Senior Sourcing Consultant
Public Service of New Hampshire, P.O. Box 330
Manchester, New Hampshire 03105-0330

Re: <u>Proposal Addendum to Determine the Real Option Value of the Newington Station</u>

Dear Ms. Menard and Mr. Packard:

Thank you for providing Levitan & Associates, Inc. (LAI) with the opportunity to amend our proposal of April 26, 2010, to address how we will quantify the benefits associated with Public Service of New Hampshire's (PSNH's) ownership and operation of the 400 MW dual fuel capable Newington Station (Newington). This addendum replaces LAI's proposal of April 26, 2010, including all pricing for the individual work tasks delineated therein. We have done our best to tailor our proposed methodology and research emphasis to incorporate the PSNH steering committee's constructive comments and recommend-ations based on discussions in your office on June 16th and subsequent email in which study objectives have been prioritized.

While LAI has defined our general approach, methodology, and data requirements in this addendum, we reserve the right to make additional analytic refinements and data requests as appropriate. Notably, we will *not* make any structural modifications to the valuation technique that addresses the potential impact of the proposed HQ HVDC transmission line to southern New Hampshire, nor will we consider PSNH's portfolio attributable to interaction effects between Newington and other generation assets. In addition to clarifying and extending our modeling capabilities and methods, we also address deliverables and price. Prior background information regarding LAI's qualifications and experience has been omitted from this addendum.

<u>Modeling Capability</u>

LAI licenses various models and databases that will be used in this study. From Ventyx we license MarketSym, a state-of-the-art production simulation model that is frequently used to support LAI's procurement oversight responsibilities in Connecticut regarding the derivation of congestion adders and energy prices by location. We also license other modeling tools for development of customized proprietary financial and mathematical models. A number of proprietary models will help support the quantification of plant commitment and dispatch, generation entry / exit, price and load volatility, and customer load patterns and migration, among other variables. LAI also has a capacity price forecasting model that reflects ISO-NE's Forward Capacity Market (FCM). Finally, LAI has a financial model that we use to forecast the price of renewable energy credits (RECs) based on the revenue requirement of a marginal onshore wind project. LAI's suite of simulation, financial and mathematical models will support the study objectives set forth by the PSNH steering committee, thereby providing a solid foundation for LAI's testifying expert(s) to convey to the New Hampshire Public Service Commission (NH PSC) the reasonableness of our findings.

Valuation Approach

Newington's declining capacity factor has raised the question of the station's value to ratepayers. Current weak capacity prices coupled with the present outlook for capacity prices during a period of capacity overhang in New England portends weak financial performance when Newington is considered on a stand-alone basis. In conducting this study, the primary objective is to determine Newington's value to PSNH's retail customers when we consider both the intrinsic and extrinsic value of the sundry benefits ascribable to Newington relative to the costs otherwise borne by PSNH's retail customers if PSNH could no longer lay claim to Newington's energy, capacity and hedge or "insurance" benefits. Part of this assessment will therefore reflect the value to New England at large through Newington's daily participation in either the Day Ahead Market (DAM) or Real Time Market (RTM).

Newington provides operational flexibility by: (i) its moderate startup cost and time, (ii) quick ramp rate relative to other steam turbine generators (STGs) and other PSNH resources, (iii) its ability to burn a mix of residual fuel oil (RFO) and/or natural gas, and, (iv) its ability to avoid costly fixed firm transportation reservation rates on the Portland Natural Gas Transmission System (PNGTS). Newington provides financial benefits directly to PSNH customers due to the unit's low net book value relative to the potential uncertain cost of capacity under ISO-NE's evolving FCM. The empirical challenge is to determine whether or not Newington provides PSNH with an effective market hedge against future uncertain energy, capacity, ancillary service, fuel, emission prices, and load. The uncertainty about load relates not only to the overall level of customer usage, but also to the number of customers from month-to-month in response to market and regulatory incentives that allow migration from (to) competitive suppliers to (from) PSNH for backstop service. Also, Newington can provide transmission security benefits, but the determination of such transmission security benefits under ISO-NE's Local Sourcing Requirements or Transmission Security Analysis is not part of LAI's study approach.

In this study, LAI will derive the value of PSNH's continued ownership and operation of the Newington Station. We will quantify the real option value (ROV) – also colloquially referred to as the "hedge value" of the asset – based on LAI's technical assessment of the evolving FCM and wholesale energy markets, including ancillary services. Underlying fuels and emissions markets will be included in the analysis. This analysis will consider both market price and load uncertainties, in particular, future potential Forward Capacity Auction (FCA) "trajectories" based on changes to dynamic and static de-list bids, other revisions to the mitigation rules, and adjustments to the Alternative Price Rule (APR) when Out of Market (OOM) resources are deemed to depress the capacity price. On an expedited track, other issues raised by FERC in the FCM Redesign Order will be considered as appropriate. Therefore we will want to have one meeting with the PSNH steering committee and, perhaps, other NU FCM Working Group participants to ensure that the range of FCA trajectories has been reasonably defined.

As an optional study task, LAI will also estimate any additional insurance-like value based on consideration of the appropriate cost of market price and load volatility risk avoidance. By postulating the loss of Newington, we would estimate plant value as a financial hedge relative to the alternative of a purchased hedge instruments strategy. Under this optional study task, we would assess a strategy where PSNH does business with creditworthy counterparties by rolling purchases of strips of call and put options. Call options would provide energy price protection, while straddles (paired call and put options) would provide load volumetric protection.

In accord with the three tasks previously formulated, our proposed approach is described below.

Task 1 – Qualitative Analysis of Economic and Reliability Value

In the first work task we will identify, describe, and summarize the conditions where Newington provides future economic and reliability benefits to PSNH's customers and to the ISO-NE at large. The planning horizon is 2011 to 2020. We will report the daily and longer-term operating benefits of being able to schedule energy from Newington to serve PSNH's customers' requirements. This task will provide the NH PSC with context and perspective regarding the building block assumptions used in the quantitative analysis.

We will review and evaluate:

- PSNH's reliance on Newington to self-schedule energy when the all-in, out-of-pocket cash cost of scheduling generation from Newington is in-the-money based on dispatch scheduling protocols commonly employed by generators throughout New England. We will review the plant's operating cost relative to energy prices on a locational basis when Newington has operated.

- Newington's locational benefits in the broader context of the ISO-NE system. Newington's contribution to system reliability will be described given its location in the New Hampshire area. On a qualitative basis, we will report the locational benefits of not being bottled when the ME-NH interface is constrained, if applicable. We will review ISO-NE data on any local reliability issues in the New Hampshire area.

- ISO-NE's Regional System Planning (RSP) studies of the Seacoast area, including Portsmouth, where Newington provides ISO-NE with dependable capacity regardless of operating constraints on PNGTS or other pipelines serving northern New England. We will identify material uncertainty factors in the Seacoast area, such as high load growth or generating resources that may be at risk of retirement.

- Potential repowering of Newington in order to take advantage of existing electrical and natural gas interconnections, oil tankage and conversion capability to low sulfur diesel, community support, and other infrastructure capability.

- Key short-term and long-term uncertainty drivers. The economic theory of real options will be presented, including easily understandable illustrations of plant dispatch, fuel switching/blending, and Newington's multiple product bidding flexibility. We will highlight the plant's ability to switch or blend fuels to mitigate against fuel and emission allowance price uncertainty.

Task 2 – Quantitative Analysis of Economic and Additional Insurance Value

The scope of the quantitative assessment will be centered on Newington's operational and financial value, including the additional hedge or insurance value it provides to PSNH customers. As previously mentioned, LAI's quantitative assessment will not include Newington's contribution to local or system reliability. At this juncture, we do not intend to compute the site-specific repowering option value.

The first phase of the analysis is to forecast expected energy, capacity, fuel, and emissions prices. This set of consistent multi-commodity forecasts may be also be used by PSNH in preparing its IRP. For this purpose we use a combination of available forward market information, fundamental models, and statistical calibration and extrapolation procedures. This phase has several steps.

- We will forecast expected monthly fuel prices and expected annual emission allowance prices as inputs to our energy and capacity market models. We use forward prices for fuels and emission allowances in the early years and published long-term forecasts in the later years, together with our proprietary model of basis spreads to key pricing points within New England and across neighboring market areas.

- We will update the MarketSym database and run a single regional simulation to forecast expected hourly day-ahead energy LMPs for a typical week in each month over the 10-year planning horizon. Consistent with LAI's analytic convention in our oversight role in Connecticut, we will then calibrate these hourly prices to the NYMEX MassHub forward curve. We will extend the calibration beyond the duration of current forward prices.

- We will update and run our proprietary capacity price forecasting model. This model will include the results of FCAs #1-3, and will reflect LAI's professional judgment regarding APR functionality in response to OOM resources that may affect FCA capacity prices over the planning horizon. The FCM net cost of new entry (CONE) method, including deducts for peak energy rents will be quantified. In light of rapidly changing regulatory events coupled with LAI's expectation that FERC will approve ISO-NE's recommended position, one meeting with the PSNH steering committee and other NU FCM Working Group participants is anticipated.

The second phase of the analysis is to simulate a set of stochastic paths for the uncertain operating variables of fuel, energy, and emission allowance prices. The stochastic fuel and energy prices in each scenario will be formed first at the daily level using a set of correlated two-factor (short-term and long-term) lognormal mean reversion equations for the uncertain input and output commodity prices. The energy prices will also include an overlay of hourly price fluctuations using historical simulation. Parenthetically, we note that the statistical overlay of hourly price fluctuations will not be extracted from MarketSym. The expected capacity, energy, fuel, and emission price forecasts will be used to "seed" the stochastic price forecasting model with the expected seasonal shape and long-term curve for each commodity. Historical daily and hourly prices for at least the past three years will be used to estimate the statistical mean reversion, volatility, and correlation parameters for the short-term stochastic components. Either long-dated forward energy, oil, and gas products, option implied volatilities, or many years of historical spot prices will be used to estimate the volatility and correlation parameters of the long-term stochastic components of the input and output commodity prices. The Stata statistical software package will be used to perform the regression and correlation analyses and then to simulate the set of stochastic prices. Importantly, the extra ancillary services revenue attributed to Newington will be based on a simplified analysis of the relationship between historical annual energy and ancillary service revenues. In light of our production milestones and budget objectives, we do no think it is necessary to conduct technical analysis of Newington's ancillary service revenue potential.

The third phase of the analysis will use Monte Carlo unit operation simulation to estimate Newington's operational performance and net margin for the set of stochastic fuel, energy, emission allowance, and capacity prices. To compute real option value, LAI will model unit commitment and dispatch to reflect Newington's dispatch, fuel switching/blending, and multiple product (energy into DAM v. RTM) flexibilities. Working closely with the PSNH steering committee, LAI will need extensive information on Newington's operational costs and constraints. This information requirement is delineated in this addendum.

In light of Newington's relatively short startup and shutdown time, the commitment and dispatch optimization model will have a daily scope. The dispatch model will be designed to respect the station's heat rate curve, emission rates on each fuel, minimum up and down times, start costs, ramp rate, and any fuel blending/switching limits. LAI may use the Stata software for the commitment and dispatch analysis if the model can be optimized without exposing LAI to an additional work burden that has not been contemplated in formulating the price to conduct this advisory service. Otherwise, we may use a mixed integer programming optimization tool or the PROSYM dispatch simulation model.

Many simulation paths will be run; hence, station results will be rolled-up to the monthly or annual level for reporting of generation, revenues, costs, and gross margin. We will report summary operating results by time period and across the probability distribution.

The expected value of the net operating revenues will be calculated as the average of the individual simulation path net operating revenues. To facilitate the NH PSC's appreciation for the station's ROV, we will prepare graphs and tables representing the distribution of results. Presumably, we will use PSNH's weighted average cost of capital (WACC) as the discount rate – however, we will need to hear back from the steering committee regarding other financial considerations that may warrant a basis point deduct or adder to WACC. The overall NPV would represent the economic value of continued ownership and operation of Newington. The intrinsic value of Newington's net operating revenues will be calculated in order to estimate its real option premium value by subtracting the intrinsic value from the expected stochastic value.

At additional project cost, the optional fourth phase of the analysis is to estimate any additional hedge or insurance-like value of continued Newington operation. We understand that there are times when PSNH is at risk, thereby committing Newington on a conservative basis. We interpret PSNH's conservatism as tantamount to sub-economic decision-making on an expected value basis in order to obtain price and volumetric hedge protection that otherwise would need to be obtained by purchasing financial options. Should you authorize LAI to conduct this optional fourth phase work task, the scope of this analysis will focus on Newington and PSNH load, without consideration of PSNH's other owned or contracted physical assets as well as other financial contracts. Instead, LAI will conduct two proxy analyses.

- First, historical data on DAM hourly energy spot prices and published call option prices will be used in a regression model to estimate the size of the risk premium over the risk-neutral price of the options to estimate the $/MWh cost of hedging price risk by time-of-day and season. This analysis will be supplemented with other available studies that have attempted to estimate the size of the risk premium. The same level of risk premium will be projected over the 10-year period since buying this price protection can be deferred until a few months to a year or two before delivery.

- Second, the hedge value of insuring against volumetric uncertainties of customer migration into or from PSNH and weather-based load uncertainty will be estimated by using a closed-form option valuation method. Specifically, the model will use a strip of straddle options (call option and put option at the same strike) to hedge load volatility based on a confidence interval of load uncertainty.

Task 3 – Expert Witness Testimony and Support

LAI has a number of testifying experts available to support PSNH's regulatory filing before the NH PSC. The principal witness will be Richard Carlson, Ph.D., Managing Consultant, who will be primarily responsible for the financial and mathematical work tasks defined in this addendum. Dr. Carlson has extensive experience with individual asset and portfolio level cash flow at risk analysis and options valuation.

Other LAI experts may be required to support PSNH's regulatory filing to support integrated resource planning issues, standard professional conventions associated with wholesale power procurement in New England to serve retail customers, the FCM forecast, transmission reliability, fuels, Newington's operational capability, among other things. Other testifying experts can include Seth Parker, Vice President; Jack Elder, Manager-Market Design; and/or Richard Levitan, President.

Data Inputs Required

LAI will require operating and financial data from PSNH covering Newington's market products, performance characteristics, recent and planned maintenance / upgrade requirements, potential CapEx requirements to meet state and/or federal environmental compliance requirements, RFO transport and storage costs, transport adders incurred on PNGTS relative to Algonquin Citygates, among other things. We would also like to review any prior short-term or long-term studies that have been conducted by PSNH and your advisors. LAI intends to obtain all other data from public sources, in particular, ISO-NE.

We respectfully request the following specific items at the outset (additional requests may be made later):

- Current and projected (if any planned changes) operating characteristics:
  - Maximum operating capacity by season or month (MW)
  - Minimum operating capacity (MW)
  - Maximum spinning reserve capability (MW)
  - Planned maintenance schedule (dates) by year
  - Expected forced outage rate (%)
  - VOM cost on oil ($/MWh)
  - VOM cost on gas ($/MWh)
  - Cold start cost ($) and/or start fuel (MMBtu)
  - Hot start cost ($) and/or start fuel (MMBtu)
  - Cold start time (hours)
  - Hot start time (hours)
  - Minimum run time (hours)
  - Minimum down time (hours)
  - Ramp rate (MW/minute)
  - Average Heat rate on oil (MMBtu/MWh)
  - Average Heat rate on gas (MMBtu/MWh)
  - Limits on fuel blending/switching (if any)
  - SO_2 emission rate on oil (lb/MMBtu)
  - NO_x emission rate on oil (lb/MWh)
  - NO_x emission rate on gas (lb/MWh)

    - EPA limit or company policy on maximum sulfur content of oil (by year)
- Historical operating performance of Newington for the past 10 years, in Excel or Access format:
    - Forced outages (MW by date/hour)
    - Maintenance outages (by date/hour)
    - DAM energy sales (MWh by date/hour)
    - RTM energy sales (MWh by date/hour)
    - Self-generation (MWh by date/hour)
    - Uplift payments ($ by date/hour)
    - Spinning reserve capacity sales (MW by date/hour)
    - AGC capacity sales (MW by date/hour)
- Fuel use by type (MMBtu by date/hour)
    - Cost of RFO delivered to Newington
    - Basis adder payable to marketer or third party on PNGTS
    - Description of any constraint on PNGTS affecting gas availability to Newington, including imbalance resolution cost, penalty, ratable-take requirement
    - Algonquin Citygates benchmark prices on days when natural gas was used
    - Brief description of day-ahead and intra-day gas scheduling flexibility during the heating season, November through March, versus non-heating season
- Any internal or external studies that quantify the price of risk built into daily or monthly exercisable call options
- Any reports/studies of recent and planned maintenance or upgrade projects
- Any prior short-term or long-term studies that have been conducted for the plant
- Historical PSNH customer and load data for the past 10 years, in Excel or Access format:
    - Monthly customer count by class
    - Hourly load by customer class

LAI intends to obtain all other data from public sources, ISO-NE, or a vendor of market price data.

Deliverables

Four deliverables will be provided:

1. Abstract of the report, including preliminary mock-ups of presentation charts and tables
2. Excel file of forecasted expected capacity, energy, fuel, and emission prices suitable for inclusion in PSNH's IRP

3. Draft Newington Station Continuing Operation report
4. Final Newington Station Continuing Operation report.

Timeline

LAI will exercise reasonable efforts to meet the overall time objective of delivering a final report in early September 2010. The current expected schedule has seven weeks to prepare a first working draft, one week for PSNH to return comments to us, and one week for LAI to edit the final report. These are aggressive production milestones that will therefore necessitate active involvement by the PSNH steering committee, timely turnaround of required data inputs to the analysis and good access to the steering committee throughout July and August.

Price

The Not-to-Exceed (NTE) cost to conduct the non-optional components of this study is [redacted] including the work products requested by PSNH to support your IRP filing requirements. The NTE cost includes LAI's miscellaneous licensing fees payable to Ventyx, ICAP, Stata, Bloomberg, and RBAC, Inc., the licensor of GPCM (the model used to compute basis to New England). To the extent our actual fees are lower than the NTE amount, we will charge you our actual fees to complete the study. The NTE amount covers the finalization of the report to be filed with the NH PSC, but it does not include any professional services associated with the preparation of expert testimony or other administrative support services throughout the hearing phase in 2011.

The incremental NTE cost of the optional Phase 4 work task -- quantification of any additional hedge or insurance-like risk premium for additional price and volumetric risk reduction -- is [redacted] If PSNH desires the optional Phase 4 work task, we respectfully request that you authorize the additional work task initially rather than later this summer.

All consulting services performed after October 1st will be invoiced on a time and materials basis under our standard fees, a copy of which was included in LAI's proposal of April 26th as is presumed in effect.

LAI has no conflicts of interest that would impair our ability to represent PSNH's interests fully before the NH PSC throughout the duration of this engagement. LAI has submitted a request to the CT DPUC as well as the DPUC's FERC counsel, and such request for a favorable determination regarding the absence of a conflict of interest has been granted.

If you have additional information requirements or concerns, please do not hesitate to contact me at 617-531-2818 or via email at rll@levitan.com.

We look forward to working closely with PSNH in the months ahead and toward the privilege of this engagement.

Sincerely yours,

Richard L. Levitan
President