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

Data Request TC-04
Dated: 12/16/2011
Q-TC-005
Page 1 of 2

Witness: Terrance J. Large
Request from: TransCanada

Question:
With respect to Mr. Large's testimony dated October 26, 2011 on Page 20, lines 10 - 21 and Page 21, lines 1 - 9,

i) please provide a detailed description of Mr. Large's experience, qualifications, and schooling that validate his expertise to provide his opinion that "because Newington is an intermediate to peaking resource, the proper technique to factor in uncertainty and determine value over a future time horizon is the real option value approach";
ii) please list any studies or analyses using "the real option value approach" either personally performed or managed by Mr. Large;
iii) please explain why "the real option value approach" could not be used to determine future value over a time horizon of a base load resource;
iv) please explain why "the real option value approach" was not used by NU/PSNH "to factor in uncertainty and determine value over a future time horizon" of the Northern Pass Transmission project;
v) please explain whether in Mr. Large's opinion "the real option value approach" would ordinarily consider retirement as one of the possible "options" in such an analysis;
vi) please provide the actual net energy benefits realized by Newington in the first eleven months of 2011, and compare the results to the analysis used to determine the ES rate and the Levitan "real option value approach";
vii) please identify all reasons, given the assumptions used in the study, that the GE MAPS model runs used for the NU Northern Pass Transmission study could not be used to value Newington Station as a stand-alone entity.

Response:

i) Mr. Large has had experience in running production cost simulation models in his prior work with the New York State Department of Public Service and has received post-graduate education in Probability and Statistics from the Georgia Institute of Technology. Additionally, Mr Large has personal experience in Power Generation Operations including serving as Engineering Supervisor at Middletown (CT) Generating Station where three units were operated as intermediate to peaking resources during his tenure. One of the units referenced was designed and operated in a manner very similarly to Newington Unit 1.

ii) Mr. Large personally oversaw the Newington Station Continued Unit Operation study performed by PSNH's consultant, Levitan & Associates, Inc. This study used the real option value approach.

iii) The real option value approach *can* be used to determine the value of a baseload resource. However, for a single fuel baseload resource that has a positive gross margin even when its fuel cost is high and energy prices are low, there is no extra dispatch flexibility option value or fuel-switching option value when applying the real option value approach. While the real option valuation approach yields a more accurate valuation for a resource that optionally shuts down or switches fuels, depending on market conditions, it does not produce a more accurate valuation for a single fuel baseload resource from the standpoint of dispatch flexibility or fuel-switching flexibility.

iv) The NPT project will receive energy from very low variable dispatch cost hydro resources in Quebec, but their energy has high opportunity costs for delivery to either Ontario or New York using other transmission lines. Hence, a more thorough NPT energy benefits analysis could have been conducted using a real option valuation approach to simulate the allocation of energy among three market locations.

A real option valuation analysis would use correlated stochastic scenarios for Ontario, NYISO, and ISO-NE energy prices. In addition, there is some timing real option value in the scheduling of the limited amount of hydro energy between months or over the hours within each month.

v) Retirement decisions at multiple future dates can be modeled with the real option approach. But for the CUO study, the only retirement decision date is at the start of the study period, so there is no real option value from the flexibility to defer the retirement decision to one or more later dates when additional information is known about the benefits and costs of continued operation from those dates.

(vi) PSNH objects to the request to the extent it seeks information on net energy benefits in 2011. PSNH's Least Cost Integrated Resource Plan, which was submitted to the Commission on September 30, 2010, was premised on the Company's operations as of the date the Plan was completed. As a result, the request for information on net energy benefits realized by Newington in 2011 is not reasonably calculated to lead to the discovery of information that would be admissible in this proceeding. Notwithstanding this objection, PSNH offers the following response.

Excluding real time dispatch that appears to have been mainly for operating reserves, PSNH estimates Newington's energy margin using offer prices for all of 2011 to be $4.0 million. Using accounting record fuel expense and including days where the dispatch appears to have been mainly for operating reserves would produce a different value. Fuel accounting is done on a monthly not daily or hourly basis and includes #2 fuel oil not directly used for dispatch. While it might be possible to refine the accounting record using daily gas billing information and possibly daily fuel use information, that information is not readily available whereas the offer prices are. Offer prices on gas do not necessarily reflect actual gas costs because the gas is purchased only after Newington is provided dispatch instructions which is subsequent to the Newington offers being submitted.

The final ES rate filing model submitted in December 2010 for 2011 estimated Newington's energy margin to be $0.7 million.

vii) Key limitations of the CRA study for valuation of Newington Station are:

- Forecasted fuel prices, based on the 2010 EIA Annual Energy Outlook, were higher than the more recent market forward prices used in the CUO study.
- Did not simulate stochastic daily fuel prices for natural gas, RFO, and 2FO
- Did not simulate stochastic hourly energy prices
- Did not simulate both day-ahead and real-time market dispatch

approximately $0.7 million.
Q. So we had asked for the first 11 months of 2011, and it doesn't look as though you provided that. Is that correct?
A. (Mr. Large) We objected to the question and provided the information we felt provided a reasonable response.
Q. Do you have actual numbers for 2011 now?
A. (Mr. Large) Not with me, as I sit here today.
Q. Would you take a record request?
MS. KNOWLTON: I'm going to object to that. Certainly, TransCanada could have moved to compel if they felt that this response was not sufficient, and they chose not to do so. The time for filing a motion to compel in response to this response is certainly long overdue.
MR. PATCH: Well, if we filed a motion to compel, I don't think the 2011 numbers would have been ready. I think it's a reasonable record request at this point in time, given where we are. I mean, we just talked about CapEx numbers where they updated

with actual numbers for those years. And that's all I'm asking for in this situation is actual numbers for 2011.

MS. KNOWLTON: I have a further -- may I state a further objection on the basis of relevance?

CMSR. HARRINGTON: Sure.

MS. KNOWLTON: This CUO was conducted and filed -- well, was filed with the Commission in September 2010. The work was done in the summer of 2010. And so, certainly information on that was -- Mr. Patch is seeking information from a time period subsequent to that I don't believe is relevant.

MR. PATCH: Well, if I could just point out to the Commission, one of the remedies that is requested in this docket is that an independent consultant be hired to complete a CUO study of Newington. So I think it would be very useful for the Commission to know whether actual numbers from 2011 correspond in any way to the numbers on which Mr. Levitan relied and the numbers which PSNH

has provided.

(Off-the-record discussion among Commissioners.)

CMSR. HARRINGTON: We'll let you make the request, Mr. Patch.

MR. PATCH: Okay. So, just to be clear, that record request would be for the actual numbers for 2011.

A. (Mr. Large) And clear as to what actual numbers, just so we're all understanding?

CMSR. HARRINGTON: Is this as stated in your Roman VI there, provide the actual net energy benefits realized by Newington in the first 11 months of 2011?

MR. PATCH: Yeah, that's correct.

CMSR. HARRINGTON: So you're basically asking for what's stated in TransCanada Exhibit 3, Roman VI, on the first page, but for the entire year and not just the first 11 months.

MR. PATCH: Yeah, that's right. For all of 2011.

CMSR. HARRINGTON: That would be Record Request 1?

THE CLERK: No. 4.

CMSR. HARRINGTON: Four. Okay.

(The document, as described, was herewith marked as TransCanada Request Request 4 for identification.)

BY MR. PATCH:

Q. Now, the estimates that you provided, Mr. Large, in that response, one of them was an estimate, in that second full paragraph on the second page of TransCanada Exhibit 3, under Roman VI. "PSNH estimates Newington's energy margin using offer prices for all of 2011 to be $4 million"; is that correct?

A. (Mr. Large) That's what I read, yes.

Q. And yet, in December of 2010, the estimate had been .7 million, or $700,000?

A. (Mr. Large) Yes, for the energy service rate.

Q. Can you explain why there was such a significant difference?

A. (Mr. Large) I think, simply put, the unit operated at a lower capacity factor than had been originally considered, and that energy

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

Record Request HD-01
Dated: 04/04/2012
Q-RR-002
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Witness: David A. Errichetti
Request from: New Hampshire Public Utilities Commission Staff

Question:
(RR-4 - Exhibit TC-4) – Please update the response to TC-04, Q-TC-005, part (vi), providing the actual net energy benefits realized by Newington Station for 2011 when running for economics.

Response:
Newington's net energy margin for 2011 was calculated to be $3.2 million when running for economics rather than reliability using monthly booked fuel expense allocated back to operating days where #2 oil used for warming was set aside.

Table 2
Back-Cast Result Analysis

$000	Rev 0	Rev 1	Rev 2	Rev 1	Rev 0
	Original Actual 2010	Actual with estimated actual emissions costs versus accounting emissions allowance costs	Additional change to include additional start-up fuel	Backcast corrected to include $1.2 million in plant warming costs	**Original Backcast**
Energy Revenue	22,829	22,829	22,640	24,502	24,502
Fuel Cost	(19,787)	(19,787)	(17,338)	(18,787)	(18,787)
Emission Allowance Cost	(1,969)	(428)	(328)	(356)	(356)
Plant warming cost	included	included	(1,200)	(1,200)	(0)
Net Revenue ($000)	1,073	**2,614**	**3,774**	4,159	5,359
		delta	**1,160**		

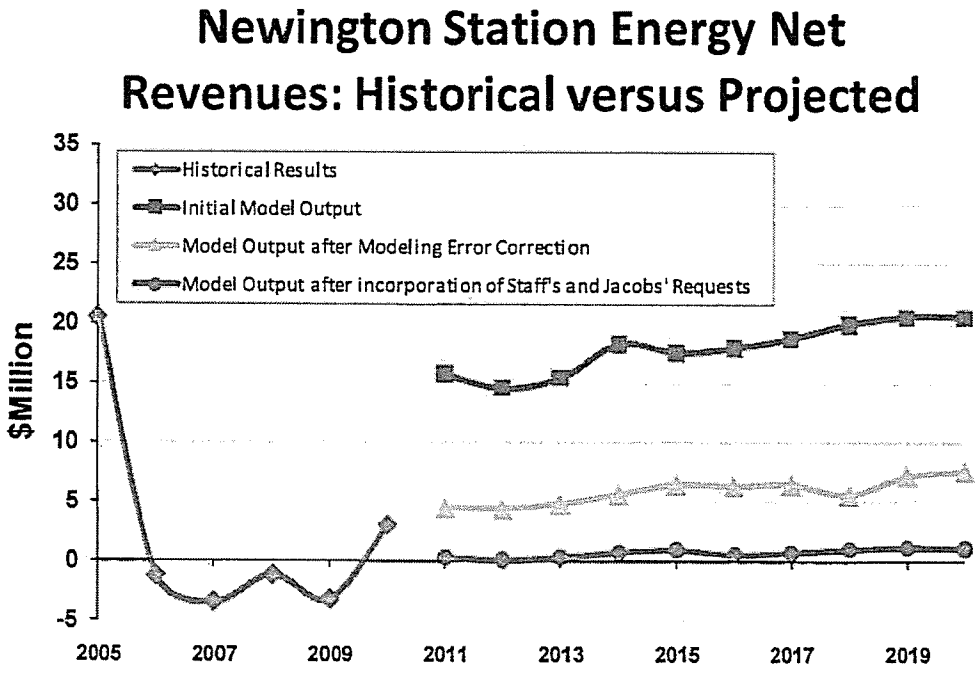
Review of Model After Final Run Incorporating Staff"s and Jacobs Desired Changes.

Following the analysis of the back-cast results, Staff and Jacobs requested LAI to rerun the model with the following changes.

1. Incorporate the additional start-up costs in the model.
2. Incorporate the plant warming costs in the model.
3. Incorporate the RFO/natural gas and 2FO/natural gas price ratios noted in Table 1 in the LAI model.
4. Incorporate in the model the basis differentials derived from the 2010 invoices submitted by the natural gas supplier to Newington Station.

The model was re-run and energy net revenues during the 2011 to 2010 period fell to the $0.15 Million to $1.2 million range. Jacobs Consultancy views these values as more realistic. Jacobs' opinion is that if the LAI model is run with the above 4 modifications it will develop an NPV forecast for the asset over the 10 year forecast period that is more realistic. Figure 2 summarizes the changes in net revues during each phase of the model "correction" process.

Figure 2



Overall Conclusions

- The LAI valuation model is a complex tool. If the model was set up to account for the potential delivery of unprofitable supply of operating reserves, if the correct data are entered into the model system and if there are no errors in the model system it should be able to deliver reasonable estimates of asset net present value.

- Since Jacobs Consultancy was not allowed to review and perform in-depth testing of the actual LAI model and its sub-units we cannot definitively comment on the integrity of the model structure. We cannot say that based on its structure it is or it is not likely to produce a realistic estimate of asset value, nor can we say that it is or it is not likely to be free of material flaws.

- On the basis of structural model errors discovered during the course of Jacobs' review, it has been shown that the model originally contained errors. Jacobs cannot definitively state as to whether the model has other errors.

- If we assume that the model is free of structural flaws, it is Jacobs's opinion that it can be used as a reasonable approximate predictor of Newington Station financial performance if the following changes are incorporated into the model: